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THE RE-DISCOVERY OF *MYXAS GLUTINOSA* (Müller) IN BRITAIN

A report to English Nature

Pond Action
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THE RE-DISCOVERY OF *MYXAS GLUTINOSA* (Müller) IN BRITAIN

CONTENTS

1. BACKGROUND

In November 1988 Pond Action discovered the rare and endangered snail *Myxas glutinosa* (the Glutinous Snail) at Kennington Pit, a pond on the outskirts of Oxford (Walker *et. al.*, 1991). *Myxas glutinosa* is protected under the Wildlife and Countryside Act (1981) and until the discovery at Kennington, the species was thought to be extinct in Britain, not having been recorded since 1957.

The following report describes:

(i) the records of *Myxas glutinosa* at Kennington Pit.
(ii) the features of the Kennington Pit site.
(iii) perceived threats to Kennington Pit.
(iv) further work that needs to be undertaken to help protect the *Myxas* population at Kennington.

2. THE STATUS OF *MYXAS GLUTINOSA*

Myxas glutinosa is a north European species, occurring between the Alps and the Arctic circle. Within this range it is very local and is believed to be declining (Bratton, 1991). The species is classified as vulnerable in Europe (Collins and Wells, 1987).

In Britain *Myxas glutinosa* is very rare: it is classed as RDB1 (endangered) and is protected by inclusion in Schedule 5 of the Wildlife and Countryside Act 1981.

At the beginning of the 20th century, *Myxas* was recorded from approximately 35 sites in Britain. Since that time, the species has declined, and there have only been eight British records in the past 60 years.

Until recently the last known record for *Myxas* in Britain was from Lake Windermere in 1957 and the last lowland record was for the River Yare (near Norwich) in 1940 (Bratton, 1991).

There are a small number of old records for *Myxas* in Oxfordshire, the most recent being from 1916. Most of the records do not give precise locations, though an 1857 record, attributable to Whiteaves, is from the Hinksey Stream, at a site 1.5 km north of Kennington Pit (M.P.Kerney, pers. comm.).

In addition to the Kennington records, a single snail shell taken from the Basingstoke canal in 1969 has recently been confirmed as *Myxas glutinosa* (Walker *et. al.*, 1991). Although the specimen was dead when collected (the shell was found without body contents) it shows little evidence of wear and was probably only recently dead when found. The site has not been revisited to determine whether *Myxas* is still present.

3. HABITAT PREFERENCES OF *MYXAS GLUTINOSA*

There has been very little work done on the ecology of *Myxas*, and its habitat preferences are poorly known. However, it is generally considered that the species prefers hard surfaces and substrates. British records of *Myxas* occupying areas of 'stones set in firm mud' in Lake Windermere and lock gates in Ireland tend to support this view (Bratton, 1991).

The species may also favour clear hard water. However, these preferences are not absolute, since two of the more recent British records (Llyn Tegid, 1952-54 and Lake Windermere, 1957) are soft-water sites.

Myxas is believed to be intolerant of poor water quality, and its decline in Britain over the past century has usually been assumed to be due to the general deterioration in surface water quality (particularly eutrophication) (Bratton, 1991). However, once again the picture is not completely clear. Zeissler (1987), describing the molluscs of an (east) German nature reserve, noted *Myxas* surviving in conditions of intensive pisciculture and eutrophication after prosobranch molluscs and unionids had disappeared.

It has also been noted that *Myxas* is very vulnerable to physical disturbance and does not survive for long in artificial conditions (M.P. Kerney, pers. comm.).

It should also be pointed out that the recording of *Myxas* at any particular site has sometimes been erratic, with the species being apparently 'absent' for several years before being re-recorded (M.P. Kerney, pers. comm.).

4. THE NEW RECORDS FOR *MYXAS GLUTINOSA* AT KENNINGTON PIT

In November 1988, 2 specimens of *Myxas* were taken from Kennington Pit near Oxford (SP 51870339) during the course of sampling invertebrates for the Oxfordshire Pond Survey. Both specimens were dead when found (during laboratory sorting of the samples), but both had remains of soft body tissue attached to the shell providing certain evidence that a live *Myxas* population was present in the pond.

In 1990 and 1991 further *Myxas* specimens were found at Kennington (see Table 1). In 1990 the specimens were dead by the time they reached the laboratory for sorting and identification, though again all specimens had clearly been recently alive (supporting Kerney's belief that they are extremely vulnerable to some forms of physical disturbance). In 1991 a single, live, specimen was identified in the field and returned to the pond. During the brief handling time, the body of the animal remained covering the shell (a feature which is characteristic of the species).

The size of the population of *Myxas* at Kennington is not known and the distribution of the species within the pond is not certain. However the 1991 individual was netted from deep water in a bay of the pond quite close to the inlet (see below). Snorkelling in the pit in July 1991 failed to discover any individuals.

5. DESCRIPTION OF KENNINGTON PIT

5.1 History of Kennington Pit

Ordnance Survey maps of the Kennington area indicate that the original pit was dug between 1921 and 1936 and was originally about 3 times its present size. The northern end of the original excavation appears to have been filled in during the construction of the Oxford ring-road. The southern area also appears to have been reduced in size at this time, though this might reflect the results of re-mapping the site. Relevant sections of the 1921 and 1936 OS maps are given in Appendix 1.

