Soil Environment Services Ltd

CONTAMINATED LAND RISK ASSESSMENT

DESK TOP STUDY

Priory Campus

Priory Campus
Lundwood

Soil Environment Services Ltd
August 2010

Our Ref: SES/PC/PR/1#1 **Date: 5th August 2010**

Client:

Priory Campus
Pontefract Road
Lundwood
Barnsley
South Yorkshire
S71 5PN

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Priory Campus
Lundwood

A report prepared on behalf of ***Soil Environment Services*** by:



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Date: 5th August 2010

INSTITUTE OF PROFESSIONAL SOIL SCIENTISTS

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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:

Priory Campus
Pontefract Road
Lundwood
Barnsley
South Yorkshire
S71 5PN

Grid Ref. 436994, 406948

The site is to be developed for educational purposes.

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

General guidance used:

BS 10175:2001 Investigation of potentially contaminated sites. British Standards Institution, London.

CLR 11: Model procedures for the management of land contamination (2004). Environment Agency.

Environment Agency guidance on requirements for land contamination reports. (2005). Environment Agency.

2. SITE CHARACTERISATION AND FORMER INVESTIGATIONS

Current setting and condition (Drawing CSM/1)

The site assessed for this investigation currently comprises a large area of land to the north east of Barnsley, South Yorkshire. The site consists of several different (primary and secondary) schools located on the north of the site with playing fields on the south. An area of grassland is located to the north with residential properties to the east, south and west (Photo 1).

Photo 1. (NB This aerial photo may be a number of months out of date).



Site history (see Historical maps – Appendix A)

Prior to 1851, the site was located on agricultural land with a small quarry located in the south east corner of the site. A small old sandstone quarry was situated 100 m to the south and a canal was situated on the western boundary.

Between 1851 and 1892, the small quarry located in the south east corner of the site ceased to be indicated and a railway line had been developed 50 m to the west.

Between 1906 and 1932, schools had been developed on the north of the site with residential properties located in the south east corner adjacent to the location of the former quarry. Residential properties had been developed to the south.

By 1938, the schools on the north had expanded in size and a laundry factory had been developed on the southern boundary of the site. Further residential development had occurred to the south and east.

The schools on the site had expanded further in size by 1948.

Between 1955 and 1962, three schools were located on the north of the site. A medical clinic and church had been developed to the east, the railway line to the west and the canal adjacent to the western boundary was indicated to be disused.

Tennis courts had been developed on the site prior to 1974 and land 20 m to the north was indicated to be a refuse or slag heap.

Between 1974 and 1984, a building had been developed in the north east corner, the laundry factory ceased to exist on the site and the refuse or slag heap ceased to be indicated. Residential properties had been developed to the north west and west.

Between 1993 and 2010, part of the schools had been removed and replaced with a development in the north west corner. The residential properties on the southern boundary had been removed and a building had been developed on the south eastern boundary (location of the former quarry).

Current soils, geology and hydrology

The north east corner of the site is located on Glacial deposits of Boulder Clay. The west and south east of the site is located on Upper Carboniferous deposits of Middle Coal Measures.

Flow to groundwater is likely to be restricted due to the clay soils.

Surface water flow could find a possible route via surface water drains and channels to the south east leading to the River Dearne 500 m to the south east of the site.

The site is located on a variably permeable minor aquifer zone (Secondary A bedrock aquifer) and is not in a groundwater source protection zone.

Former investigations

No former investigations have taken place.

Current environmental data search

Environmental data (Appendix B) indicates the following:

The site is on a variably permeable minor aquifer zone
The site is on a Secondary A bedrock aquifer zone
The site is not in a groundwater source protection zone
One active landfill site within 250 m
Two historical landfill sites within 250 m
No pollution inventory sites within 250 m
No waste treatment sites within 250 m
No pollution incidents within 250 m
Radon is not considered to be a risk
No fuel sites within 250 m

Coal Authority data (Appendix C) indicates the following:

The site is in the likely zone of influence from workings in 13 seams of coal, last worked in 1991.
The site is within 20 m of 1 mine entry
Several damage notices have been given for coal mining subsidence (residential properties on the south and to the south of the site)
No known mine gas emissions

3. CONCEPTUAL SITE MODEL

The conceptual site model detailed here is by a written and diagrammatical description (Drawing CSM/1, Table 1 Plausible pollutant linkage matrix) of the sources, pathways and receptors.

3.1 Sources

Possible sources generated on-site

Small quarry

The former small quarry located in the south east corner of the site may possibly have been backfilled with potential contaminants (metals, sulphides and sulphates, asbestos and hydrocarbons) and also putrescible material that could possibly generate methane gas during decomposition.

Former laundry factory

The former laundry factory on the south of the site may have generated potential contaminants (metals, phenols, PCB's, sulphides and sulphates, asbestos and hydrocarbons) associated with the associated workings at the laundry factory.

Possible sources generated off-site

Former canal

The former canal adjacent to the western boundary of the site may possibly have been backfilled with potential contaminants (metals, sulphides and sulphates, asbestos and hydrocarbons) and also putrescible material that could possibly generate methane gas during decomposition.

Former landfill site

The former landfill site located 20 m to the north may possibly have been backfilled with potential contaminants (metals, sulphides and sulphates, asbestos and hydrocarbons) and also putrescible material that could possibly generate methane gas during decomposition.

Former railway line

The former railway line located 50 m to the west of the site may have generated potential contaminants (metals, sulphides and sulphates, asbestos and hydrocarbons) associated with materials and goods transported on and along the former railway line.

Old sandstone quarry

The old sandstone quarry located 100 m to the south of the site may possibly have been backfilled with potential contaminants (metals, sulphides and sulphates, asbestos and hydrocarbons) and also putrescible material that could possibly generate methane gas during decomposition.

3.2 Receptors

Humans

- Personnel in the future proposed educational properties.
- Personnel using the future proposed playing fields/amenities.
- Personnel involved with any site development.

Controlled waters

- The River Dearne 500 m to the south east of the site.
- The site is on a variably permeable minor aquifer zone.
- The site is not in a groundwater source protection zone.

Ecology

- Animals and plants are considered to be possible receptors.

3.3 Pathways and plausible pollutant linkages (See Table 1)

Pathways to and from the site could exist via service channels.

Human health

The main pathways considered possible are:

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

Controlled waters

Flow to groundwater is likely to be restricted due to the clay soils.

Surface water flow could find a possible route via surface water drains and channels to the south east leading to the River Dearne 500 m to the south east of the site.

The site is located on a variably permeable minor aquifer zone (Secondary A bedrock aquifer) and is not in a groundwater source protection zone.

4. RISK ASSESSMENT

4.1 Human health

Risks from possible sources generated on-site

Small quarry

The former small quarry located in the south east corner of the site is not considered to pose a risk to human health. Given the length of time since the quarry ceased to exist and that a building has recently been developed on the site of the former quarry, the migration of potential contaminants is considered unlikely.

Former laundry factory

The former laundry factory on the south of the site is considered to pose a possible risk to human health. The risk is due to dermal contact and inhalation of vapours with the potential contaminants such as metals, phenols, PCB's, sulphides and sulphates, asbestos and hydrocarbons that may exist within the ground from the associated workings at the laundry factory.

