Wet Moor Water Level Management Plan

Parrett Internal Drainage Board

Approved July 2010

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1. Approval of the Water Level Management Plan

This Water Level Management Plan has been prepared by the Parrett Internal Drainage Board for the Wet Moor area of the Drainage Board District. Contributions to the WLMP have been received from the Environment Agency, Natural England and others.

Water Level Management Plan – General details	
Plan area	Wet Moor (Parrett IDB)
SSSI(s) covered	Wet Moor SSSI
Region / Area	Somerset Levels and Moors
IDB lead officer	Philip Brewin, Ecologist

Approval of the Water Level Management Plan			
"I agree with the proposals and actions set out in this Water Level Management Plan and confirm the Plan will help achieve favourable condition for the Sites of Special Scientific Interest covered by the Plan."			
Position & Organisation	**Name**	**Signature**	**Date**
Chairman – Parrett Drainage Board	Peter Maltby		
Area Manager – Environment Agency	Nick Gupta		
Area Manager – Natural England	Mark Watson		

2. Introduction

2.1. Purpose of the Plan

Water Level Management Plans (WLMPs) are required for all areas which have a conservation interest and where water level management is important for the maintenance, or rehabilitation, of that interest (e.g. Sites of Special Scientific Interest (SSSIs), Special Protection Areas and Ramsar sites). WLMPs also provide a framework for balancing and integrating the water level requirements of agriculture, recreation, flood risk and conservation within an area.

Natural England is responsible for assessing the condition of SSSIs and has identified a number of wetland SSSIs in Somerset where changes in water level management are required to achieve favourable condition for each site (see Box 2). One of these sites is within the area covered by this Plan:

- Wet Moor SSSI (491ha), with 15.8% of the area being in an unfavourable condition due to inappropriate water management.

The activities of the Parrett IDB play an important role in maintaining a healthy natural environment in Somerset and the IDB acknowledges its statutory duties to nature conservation under the Land Drainage Act (1991), the Conservation (Natural Habitats etc) Regulations (1994), the Countryside and Rights of Way Act (2000) and the Natural England and Rural Communities Act (2006). This WLMP will assist the Parrett IDB in carrying out its nature conservation duties and help provide appropriate water level management required to achieve favourable condition for the Wet Moor SSSI. It will also help ensure effective management measures are in place to resolve problems and protect and sustain valued features of the Plan area.

2.2. Plan area

The Plan covers 1885 acres (763 hectares) of the former Langport Drainage Board District that now forms part of the area managed by the Parrett IDB. The location and extent of the Plan area is shown on Map 1.

The Plan area is situated between Long Load to the south, Muchelney to the west, Huish Episcopi to the north and Long Sutton to the east. The area is mostly pasture land lying to the south of the River Yeo, but also includes the areas known as Ablake and Wet Crouds to the north of the river.

2.3. Responsibility for preparation and implementation of the Plan

The Parrett IDB is responsible for the preparation, overall monitoring and review of this WLMP on behalf of the Drainage Authorities operating in the area, namely the Parrett IDB, the Environment Agency, Somerset County Council and South Somerset District Council. Each Drainage Authority has contributed information to enable the WLMP to be produced by the Parrett IDB. The end result is a collaborative effort by all the Drainage Authorities. Each Drainage Authority is responsible for implementing and monitoring their own actions within the WLMP, and for reporting on these matters to the Parrett IDB as appropriate.

The Parrett IDB will adopt and implement the WLMP in accordance with the criteria set out in Box 1.

Box 1: The approval and implementation of Water Level Management Plans

The following criteria will be used by the Parrett IDB when considering WLMPs for approval and when implementing actions relating to:

a. Making recommendations regarding the approval of a WLMP as a plan of action;
b. The construction of a capital improvement scheme as proposed within the approved WLMP;
c. Changing water levels as proposed within the approved WLMP.

A. Continuation of existing good practices

Where the WLMP includes proposals to '*continue the current good practices regarding water level management, watercourse maintenance and operational procedures'*, the Parrett IDB will satisfy itself that the current practices:

- Are technically sound;
- Satisfies the drainage and water level management needs of the area;
- Are environmentally sound;
- Are within the financial capacity of the Board to achieve;
- Will fulfil all the legal obligations of the Board, including those related to achieving favourable condition and biodiversity.

B. Undertake a capital improvement scheme

Where the WLMP includes a '*proposal to carry out a capital improvement scheme'*, the Parrett IDB will satisfy itself that the proposed scheme:

- Is technically sound;
- Satisfies the drainage and water level management needs of the area;
- Is environmentally sound;
- Is within the financial capacity of the Board to achieve;
- Has been agreed in principle with the occupier(s) and owner(s) of the land where the capital scheme is to be built;
- Is within the legal power of the Board to implement.

C. Change water level management

Where the WLMP includes proposal is to '*change the water level management, watercourse maintenance or operational procedures'*, the Parrett IDB will satisfy itself that the proposed change:

- Is technically sound;
- Satisfies the drainage and water level management needs of the area;
- Is environmentally sound;
- Is within the financial capacity of the Board to achieve;
- Is supported by the owners and occupiers of a significant majority of the land that would be affected by the proposed change being considered (see note below);
- Will fulfil all the legal obligations of the Board, including those related to achieving favourable condition and biodiversity;
- Does not carry a significant risk that the Board may face a legal claim for damages incurred by a third party as a consequence of its decision to change its current practice.

Notes: When considering a proposal to change water levels, the Parrett IDB will use the uptake of agri-environment scheme agreements (including proposals by the occupiers to upgrade their agreements), in the area likely to be affected by the proposed change, as an initial indication of the measure of compatibility of the farm holding/land management unit with the proposed change in water levels. Actual changes in water levels thereafter will be sought through the negotiation of appropriate land management agreements between the owners/occupiers of the land and the relevant authority (i.e. Higher Level Stewardship agreements between farmers and Natural England).

2.4. Consultation and Plan approval

The First Draft of the WLMP was considered by the Parrett IDB WLMP Committee in May 2010 and was endorsed for purposes of consultation with drainage ratepayers, Statutory Bodies and other organisations. Consultation on the WLMP took place during a four week period in May and June 2010.

Consultation responses, and any amendments to the WLMP arising from the consultation, were considered by the Parrett IDB WLMP Committee before recommending the WLMP for approval by the Full Parrett Board in July 2010.

3. Hydrology, watercourses and infrastructure

3.1. Topography and soils

The land drained by the watercourses is low lying alluvium bordering the banks of the River Yeo. The land surface varies from levels of 8 metres above Ordnance Datum Newlyn (ODN) near the river to 6m ODN further inland. Water is normally prevented from inundating the low lying land by embankments along the banks of the River Yeo, with crest levels between 8m and about 9m ODN.

3.2. Water supply

The mean annual rainfall between 2000 and 2008 for Wet Moor was 690mm.

In addition to rainfall, water is fed into the catchment in the summer months via inlets on the penned Parrett and Yeo. Water is supplied to the Plan area by inlets from the River Yeo (Outmoor Inlet, Balham Inlet and Chinese Puzzle) and the River Parrett (Coombe Bridge Inlet, Old River Old Inlet, Oxbore Inlet and Higher Chaffey Inlet, all of which are upstream of Thorney Mill near Kingsbury Episcopi, and also from Haymoor Inlet and Thorney Moor Clyse, all downstream of Thorney Mill).

Water management in the summer is mostly focused on the supply of water to the rhyne and ditch system and the maintenance of high ditch water levels for farming and conservation, except during periods of heavy rainfall when there is a risk of flooding. From early April to the end of November, sluice gates and penning boards are operated to raise water levels in the rhynes and ditches to summer pen levels. The maintenance of summer levels is required to:

a) Provide wet fences around the fields and the watering of livestock;

b) Maintain an appropriate groundwater table during the growing season;

c) Maintain the conservation interest of the watercourses.

Details of the water supply inlets to the Plan area are given in Section 3.7.1 and the locations of structures are shown on Map 3.

3.3. Drainage

The principal outlet for water from the Plan area is to the River Yeo via the Huish Episcopi Pumping Station. Water from the north side of the Yeo, from Hay Moor and Ablake, drains via the Ablake Tunnel structure into the Long Sutton Main Drain. Water from the area to the south of Langport, Huish Episcopi and Pibsbury drains into the Long Sutton Catchwater , then into the Yeo via Ablake Tunnel structure. Water entering the Long Sutton Main Drain via the Ablake Tunnel is pumped into the Yeo, via Huish Episcopi Pumping Station, and out of the plan area. The Yeo joins the Parrett at Langport. Water from Muchelney Level is evacuated through Thorney Moor Main Drain into the Long Load Main Drain, then into the Yeo via the Huish Episcopi Pumping Station

During periods of exceptional flooding on Wet Moor, the North Barrier Bank Sluice and the Ablake Tunnel penstocks can be closed to allow the Pumping Station to evacuate flood from the Muchelney area first (particularly the Langport to Muchelney Road). North Barrier is registered under the Reservoirs Act 1975.

Water levels are generally lowered in winter to allow better drainage and to reduce the risk of overland flooding. However, most watercourses retain a pen level in winter to maintain the conservation interests and to reduce frost damage and the erosion of banks.

3.4. Asset management systems

The Environment Agency manages its assets using a Flood Risk Management (FRM) system approach. An FRM system is defined as "*a group of assets that work together to reduce the flood risk to the people, infrastructure and environment within the system*". Each system has its own specific Management Plan.

Performance specifications are given to each system to guide maintenance standards. The maintenance works are then carried out by the Environment Agency's Operations Delivery Team. This process is used to direct the highest standards of maintenance to where they are needed most (i.e. people, property and environment) using a risk based approach. The Environment Agency has adopted three categories to prioritise maintenance for each FRM system:

- **High** – Generally urban areas with high populations or rural areas with high environmental designations.
- **Medium** – Urban to rural areas with relatively low population densities.
- **Low** – Sparsely populated areas and agricultural land.

The FRM system that covers the whole the Wet Moor WLMP area is:

- **FR/14/S035 Yeo Langport to Long Load (High)**

The Yeo Langport to Long Load FRM system has been categorised as a high priority system because of the high environmental designations of the adjoining land and the importance of water management to these environmental assets.

Each Environment Agency maintained asset is listed in the National Flood and Coastal Defence Database (NFCDD). This provides a definitive store for all data on flood and coastal defences. It records inspections, identifies asset condition, residual life and recommends any works required and their urgency.

The Parrett IDB manages its assets in the Plan area under a comparable asset management system.

3.5. The strategic context for water management

There are a number of strategic plans and documents which provide the context for this Water Level Management Plan, including:

- *The Catchment Flood Management Plan* - A summary version is available on the Environment Agency website.
- *Catchment Abstraction Management Strategies (CAMS)* - These documents are currently being revised for re-release in 2011.
- *Mid Parrett, Isle & Yeo Study* - Completed in March 2007.
- *Lower Parrett & Tone Flood Management Strategy* - Working Draft prepared in February 2005.
- *Parrett and Tone Channel Monitoring Project 2008-09.*
- *Water Framework Directive* and *South West River Basin Management Plan* - The plan is available on the Environment Agency website.

3.5.1. Catchment Flood Management Plan

The Catchment Flood Management Plan (CFMP) for the River Parrett provides an overview of flood risk management in the catchment for the next 100 years. The CFMP is intended to guide Flood Risk Management (FRM) investment in the catchment by the Environment Agency and other bodies with FRM responsibilities and powers. The CFMP was produced in 2008 and will be reviewed every six years.

The Environment Agency proposes to adopt Policy Option 6 for the floodplains of the Parrett catchment. This would involve the Environment Agency, and others, taking action to increase the frequency of flooding to deliver benefits locally and elsewhere. It appears that by redistributing floodwater - primarily from upstream of Langport to the King's Sedgemoor Drain, the overall damage and disruption from flooding will be reduced. Work will also be required to maintain the safety of the existing embankments and infrastructure.

3.5.2. Catchment Abstraction Management Strategy

The Environment Agency has developed Catchment Abstraction Management Strategies (CAMS) to assess the water availability in catchments and to ensure water resources are managed sustainably. As the Levels and Moors are penned systems, the current Strategy for the Parrett catchment (published March 2006) was unable to accurately assess the water requirements for these areas, and therefore the availability of water for abstraction. To address this problem the Environment Agency is preparing a new CAMS for the Levels and Moors, which is due for completion by February 2011. The aim of the new Strategy will be to identify what water may be available for abstraction and set an appropriate abstraction licensing policy for those rivers that are influenced by the inlets and outlets from penned systems. The new CAMS will not seek to change the water levels within penned systems, and will assume that the water levels stated in the WLMPs are appropriate. If the CAMS identifies that there is surplus water available in the catchment, then it will also consider how much of this water is available for new abstraction licences. Where over abstraction is identified it will consider what actions are necessary to redress the balance.

3.5.3. Mid Parrett, Isle & Yeo Study

This study considered flood management for the Rivers Parrett, Isle and Yeo upstream of Langport and was commissioned to assess the scope for improvements to the flood management infrastructure and to guide proactive and reactive maintenance in the future. The study examined flood management practices, the impact on flood risk elsewhere, and included a review of embankments and pumping stations.

3.5.4. Lower Parrett & Tone Flood Management Strategy

This draft report looks at the long term flood management of the River Parrett and River Tone downstream of Taunton and Langport. The strategic aim is to achieve sustainable flood management within the area, minimise the impact on communities and maximise opportunities for wildlife and other local interests. Most of the area has a significant risk of flooding from either fluvial and / or tidal sources. Embankments provide most of the flood protection in the area and there is an increasing risk of breaching due to bank condition and climate change. Various options have been recommended for further study.

3.5.5. Parrett and Tone Channel Monitoring Project

The Environment Agency is currently undertaking a study on the River Parrett and River Tone to monitor and assess the success of dredging work that was carried out between 2002 and 2005. The study area on the Tone is from the Parrett confluence to New Bridge and on the Parrett from Oath Lock downstream to the M5 flyover. New bathymetric surveys will be undertaken to gauge the current profile of the river channels. This data will then be meshed together with LiDAR data in order to obtain accurate cross sections. Once these cross sections are in place, the Environment Agency intends to reuse the existing Parrett / Sowy hydraulic model to replicate the current profile of the Parrett and Tone. The Environment Agency will then model alternative scenarios to determine the need for a programme of de-silting that maximises flood alleviation and optimises the performance and sustainability of the channels.

3.6. Watercourses

3.6.1. Main Rivers

The Environment Agency has permissive powers to manage designated Main Rivers to reduce the risk of flooding property and the risk to human life. There are seven Main Rivers that affect the Wet Moor Plan area: River Parrett, River Yeo, Long Sutton Main Drain, Long Sutton Catchwater, Long Load Main Drain, Dunball Rhyne, Thorney Moor Main Drain and Shortwall Rhyne. Summary details of the Main Rivers affecting Wet Moor are set out in Table 1 and their locations are shown on Map 2. The control structures on these watercourses are listed in Tables 2 – 4.