5.2 Physical description of the site and its environs

Kennington Pit is situated within an approximately rectangular area (ca.1.3 ha.), between the Oxford-London railway, the Oxford ringroad, a slip-road to the village of Kennington and a small area of rough pasture. Parallel with the eastern edge of the site a broad ditch separates the pond and from the railway line.

The pond occupies about half of the Kennington site (ca. 0.47 ha.). The remaining area is predominantly wood and scrub covered slopes which rise steeply to the surrounding roads to the north and west.

The pond is relatively deep, with maximum water depth of 2.8m and an average depth of 1.7m. The pond banks are very steep in places (especially along the eastern edge), and the bottom is more or less flat. Most of the pond bed appears to be covered with silt (averaging 0.15m deep). However, a few areas around the edge are bare, exposing the sandy-gravel bed material (it is probable that these areas are kept bare by the activity of anglers). Several vegetated spits extend into the pond. In winter these are usually submerged, but in summer they are exposed above water level and divide the pond into several distinct areas.

5.3 Hydrology of the site

Kennington Pit receives water from at least four sources:

(i) Groundwater. The original pit was dug into the Thames Valley gravels which, in the Oxford area, support a shallow aquifer. The pit is therefore likely to be at least partly fed by groundwater.

(ii) Surfacewater connection. A broad ditch runs parallel with the eastern edge of the pond. This ditch usually contains rather poor quality water, with a mat of blanket weed on the surface for much of the summer and autumn. Local information suggests that the water quality is, occasionally, very poor. In winter there is usually a flood connection between the ditch and pond: this flooding is sometimes extensive, submerging the whole of the eastern bank. During the rest of the year, water runs from the ditch into Kennington Pit via a 'low point' midway along the east bank. The size of this inflow varies from an

average of approximately 20cm wide x 5cm deep down to a small trickle in high summer. It is also possible that there is subsurface hydraulic continuity between the ditch and pond through the gravels.

(iii) Local surface/near surface runoff. Surface water probably drains from the wooded banks around the north and west of the pond. Though this catchment area is only about 0.8ha., it is probably at least as important as direct precipitation. Water may also drain in from the hard surface areas of the roads beyond.

(iv) Direct precipitation.

The relative importance of these different water sources to the hydrology and water chemistry of Kennington Pit is not clear, but we would expect groundwater to be the most significant component.

5.4 The relationship between Kennington Pit and the Hinksey Stream

Maps of the Kennington area show that the ditch east of Kennington Pit is, essentially, a slow-flowing branch of the Hinksey Stream. Thus the Pit has an indirect connection to a stream from which *Myxas* has previously been recorded (see Section 2). It is not obvious from earlier maps whether or not this ditch has been present since Kennington Pit was first excavated, though this would seem likely. It is of course, quite possible that the species is still present in the main channel of the Hinksey Stream, though surveys by Pond Action of the Hinksey Stream around the site of the 1857 record failed to find any specimens (Pond Action, 1989). It is of interest to note that some of the old records for *Myxas,* whilst not being specific in terms of location, do in fact refer to 'ditches near Oxford' (M.P. Kerney, pers. comm.).

5.5 Wetland plants recorded from the site

Kennington Pit supports a rich wetland and aquatic macrophyte community: a total of 44 species have been recorded to date (see Appendix 2). The pond was found to be one of the three richest sites for wetland macrophytes surveyed by Pond Action during the course of the Oxfordshire Pond Survey (during which 144 sites were surveyed).

The list of macrophytes includes the rare *Oenanthe fluviatilis* (river water-dropwort) and the increasingly uncommon *Potamogeton praelongus* (long-stalked pondweed). *P.praelongus* is thought to have declined very rapidly in Britain in past decades. As with *Myxas* the cause of the decline has been principally attributed to enrichment and eutrophication (T.G.C. Rich, pers. comm.).

A wetland plant species list for the pond is given in Appendix 2.

TABLE 1. RECORDS OF *MYXAS GLUTINOSA* DURING SURVEYS OF KENNINGTON PIT: 1988 - 1991

Date	Number of specimens	Maturity of specimens
24 November 1988	2	One mature One immature
15 July 1989	0	
20 August 1990	5	One mature Four immature
29 March 1991	1	Mature

N.B. all records are of specimens that were live when collected.

5.6 Aquatic macroinvertebrates and amphibians recorded from the site

Kennington Pit supports a diverse macroinvertebrate fauna, particularly rich in aquatic gastropods (20 species recorded). In addition to *Myxas*, the pond supports several local invertebrate species. In preliminary analyses of National Pond Survey data (Pond Action, 1991), Kennington's invertebrate community appears to most closely resemble that of ponds in Wicken Fen. A full list of species recorded from Kennington is given in Appendix 3.

The site also supports a large breeding population of toads, although exact numbers are not known.

5.7 Recent changes in the water quality of the site

There has been no systematic, detailed, recording of water chemistry at the site, but observations of the vegetation over the past 4 years suggest that the water quality in the pond may have deteriorated during this time. This has been particularly evident during the very dry years of 1990 and 1991 when the usually clear water of the pond has been more turbid, and blooms of filamentous algae and *Lemna trisulca* have become very pronounced.