Risks from possible sources generated off-site

Former canal

The former canal adjacent to the western boundary of the site is considered to pose a possible risk to human health. No information is known regarding the back filling or back fill type used at the canal and this may contain potential contaminants and may possibly generate methane gas during decomposition. The primary risks are considered to be inhalation of vapours.

Former landfill site

The former landfill site located 20 m to the north of the site is considered to pose a possible risk to human health. The landfill site accepted inert, industrial, commercial and liquids and sludge wastes. This may contain potential contaminants and may possibly generate methane gas during decomposition. The primary risks are considered to be inhalation of vapours.

Former railway line

The former railway line located 50 m to the west of the site is not considered to pose a risk to human health. Given the distance from the site, the length of time since the railway line existed and a canal between the site and the railway line, the migration of potential contaminants is not considered to exist.

Old sandstone quarry

The old sandstone quarry located 100 m to the south of the site is not considered to pose a risk to human health. Given the distance from the site, the length of time since the old sandstone quarry existed and the development of residential properties on the former quarry site, the migration of potential contaminants is not considered to exist.

4.2 Controlled waters

The site is considered to pose a possible risk to controlled waters due to significant sources of potential contaminants existing on the site.

4.3 Ecology

The site is considered to pose a possible risk to the ecology due to significant sources of potential contaminants existing on or within a significant distance of the site.

TABLE 1. Plausible pollutant linkage/pathway matrix Y = yes, N = no, Blank = not possible																		CSM	Ref	No.	1	Version	a
SOURCE	**Chemicals**		**RECEPTORS**																				
			On site								**Off site**												
	Type	Possible present 1 yes, 0 no	Current workers	Future workers	Dev,ment workers	Current residents	Future residents	Ground water	Surface water	Ecology	Current workers	Future workers	Dev,ment workers	Current residents	Future residents	Ground water	Surface water	Ecology						
ON SITE																							
Former quarry	Hydrocarbons	1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
	Metals	1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
	Asbestos	1	N	N	N	N	N	NA	NA	N	NA	NA	NA	NA	NA	NA	NA	NA					
	Methane Gas	1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
Former laundry factory	Hydrocarbons	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y					
	Metals	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y					
	Asbestos	1	Y	Y	Y	Y	Y	NA	NA	Y	NA	NA	NA	NA	NA	NA	NA	NA					
	Phenols	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y					
	PCB's	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y					
OFF SITE																							
Former canal	Hydrocarbons	1	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA	NA					
	Metals	1	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA	NA					
	Methane Gas	1	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA	NA					
Former landfill site	Hydrocarbons	1	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA	NA					
	Metals	1	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA	NA					
	Methane Gas	1	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA	NA					
Railway line	Hydrocarbons	1	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA					
	Metals	1	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA					
Old sandstone quarry	Hydrocarbons	1	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA					
	Metals	1	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA					
	Methane Gas	1	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA					
Notes	For sources and contaminants see Section 3.1 of the report.																						
	For receptors and plausible linkages see Sections 3.2 and 3.3 of the report.																						
	For risks from sources on-site and sources off-site see Section 4 of the report.																						

5. UNCERTAINTIES AND PHASE 2 PROPOSALS

Significant uncertainties are considered to exist on the site with respect to future risks and the future developments.

A site walk-over is recommended to examine the ground and the former buildings to determine if any possible contamination exists.

Following the walkover survey the need for a Phase 2 investigation will be considered.

DRAWING CSM/1

NOTES:

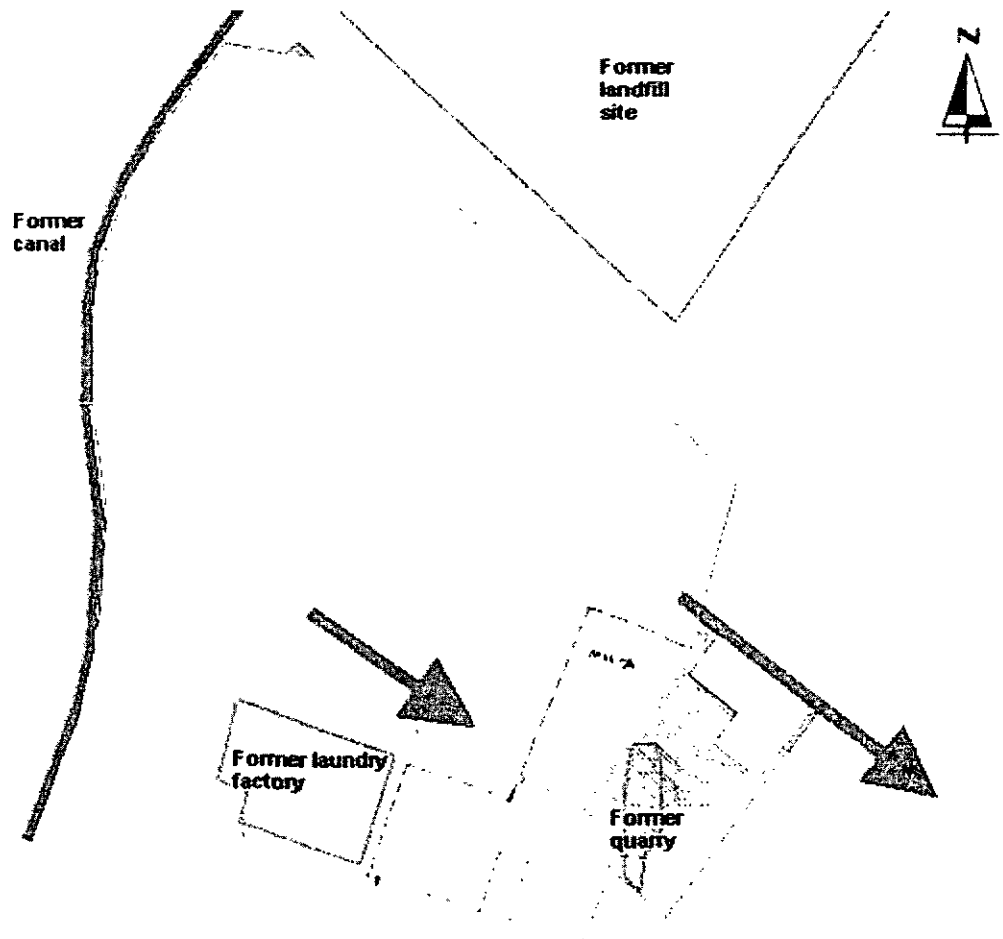
Site Outline

Direction of possible surface water flow

Soil Environment Services

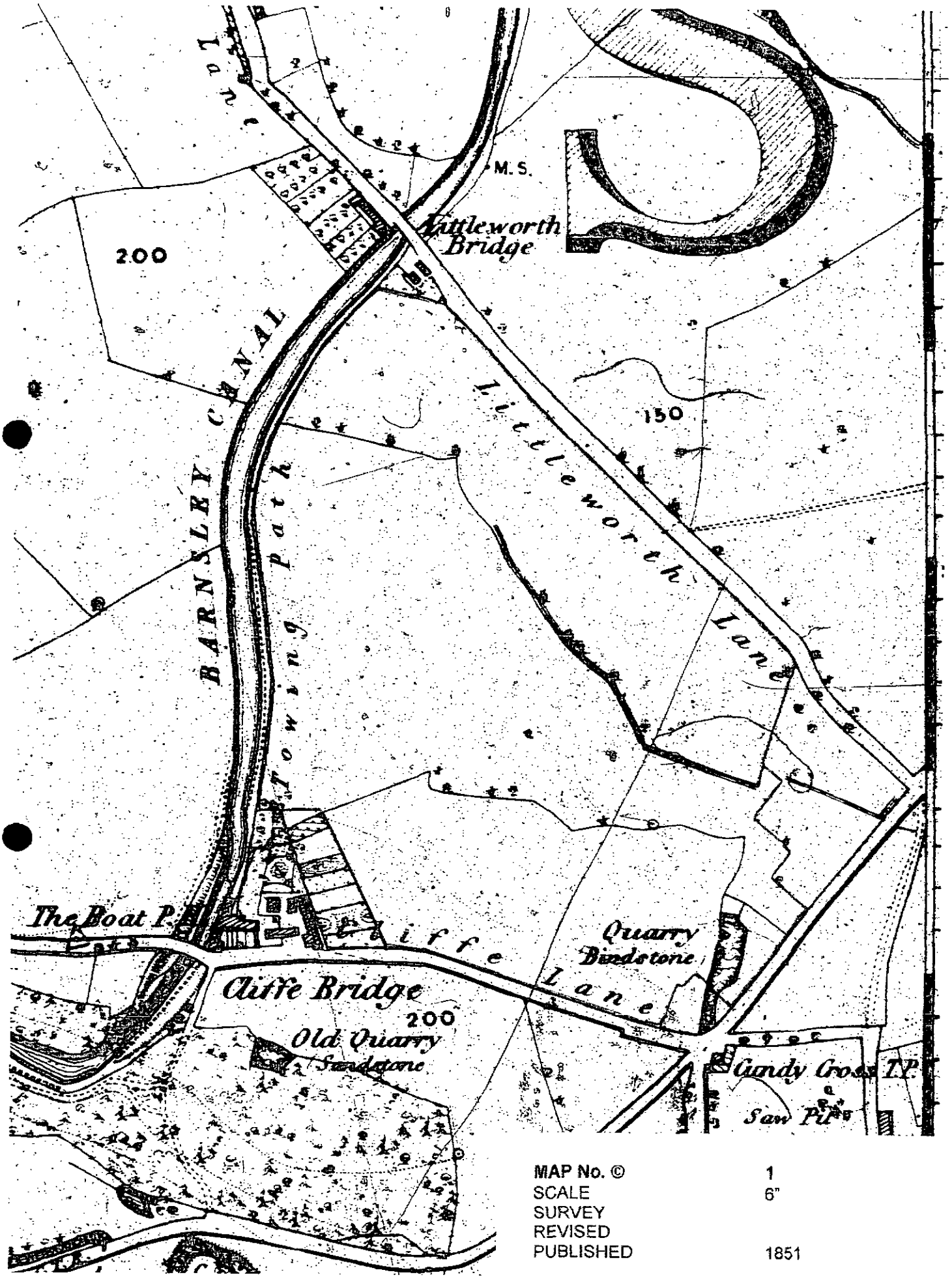
Contaminated Land Risk Assessment
Tel.: 0191 243 0686
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Drawing Title: Current site setting	Drawing No.: CSM/1
Client: Priory Campus	Project: Priory Campus, Lundwood
Scale: 1: 4275	Date: 5th August 2010