3.6.2. IDB watercourses

The Parrett IDB is responsible for maintaining a network of arterial watercourses in the Plan area known as ‘Viewed Rhynes’. Watercourses can be taken into, or out of, view by resolution of the Board. There are over 36 kilometres of IDB maintained Viewed Rhynes in the Plan area. Summary details of the Viewed Rhynes for Wet Moor are set out in Table 1 and their locations are shown on Map 2. The control structures on these watercourses are listed in Tables 2 – 4.

3.6.3. Private ditches

In addition to the Main Rivers and Viewed Rhynes, private ditches occur throughout the Plan area and the responsibility for maintenance of these watercourses lies with the riparian owner. This network of ditches is an integral part of the drainage and water supply network in the Plan area. They are particularly important as wet fences, to supply drinking water for grazing animals, and as habitats for a substantial part of the biodiversity interest of the Plan area.

Table 1: Schedule of arterial watercourses in Wet Moor

Asset no.	Watercourse	Operating authority	Length (m)	Location & connections	Current maintenance regime	Control structures (see Table 4)
8750	River Parrett	EA	62000 (approx)	The River Parrett flows north and west of the Plan area, but does not form any part of its boundary. It comes closest at Muchelney then heads west towards Langport. From here, the river continues north and eventually reaches the coast near Bridgwater.	Between Huish Bridge (Black Bridge) and Midelney Pumping Station W6(FB) specification is used once annually in August.	Oath Lock Sluice Thorney Mill Langport Lock Haymoor Inlet Old River Old Inlet Coombe Bridge Inlet Oxbore Inlet Higher Chaffey Inlet Old River New Inlet
8761	River Yeo	EA	3600 (approx)	The River Yeo originates at Sherborne Lake in Dorset, and flows towards Yeovil before meandering north-west. The Yeo enters the Plan area at Long Load and flows through the eastern side of the Plan area to Huish Episcopi Pumping Station. It then flows due west out of the Plan area. Its confluence with the Parrett is upstream of Langport.	Between Huish Episcopi Pumping Station and Long Load Syphon the river is cut using W5 (FB) specification once annually in August	Ablake Weir (Sluice/Boards) Hammocks Dam Water Lane Outfall Ablake Clyse Chinese Puzzle Inlet Main Lake Outfall Outmoor Inlet Balham Rhyne Inlet
8771	Long Sutton Catchwater	EA	1270	The Long Sutton Catchwater flows roughly parallel to the right bank of the River Yeo from Huish Episcopi Pumping Station (HEPS) past the confluence with the Parrett, and then parallel to the Parrett into Langport where it terminates.	W6 (FB) specification once or twice annually in June and October, depending on review.	Water Lane Outfall (Weir) Water Lane (East) Sluice HEPS Access Road Flap
8772	Long Sutton Main Drain	EA (IDB in part)	3200	The Long Sutton Main Drain starts at Hammocks Sluice and runs parallel to the River Yeo right bank for 2.9km to the Huish Episcopi Pumping Station where it ends.	W3 specification twice annually in July and September	Ablake Tunnel Sluices Ablake Clyse West Haymoor Sluice Hammocks Rhyne Weir Hammocks Rhyne Sluice
8773	Shortwall Rhyne	EA	580	Shortwall Rhyne is a short section of Main River (approx 600m) that connects the Long Sutton Catchwater to the Thorney Moor Main Drain on the opposite bank of the Yeo.	W2 specification in July and October	Bicknells Tunnel Flap
8774	Thorney Moor Main Drain	EA	3500	This watercourse flows for 3.4km from the dismantled Yeovil Railway Line North then East to join the Long Load Main Drain 50m upstream from HEPS. The Thorney Moor Rhyne and the Thorney Moor Catchwater both form part of the Thorney Moor Main Drain.	W2 specification twice annually in July and October	South Barrier Bank Sluice
8775	Long Load Main Drain	EA	3020	Long Load Main Drain runs approximately parallel to the River Yeo on its left bank for 3.0km from Outmoor Rhyne (inlet) to the Huish Episcopi Pumping Station at Pibsbury further downstream.	W3 specification twice annually in July and September or October, depending on review	Huish Episcopi Pumping Station North Barrier Sluice Whit Moor Weir Broad Drove Penning Pay Board Drove Tilting Weir Bowmead Drove Tilting Weir Outmoor Inlet

Table 1 (continued): Schedule of arterial watercourses in Wet Moor

Asset no.	Watercourse	Operating authority	Length (m)	Location & connections	Current maintenance regime	Control structures (see Table 4)
8776	Dunball Rhyne	EA	1100	The channel flows from Muchelney Ham northwards to the Long Load Main Drain where it discharges freely depending on the water level in the drain.	W3 specification twice annually in July and September	Balls Clyse Eastmoor Rhyne Sluice Poplar Drove Tilting Weir New East Moor Inlet South Barrier Bank Spillway
72	Gainsmarsh	IDB	748	South and west from Rose Cottage Farm towards Ablake Clyse.	W1	
73	Ablake Rhyne	IDB	512	Through Ablake to connect with the Long Sutton Main Drain just upstream of Ablake Clyse.	W1	
74	Long Sutton Catchwater	IDB	2229	From Hammocks Drove in the east, west to Ablake Clyse.	W1	Ablake Sluice (LG056) West Haymoor Outlet Haymoor Sluice & Overflow
75	Hammocks Drove	IDB	295	Short length of rhyne between Long Sutton Catchwater and Hammocks and Crouds.	W1	
76	Hammocks & Crouds	IDB	1565	Through Hay Moor, connecting to Long Sutton Main Drain in the south.	W1	Hammocks Rhyne Weir (LG054) Hammocks Rhyne Sluice Chinese Puzzle (LG053)
77	Crouds Lake	IDB	1038	Through Crouds to connect with Hammocks and Crouds.	W1	
78	Main Lake, Withymoor Rhyne	IDB	1039	Adjacent to Withymoor Drove, connecting with Long Sutton Main Drain to the south.	W1	Main Lake Spillway (LG063)
79	Long Sutton Main Drain (Lake)	IDB	611	Upstream part of Long Sutton Main Drain.	W1	
80	Narred Rhyne	IDB	368	Connects to western end of Eastmoor.	W1	
81	Eastmoor	IDB	3376	Complex of rhynes on Eastmoor, the western part of Wet Moor.	W1	
82	Wetmoor (Broad Drove)	IDB	3259	Complex of rhynes along Broad Drove and to either side, flowing north to Long Load Main Drain.	W1	S1 (Bowmead Drove Stoplogs) S2 (Broad Drove Tilting Weir) S4 (Broad Drove Branch Tilting Weir)
83	Bowmead	IDB	1531	Complex of rhynes along Bowmead Drove, flowing north to Long Load Main Drain.	W1	
84	Outmoor	IDB	2908	Complex of rhynes in Outmoor, flowing north to Long Load Main Drain.	W1	Balham Inlet
85	Muchelney Ham	IDB	1068	Rhyne on south side of Wetmoor Lane, connecting with Wetmoor (Rhyne).	W1	
110	Dunball Rhyne	IDB	595	Upstream section of Dunball Rhyne (Main River).	W1	

3.7. Structures

3.7.1. Structures controlling inflows

A number of structures are used to supply water to the Plan area (Table 2).

Table 2: Structures controlling inflows to Wet Moor

Inlet	Grid Ref.	Maintained by	Operated by
Haymoor Inlet	ST 4256 2504	EA	Private
Cridlands Clyse (Redundant)	ST 4236 2455	EA	Private
Bishops Clyse (Redundant)	ST 4240 2573	IDB	Private
Thorney Moor Clyse (New Mead Clyse Inlet)	ST 4196 2338	IDB	Private
Old River Old Inlet	ST 4323 2193	IDB	Private
Old River New Inlet (Penstock missing)	ST 4359 2161		-
Oxbore Inlet (Linnets Mead Rhyne Inlet)	ST 4377 2127	IDB	Private
Higher Chaffey Inlet	ST 4400 2069	IDB	Private
Horsey Farm Outfall	ST 4350 2620	Private	Private
Ablake Clyse / Inlet / Outfall	ST 4413 2608	EA	EA
Balls Clyse (Redundant)	ST 4412 2537	Private	Redundant
Chinese Puzzle Inlet (Hammocks Rhyne Sluice)	ST 4562 2483	EA	EA
Outmoor Inlet	ST 4578 2474	EA	EA
Balham Rhyne Inlet	ST 4626 2418	IDB	IDB
Water Lane Outfall	ST 4331 2620	EA	EA

3.7.2. Structures controlling outflows

The Huish Episcopi Pumping Station and three gravity outfalls are used to control water leaving the Plan area (Table 3).

Table 3: Structures controlling outflows from Wet Moor

Outfall	Grid Ref.	Maintained by	Operated by
Huish Episcopi Pumping Station	ST 4406 2610	EA	EA
Bicknells Tunnel Flap	ST 4264 2611	EA	EA
Ablake Tunnel Sluices	ST 4413 2612	EA	EA
Main Lake Outfall	ST 4576 2480	IDB	Private

3.7.3. Structures controlling water levels within the area

Water control structures that currently are used to maintain water levels within the Plan area are detailed in Table 4.

Table 4: Schedule of control structures affecting water management in Wet Moor

Asset no.	Control structure	Grid reference	Maintained by	Operated by	Watercourse (see Table 1)	Description	Dimensions & operating range
11225877501 01B01001	Huish Episcopi Pumping Station	ST 4406 2610	EA	EA	Long Load Main Drain	Pumping Station	3 electrically operated 36" diameter vertical spindle axial flow pumps with a max output of approx 5.1 cumecs (1.7 cumecs per pump) when driven under design conditions. There is no facility to gravitate into the river from this point.
11258750040 3B01001	Langport Lock	ST 4158 2699	-	Removed	River Parrett	Sluice	Removed in 2007. Once consisted of a steel and timber deck spanning two thirds of the river width.
11225875006 05B01002	Thorney Mill	ST 4287 2262	Private	EA	River Parrett	Fixed weir and large lifting gate/sluice	The EA operates one structure here: a 4m high x 2.5m wide steel lifting gate, operated by electric actuator and connected to telemetry.
11225876101 06B02001	Ablake Weir	ST 4412 2611	EA	EA	River Yeo	Penning bays and vertical lifting sluice	7 penning bays across the channel, approximately 2.5m wide (one is 3m wide), and one vertical sluice gate, around 3m wide x 2.5m high.
11225877101 07L01001	Ablake Clyse & Ablake Tunnel Sluices	ST 4413 2612	EA	EA	Long Sutton Main Drain	2 Penstocks and 1 penning gate	Ablake Sluice consists of two 1.22m² penstocks and one vertical lifting gate. The vertical lifting gate is 3.35m wide and 1.72m high, has had an adjustable flap added to the top for penning purposes. The culvert under the Yeo is 3.14m wide x 1.22m high.
11225876101 06R03001	Ablake Clyse/Inlet/ Outfall	ST 4413 2608	EA	EA	Long Sutton Main Drain	Penstock	0.91m² manually operated sluice gate penstock on the Yeo side of the flood bank, connected to the Long Sutton Main Drain via a 1.22m diameter, 26m long culvert.
11225877201 02L01001	West Haymoor Sluice & West Haymoor Overflow	ST 4463 2542	IDB	IDB	Long Sutton Main Drain	Penstock	0.91m wide by 1.2m high sluice penstock fixed to a stone headwall. Flows are discharged from West Haymoor Rhyne into the LSCW though the bank via a 1.22m diameter 6m long Armco culvert.
11225876101 06R06001	Hammocks Rhyne Sluice	ST 4568 2486	EA	EA	Long Sutton Main Drain	Penstock	400mm wide penstock with a 600mm diameter pipe in a masonry headwall. Controls flows from Hammocks Rhyne to Long Sutton Main Drain
11225877201 03R01006	Chinese Puzzle Inlet	ST 4562 2483	EA	EA	River Yeo, Long Sutton Catchwater	Inlet (penstocks and pipe)	Penstock allows water to be fed into Hay Moor.
LG052	Main Lake Outfall	ST 4577 2480	IDB	IDB	Outfall from Main Lake to Long Sutton Main Drain	Outfall	Flap valve controls discharge to River Yeo.
LG054	Hammocks Rhyne Weir	ST 4510 2499	IDB	IDB	Hammocks Rhyne	Fixed Weir	Permanently fixed penning boards.
LG056	Ablake Sluice	ST 4416 2609	IDB	IDB	Long Sutton Catchwater	Sluice gate penstock	Penstock in concrete headwall to drain water into Long Sutton Main Drain.
LG063	Main Lake Spillway	ST 4579 2482	IDB	IDB	Main Lake	Spillway	Buried concrete blocks form the spillway.

Table 4 (continued): Schedule of control structures affecting water management in Wet Moor

Asset no.	Control structure	Grid reference	Maintained by	Operated by	Watercourse (see Table 1)	Description	Dimensions & operating range
11225877101 06B01001	Water Lane (East)	ST 4331 2622	-	Redundant	Long Sutton Catchwater	Redundant	A sluice penstock at this location used to feed summer water from the penned Wagg Rhyne into the LSCW. This sluice has now been removed.
11258771010 B01001	HEPS access road flap	ST 4403 2620	EA	None	Long Sutton Catchwater	Flap	400mm wide self activating, double hung flap, closing over a 36” diameter Armco culvert
11225877501 01B01003	North Barrier Sluice	ST 4387 2582	EA	EA	Long Load Main Drain	The Barrier over tops when the water reaches 7.86	1.83m wide cast iron sluice in a concrete headwall in the north barrier bank. Operated by an electric actuator – can be operated from Huish Episcopi Pumping Station. The barrier overtops when the water reaches 7.86
11225877501 02B01003	Whit Moor Weir	ST 4447 2527	EA	EA	Long Load Main Drain	Fixed crest weir	Interlocking sheet piles forming a steel trench sheet dam (1.5m high, 8.2m long). Central 1.26m section is lowered, forming a fixed crest weir.
11225877501 02B01005	Broad Drove Penning Bay	ST 4489 2502	EA	EA	Long Load Main Drain	Stoplog structure	Sheet piles spanning the watercourse. Capacity to insert stoplogs. No longer used to maintain the RWLA.
11225877501 03B01005	Bowmead Drove Tilting Weir (Structure C)	ST 4552 2475	EA	EA	Long Load Main Drain	Tilting weir	1.25m wide steel tilting weir is fixed to a 6.7m long, 2.7m wide concrete headwall. Manually operated by a handwheel. Vertical range of the weir is 1.40m. Penning depth of 1.22m.
11225876101 03L03001	Outmoor Inlet	ST 4578 2474	EA	EA	Long Load Main Drain (River Yeo)	Sluice gate penstock	Sluice penstock, 300mm wide on a masonry headwall, used to maintain integrity of the RWLA
11225877401 05B01001	South Barrier (Bank) Sluice and Spillway	ST 4240 2436	EA	EA	Thorney Moor Main Drain	Penstock and spillway	1m x 1m square hand operated iron penstock which closes over a short length of culvert in a 6m long stone headwall across the drain. Forms part of the barrier bank which is a high level embankment. A spillway has been cut into the bank which means the sluice no longer fulfils its function. The spillway is 7m long.
11225877301 01B03002	Bicknells Tunnel Flap	ST 4264 2611	EA	EA	Shortwall Rhyne	Flap	1.27m diameter culvert under the Yeo leading to a 1.37m wide by 1.07m high manually operated, double hung flap valve on the southern bank.
11225877101 06B02001	Pibsbury Flap	ST 4369 2627	-	Redundant	Long Sutton Catchwater	Redundant	The flap gate, which once closed over a 1.0m culvert under an accommodation bridge, has been removed.
11225876101 03L01001	Balls Clyse	ST 4412 2537	-	Redundant	Dunball Rhyne	Redundant penstock	Previously the gravity outfall for Dunball Rhyne before HEPS scheme. The ditch behind has now been filled in.
11225877601 02L01002	New East Moor Inlet	ST 4400 2418	IDB	IDB	Dunball Rhyne	Sluice gate penstock	300mm diameter gate valve with 0.75m x 0.75m weed screen on the end of a 300mm diameter 125m long culvert under the field.
11258750050 6R01001	Bishops Clyse	ST 4240 2573	-	Redundant	River Parrett	Redundant	