Possibly related to this, stands of *Potamogeton praelongus* were very restricted in 1990 (though they were rather better in 1991) and a survey for unionid mussels, (which were plentiful in 1988 and 1989), failed to locate any in 1991.

In addition lower summer water levels in the last two years have allowed rapid encroachment of the marginal vegetation along some edges. This **may** in turn be resulting in less suitable bottom substrate areas for *Myxas* and greater deposition of organic material into the pond.

5.8 Ownership, current use and future management of the site

Kennington Pit is owned by the Vale of White Horse District Council. The site is occasionally used by a local fishing club which may have stocked the pond at low intensity in the past.

In 1991 the Council accepted plans, set out by Pond Action, Oxford Urban Wildlife Group and BBONT, to turn the site into a Local Nature Reserve. Negotiations for the establishment of the reserve are in progress, being undertaken mainly by BBONT. A management plan for Kennington Pit once it becomes a nature reserve will be prepared jointly by this group. It is intended that the site will be administered by BBONT, with management undertaken by the OUWG supervised by Pond Action.

The original proposal to the Council was set out in the document 'The Future Of Kennington Pond' which is reproduced as Appendix 4 of this report.

6. POTENTIAL THREATS TO KENNINGTON PIT AS A HABITAT FOR *MYXAS GLUTINOSA*

There is so little information about the ecology of *Myxas* that any discussion of the potential threats to the species at Kennington is largely speculative. Bearing this in mind, the most likely problems would currently seem to be:

(i) deterioration of water quality, particularly through eutrophication.
(ii) lack of suitable hard substrates (if *Myxas* does, indeed, have a preference for these).
(iii) physical disturbance, since the species does seem very vulnerable to the effects of being removed from its habitat for any length of time.

6.1 Deterioration of water quality

Deterioration of water quality, particularly through eutrophication, may be the most serious threat to the long term survival of *Myxas* at Kennington. The presence of *Potamogeton praelongus* at the site (a species also thought to be intolerant of enrichment) gives some suggestion that the site has previously enjoyed relatively good water quality, enabling both species to survive here despite national population declines.

Section 5.3 described the likely sources of water for the site. Polluting nutrients have the potential to enter the pond through any of these sources (though the input from direct precipitation is likely to be slight). In addition there may be long term changes in the pond's water regime and chemistry caused by gradual siltation (see below).

The most obvious source of nutrient pollutants is through the ditch inflow and its winter flood connection to the pond. This ditch appears to have poor water quality and it may, in addition, carry in sediments.

The surface/near surface drainage to the pond is largely buffered by a 30-80m wide zone of scrub and woodland around 3 sides of the pond. Beyond this are urban areas dominated by roads. There seems to be no direct drainage into the pond from these urban areas, though it is difficult to believe that the isolation from roads is perfect.

Because the site has a gravel substratum, groundwater is always likely to have been an important water source for the pond. We suspect that a rapid throughflow of relatively good quality groundwater in the past may be the reason that the site still supports enrichment-intolerant species. However, the present or past quality of groundwater is not known; neither is its origin or direction of flow.

If the quality of groundwater is still relatively good, then siltation of the pond may be an increasing problem. Deposition of silt will progressively reduce the flow of groundwater through the pond. As it becomes isolated from groundwater then the quality of the pond water will increasingly be determined by the quality of both surface inflows and chemical exchange with its own sediments. Unless the quality

of the groundwater proves to be poor, the effects of siltation are likely to result in greater eutrophication of the site.

6.2 Lack of suitable hard substrates

If *Myxas* requires hard substrates then the gradual silting-up of the pond may also be directly relevant to the species in terms of habitat availability. Most of the pond bed is currently covered in silt (approximately 0.15m). There are still likely to be some areas of firm substrate in areas of steep banks and shallow patches cleared by fishermen. Whether any areas of firm surface remain in the deeper water is difficult to ascertain.

6.3 Physical disturbance

The Kennington site is to be made into a local nature reserve, which will give some protection to its existence in the long term. It is likely that some of the suggestions with regard to the use of the site as an educational facility (Appendix 4) may need to be revised in view of the potential sensitivity of *Myxas* to physical disturbance.

7. FUTURE SURVEY AND RESEARCH NECESSARY TO PRODUCE A MANAGEMENT PLAN FOR KENNINGTON PIT

There are at least three areas of research which need to be undertaken at Kennington.

(i) biological surveys to discover the present habitat of *Myxas* within the site and determine the size of its population (and then to monitor the population).

(ii) geochemical surveys to understand more about the sources and quality of water entering the site.

(iii) surveys of surrounding water courses to determine whether other sites in the close vicinity of Kennington support *Myxas*.

7.1 Assessment of the current population and habitat of *Myxas glutinosa* at Kennington Pit

There is a clear need for greater understanding of the population size, distribution and habitat preferences of *Myxas* within the pond. Only one suitable area of the pond has so far been identified. Once more information is available, it may be possible to give better protection to this habitat, or to extend it into different areas of the pond. It may also allow consideration of whether other sites in the Oxford area might be suitable for translocation.