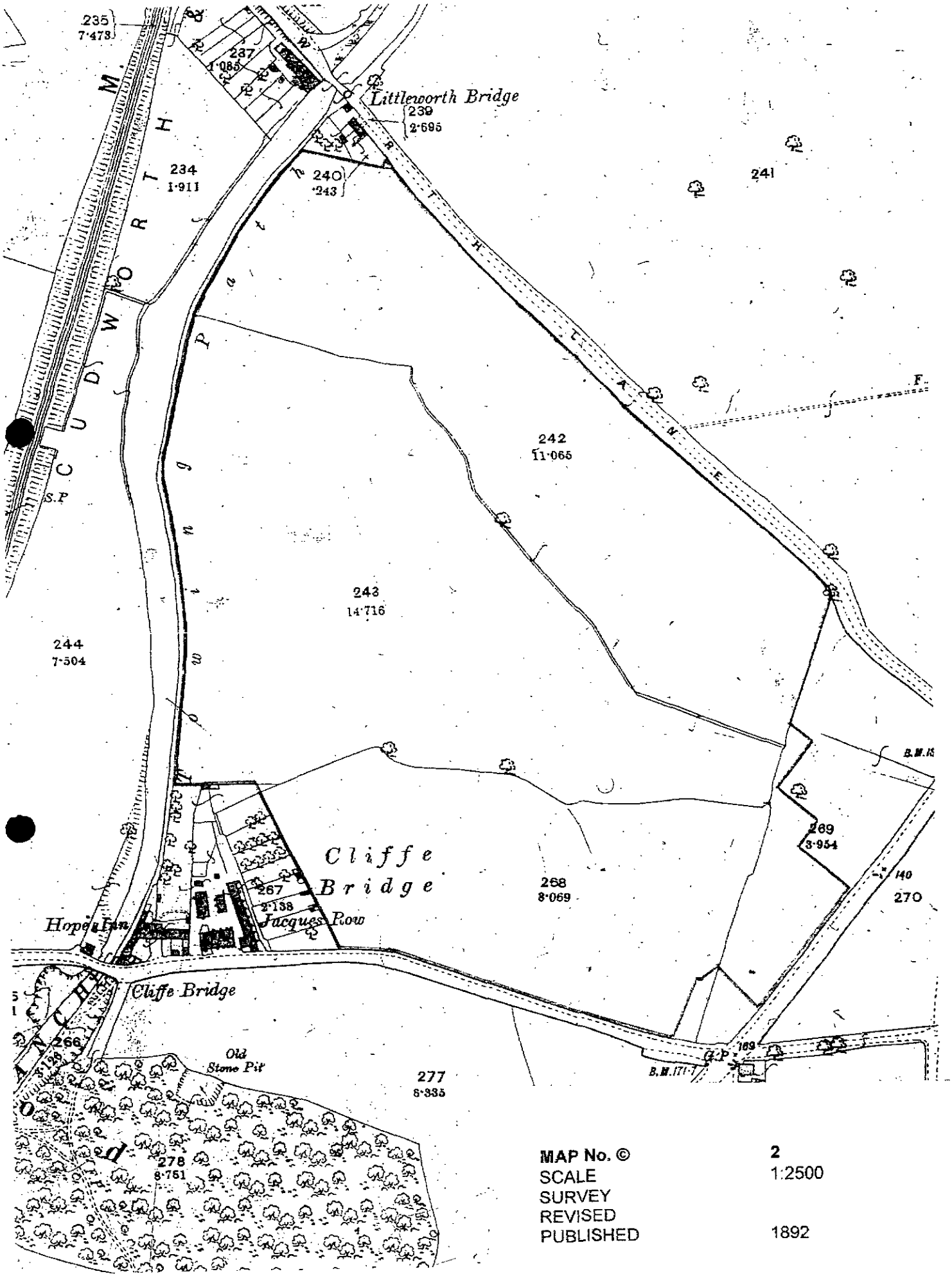


APPENDIX A

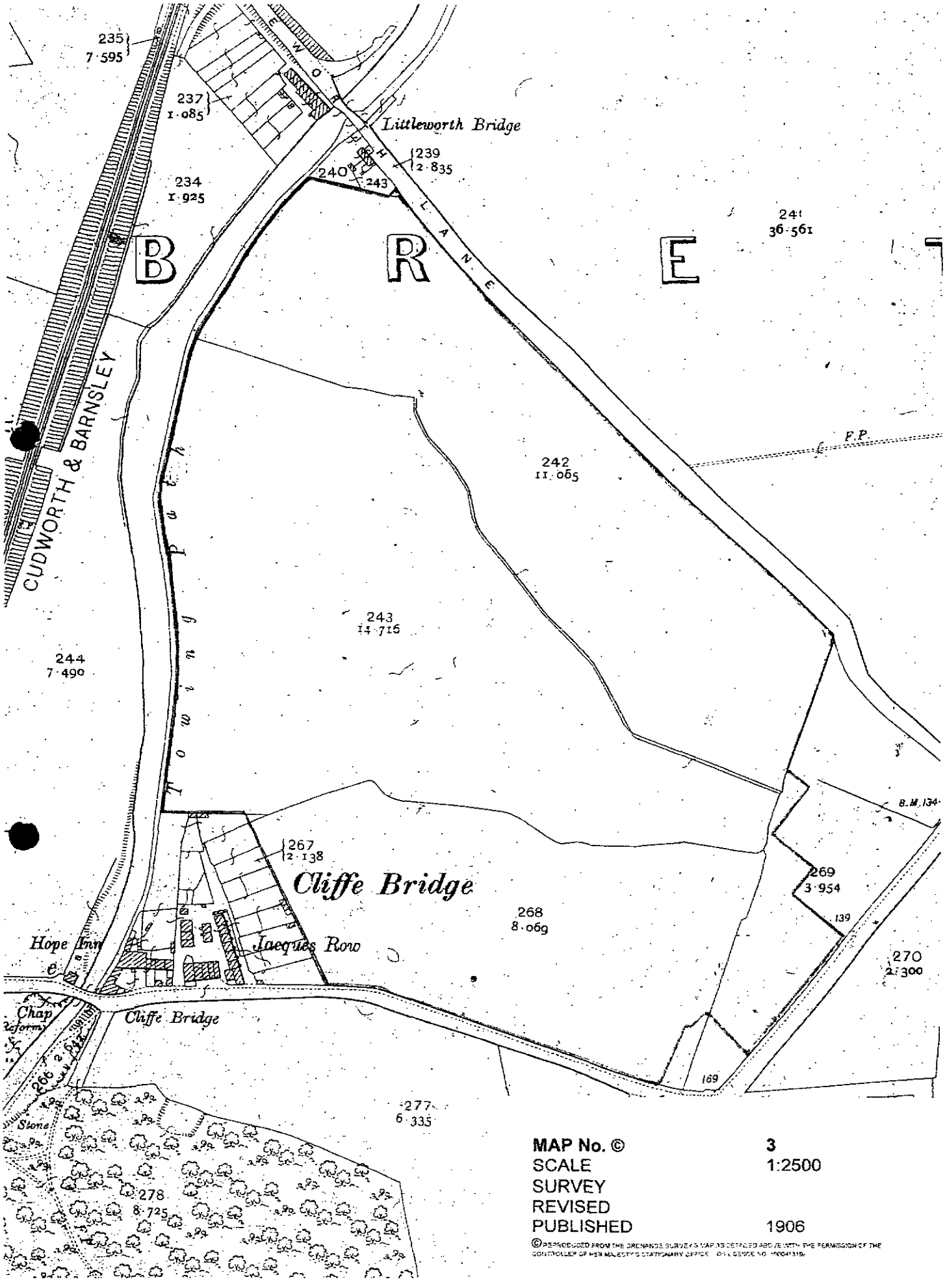
Historical maps



MAP No. ©	**1**
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SURVEY	
REVISED	
PUBLISHED	1851