Table 4 (continued): Schedule of control structures affecting water management in Wet Moor

Asset no.	Control structure	Grid reference	Maintained by	Operated by	Watercourse (see Table 1)	Description	Dimensions & operating range
11225875005 06R01002	Haymoor Inlet	ST 4256 2504	EA	Private	River Parrett	Penstock	Circular penstock 300mm wide in a masonry headwall, manually operated using a lever.
11225875005 07R01001	Thorney Moor Clyse (New Mead Clyse Inlet)	ST 4196 2338	IDB	Private	River Parrett	Penstock	Penstock, 600mm wide installed in the river bank. Manually operated using a hand wheel
11225875006 0R01001	Old River Old Inlet	ST 4323 2193	IDB	IDB	River Parrett	Penstock	Steel penstock approximately 60mm square opertated manually using a hand wheel
11225875006 06R02001	Coombe Bridge Inlet (Lavers Row Inlet)	ST 4334 2164	Riparian	IDB	River Parrett	Culvert	200mm diameter pipe. Sluices removed by IDB. Water levels here are influenced by the pen at Thorney Mill.
11225875006 0R03001	Old River New Inlet	ST 4359 2161	-	-	River Parrett	Penstock	Penstock is currently missing, and is effectively redundant.
11225875006 06R03002	Oxbore Inlet (Linnets Mead Rhyne Inlet)	ST 4377 2127	IDB	IDB	River Parrett	Penstock	Manually operated penstock with a hand wheel, fixed to a masonry headwall. Penstock has been removed and flow into the Linnets Mead Rhyne are determined by the 0.35m diameter corrugated steel pipe through the floodbank.
11225875006 06R03003	Higher Chaffey Inlet	ST 4400 2069	IDB	IDB	River Parrett	Penstock	Penstock 600mm square installed in the riverbank wall. Operated using a hand wheel.
11225877501 03L01003 (LG041)	S1 (Bowmead Drove Rhyne Stoplogs)	ST 4540 2401	EA	EA	Bowmead Drove	Stoplog structure	Removable timber stoplogs, 1.60m long forming an adjustable weir, in a 2.3m high, 3m long and 0.37m thick concrete headwall.
11225877560 101R01006 (LG040)	S2 (Broad Drove Rhyne Tilting Weir)	ST 4465 2409	EA	EA	Broad Drove	Tilting weir	1.5m adjustable tilting weir off centre spindle made from galvanised steel in a 2m high, 5m long and 0.3m thick concrete headwall.
11225877501 03B01001 (LG043)	S3 (Board Drove Tilting Weir)	ST 4488 2494	EA	EA	Broad Drove	Tilting weir	1.5m adjustable tilting weir off centre spindle made from galvanised steel in a 300mm thick concrete headwall.
11225877501 02L01003	S4 (Board Drove Rhyne Branch Tilting Weir)	ST 4485 2489	EA	EA	Broad Drove	Tilting weir	1.5m wide tilting weir with off centre spindle made from galvanised steel in a 2m high, 5m long & 0.3m thick reinforced concrete headwall.
11225877601 01R01004	S5	ST4427 2449	EA	EA	Outfalls to Dunball Rhyne	Tilting weir	1.5m wide tilting weir with off centre spindle made from galvanised steel in a 2m high, 5m long & 0.3m thick reinforced concrete headwall.
11225877501 02L01001	S6	ST4395 2535	EA	EA	Outfalls to Long Load Main Drain	Tilting weir	1.5m wide tilting weir with off centre spindle made from galvanised steel in a 2m high, 5m long & 0.3m thick reinforced concrete headwall
LG045	Eastmoor Rhyne Sluice	ST 4400 2417	IDB	IDB	Dunball Rhyne	Sluice gate	Sluice gate in a 5m long, 1.7m wide and 2.1m high stone headwall.
LG050	Penstock (S7)	ST 4410 2505	IDB	IDB	Dunball Rhyne	Penstock	
LG051	Tilting weir	ST 4412 2525	IDB	IDB	Dunball Rhyne	Tilting weir	

3.7.4. Gauge boards

The principal gauge boards within the Wet Moor area are summarised in Table 5. All gauge boards are metric and are levelled to metres above Ordnance Datum Newlyn (ODN) relative to local Ordnance Survey benchmarks.

Table 5: Gauge boards in Wet Moor

Location of gauge board	Grid reference	Notes	Operator
River Parrett			
Oath Lock Sluice	ST 3831 2788	u/s & d/s	EA
River Yeo			
Bicknells Bridge	ST 4274 2612	d/s	EA
Huish Episcopi Pumping Station	ST 4406 2611	(u/s &) d/s	EA
Ablake Weir/ Sluice	ST 4411 2610	u/s/	EA
Long Sutton Main Drain			
Ablake Sluice (Penning)	ST 4413 2612	d/s	EA
Hammocks Rhyne Sluice	ST 4568 2486	u/s &d/s	EA
Long Load Main Drain			
Huish Episcopi Pumping Station	ST4406 2610	u/s (& d/s)	EA
North Barrier Sluice	ST4387 2582	u/s	EA
Bowmead Drove Tilting Weir	ST 4552 2475	u/s	EA
Whatley	ST 4200 2663	Adjacent sluice	EA
S1, Broad Drove stoplog structure	ST4540 2401	u/s	EA
S2, Broad Drove Rhyne tilting weir	ST4466 2409	u/s	EA
S3, Broad Drove tilting weir	ST4488 2494	u/s	EA
S4, Broad Drove tilting weir	ST4486 2489	u/s	EA
S5, tilting weir	ST4427 2449	u/s	EA
S6, tilting weir	ST4395 2535	u/s	EA
Dunball Rhyne			
Poplar Drove Tilting Weir	ST 4426 2449	u/s	EA
Thorney Moor Main Drain			
Shortwall Bridge	ST 4278 2568	d/s	EA
South Barrier	ST 4240 2436	u/s	EA
Shortwall Rhyne			
Bicknells Tunnel	ST 4264 2611	u/s	EA

3.7.5. Water level telemetry

The Environment Agency has installed telemetry where there is an operational need to be kept informed of water levels and to alert staff to changes in water levels. The Environment Agency has telemetry installed at Huish Episcopi Pumping Station, Thorney Mill and Oath Lock, which remotely monitors water levels in the Main Drain, River Parrett and River Yeo. The pumping station has prescribed target water level ranges for summer and winter, and a series of alarms alert staff when water levels go outside of the predetermined range. Alarms have also been created for weed screens, pump failure, mains failure and telemetry failure. Alarms are received 24 hours a day, seven days a week by a National Incident Communication Service. The alarms are then passed on immediately to the most appropriate duty officer in the local area.

3.8. Abstraction and other hydrological management issues

There are no known significant, ongoing water resource issues which directly influence, or are influenced by, water level management within this catchment.

The Water Act (2003) has introduced a new statutory framework for managing water resources. Under the Act the abstraction of up to and including 20 cubic metres per day (approximately 4,400 gallons per day) from surface water or groundwater does not require a licence from the Environment Agency regardless of the purpose for which the abstracted water will be used. Abstractions above 20 cubic metres per day require a licence, issued by the Environment Agency. The Water Act (2003) also removes a range of exempt activities that currently do not require an abstraction or transfer licence. However, this section of the legislation has not yet been enacted (see the EA website for further information on licensing requirements under the Water Act (2003)).

The Environment Agency will consult the Parrett IDB and Natural England regarding its consideration of applications for an abstraction licence.

There are five abstraction licences that may affect water management in the Plan area, which are summarised in Table 6.

Table 6: Abstraction licences in or near Wet Moor

Licence no.	Description	Point name	Max daily vol. (m^3)	Max annual vol. (m^3)
16/52/003/S/090	Process water	River Yeo at Huish Episcopi ST 4308 2610	45.5	13637
16/52/003/S/172B	Spray irrigation – direct	Prior Brook Drain ST 4291 2418	100 (March – Oct)	3,000 (March – Oct)
16/52/002/S/303	Fish farm / cress pond through flow	Prior Brook ST 4340 2310	690	120,000
16/52/003/S/213	Hydroelectric power generation	Thorney Mills ST 4287 2261	112,300	27,500,000
16/52/002/G/302	Spray irrigation - direct	Long Load ST 4721 2442	80 (April – Oct)	8,000 (April – Oct)

3.9. Water quality

There have been 20 years of steady water quality improvements across the Somerset Levels and Moors catchments; however, phosphate levels remain a concern. There are some local water quality issues in the Plan area related to diffuse and point sources of pollution. Diffuse pollution is primarily caused by high phosphate levels from nutrient enrichment (fertilisers) and private septic tank overflows. Point sources of pollution mainly occur at sewage treatment works.

The Environment Agency and Natural England are currently developing 'Diffuse Water Pollution from Agriculture' plans that aim to reduce nutrient enrichment of watercourses and promote good agricultural practice through the Catchment Sensitive Farming Programme. The Environment Agency has also undertaken nutrient modelling to identify the relative importance of diffuse and point sources to nutrient enrichment in the catchment and is working with the water companies to reduce nutrient discharges from sewage treatment works.

Weed-cutting activities can also cause significant drops in dissolved oxygen (DO) levels on most watercourses. The Environment Agency's Operations Delivery team take DO readings before and during weed cutting to ensure water quality does not deteriorate rapidly. If DO levels drop below 20%, all operations stop immediately, including the operation of Pumping Stations, especially in summer. This practice helps to prevent fish kill and unnecessary damage to the aquatic environment.

It is illegal to discharge raw sewage or trade effluent directly into any controlled watercourse. Controlled discharge of treated effluent requires consent to discharge, which must be obtained from the Environment Agency. The Environment Agency should be informed of any water pollution problems, particularly septic tank discharges, to allow investigation and improvement. In the event of a pollution incident being noted, assistance should be sought immediately from the Environment Agency's incident pollution hotline on 0800 80 70 60.

There are a number of discharge consents in or near the Wet Moor Plan area, as set out in Table 7.

Table 7: Discharge consents in or near Wet Moor

Consent no.	Site name	Grid reference	Discharge type
082151	Huish Episcopi Pumping Station	ST 4380 2610	Sewerage network – pumping station – water company
100182	The Almonry	ST 4283 2492	Domestic property (single)
081948	Pound Way S/Tank	ST 4320 2450	Domestic property (multiple)
071240	Great Island House	ST 4313 2445	Domestic property (single)
100125	Muchelney Ham Farm	ST 4400 2371	Domestic property (single)
012889	1 – 5 Milton Leaze	ST 4667 2352	Domestic property (multiple)
102767	Long Load Pumping Station	ST 4669 2367	Undefined or other
102402	Back Street CSO	ST 4671 2538	Sewerage network – sewers – water company
102399	Bennett's Orchard PS	ST 4674 2548	Sewerage network – sewers – water company
102405	Upton PS	ST 4600 2620	Sewerage network – sewers – water company
1010273	Barn Con at Batts Corner Farm	ST 4563 2610	Domestic property (single)
102404	Upton CSO	ST 4587 2628	Sewerage network – sewers – water company

4. Agriculture and other land uses

4.1. Agriculture

Agriculture is the predominant, most extensive land use within the Plan area. Most of the land is divided into small fields which are separated mostly by watercourses or a combination of hedge and watercourse. The watercourses are used to provide drinking water for livestock and as wet fences. The Parrett IDB recognises the importance of agriculture within the Plan area and the key role that the effective management of water has to play in enabling this land use to prosper within the area. The Board also recognises that additional investment in the water management system will be required in the years to come in order to achieve the combined objectives of conservation and farming in the Plan area.

Livestock farming is the primary land use, with improved, semi-improved and unimproved grassland used for grazing and for winter fodder covering about 80% of the farmed area. Livestock farming systems not only produce food but the wider land management they provide is crucial in delivering conservation outcomes, for example through agri-environment agreements. Farm businesses need continual re-investment to survive if their food production and conservation land management are to continue.

The growing need for food security, and the growing demand for quality food to supply the increasing population of the UK and elsewhere, may stimulate additional investment in agriculture on some farms in the area in the coming years. The larger farm units in particular have invested in productive capacity over the years and will continue to do so in line with market signals. Many will also continue to deliver environmental outcomes alongside food production.

Within the Wet Moor SSSI, appropriate balances will be sought between agriculture, nature conservation value, flood risk and the vulnerability of peat soils.

4.2. Built development, services and transport

A number of domestic and commercial properties in the Plan area depend, either directly or indirectly, on the effective flood protection and water level management. Low lying properties, utilities infrastructure and minor roads (which provide essential transport links) would suffer from flooding or waterlogging without the appropriate maintenance of flood defences, Main Rivers and IDB Viewed Rhynes.

The provision of adequate land for housing and employment is a national priority and Local Planning Authorities are charged with ensuring that sufficient land is made available though the new Local Development Frameworks. However, new development in areas of high flood risk may not be sustainable, particularly where these low lying areas are protecting existing development by providing space for water.

The Local Authorities consult the Environment Agency and the Parrett IDB on strategic plans, such as the new Local Development Frameworks, and on individual applications of significance. Planning Policy Statement 25 (PPS25, December 2006) sets out Government policy on development and flood risk. It aims to ensure that flood risk is taken into account, at all stages in the planning process, to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk.

In the exceptional cases where new development is necessary in areas of flood risk, the policy aims to make it safe, without increasing flood risk elsewhere. Where possible, developers are encouraged to work with the Planning Authority and the Drainage Authorities to use opportunities for new development to reduce flood risk overall.

4.3. Recreation

The Environment Agency has a duty to consider recreation on or near water and aims to create a quality of environment that people will be able to enjoy. The Agency's vision is to conserve and improve the quality of the river environment whilst balancing recreational interests on water (e.g. canoeists, rowers, anglers and boaters) and on river banks (e.g. cyclists, horse-riders, walkers and bird watchers).

4.4. Fisheries

The Environment Agency has a duty to maintain freshwater and eel fisheries. These fisheries are a major part of the wildlife interest and ecology of the Plan area; especially eels, which are widely distributed and are a favoured food for both otters and fish-eating birds. Works to improve water level management will have to consider fisheries improvements, and any new structures should allow for the free movement of eels and elvers. The Environment Agency's fisheries officers can provide advice to ensure that fisheries are safeguarded and that the Environment Agency's duty to fisheries is not prejudiced.