The main problem in undertaking surveys for the species is that it appears to prefer deep water (ca. 2m in this site). Collecting at this depth, even with a grab rather than a net, is quite likely to be damaging to the species and might also destroy the precise habitat itself.

A potentially less damaging solution would be to undertake underwater surveys. The one attempt at snorkelling to date failed to locate the species. Use of sub-aqua equipment might be more successful and has a greater potential to yield precise information about habitat, numbers of specimens and area covered by the species.

7.2 Site water quality

If, as suspected, maintaining water quality is critical to the long term survival of *Myxas* at Kennington, then there is a clear need both to (i) monitor water quality at the site and (ii) understand the quality and quantity of water entering the pond from different sources. In particular there is a need to understand the quality of the groundwater and that of the ditch inflow. If the ditch water has a high concentration of pollutants there **may** be a case for reducing or preventing its inflow. If the quality of groundwater is high or groundwater flow is thought likely to be important in sustaining the species, then there may be a case for careful and localised silt removal from some areas of the site.

7.3 The surrounding water bodies

As mentioned previously, *Myxas* may still be present in surrounding ditches or the Hinksey stream. A selective survey of ditches and streams in the area may yield new sites for the species. Bankside surveys by Pond Action in summer 1989 of the Hinksey Stream at the site where it was last definitely recorded in 1857 did not reveal the species (Pond Action, 1989). However the erratic nature of its recording in the past and the unfavourable season does not preclude the possibility that it still exists at this old site. In its favour, the main Hinksey stream still supports a number of pollution-intolerant species such as *Oenanthe fluviatilis*, the sponge *Ephydatia fluviatilis* and the Nationally Notable sponge-associated caddis *Ceraclea senilis.*