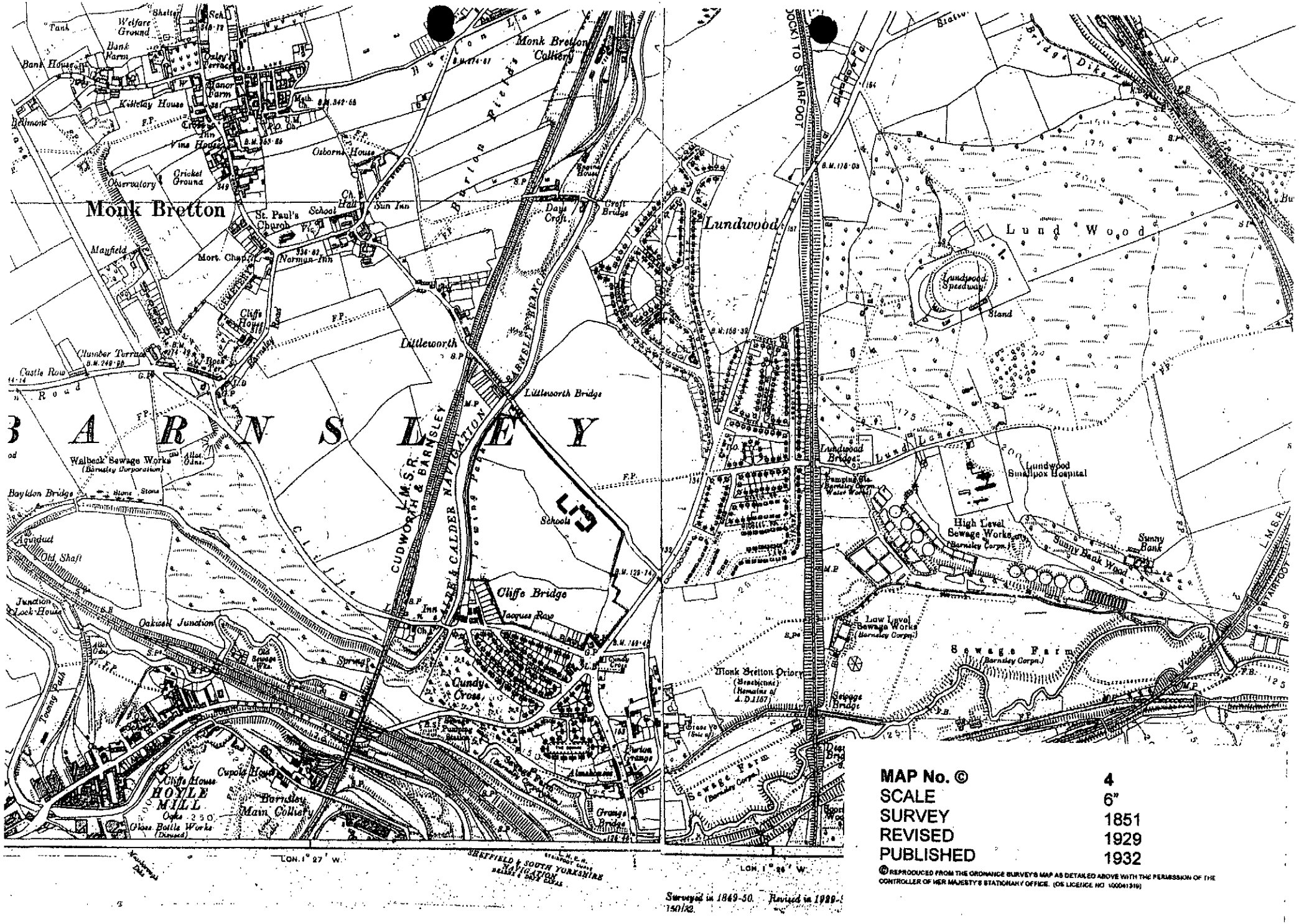


MAP No. ©	**2**
SCALE	1:2500
SURVEY	
REVISED	
PUBLISHED	1892



MAP No. ©	**3**
SCALE	1:2500
SURVEY	
REVISED	
PUBLISHED	1906

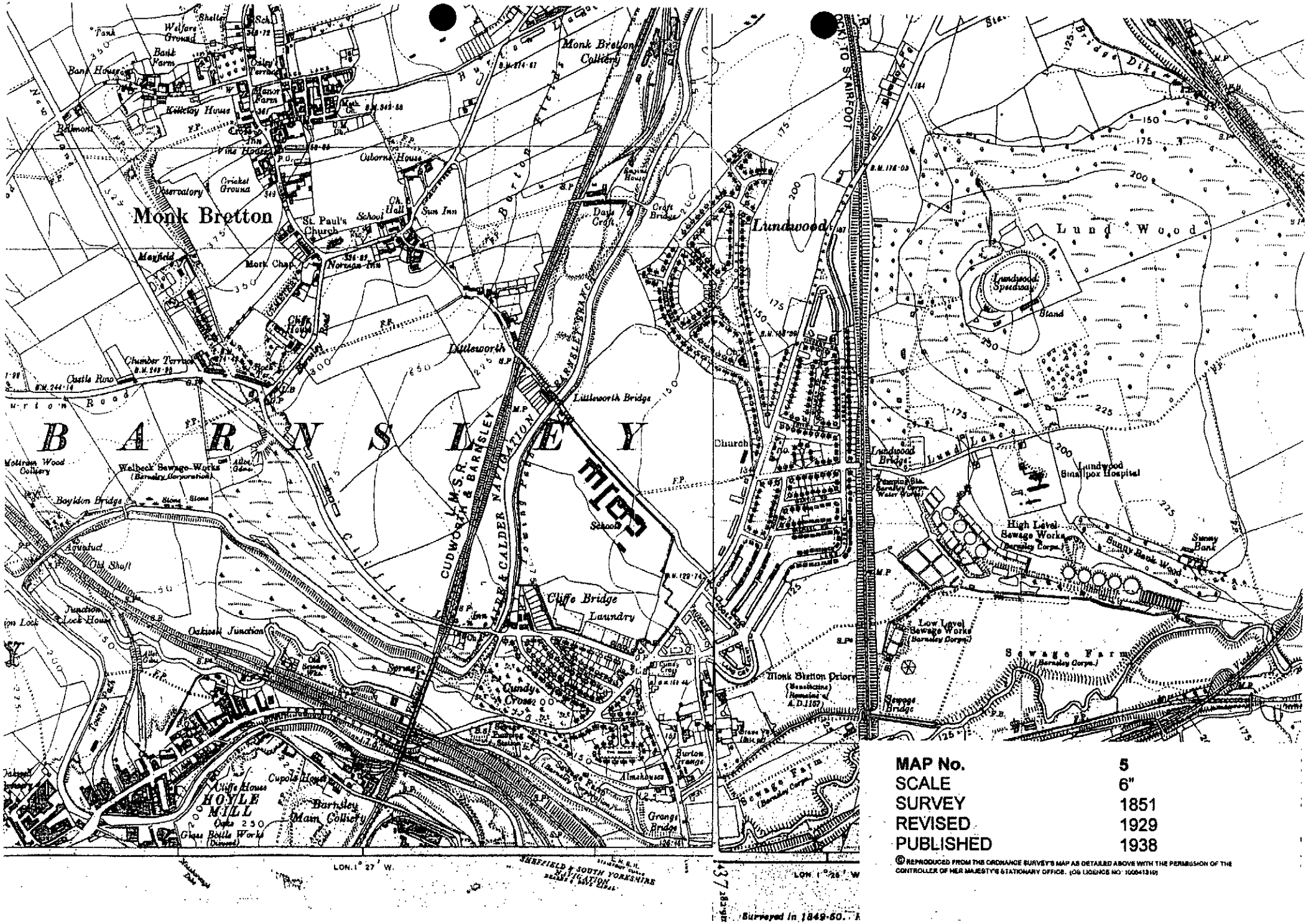
©REPRODUCED FROM THE ORDNANCE SURVEY'S MAP IS DETAILED ABOVE WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE. (P.L. SERVICE NO. 100041319)



MAP No. ©	**4**
SCALE	6"
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REVISED	1929
PUBLISHED	1932

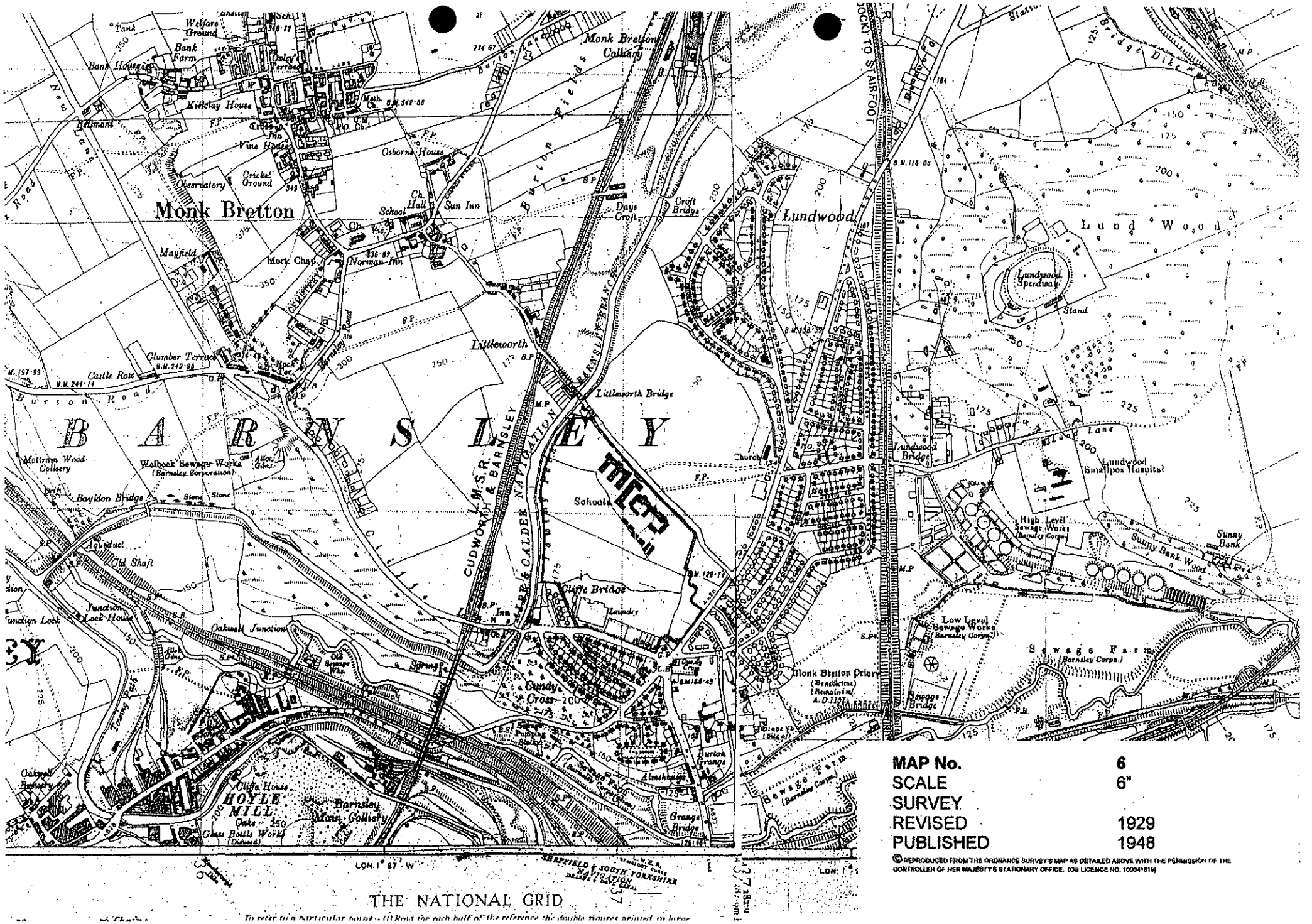
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Surveyed in 1849-50. Revised in 1929-
150/32.