Some of the watercourses in the catchment area are de-silted and weed-cut for flood risk management purposes. As these practices can disturb spawning fish, remove spawn or reduce cover for fry, the method and timing of weed cutting and de-silting must be carefully considered to avoid these impacts. In some watercourses, excessive build up of duckweed at penned structures can be a problem during the summer that can result in de-oxygenation. Removal of the duckweed is difficult, although the use of floating booms across the watercourse can help to prevent the duckweed from completely covering the water surface.

Regular angling takes place on the Parrett and the Yeo, as well as many of the large rhynes. The watercourses in this area are important coarse fisheries with roach, bream, pike, tench, ruffe and eels as the dominant species. Rudd, gudgeon, perch and carp are also locally important.

5. Nature conservation and archaeology

5.1. Nature conservation interests

The Plan area contains:

a) An essential part of the largest area of lowland wet grassland remaining in England (the Somerset Levels and Moors), supporting an important assemblage of breeding waders and wetland birds, notably snipe, curlew, redshank, lapwing and yellow wagtail.

b) Part of a large wetland of international importance for its overwintering and migratory populations of waterfowl, and in particular golden plover, teal, wigeon, shoveler and lapwing.

c) Part of a large wetland of international importance for its outstanding assemblage of rare invertebrates, particularly water beetles.

d) Part of a wetland of national importance for:

- Botanically rich, unimproved wet meadows and mires;
- Ditch flora, including species which are nationally scarce, and relict fen species on ditch banks;
- Ditch fauna, including species which are nationally rare or scarce;
- Meadow fauna, including species which are nationally rare or scarce;
- Breeding wetland birds, such as sedge and reed warblers, lapwing, snipe, ducks and rails/crakes.

The Plan area includes:

a) Wet Moor SSSI (498 hectares / 1225 acres) notified in 1985;

b) Wet Moor SSSI is part of the Somerset Levels and Moors Special Protection Area, which was designated under the European Community's Directive on the Conservation of Wild Birds in June 1997;

c) Wet Moor SSSI is also part of the Somerset Levels and Moors Ramsar Wetland of International Importance, which was designated under the terms of the Ramsar Convention in June 1997;

The locations of the nature conservation sites are shown on Map 5 and Natural England's advice to the Parrett IDB on the water management requirements for Wet Moor SSSI is summarised on Map 7.

Box 1: Favourable condition for wetland SSSIs in Somerset

An SSSI is considered to be in favourable condition when the special habitats and features of an SSSI are in a healthy state and are being conserved for the future by appropriate management. The Government's Public Service Agreement with DEFRA requires that 95% of all nationally important wildlife sites (SSSIs) are in a favourable (or unfavourable recovering) condition by the end of 2010.

Water management requirements for wetland SSSIs in Somerset

The following information summarises Natural England's advice to the Parrett IDB on the water management requirements needed for wetland SSSIs in Somerset to achieve favourable condition.

For ditch and grassland interests in winter:

- At least 30cm of water in the bottom of rhynes and ditches except in those around the margins of the SSSI where the ground levels are slightly higher.
- Summer water level at not more than 30cm below mean field level from 1 April to 30 November.

For wintering birds:

In early winter (from mid November):

- Gradual rising water levels to create extensive pools providing surface water covering 20 to 50% of the majority of fields with the lowest lying fields being close to 50%.

In mid winter (1 December to 28 February):

- Extensive areas of splashy conditions and shallow pools up to 25cm deep covering at least 50% of the majority of the fields;
- Deeper water roosts of at least 60ha, with water 25 to 75cm deep.

In late winter and early spring (to end of March):

- Gradual lowering of mid winter levels with some splashy conditions and shallow pools remaining through late February and into March in the lowest fields.

For breeding waders in spring (ideally blocks 50ha or more in size):

In early spring (1 March to 30 April):

- Extensive pools providing surface water covering up to 25% of the majority of fields with the lowest lying fields being close to 25%.
- On higher fields and species-rich fields, limited surface water covering less than 10% of the field.

In mid spring (May):

- Some pools in the lower lying fields covering up to 15% of surface area with soft ground and damp soils elsewhere;
- Low intensity grazing from mid-May in those fields not being laid up for hay.

In late spring (June):

- A few surface pools present in the lowest lying fields towards the end of this period and into July.

5.2. Biodiversity Action Plans

The floodplain grazing marshes found within the Wet Moor area are considered a habitat of primary importance in the UK Biodiversity Action Plan (1996). Furthermore, the 36 km of Main Rivers and Viewed Rhynes in the Plan area, and the associated network of ditches and ponds, are biodiversity rich habitats that support good populations of priority BAP species such as water voles and otters.

The IDBs in Somerset have recently completed a biodiversity audit of all BAP species and habitats in their drainage districts and used this information to prepare a Biodiversity Action Plan relevant to IDB activities and interests (April 2010). The introduction of an IDB BAP for Somerset is intended to assist the integration of biodiversity conservation and enhancement works into IDB planning and work programmes. The new IDB BAP will also allow the Somerset IDBs to demonstrate and record their important contributions to conserving biodiversity. The Somerset IDB BAP sets objectives and targets for the conservation and enhancement of wetland species and habitats, and provides a link to the national and local BAP targets. The IDB BAP will also be used to report progress on the implementation of all IDB WLMPs in Somerset.

5.3. Conservation management

The current practices, adopted by the Parrett IDB and the Environment Agency for the maintenance of watercourses, help to maintain the conservation and biodiversity interest of these wetland habitats in balance with the need for effective drainage and irrigation throughout the Plan area.

Financial support for the conservation management of land is available to farmers and landowners from Natural England, who administers the Environmental Stewardship scheme on behalf of DEFRA. Such agri-environment schemes operate on the principle that the landowner, or farmer, voluntarily enters into an agreement where payment is made in return for following land management practices that benefit the environment. Farmers can join Entry Level Stewardship (ELS), where a basic payment is made for 5 years for basic environmental management, or Higher Level Stewardship (HLS), which is more targeted and provides higher payments for more demanding conservation management over 10 year agreements. Many farmers in the area have still to complete their agreements under the previous Somerset Levels and Moors Environmentally Sensitive Area (ESA) Scheme.

5.4. Archaeology

The wetlands of the Somerset Levels and Moors contain a wealth of archaeological information often hidden under layers of peat and clay that have built up over many millennia. This has had three significant effects:

a) Organic remains such as wood and leather are preserved because the waterlogging excluded oxygen and prevented the normal types of decay which destroy these materials on normal archaeological sites;

b) The waterlogged conditions also preserve pollen grains, plant material, insects, snails and even macroscopic plant and animal remains. These constitute a unique record of the past natural and man-made environment stretching back over the last 6,000 years. They can also provide information concerning human activity on the neighbouring dry land, and past changes in climate and sea levels;

c) The normal methods of archaeological detection do not work well in wetland areas where sites can be deeply buried. The number of known archaeological sites is therefore only a small fraction of the existing total. It is extremely likely that all the river valley wetlands in Somerset contain a wealth of important archaeological sites. In

addition there are several types of sites such as fisheries, medieval flood defences and small river ports of which we know very little, but may exist in considerable numbers.

The organic archaeological remains from the Somerset Levels and Moors depend for their continued survival, on an anaerobic waterlogged burial environment. If the surrounding peat or clay dries out, the organic material will shrink considerably and crack apart. The presence of oxygen will also allow bacterial and fungal decay to resume and eventually completely destroy the artefacts.

The peat itself, and the precious information contained within it, is also adversely affected by desiccation. Where field water tables are below ground level for long periods of time, the shrinkage and chemical breakdown of peat soils can be significant and can destroy all the archaeological information contained within them. In this regard, the summer is the crucial period, as that is when in-field water tables are generally at their lowest and therefore peat wastage highest.

All the known archaeology in the area is contained in the County Sites and Monuments Record which is kept in map form and on computer at County Hall, Taunton. This represents information collected from aerial photographs, excavations, chance finds, observations of drainage ditches and other sources. However, in the Somerset Levels and Moors, the deep deposits of clay and peat that have built up over thousands of years mean that much of the local archaeology in the area remains hidden from the normal forms of archaeological detection. Therefore the known archaeology recorded on the Sites and Monuments Record represents only a fraction of the total archaeological resource that lies below the surface.

A water management system beneficial to the preservation of wetland archaeological is a key objective of the WLMP. The locations of the archaeological sites in the Plan area are shown on Map 6.

6. Constraints and impacts on adjacent ground

6.1. Works adjacent to Main River

Any work proposed in, over, under or adjacent to Main River requires Flood Defence Consent (FDC) from the Environment Agency. Land Drainage Byelaws require third parties to apply for consent for any alterations or new works within an eight metre strip on either side of the Main Rivers. Where consent is applied for on land which forms part of an SSSI, or other designated site, the applicant is obliged to consult Natural England. Where works may affect a European designated site, the Environment Agency will undertake a test of likely significance and seek Natural England's approval before a consent can be issued. These conditions will also apply to proposals that lie outside the boundary of a designated sites but which may impact on the site.

6.2. Works adjacent to IDB rhynes

Under the Land Drainage Act (1991), the Parrett IDB has administrative responsibility for all the Viewed Rhynes and ordinary watercourses within the Plan area for the purposes of consenting activities as set out in the IDB's Byelaws. The Parrett IDB exercises this administrative control using a series of policy documents adopted by the IDB for this purpose.

The Parrett IDB Byelaws require third parties to apply for consent for any alterations or new works within a nine metre strip on either side of a Viewed Rhyne. Where consent is applied for on land within a SSSI, the IDB consults Natural England before arriving at its decision. The form of consent given by the IDB states that such consent does not override the necessity of obtaining other statutory consents (including that of Natural England).

6.3. Private ownership of land and property rights

Most of the land within the Plan area is under private ownership and is occupied either by the owner or by tenants, licensees, graziers etc. For the WLMP to be sustainable and succeed, any works or proposals to vary water levels must respect all legal obligations and responsibilities including property rights. As mentioned in 4.1, the predominant land use across the Plan area is agriculture, and changes in water levels can potentially have a significant impact on agricultural activities carried out by owners and/or occupiers. Changing of water levels to achieve conservation objectives (e.g. within SSSI areas) will be achieved most sustainably through negotiation of individual agri-environment agreements under the HLS scheme, whereby farmers receive an appropriate payment in return for their management which delivers the public benefit (in terms of favourable SSSI condition).

7. Current water management practices

7.1. Current water level management regime

In general, water levels are maintained at a relatively high level during the summer months to provide wet fences and, to a certain extent, to keep water tables high to promote the growth of grass and other crops. During the winter periods, water levels are lower in order to accommodate increased rainfall and runoff, and to reduce the risk or severity of flooding.

Seasonal changes in water levels are normally implemented on the 1 April for summer levels and 1 December for winter levels. In practice however, the seasonal water levels are usually phased in two weeks either side of these 'normal operating dates'. This system has come about through custom and practice and generally works well. From time to time, depending on the prevailing weather conditions, requests may be received by the Parrett IDB to advance or delay these seasonal operations. Under these circumstances, the IDB will consult Natural England before advancing or delaying the normal operating dates by more than two weeks.

7.1.1. Contingency measures for drought

During a drought situation the Environment Agency will encourage the public and industry to practice water efficiency and to conserve water, whilst all abstraction licence holders will be encouraged to minimise water abstraction. There will also be close liaison between the Environment Agency and the Parrett IDB to conserve water and to ensure a fair distribution of what water is available.

If there is an exceptional shortage of rain, or a serious deficiency in water flow that threatens flora or fauna, drought permits or orders may be issued. Drought permits are issued by the Environment Agency to enable water companies to take water from new sources or to alter restrictions on existing abstractions. Drought orders, issued by the Secretary of State, go further and restrict the non-essential use of water.

7.1.2. Current target water levels

The current target water levels for key control structures within the Plan area are set out in Table 8 and any proposed changes in target waters levels are detailed in Table 15. The Parrett IDB will consult Natural England and the Environment Agency if they are considering changing the water levels at a structure so that it falls outside the range given in the Plan. Target water levels have been adjusted for gauge board errors and relate to metres above Ordnance Datum Newlyn (ODN).

Table 8: Current target water levels in Wet Moor

Water level control structures	Grid Ref.	Operated by	Summer water levels (m ODN)	Winter water levels (m ODN)	Flood conditions
River Parrett & Yeo					
Oath Lock	ST 383 278	EA	6.60	Open	Open
Huish Episcopi Pumping Station	ST 441 261	EA	6.25	6.00	On
Ablake Weir	ST 441 261	EA	7.30 (boards) Sluice lowered	7.30 (boards) Sluice open	Sluice open
Thorney Mill	ST 429 226	EA	10.30	10.05	Sluice open
Long Load Main Drain & Dunball Rhyne					
HEPs Access Road Flap	ST 440 262	None	Closed	Closed	Closed
North Barrier Sluice	ST 439 258	EA	Open	Open	Open
Whit Moor Weir	ST 445 253	EA	Crest level 6.45	Crest level 6.45	Crest level 6.45
Broad Drove Penning Bay	ST 449 250	EA	Crest level 6.55	Crest level 6.55	Crest level 6.55
Poplar Drove Tilting Weir	ST 442 243	IDB	7.37	Not penned	Not penned
New East Moor Inlet	ST 440 242	IDB	Open	Closed	Closed
S1	ST 454 240	EA	6.90	7.20	-
S2	ST 446 240	EA	6.90	7.20	-
Bowmead Drove Tilting Weir (C)	ST 455 248	EA	6.90	7.20	-
Broad Drove Tilting Weir (S3)	ST 449 250	EA	6.70	7.00	-
S4	ST 448 249	EA	6.60	6.90	-
S5	ST443 245	EA	6.60	6.90	-
S6	ST440 254	EA	6.25	6.55	-
Outmoor Inlet (Inlet A)	ST 462 241	EA	Open	Closed	Closed
Balham Inlet (Inlet B)	ST 458 248	IDB	Open	Closed	Closed
Long Sutton Main Drain and Long Sutton Catchwater					
Ablake Clyse	ST 441 261	EA	6.80	Open ~6.10	Open
Ablake Tunnel Penstocks	ST 441 261	EA	1 No. open	1 No. open	2 No. open
Ablake Clyse Inlet	ST 441 261	EA	Closed	Closed	Closed
Ablake Sluice	ST 442 261	IDB	Closed	Closed	Closed
West Haymoor Sluice	ST 446 254	IDB	Closed	Open	Open
West Haymoor Overflow	ST 446 254	None	Fixed pipe invert	Fixed pipe invert	Fixed pipe invert
Hammock Rhyne Weir	ST 451 250	None	Fixed weir ~6.90	Fixed weir ~6.90	Fixed weir
Hammocks Rhyne Sluice	ST 457 249	EA	Closed ~7.00	Open	Open
Chinese Puzzle Inlet	ST 456 248	EA	Open	Closed	Closed

Notes: **- Summer season:** Aim to achieve summer pen levels by 1st April.
- Winter season: Aim to achieve winter pen levels by 1st December.
- See Box 2 (page 26) for target conditions for RWLAs.
- **ODN:** Ordnance Datum Newlyn.
- [~] approximate water level.