8. REFERENCES

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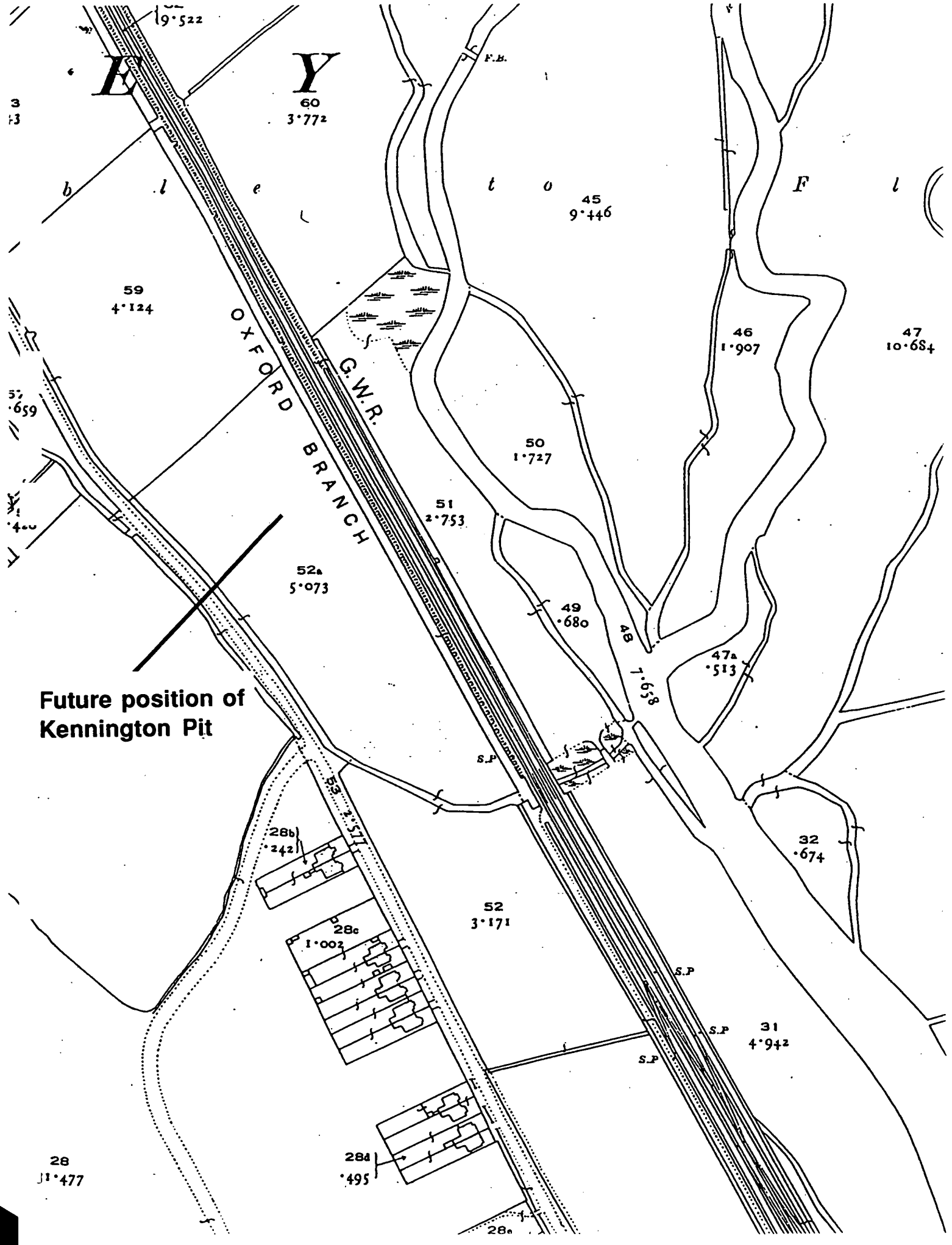
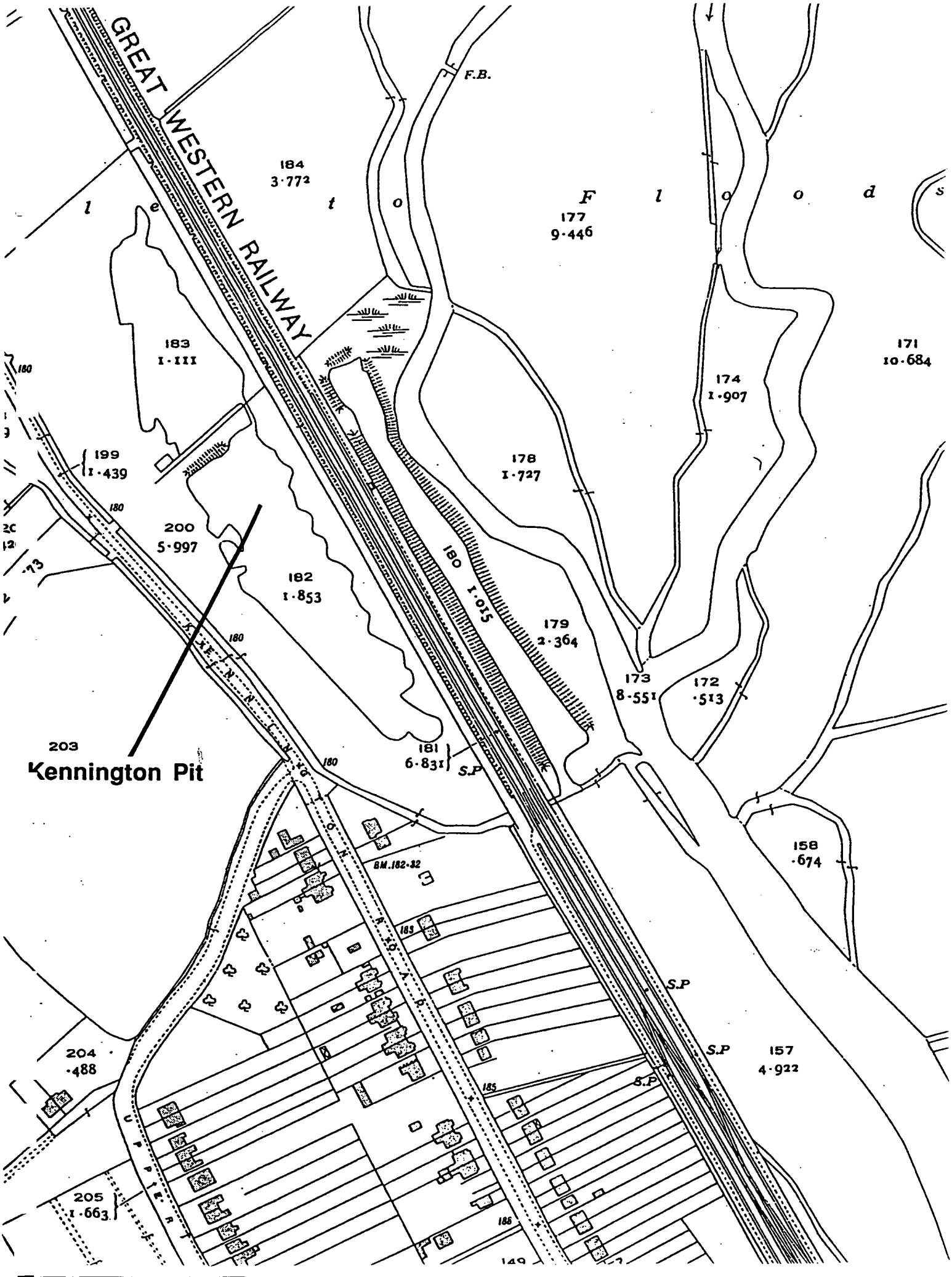
APPENDIX 1

(maps)