MAP No.	**5**
SCALE	6"
SURVEY	1851
REVISED	1929
PUBLISHED	1938

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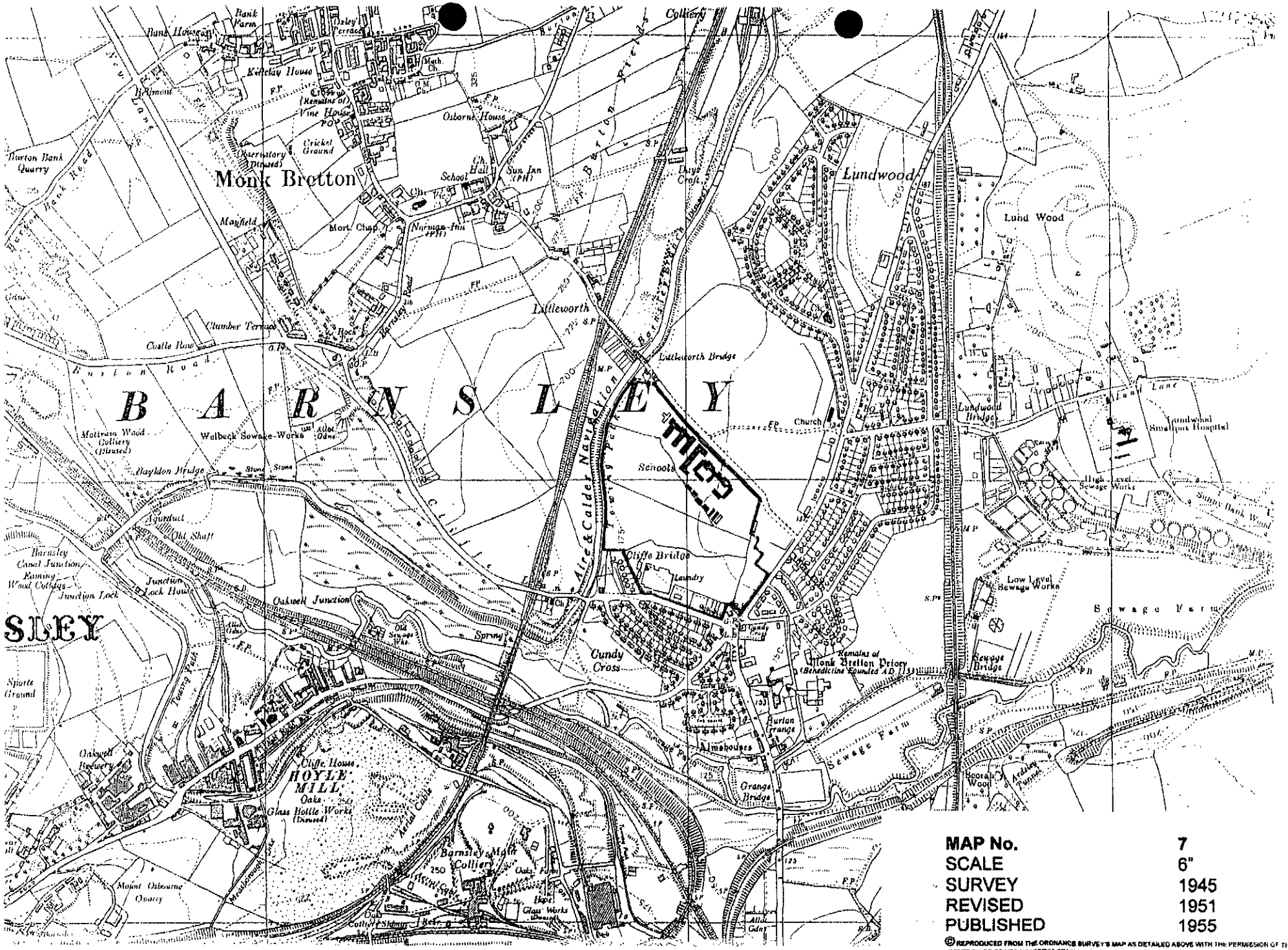


THE NATIONAL GRID

To refer to a particular point:- (1) Read the each half of the reference the double figures printed in large