7.1.3. Raised Water Level Areas

There are four Raised Water Level Areas (RWLAs) in the Plan area, where high water levels are maintained in winter and spring to provide suitable wetland conditions for wildfowl and waders (see Box 2 for target conditions). The largest RWLA on Wet Moor was constructed in 1992 and is maintained by the Environment Agency. There are also three smaller privately operated RWLAs at Horsey Farm, Hay Moor and Town Tree Farm. Details for all RWLAs in the Plan area are given in Table 9 and their locations are shown on Map 4.

Table 9: Raised Water Level Areas in Wet Moor

RWLA	Maintained & operated by	Area in hectares	Area in acres
Wet Moor	Environment Agency	264	652
Horsey Farm	Private	37	91
Hay Moor	Private	13	32
Town Tree Farm	Private	29	72

7.2. Current flood management regime

The Environment Agency has permissive powers to carry out works to reduce flood risk on Main Rivers. The primary flood defences within this Plan area are raised earth embankments located on either side of the River Yeo, with a few small sections of harder engineering (e.g. steel piles and masonry walls) where space is at a premium. These defences are inspected regularly to ensure they provide the flood risk management benefit that they were designed for. The Environment Agency also undertakes routine maintenance i.e. weed cutting, tree pruning and removal. Emergency repair and maintenance works are carried out when necessary.

The Environment Agency regularly inspects and operates the main inlet structures into the Plan area. These are closed when water levels in the River Parrett and the River Yeo rise in order to minimise the risk of flooding from the river. During flood conditions, the Huish Episcopi Pumping Station is operated by the Environment Agency to evacuate flood water from the moor until high river levels make pumping ineffective. At this point, the pumps are switched off manually and operatives monitor the situation until river levels drop and pumping can resume.

7.2.1. Contingency measures for flooding

The Environment Agency carries out active monitoring of raised flood banks during high flows, and ensures that outfall structures are kept clear of debris to allow evacuation of flood water as safe working conditions allow. The Environment Agency will also carry out emergency works as required to protect people and property.

The Environment Agency and the Parrett IDB are investigating the potential benefits of pre-emptive lowering of water levels at key control structures in anticipation of extreme weather conditions. It has been suggested that early action at certain control structures may reduce the severity of damage caused by overland flooding at critical times of the year, especially in summer. This work is at an early stage and will need to consider the impacts on the SSSI and the concern that it may be difficult to restore summer pen levels if forecast rainfall does not occur.

The Parrett IDB will ensure that all weed-screens on Viewed Rhynes are cleared on an 'as required basis' and that watercourses are running freely to assist the evacuation of flood water as soon as is reasonably possible.

Box 3: Flood Zones

The Flood Map shows areas across England and Wales that could be affected by flooding from rivers and/or the sea. It has been produced by the Environment Agency to raise awareness among the public, local authorities and other organisations of the likelihood of flooding and to encourage people living and working in areas prone to flooding to find out more and take appropriate action. The Flood Zones in the Plan area are shown in Map 8.

Flood Zones are also known as floodplains which could be affected by flooding from rivers and the sea. There are three zones which are defined in the Government's planning policy for England. They ignore the presence of existing flood defences as these can be overtopped and even fail in an extreme event.

Zone 1 - is shaded white and shows areas with the lowest probability of flooding from rivers or the sea and where the chance of flooding in any one year is less than 0.1% (i.e. less than a 1 in 1000 chance).

Zone 2 - is shaded turquoise and shows areas where the chance of flooding in any one year is between 0.1% and 1% for flooding from rivers (i.e. a 1 in 1000 to a 1 in 100 chance), or 0.5% for flooding from the sea (i.e. 1 in 200 chance). The outer edge of this zone is referred to as the 'Extreme Flood Outline' (EFO).

Zone 3 - is shaded blue and shows areas with the highest probability of flooding where the chance of flooding in any one year is greater than 1% for flooding from rivers (i.e. a 1 in 100 chance), or 0.5% flooding from the sea (i.e. a 1 in 200 chance).

It is important to understand that a 1 in 100 chance of flooding in any one year does not mean that level of flood will happen once every 100 years, nor does it mean that if the flood hasn't happened for the last 99 years, it will happen this year. In fact, a flood of this magnitude may occur more than once in a year.

7.3. Current watercourse maintenance regimes

7.3.1. Environment Agency maintenance practices

The Environment Agency assesses all maintenance works on the basis of flood risk to people and property and whether the management system is rated as high, medium or low risk. As a result, maintenance is targeted towards high risk systems. The Environment Agency regularly reviews its annual and intermittent maintenance procedures, in accordance with national guidance and policy, to ensure that a high level of flexibility and efficiency of funding and staffing allocation are achieved.

The Environment Agency operates a flexible, annual weed cutting programme during the summer months. The Main Rivers are inspected prior to starting and the programme can be changed to accommodate urgent cuts or abnormal weather and vegetation conditions. It is normal practice to provide good access for weed-cutting machinery, which consists of culverting side ditches and providing gates and side fencing so that travel across field boundaries is unrestricted. The Environment Agency does not typically use herbicides in the Plan area.

The Environment Agency regularly reviews its annual and intermittent maintenance procedures, in accordance with national guidance and policy, to ensure that a high level of flexibility and efficiency of funding and staffing allocation are achieved.

The left and right banks of the River Yeo are flailed annually where no regular grazing takes place. This is done to control weed growth and to reduce the risk of burrowing mammals (e.g. rabbits and badgers) destabilising the banks.

Trees, branches and bushes within the channel area are trimmed, coppiced or pollarded to allow maximum flow, whilst retaining as much shade as possible to reduce weed growth. Tree removal will take place in exceptional circumstances where blockage of the channel has occurred, or is likely to occur. The Environment Agency expects riparian landowners to maintain trees and vegetation that could cause flood risk. Where necessary, the Environment Agency will serve notice on landowners to ensure that works are completed as requested. Where the Environment Agency owns land, it will carry out any required tree maintenance.

7.3.2. Parrett IDB maintenance practices

The Parrett IDB maintains all Viewed Rhynes in the Wet Moor area once a year in late summer or during the winter. Viewed Rhynes are occasionally de-silted to prevent their condition from deteriorating and to sustain the required water depth and flow. Aquatic herbicides are not routinely used by the IDB, but may be used to control invasive plants. The use of aquatic herbicide in any watercourse requires consent from the Environment Agency and from Natural England when used within the SSSI.

The maintenance of watercourses adjoining Viewed Rhynes is the responsibility of the riparian occupiers. The Board has powers under its Byelaws to require occupiers to fulfil their obligations in this respect where they fail to do so.

Water control structures are inspected by the Parrett IDB on a regular basis and repaired as necessary. The Board does not accept any liability for the maintenance of bridges and culverts over Viewed Rhynes, however it is prepared to consider making an *ex gratia* contribution of a share of the cost of such maintenance, approximately in proportion to its usage by the IDB. The Parrett IDB does not accept any liability for the maintenance of droves, and only carries out such maintenance, or contributes to the cost of maintenance, where droves are essential to the Board for gaining access to a channel, or where damage has been caused by works carried out on behalf of the IDB.

8. Objectives for water level management in the future

The Water Level Management Plan is based on the following objectives which have been adopted by the signatories to the Plan. The signatories acknowledge that not all the objectives can be achieved on each and every occasion or location.

Objective 1 – Balance of interests
Firstly, ensure that all legal obligations and responsibilities are met and secondly, balance different interests by managing water in a way that reflects the local hydrology and topography of the area and which best serves the owners and farmers of the majority of the land within each sub-catchment.

Objective 2 – Agriculture
Maintain seasonal water levels that provide wet fences, stock watering and drainage appropriate for the principal land management and farming practices in each sub-catchment.

Objective 3 – Biodiversity
Maintain and enhance, when suitable opportunities arise, wet grassland, wetland and freshwater aquatic habitats and species throughout the Plan area, with particular attention being given to those protected by law or designated in some way.

Objective 4 – Favourable condition of SSSIs
Implement a programme of improvement works to ensure that the management of water that affects the SSSI in the Plan area helps to secure, or makes significant progress towards achieving, this SSSI being in favourable condition by December 2010.

Objective 5 – Organic soils and archaeology
Maintain a stable, year round water table that avoids desiccation and oxidation of the organic soils.

Objective 6 – Settlements and highways
Ensure the proposed changes in water management do not increase the flood risk to settlements, property, highways, utility infrastructure or rights of way.

Objective 8 – Watercourse maintenance operations
Maintain the watercourses in the Plan area on rotation and in a sympathetic manner, to maintain an adequate flow of water around the sub-catchments and to enhance the diversity of ditch habitats and their associated flora and fauna.

Objective 9 – Water quality
Sustain the ditch flora and fauna in the Plan area through the provision of an adequate supply of water of high quality (defined as having water in a ditch at a given season, of sufficient quality and volume to sustain the full diversity, abundance and distribution of all aquatic plants and animals recorded in the area).

Objective 10 – Flood management
Mitigate the impacts of flooding where these are damaging to the biodiversity and agricultural interests of the Plan area.

Objective 11 – Drought management
Mitigate the impacts of drought where these are damaging to the soils, biodiversity, archaeology and agricultural interests of the Plan area.

9. Proposed water management practices

9.1. Continuation of current good practice

Many of the current management practices carried out by the Parrett Drainage Board and by the Environment Agency are meeting the needs of both farming and conservation. These good practices will continue, as set out below.

Proposal 1: The current summer penning levels at the key control structures, as set out in Table 15, will continue to be maintained by the Parrett IDB and the Environment Agency.

Reason: The current summer target water levels throughout the Plan area are considered suitable for farming and nature conservation. The current summer penning levels that will continue to be maintained by the Parrett IDB and the Environment Agency are set out in Table 15 (see proposal 6).

Proposal 2: Maintenance of the current Viewed Rhyne network will continue to be undertaken by the Parrett IDB.

Reason: The Parrett IDB will continue to maintain the existing Viewed Rhyne network, as shown on Map 2, and is of the opinion that its current maintenance procedures help to achieve favourable condition and to further conservation and biodiversity in the Plan area.

9.2. Changes to water control infrastructure

Natural England has advised the Parrett IDB that the management of water, in winter in some parts of Wet Moor SSSI, does not allow the designated site to be recorded as being in a favourable condition for wildlife. Capital improvements to water control structures are required to enable the Parrett IDB to change the management of water levels in winter in order to achieve favourable condition across the SSSI, and to help maintain favourable conditions in the future.

Proposal 3: Capital improvement works will be carried out by the Parrett IDB to help achieve favourable condition on Wet Moor SSSI.

Reason: A number of capital improvement works are proposed by the Parrett IDB in order to help achieve the objective of favourable condition on Wet Moor SSSI. These proposed works are listed in Table 13 and the locations of works are shown on Map 9.

Table 13: Proposed capital improvement works for Wet Moor

Ref	Capital works	Grid ref	Action by	Date
1.1	**Long Sutton Catchwater Tilting Weir** – replace Ablake Sluice penstock with tilting weir to control levels in the Long Sutton Catchwater.	ST 442 261	IDB	2010
1.2	**Wet Crouds Tilting Weir –** Construct new tilting weir on Crouds Lake Rhyne to control winter levels within the Wet Crouds Block.	ST456 249	IDB	2010
1.3	**Ablake Clyse** – review operation with the Environment Agency, to determine whether the existing structure can be used to maintain winter levels in the Long Sutton Main Drain.	ST 441 261	IDB & EA	2010
2.1	**Chinese Puzzle Inlet –** reconstruct inlet opposite Hammock Rhyne Sluice and renew inlet pipe (new inlet name - Hammock Rhyne Inlet). [1]	ST 456 248	IDB	2011
2.2	**Hammocks Rhyne Sluice** – refurbish or replace penstock.	ST 457 249	IDB	2011
2.3	**Hammocks Rhyne Weir** – renew fixed weir structure.	ST 451 250	IDB	2011
2.4	**West Haymoor Sluice –** Refurbish or replace penstock, including summer level control for overflow pipe.	ST 446 254	IDB	2011
2.5	**Ablake Pool Inlet –** Replace flap valve with inlet structure to control water supply from the Long Sutton Catchwater to the Ablake Pool Block.	ST446 258	IDB	2011
2.6	Installation of 2 No. telemetry outstations.	Various	IDB	2011
3.0	**Ablake Pool Tilting Weir –** Construct new tilting weir on Ablake Rhyne (to control levels within the Ablake Pool Block). [2]	ST442 260	IDB	2012
3.1	**Ablake Pool Block –** Construct earth bunds and investigate gateway culverts (to form Ablake Pool Block). [2]	Various	IDB	2012

Notes: - [1] subject to outcome of EA liability transfer agreement with IDB
- [2] detail of works subject to outcome of action 2.2

Proposal 4: The Parrett IDB will develop a capital improvement scheme for Wet Moor Raised Water Level Area on the south side of the River Yeo to maintain favourable condition for Wet Moor SSSI and improve water level management in the Plan area.

Reason: The Parrett IDB acknowledges that the effective and sustainable management of water levels is crucial to maintaining the condition of Wet Moor SSSI. The Parrett IDB will therefore develop a long-term improvements programme for water management on Wet Moor, in order to maintain the SSSI in favourable or recovering condition.

Proposal 5: Additional gauge boards and telemetry stations will be installed by the Parrett IDB in the Plan area.

Reason: To improve its ability to manage water levels in the Wet Moor area, the Parrett IDB proposes to install remote monitoring equipment and additional gauge boards at the locations set out in Table 14. Alarm settings will be established for each station, which will report directly to the Drainage Board Office. Stations may also be used to collect other relevant data such as rainfall or water quality information. Additional structures may be added to this list as part of the work undertaken by the IDB and Environment Agency under Proposal 4.

Table 14: Proposed additional gauge boards and telemetry stations for Wet Moor

Location	Grid ref.	Notes	Operator
Ablake Sluice	ST 442 261	Long Sutton Catchwater and Long Sutton Main Drain Level	IDB
Hammocks Rhyne Inlet & Tilting Weir	ST 451 250	Long Sutton Catchwater and Long Sutton Main Drain Level	IDB

9.3. Changes to target water levels

Proposal 6: The Parrett IDB and the Environment Agency will adopt the proposed changes to target water levels, as set out in Table 15, and trial these levels to ensure they meet the agreed objectives.

Reason: Natural England has advised the Parrett IDB that some parts of Wet Moor SSSI require an increase in winter water levels to provide a minimum depth of water in ditches for aquatic plants and invertebrates, and splashy fields in winter for wintering water birds. The seasonal water levels at some of the control structures will therefore need to be changed to help achieve favourable condition for Wet Moor SSSI.

The proposed changes in target winter water levels are set out in Table 15. The locations of the areas with seasonally higher water levels are shown on Map 10. The proposed improvements to the water control infrastructure, outlined in Proposals 3 and 4, will help the Parrett IDB and the Environment Agency to achieve, and maintain, the water levels required for favourable condition on the SSSI.