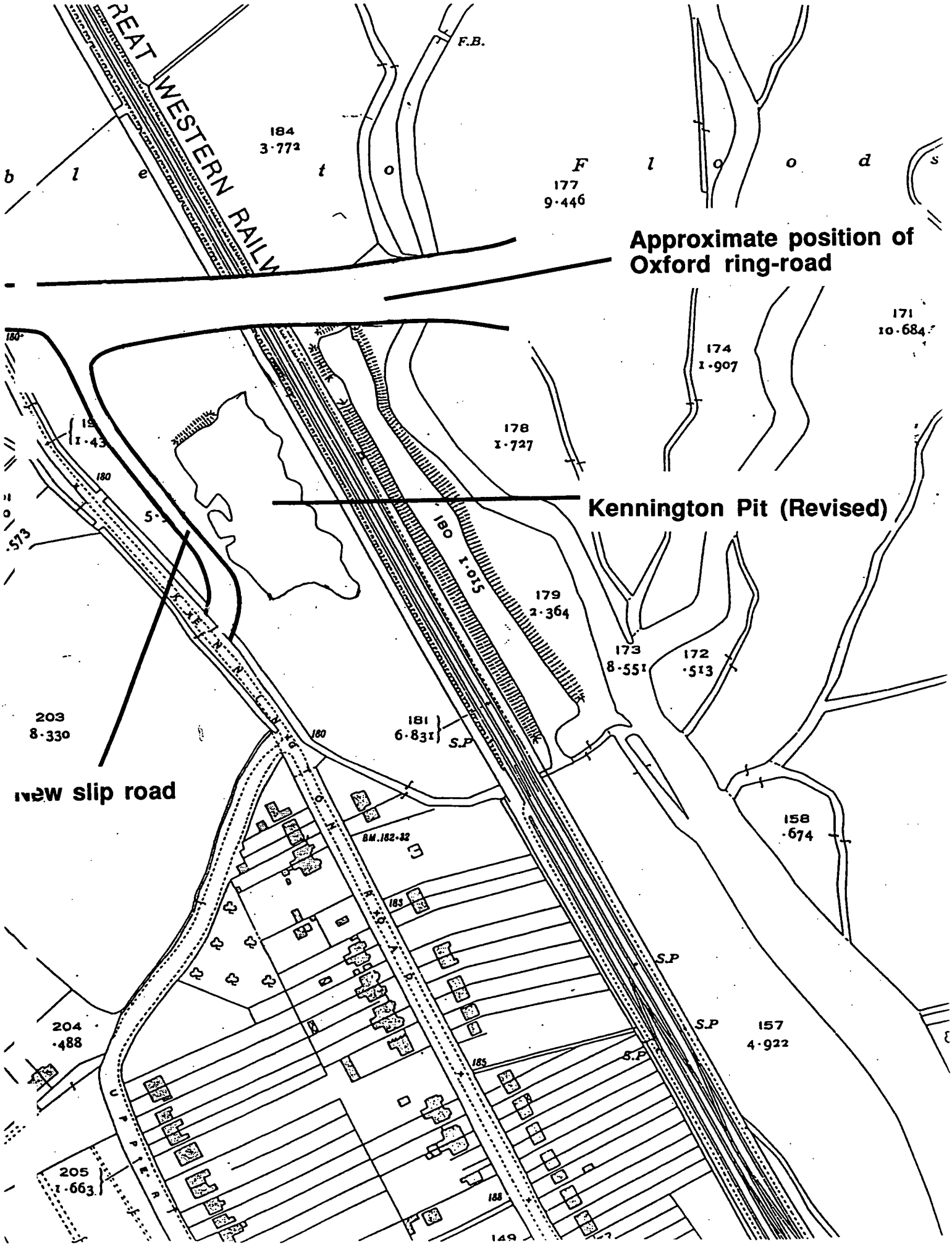
ORDNANCE SURVEY: BERKSHIRE, VI : 7
1:2,500 SCALE (1921)



ORDNANCE SURVEY: BERKSHIRE, VI : 7
1:2,500 SCALE (1936)



ORDNANCE SURVEY: BERKSHIRE, VI : 7
1:2,500 SCALE (1936)
(revised to show present status)



APPENDIX 2. WETLAND PLANTS RECORDED IN KENNINGTON POND BETWEEN: 1988-1991.

Status: * - Local, ** - Rare,

Alisma plantago-aquatica (Water-plantain)
Agrostis stolonifera (Creeping Bent)
Angelica sylvestris (Wild Angelica)
Berula erecta (Lesser Water-parsnip)
Butomus umbellatus (Flowering-rush)
Cardamine pratensis (Cuckoo-flower)
Carex riparia (Greater Pond-sedge)
Deschampsia caespitosa (Tufted Hair-grass)
Elodea nuttallii (Nuttall's Waterweed)
Epilobium hirsutum (Great Willowherb)
Equisetum fluviatile (Water Horsetail)
Eupatorium cannabinum (Hemp Agrimony)
Filipendula ulmaria (Meadowsweet)
Glyceria fluitans (Floating Sweet-grass)
Hippuris vulgaris (Marestail)*
Hypericum tetrapterum (Square-stemmed St John's-wort)
Impatiens capensis (Orange Balsam)
Iris pseudacorus (Yellow Flag)
Juncus articulatus (Jointed Rush)
Juncus effusus (Soft Rush)
Juncus inflexus (Hard Rush)
Lemna minor (Common Duckweed)
Lemna trisulca (Ivy-leaved Duckweed)
Lycopus europaeus (Gipsywort)
Lysimachia nummularia (Creeping-Jenny)*
Lythrum salicaria (Purple-loosetrife)
Mentha aquatica (Water Mint)
Myosotis scorpioides (Water Forget-me-not)
Myriophyllum spicatum (Spiked Water-milfoil)*
Nasturtium officinale (Water-cress)
Nymphaea alba (White Water-lily)
Oenanthe aquatica (Fine-leaved Water-dropwort)*
Oenanthe fluviatilis (River Water-dropwort)**
Phragmites australis (Common Reed)
Potamogeton praelongus (Long-stalked Pondweed)**
Rumex hydrolapathum (Water Dock)
Sagittaria sagittifolia (Arrowhead)*
Schoenoplectus lacustris (Common Club-rush)
Solanum dulcamara (Bittersweet)
Sparganium emersum (Unbranched Bur-reed)
Sparganium erectum (Branched Bur-reed)
Stachys palustris (Marsh Woundwort)
Symphytum officinale (Common Comfrey)
Typha latifolia (Bulrush)
Urtica dioica (Common Nettle)
Valeriana officinalis (Common Valerian)