MAP No.	**6**
SCALE	6"
SURVEY	
REVISED	1929
PUBLISHED	1948

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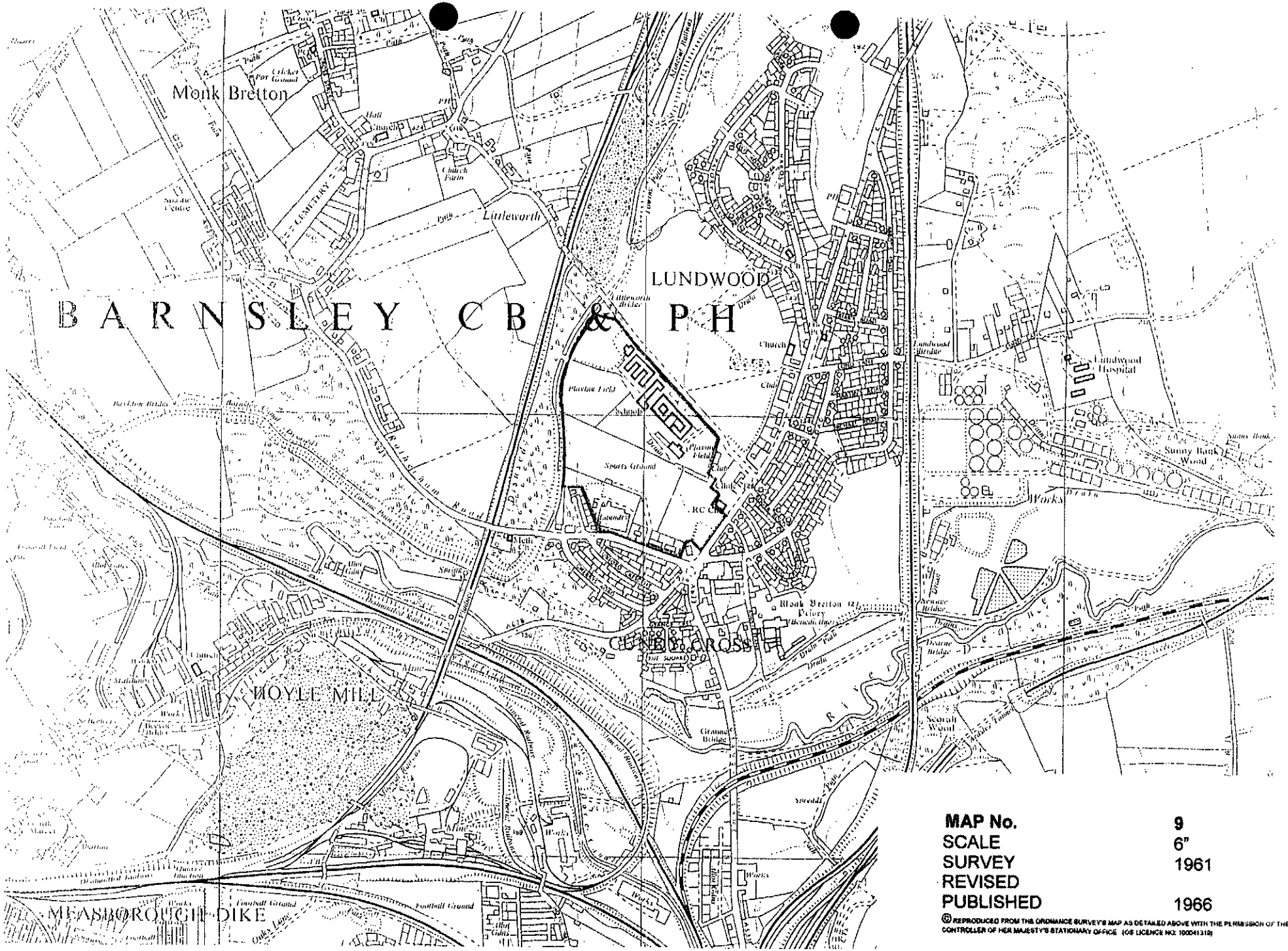
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REVISED	1951
PUBLISHED	1955

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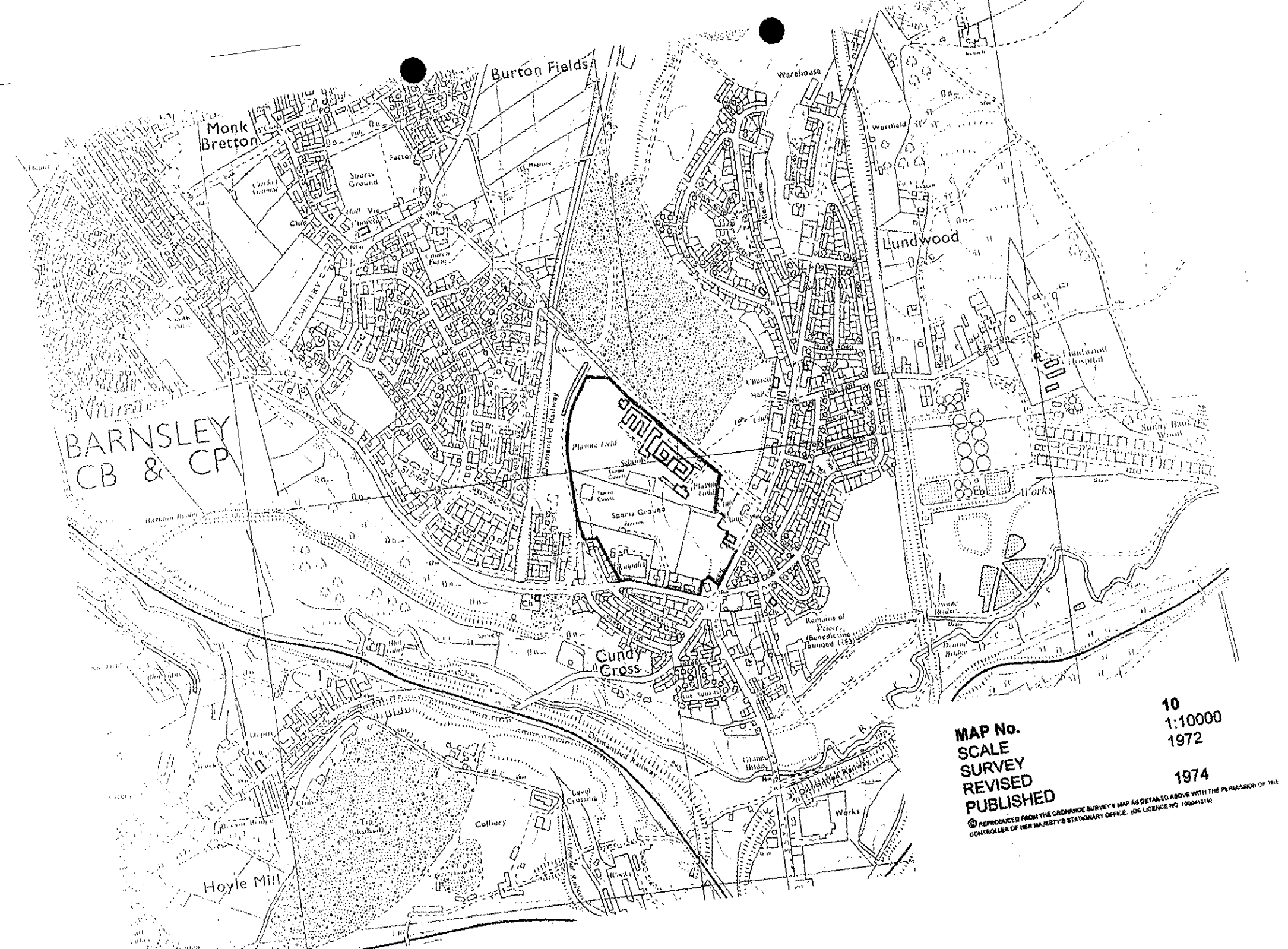
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SURVEY
REVISED
PUBLISHED 1962