Table 15: Proposed target water levels for Wet Moor

Water level control structures	Operated by	Existing summer water levels (m ODN)	Existing winter water levels (m ODN)	Proposed summer water levels (m ODN)	Proposed winter water levels (m ODN)	Flood operations
River Parrett & Yeo						
Oath Lock	EA	6.60	Open	6.60	Open	Open
Thorney Mill	EA	10.30	10.05	10.30	10.05	Sluice open
Huish Episcopi Pumping Station	EA	6.25	6.00	6.25	6.00	On
Ablake Weir	EA	7.30 (boards) Sluice lowered	7.30 (boards) Sluice raised	7.30 (boards) Sluice lowered	7.30 (boards) Sluice raised	Sluice raised
Long Load Main Drain & Dunball Rhyne						
Huish Episcopi Pumping Station Access Road Flap	EA	Not penned	Not penned	Not penned	Not penned	Not penned
North Barrier Sluice	EA	Open	Open	Open	Open	Open
Whit Moor Weir	EA	Crest level 6.45	Crest level 6.45	Crest level 6.45	Crest level 6.45	Crest level 6.45
Broad Drove Penning Bay	EA	Crest level 6.55	Crest level 6.55	Crest level 6.55	Crest level 6.55	Crest level 6.55
Poplar Drove Tilting Weir	EA	7.37	Not penned	7.37	Not penned	Not penned
New East Moor Inlet	EA	Open	Closed	Open	Closed	Closed
S1	EA	6.90	7.20	6.90	7.20	-
S2	EA	6.90	7.20	6.90	7.20	-
Bowmead Drove (C)	EA	6.90	7.20	6.90	7.20	-
Broad Drove (S3)	EA	6.70	7.00	6.70	7.00	-
S4	EA	6.60	6.90	6.60	6.90	
S5	EA	6.60	6.90	6.60	6.90	
S6	EA	6.25	6.55	6.25	6.55	
Outmoor Inlet (Inlet A)	EA	Open	Closed	Open	Closed	Closed
Balham Inlet (Inlet B)	EA	Open	Closed	Open	Closed	Closed
Long Sutton Main Drain and Long Sutton Catchwater						
Ablake Clyse	EA	6.80	Open ~6.10	6.80	6.55 [1]	Open
Ablake Tunnel Penstocks	EA	1 No. open	1 No. open	1 No. open	1 No. open	2 No. open
Ablake Clyse Inlet	EA	Closed	Closed	Closed	Closed	Closed
Ablake Sluice	IDB	Closed	Closed	Proposed replacement with tilting weir		
Long Sutton Catchwater Tilting Weir	IDB	New structure		6.90 [1]	6.55 [1]	Not penned
West Haymoor Sluice	EA	Closed	Open	Closed	Open	Open
Hammock Rhyne Weir	None	Fixed weir ~6.90	Fixed weir ~6.90	Tilting weir 6.90 [1]	Tilting weir 6.55 [1]	-
Hammocks Rhyne Sluice	IDB	Closed ~7.00	Open	Closed ~7.00	Open	-
Hammock Rhyne Inlet	IDB	New structure		Open	Closed	Closed
Chinese Puzzle Inlet	None	Open	Closed	Proposed replacement with IDB inlet		
Wet Crouds Tilting Weir	IDB	New structure		Not penned	6.90 [1]	-
Ablake Pool Tilting Weir	IDB	New structure		Open [1]	6.55 [1]	-
Ablake Pool Inlet	IDB	New structure		Open	Closed	-

Notes:
- **Summer season:** Aim to achieve summer pen levels by 1st April.
- **Winter season:** Aim to achieve winter pen levels by 1st December.
- See Box 2 (page 26) for target conditions for RWLAs.
- **[1]:** Level subject to trial.
- **[~]** approximate water level.
- **ODN:** Ordnance Datum Newlyn.

Proposal 7: The Parrett IDB will support the management of Raised Water Level Areas in the Plan area, as set out in Table 16.

Reason: Within the framework provided by the operation of the arterial watercourses and control structures, the Parrett IDB will support the management of RWLAs in the Plan area, where they do not adversely affect the management of neighbouring land. Where conflict does occur, the IDB will work with landowners to achieve the best water management solution.

The Parrett IDB acknowledges that there may be potential to increase the area managed with raised water levels in the winter and/or the spring months within the Plan area. The Parrett IDB would support Natural England in their work to secure the appropriate agri-environment agreements with farmers to increase the area managed for breeding waders in the spring during the five years of this WLMP. The improvements to the water management infrastructure in this Plan would support and not prejudice the realisation of these opportunities in future years.

The areas with seasonally higher water levels are set out in Table 16 and their locations are shown on Map 10.

Table 16: Areas with seasonally higher water levels in Wet Moor

RWLA	Maintained & operated by	Area in hectares	Area in acres
Wet Moor	Environment Agency	264	652
Horsey Farm	Private	37	91
Hay Moor	Private	13	32
Town Tree Farm	Private		

9.4. Changes to operational procedures and responsibilities

Proposal 8: The Parrett IDB and the Environment Agency will adopt a flexible operating regime that allows water levels and seasonal penning dates to vary in response to weather conditions.

Reason: The Parrett IDB considers that flexibility is a critical element in the management of water across the Somerset Levels and Moors. The timing of operations (e.g. setting pen levels, watercourse maintenance) and the water levels need to be responsive to the prevailing weather conditions at the time. The dates of operations and the water levels set out in this Plan are the product of many years experience and are most likely to be accurate for a 'normal season'.

The Parrett IDB and the Environment Agency propose to adopt the principle that:

- The timing of the normal seasonal changes in pen level can vary by up to two weeks from the date specified in the Plan;
- The normal water level can range up to 50 mm above the level specified in the Plan during dry conditions;
- The normal water level can range up to 100 mm below the level specified in the Plan during wet conditions.

The Environment Agency and the Parrett IDB have also agreed to meet three weeks before the normal seasonal changeover date to confirm summer/winter penning dates based on catchment

conditions. If the season or local conditions require the Parrett IDB or the Environment Agency to operate outside these 'normal' parameters then consultation with Natural England will take place.

Proposal 9: The Parrett IDB, the Environment Agency and Natural England will establish and maintain a monitoring programme to support the implementation of the Plan and ensure water level management meets the agreed objectives.

Reason: Changes in water levels and operational practices will be monitored by the relevant authorities and assessed to determine their effects on conservation, agriculture and flood risk management. The Parrett IDB will report on the outcomes of this monitoring, at least once a year, for three years following the implementation of the Plan.

Several organisations are involved in monitoring environmental information that is relevant to the WLMP, as set out in Table 17.

Table 17: Monitoring arrangements for Wet Moor

Lead body	Topic of monitoring
Parrett IDB	• Target water levels at key IDB control structures; • Maintenance of Viewed Rhynes; • Monitoring channel profiles and conveyance in Viewed Rhynes; • Maintenance of minor watercourses, farmers ditches etc; • Water quality.
Environment Agency	• Target water levels at key Agency control structures; • Maintenance of Main Rivers; • Monitoring channel profiles and conveyance in Main Rivers; • Catchment rainfall and weather events; • Water quality.
Natural England	• Plant, bird, invertebrate and mammal communities; • Land management; • Surface water and soil wetness conditions; • Water quality.

It is anticipated that an ongoing monitoring programme of long-term changes in the plant, bird, invertebrate and mammal communities of the Wet Moor area will be undertaken by Natural England and others. The data collected will be used in combination with Environment Agency and Parrett IDB environmental data, and local knowledge, to inform and refine decisions regarding suitable water levels in the future.

Proposal 10: The Parrett IDB and the Environment Agency will resolve the proposed changes in the maintenance and operational responsibilities for selected water control structures and watercourses in the Plan area.

Reason: There are merits to having one Operating Authority manage a greater proportion of the smaller structures that control water levels within a defined system. The Environment Agency and the Parrett IDB are negotiating the handover of maintenance and operational responsibility for some of the control structures currently maintained and operated by the Environment Agency.

DEFRA and Government priorities, with regards to flood risk management, have been evolving over the past few years. This has resulted in the Environment Agency having to review its

priorities and activities. The Environment Agency currently maintains and operates many structures that provide essential land drainage and nature conservation benefits. It also manages and maintains Main Rivers that serve no critical flood defence benefit. In the future the Environment Agency may no longer be able to justify maintaining or operating these structures and watercourses. The Environment Agency may consider de-maining some watercourses on this basis in the future.

One possible option is for the Parrett IDB to take over the ownership and management of these watercourses and structures, to continue a system of professional management and to provide continuity for the benefit of land owners and wildlife. The structures identified for this proposal are listed in Table 18. Additional structures may be added to this list as part of the work undertaken by the Parrett IDB and Environment Agency under Proposal 4.

Table 18: Proposed changes in ownership and responsibility of water control structures

Structure	Current operator	Proposed operator
West Haymoor Sluice	EA	IDB
Hammocks Rhyne Sluice and Chinese Puzzle Inlet	EA	IDB

9.5. Changes to maintenance practices

Proposal 11: The Environment Agency will complete its review of the maintenance of Main Rivers within and adjacent to the Plan area.

Reasons: The Environment Agency is currently investigating the effectiveness of silt removal from a number of Main Rivers and Drains in the Parrett IDB District including, the Rivers Parrett and Tone, North Moor Main Drain and West Sedgemoor Main Drain. The Environment Agency will use the findings of these investigations to help determine the need for a programme of de-silting.

10. Unresolved matters

The potential effects of climate change and sea level rise on the Plan area are unclear at present. Current studies by the Environment Agency, and others, should inform the Parrett IDB on these matters and the mitigation or adaptation required in water management to accommodate these impacts.

The Government has recently introduced the Carbon Reduction Commitment, which the Environment Agency and other public sector organisations must comply with. The Environment Agency has set itself a target of 33% carbon reduction by 2015. Therefore, water level management needs to be carried out with the minimum of CO_2 output. The Parrett IDB will work with the Environment Agency to identify opportunities, such as maximising gravity discharge, and investigate the potential impacts of such measures on flood risk management and the environment.

11. Amendments agreed during the period of the Plan

Amendments to this Plan which are agreed by Drainage Board, the Environment Agency and Natural England are set out in Table 19.