APPENDIX 3. AQUATIC MACROINVERTEBRATES RECORDED IN KENNINGTON POND: COMPOSITE SPECIES LIST FOR SITE VISITS MADE BY POND ACTION IN NOVEMBER 1988, MARCH 1989 AND JULY 1990.

TRICLADIDA (Flatworms)

Dendrocoelum lacteum
Dugesia polychroa
Dugesia tigrina
Polycelis nigra
Polycelis tenuis

HIRUDINEA (Leeches)

Erpobdella octoculata
Erpobdella testacea
Glossiphonia complanata
Glossiphonia heteroclita
Haemopis sanguisuga (Horse Leech).
Helobdella stagnalis
Hemiclepsis marginata (a fish Leech)
Piscicola geometra (a fish leech)

GASTROPODA (Snails)

Acroloxus lacustris (Lake Limpet)
Anisus vortex (Whirlpool Ramshorn)
Arrmiger crista (Nautilus Ramshorn)
Bathyomphalus contortus
Bithynia leachi (Leach's Bithynia)
Bithynia tentaculata (the Bithynia)
Gyraulus albus (White Ramshorn)
Hippeutis complanatus (Flat Ramshorn)
Lymnaea auricularia (Eared Pond Snail)
Lymnaea palustris (Marsh Snail)
Lymnaea peregra (Wandering Snail)
Lymnaea stagnalis (Great Pond Snail)
Physa fontinalis (a bladder snail)
Planorbarius corneus (Great Ramshorn)
Planorbis carinatus (Keeled Ramshorn)
Potamopyrgus jenkinsi (Jenkin's Spire Snail)
Valvata cristata (a valve snail)
Valvata piscinalis (a valve snail)
Viviparus fasciatus (Lister's River Snail).
Viviparus viviparus (River Snail)

BIVALVIA (Mussels)

Anadonta anatina (Duck Mussel)
Sphaerium corneum (an orb mussel)
Sphaerium lacustre (an orb mussel)
Unio tumidus

MALACOSTRACA (Shrimps and slaters)

Asellus aquaticus (a water slater)
Crangonyx pseudogracilis (a freshwater shrimp)

ARANEAE (Spiders)

Argyroneta aquatica (Water Spider)

EPHEMEROPTERA (Mayflies)

Caenis horaria (an anglers curse)
Caenis luctuosa (an anglers curse)
Caenis robusta (an anglers curse)
Cloeon dipterum (pond olive)

ODONATA (Dragonflies and damselflies)

Aeshna cyanea (Southern Hawker).
Aeshna grandis (Brown Hawker)
Coenagrion puella/pulchellum (Azure/Variable Damselfly)
Enallagma cyathigerum (Common Blue Damselfly)
Erythromma najas (Red-eyed Damselfly)
Ischnura elegans (Blue-tipped Damselfly)
Sympetrum striolatum (Common Darter).

MEGALOPTERA (alder-flies)

Sialis lutaria

HETEROPTERA (Bugs)

Gerris argentatus (Little Pond Skater).
Gerris lacustris (a pond skater)
Ilyocoris cimicoides (a saucer bug)
Nepa cinerea (Water Scorpion)
Notonecta glauca (a greater water boatman)
Plea leachi
Ranatra linearis (Water Stick Insect)
Sigara dorsalis (a lesser water boatman).
Sigara falleni (a lesser water boatman)

TRICHOPTERA (caddis flies)

Anabolia nervosa
Athripsodes aterrimus
Glyphotaelius pellucidus
Limnephilus decipiens
Limnephilus flavicornis
Limnephilus lunatus
Limnephilus marmoratus
Oxyethira sp.
Phryganea bipunctata
Triaenodes bicolor

LEPIDOPTERA (Moths and butterflies)

Paraponyx stratiotata (a china mark moth)

COLEOPTERA (Beetles) S = water scavenger beetles; C - crawling water beetles; D = diving beetles; W = whirligig beetles.

Agabus bipustulatus.	D
Anacaena limbata	S
Anacaena lutescens	S
Enochrus testaceus	S
Gyrinus marinus	W
Haliplus immaculatus	C
Haliplus lineatocollis	C
Haliplus lineolatus	C
Haliplus obliquus	C
Haliplus ruficollis	C
Helophorus brevipalpis	S
Hydraena riparia	S
Hydrobius fuscipes	S
Hyphydrus ovatus	D
Ilybius fenestratus	D
Ilybius quadriguttatus.	D
Laccobius biguttatus.	S
Laccophilus hyalinus	D
Noterus clavicornis	

APPENDIX 4

THE FUTURE OF KENNINGTON POND

A paper prepared by BBONT, Oxford Urban Wildlife Group and Pond Action

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November 1990

THE FUTURE OF KENNINGTON POND

INTRODUCTION

Kennington Pond, situated between Kennington village and the Oxford ring-road, is a surprisingly secluded and attractive site in a suburban setting. Surveys undertaken by Pond Action since 1988 have revealed that the pond provides a habitat for an unusually wide variety of wetland plants and animals, including several species which are rare in Britain. The variety of species, occurrence of rarities and attractiveness of the site combine to make Kennington Pond one of the most valuable ponds in Oxfordshire for its wetland wildlife.