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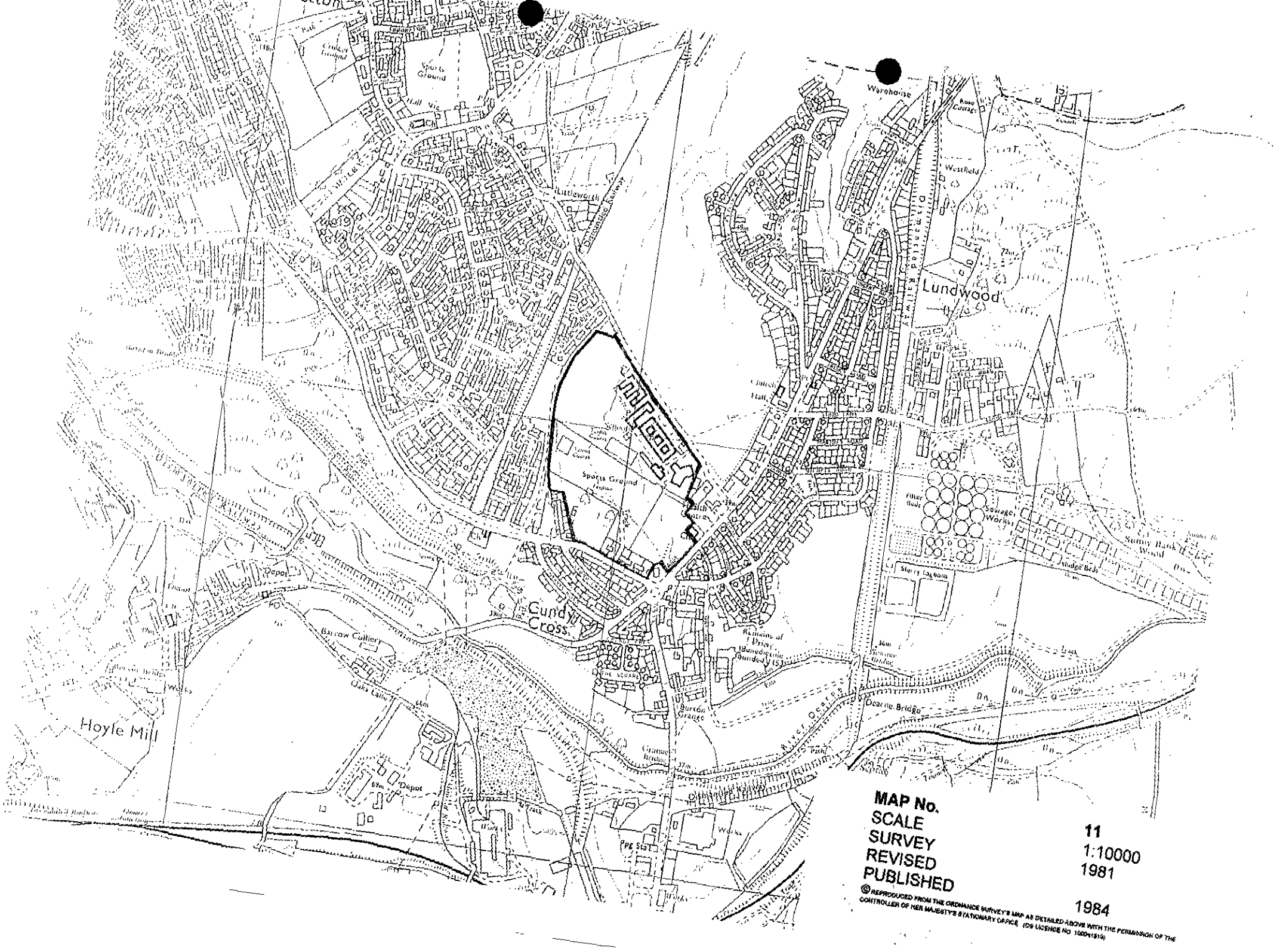
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SURVEY	1961
REVISED	
PUBLISHED	1966

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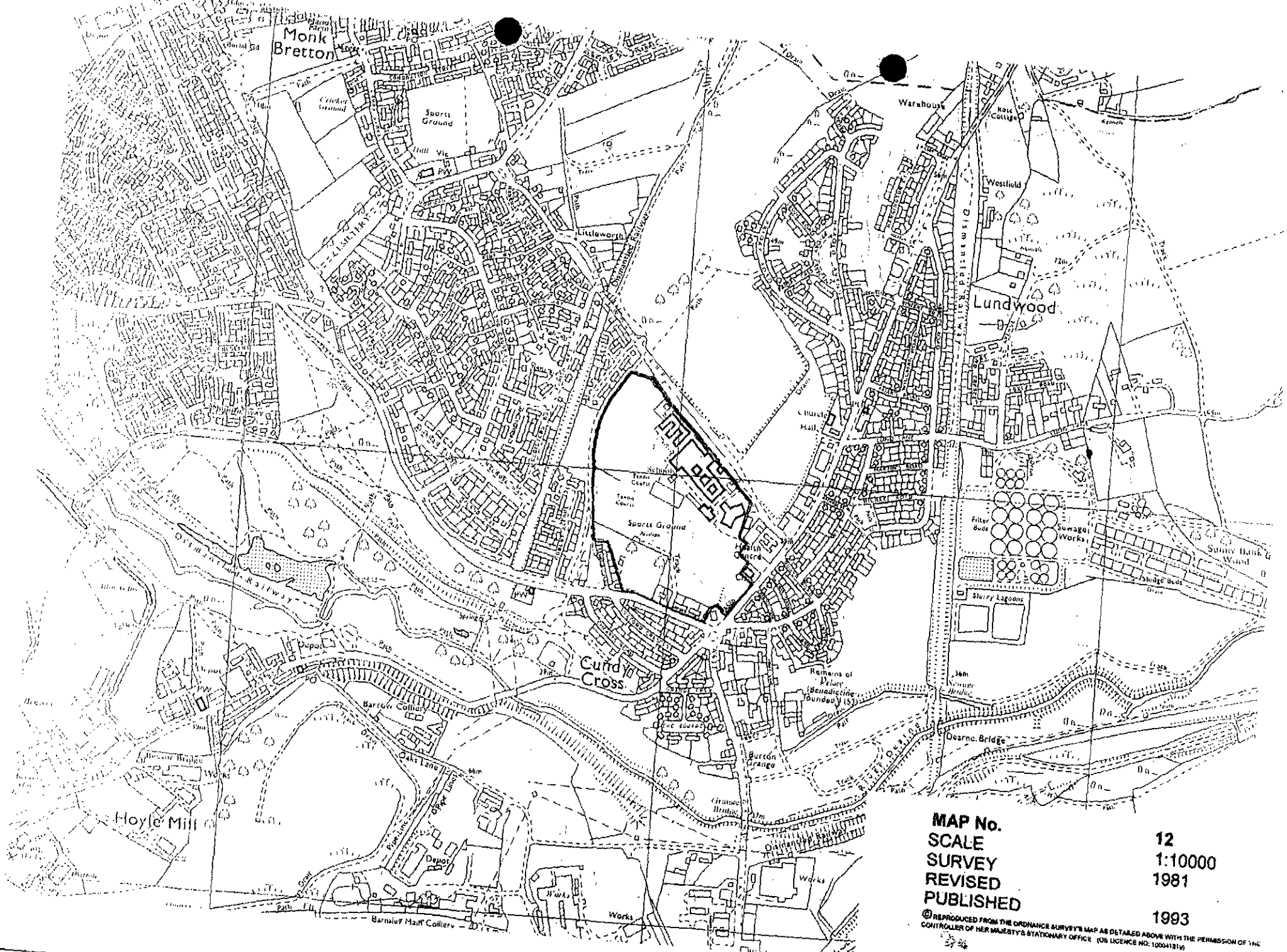
MAP No. 10
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SURVEY 1972
REVISED
PUBLISHED 1974

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MAP No. 11
SCALE 1:10000
SURVEY 1981
REVISED
PUBLISHED 1984

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MAP No. 12
SCALE 1:10000
SURVEY 1981
REVISED
PUBLISHED 1993

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