Table 19: Amendments agreed during the period of the Plan

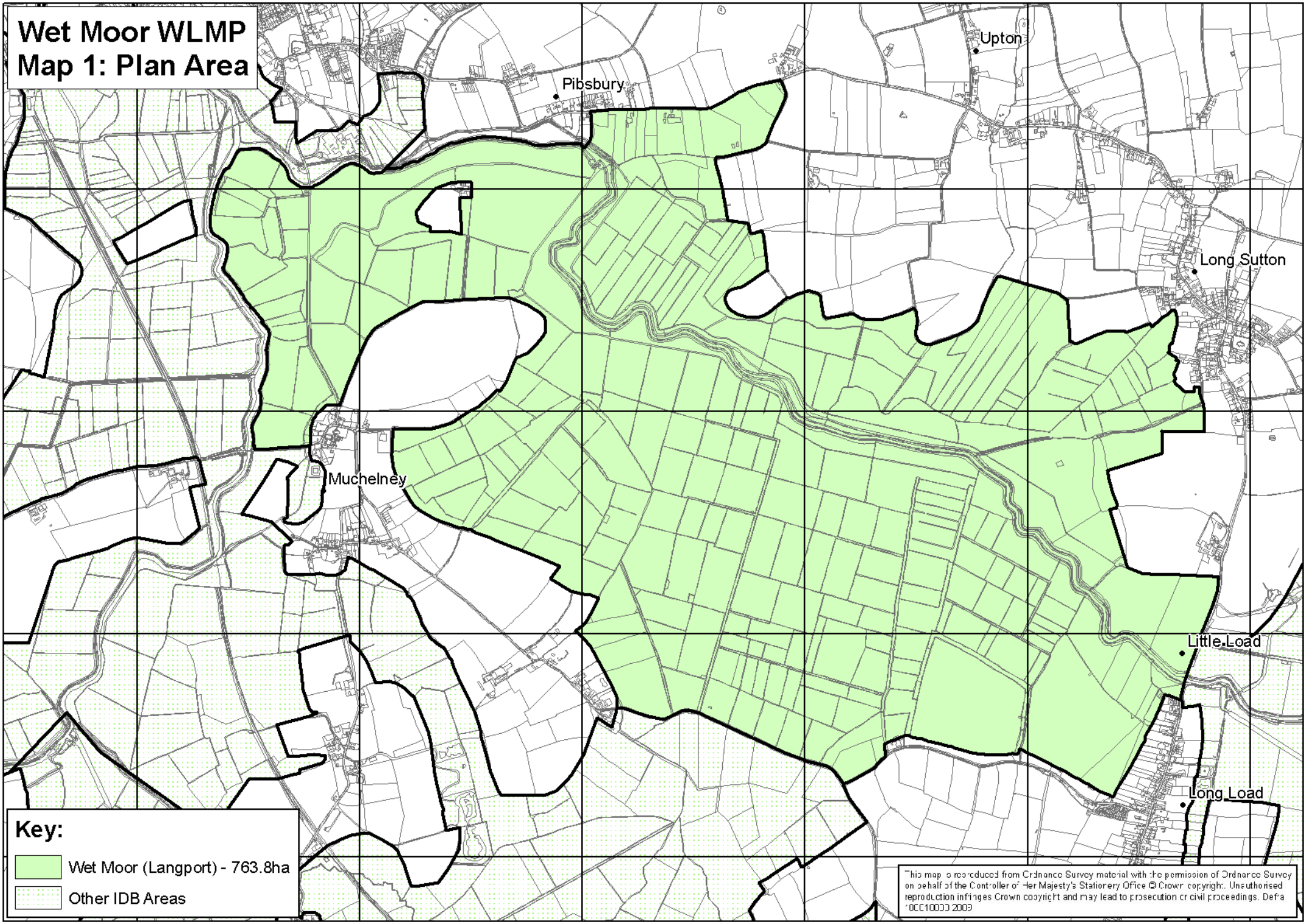
No.	Date	Amendment	Agreed

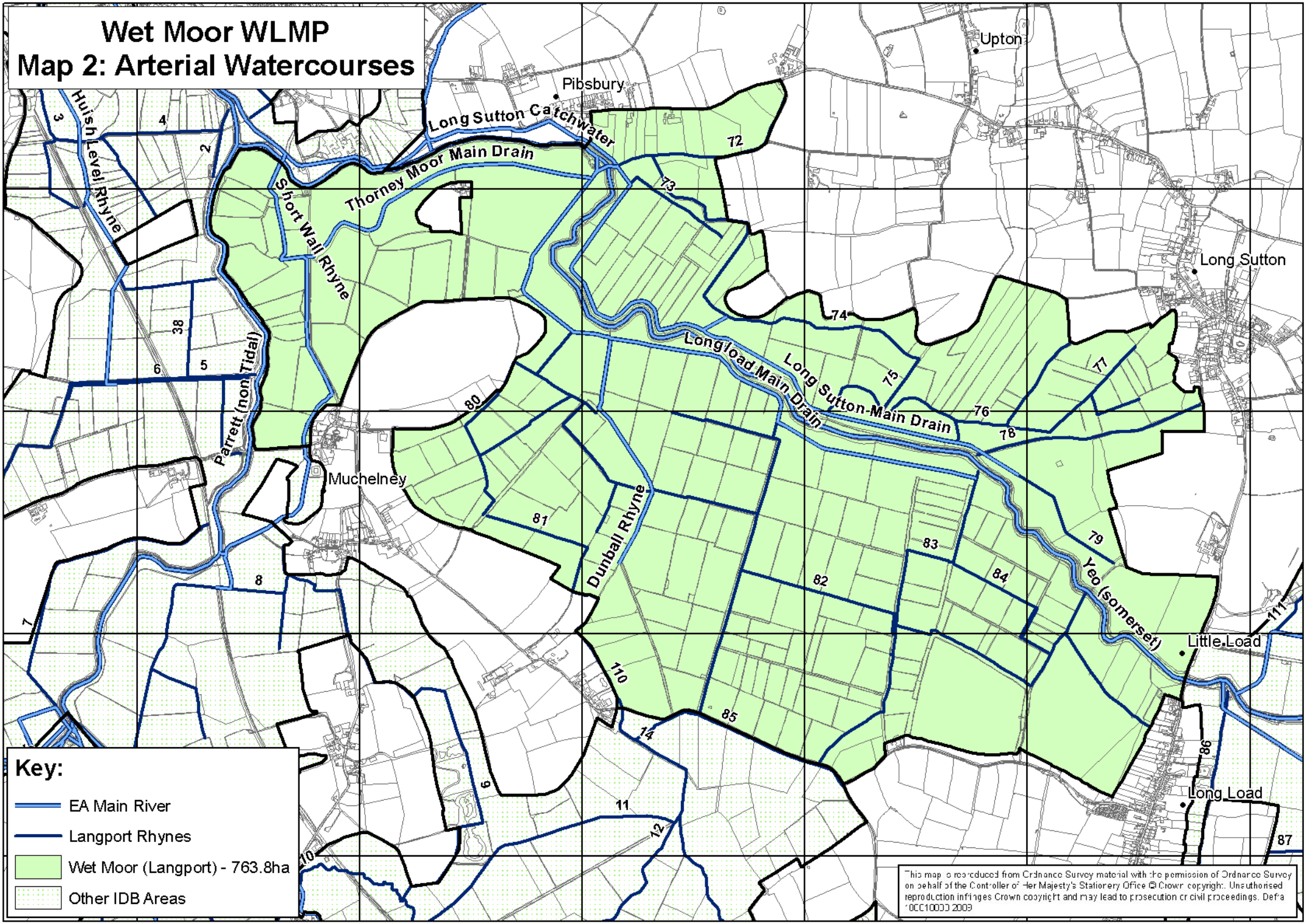
12. Review arrangements

The Parrett IDB proposes to review this WLMP in 2015, five years after it has been adopted. If any alterations to operating procedures or maintenance are required before 2015, these will be discussed by the IDB, the Environment Agency and Natural England and can agreed as interim measures pending the full review.

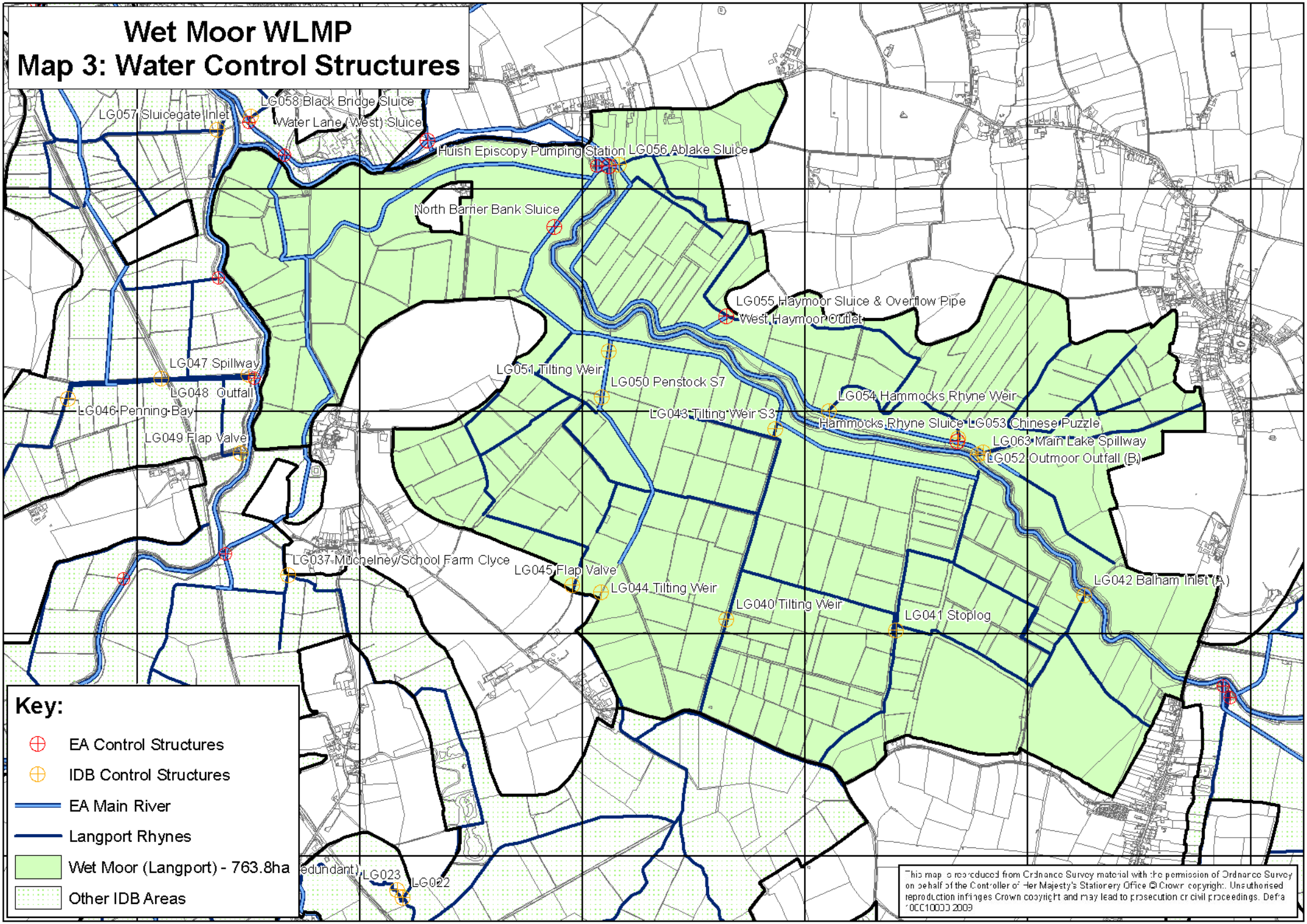
13. Timetable of actions: Wet Moor 2010 WLMP

	Proposed continuation of current good practice	
1:	The current summer penning levels at the key control structures, as set out in Table 15, will continue to be maintained by the Parrett IDB and the Environment Agency.	**Ongoing**
2:	Maintenance of the current Viewed Rhyne network will continue to be undertaken by the Parrett IDB.	**Ongoing**
	Proposed changes to water control infrastructure	
3:	Capital improvement works will be carried out by the Parrett IDB to help achieve favourable condition on Wet Moor SSSI.	**Complete by end 2014**
4:	The Parrett IDB will develop a capital improvement scheme for Wet Moor Raised Water Level Area on the south side of the River Yeo to maintain favourable condition for Wet Moor SSSI and improve water level management in the Plan area.	**Works identified by end 2011**
5:	Additional gauge boards and telemetry stations will be installed by the Parrett IDB in the Plan area.	**Complete by end 2012**
	Proposed changes to target water levels	
6:	The Parrett IDB and the Environment Agency will adopt the proposed changes to target water levels, as set out in Table 15, and trial these levels to ensure they meet the agreed objectives.	**From 2010**
7:	The Parrett IDB will support the management of Raised Water Level Areas in the Plan area, as set out in Table 16.	**Ongoing**
	Proposed changes to operational procedures and responsibilities	
8:	The Parrett IDB and the Environment Agency will adopt a flexible operating regime that allows water levels and seasonal penning dates to vary in response to weather conditions.	**Immediate**
9:	The Parrett IDB, the Environment Agency and Natural England will establish and maintain a monitoring programme to support the implementation of the Plan and ensure water level management meets the agreed objectives.	**Establish winter 2009**
10:	The Parrett IDB and the Environment Agency will resolve the proposed changes in the maintenance and operational responsibilities for selected water control structures and watercourses in the Plan area.	**Complete by end 2011**
	Proposed changes to maintenance practices	
11:	The Environment Agency will complete its review of the maintenance of Main Rivers within and adjacent to the Plan area.	**Complete by end 2011**


Wet Moor WLMP
Map 1: Plan Area
Upton
Pibsbury
Long Sutton
Muchelney
Little Load
Long Load
Key:
Wet Moor (Langport) - 763.8ha
Other IDB Areas
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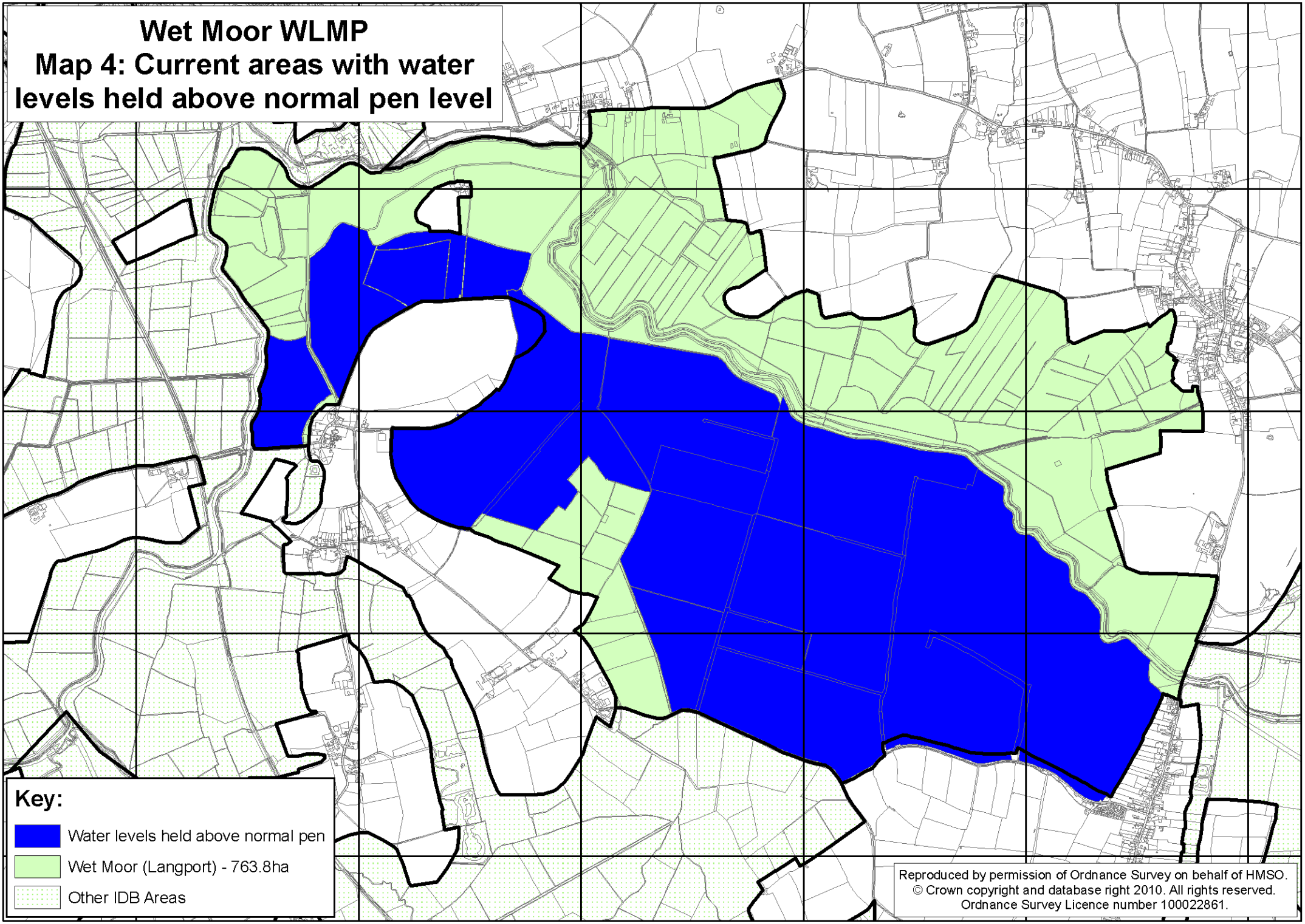

Wet Moor WLMP
Map 2: Arterial Watercourses
Upton
Pibsbury
Long Sutton Catchwater
Thorney Moor Main Drain
Short Wall Rhyne
Huish Level Rhyne
Parrett (non Tidal)
Long Sutton
Longload Main Drain
Long Sutton Main Drain
Muchelney
Dunball Rhyne
Yeo (somerset)
Little Load
Long Load
Key:
EA Main River
Langport Rhynes
Wet Moor (Langport) - 763.8ha
Other IDB Areas
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Wet Moor WLMP
Map 3: Water Control Structures