BBONT, the Oxford Urban Wildlife Group and Pond Action are now seeking to obtain permanent protection for Kennington Pond, in collaboration with the Vale of White Horse District Council. This short paper outlines our recommendations for the future use and management of the site, giving a programme of work which indicates how Kennington's important plant and animal communities can be conserved whilst encouraging public access and educational use of the site.

THE NATURE CONSERVATION VALUE OF KENNINGTON POND

Kennington Pond is located on the southern outskirts of Oxford between the Oxford ring-road, the Kennington slip road from the ring road and the Oxford-London railway line (grid reference SP518034). Although bounded on three sides by roads and the railway, the site is remarkably secluded and tranquil.

The wetland plant and invertebrate animal communities of Kennington Pond are of very high nature conservation value (see Table 1 which outlines the criteria used by Pond Action to assess the nature conservation value of freshwater plant and animal communities). A detailed list of the wetland plant and invertebrate animals recorded at Kennington is given in Appendix Table 1.

Kennington Pond supported the greatest number of wetland plants recorded in any of the 144 ponds surveyed by Pond Action for the Oxfordshire Pond Survey. Protection of two of the species found, river water-dropwort and long-stalked pondweed, is particularly important. River water-dropwort, an aquatic umbellifer, is rare in Britain; the long-stalked Pondweed is a very local species which is known to be declining rapidly throughout Britain, probably because of water pollution.

The pond also supports the glutinous snail, a water snail which, until it was discovered by Pond Action at Kennington in November 1988, was thought to be extinct in Britain. This species has become rare throughout Europe and is specially protected under the 1981 Wildlife and Countryside Act (Amendments). The provisions of the Act make it an offence to collect or intentionally kill the snail or to damage its habitat.

In addition, Kennington Pond supports a breeding population of toads, although their numbers have not been estimated. It is also possible that the Great Crested Newt (a

specially protected species under Schedule 5 of the Wildlife and Countryside Act, 1981) occurs at Kennington. The pond probably supports a variety of species of fish.

THE FUTURE STATUS OF KENNINGTON POND

We recommend that, because of the high nature conservation value of the site, Kennington Pond should be protected formally as a nature reserve.We believe that the site is ideally suited for designation as a Local Nature Reserve (LNR), under Section 21 of the National Parks and Access to the Countryside Act 1949.

The site should be jointly managed by BBONT, Oxford Urban Wildlife Group, Pond Action and Vale of White Horse District Council (VOWH DC), whilst remaining under the ownership of VOWH DC. We believe that the designation of the site as LNR would generally increase the chances of attracting sponsorship for the management of the site.

It is also possible that Kennington could be designated a Site of Special Scientific Interest (SSSI): discussions are currently in progress with the Nature Conservancy Council with regard to the notification of the sites as a SSSI. If Kennington becomes a SSSI, grants for site management should become available from NCC.

FUTURE USE AND MANAGEMENT OF THE SITE

We recommend that a Working Group or Management Committee oversee the management of Kennington Pond. The Working Group would be composed of all interested parties (conservation organisations, VOWH representatives, local residents and anglers). One of the first tasks of this group would be the preparation of a draft management plan for the site. This would outline the aims of managing the site for wildlife, the work required to maintain its nature conservation value and the extent to which the site could be used for general public amenity, environmental education and angling. It would also describe survey work that would be required before any attempts were made to manage the plant and animal communities of the pond.

We would recommend that an approach be made to various sponsors and grant-making bodies to fund the preparation of the draft management plan and the further scientific survey work. A date should be set for the preparation of a revised management plan (perhaps three years after the preparation of the draft plan).

We suggest that, if these arrangements are acceptable to VOWH DC, Oxford Urban Wildlife Group takes on the daily responsibility for the management of the site. The UWG would be able to organise local volunteers to manage and warden the site. The work undertaken by UWG would be guided by the Kennington Working Group and the site management plan.

APPENDIX TABLE 1. PROVISIONAL SYSTEM FOR ASSESSING THE NATURE CONSERVATION VALUE OF AQUATIC MACROINVERTEBRATE COMMUNITIES.

CONSERVATION VALUE	DESCRIPTION OF TYPE OF COMMUNITY
VERY HIGH	Supporting a community rich in macroinvertebrate species, including rare and uncommon species.
HIGH	Supporting a community rich in macroinvertebrate species, including uncommon species. No rare species recorded.
INTERMEDIATE	Supporting a macroinvertebrate community which includes only common species. No uncommon or rare species recorded.
LOW	Supporting an impoverished macroinvertebrate community which includes only common species.