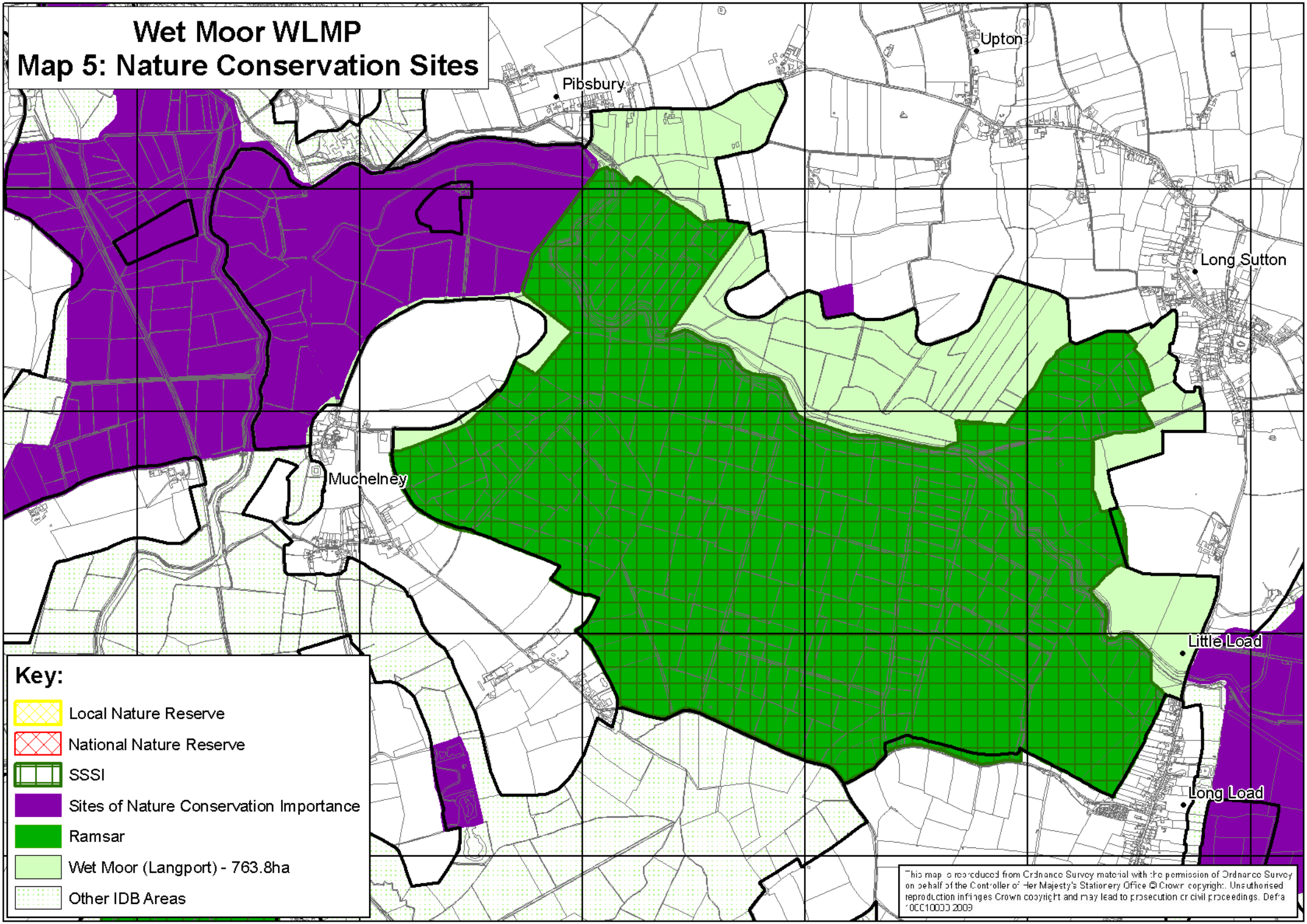
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Wet Moor WLMP
Map 4: Current areas with water levels held above normal pen level

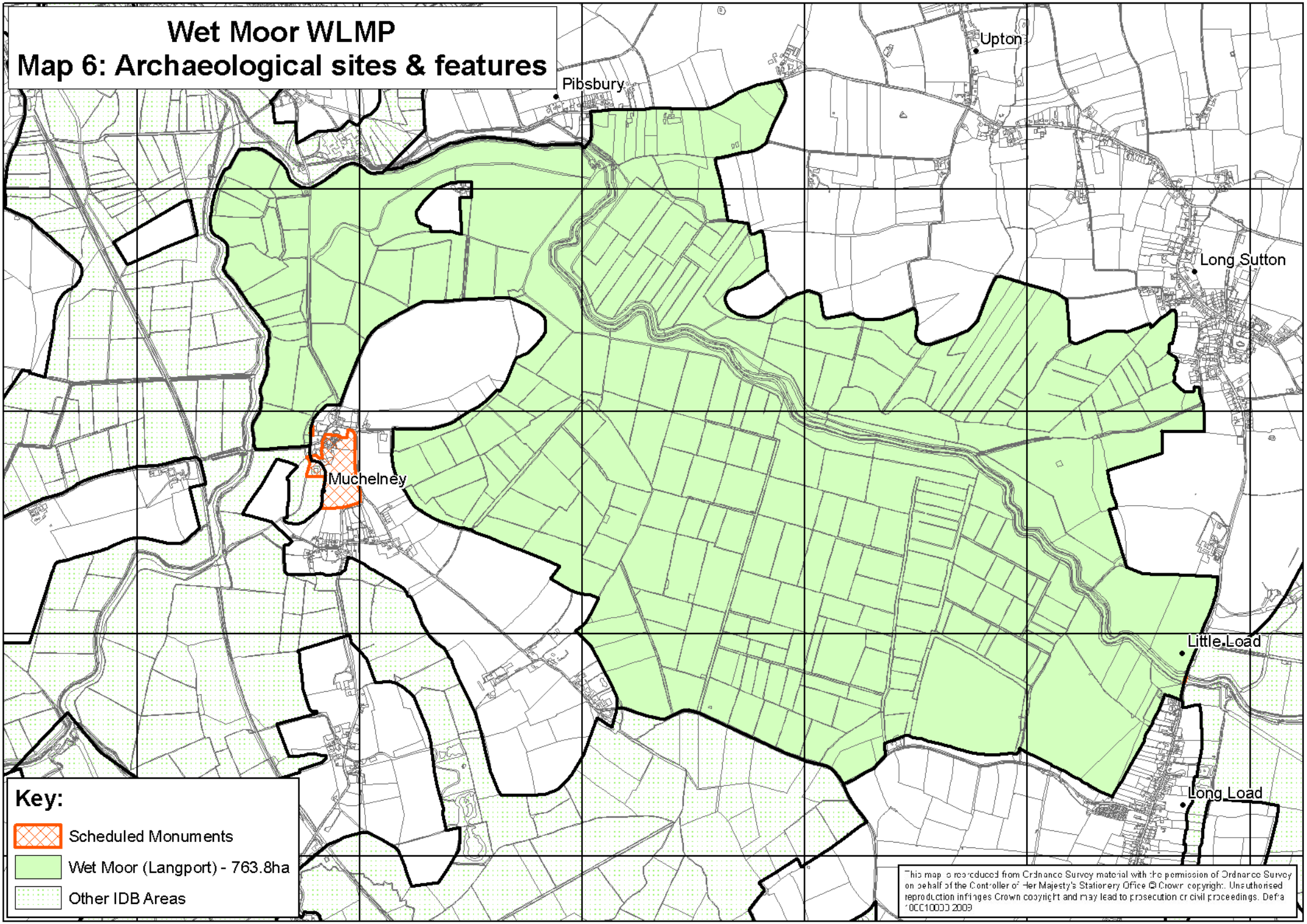


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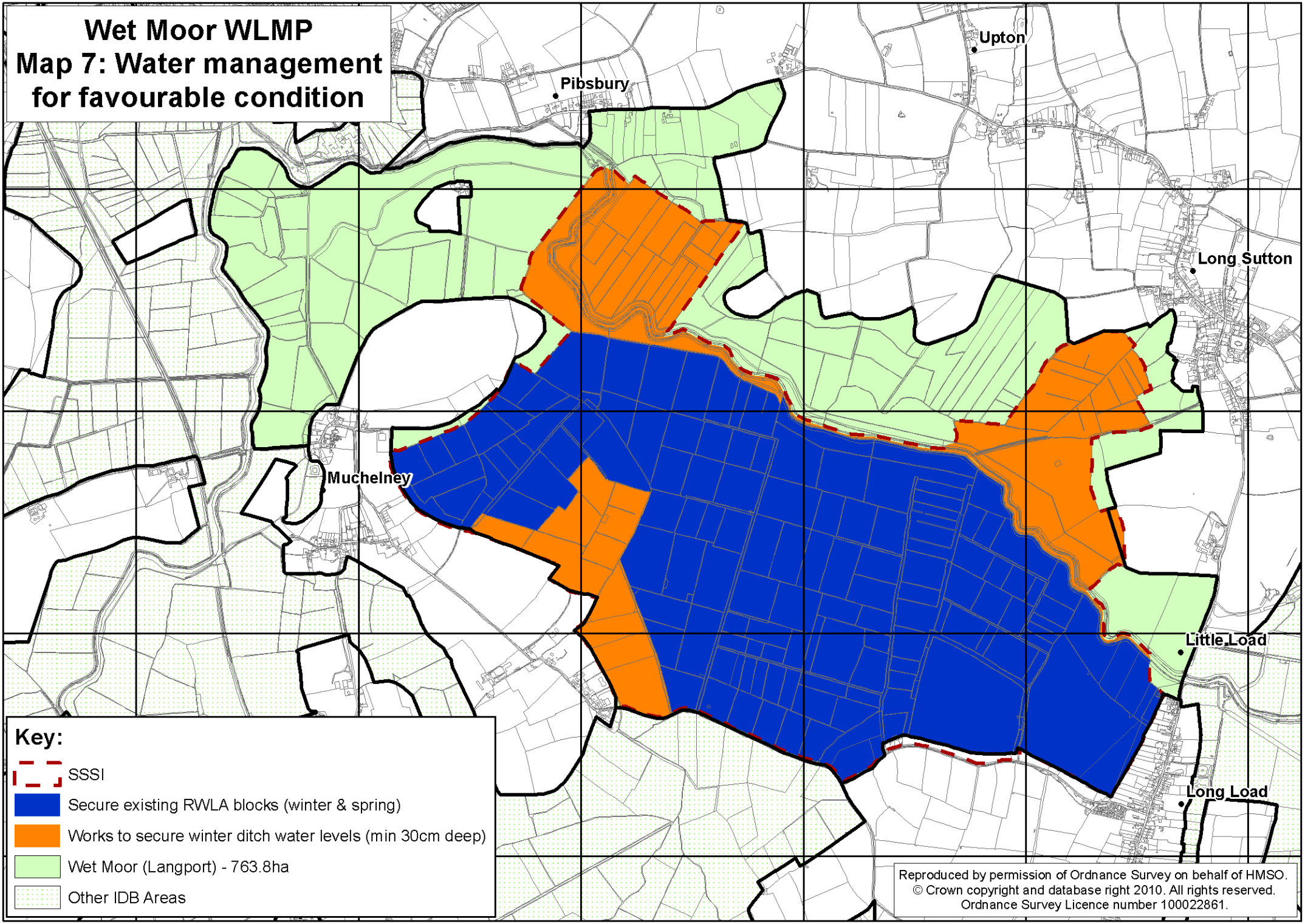
Wet Moor WLMP
Map 5: Nature Conservation Sites



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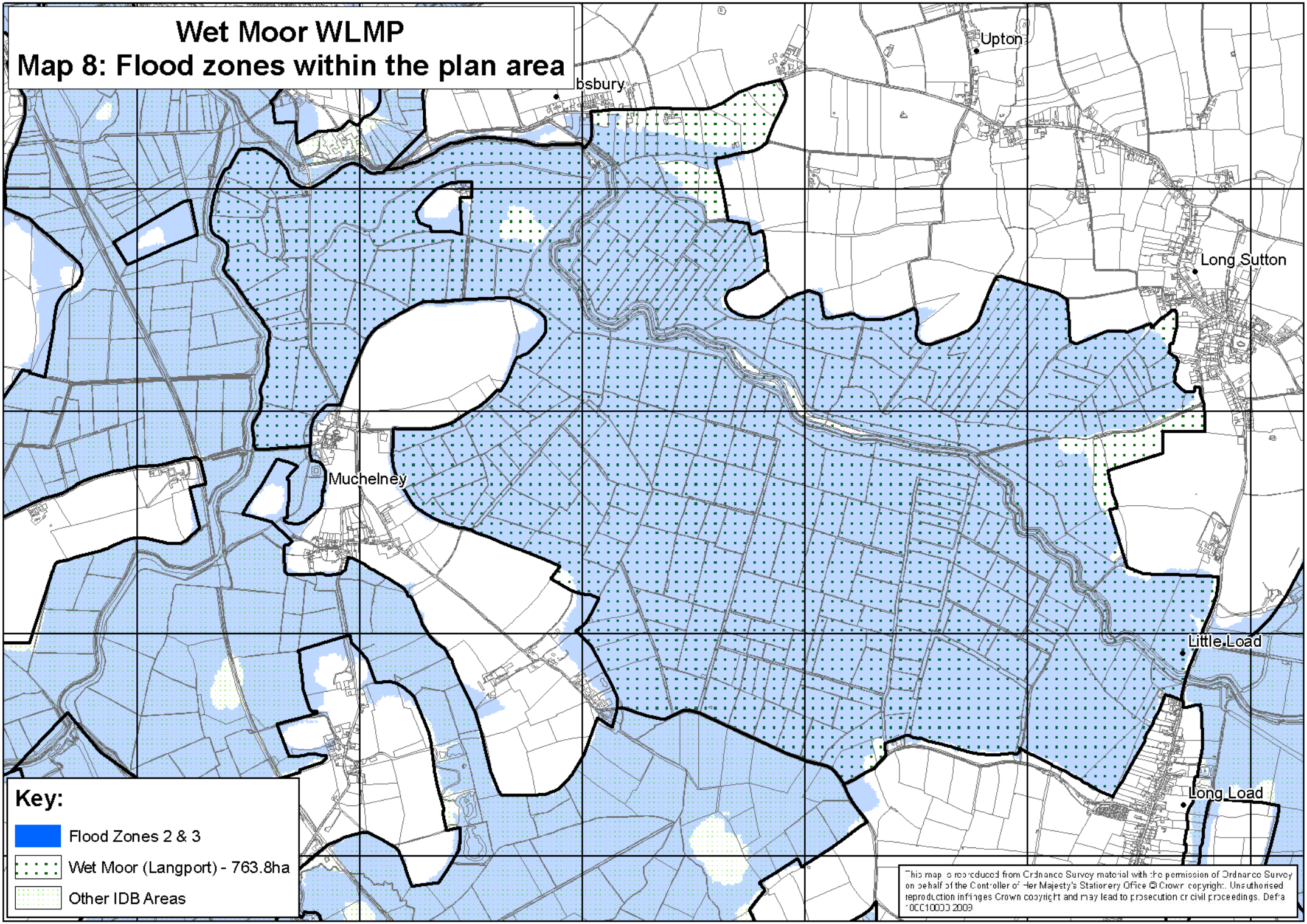

Wet Moor WLMP
Map 6: Archaeological sites & features
Upton
Pibsbury
Long Sutton
Muchelney
Little Load
Long Load
Key:
Scheduled Monuments
Wet Moor (Langport) - 763.8ha
Other IDB Areas
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Wet Moor WLMP
Map 7: Water management for favourable condition



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Wet Moor WLMP
Map 8: Flood zones within the plan area



LSCW Tilting Weir
Replace Ablake Sluice
with tilting wier

Ablake Clyse
Operational levels to
be reviewed with EA

Ablake Pool
New tilting weir
(alternative location at A)

New inlet structure to Ablake Pool
(replace existing flap)

SWL = 6.80
WWL = 6.55

Small number of
gateway culverts

A

West Haymoor Sluice
Refurbish or replace penstock
(including summer
level control for LSCW)

New inlet structure
required

SWL = 6.85
WWL = 6.55

SWL = 6.90-7.00
WWL = 6.55

New level control
structure required

Wet Crouds
New tilting weir

SWL = 7.00
WWL = 6.90

Hammocks Rhyne Weir
Replace fixed weir with
tilting weir

Chinese Puzzle
Rebuild inlet opposite
Hammocks Rhyne Sluice
and replace inlet pipe

Hammocks Rhyne Sluice
Refurbish or replace
penstock

SWL = 6.80
WWL = 6.55

Key:

- EA Control Structures
- Existing IDB Structure
- New Tilting Weir
- Private structure
- Bund

LSCW = Long Sutton Catchwater

LSMD = Long Sutton Main Drain

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PART OF

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PROJECT TITLE

WET MOOR
FAVOURABLE CONDITIONS PROJECT

DRAWING TITLE

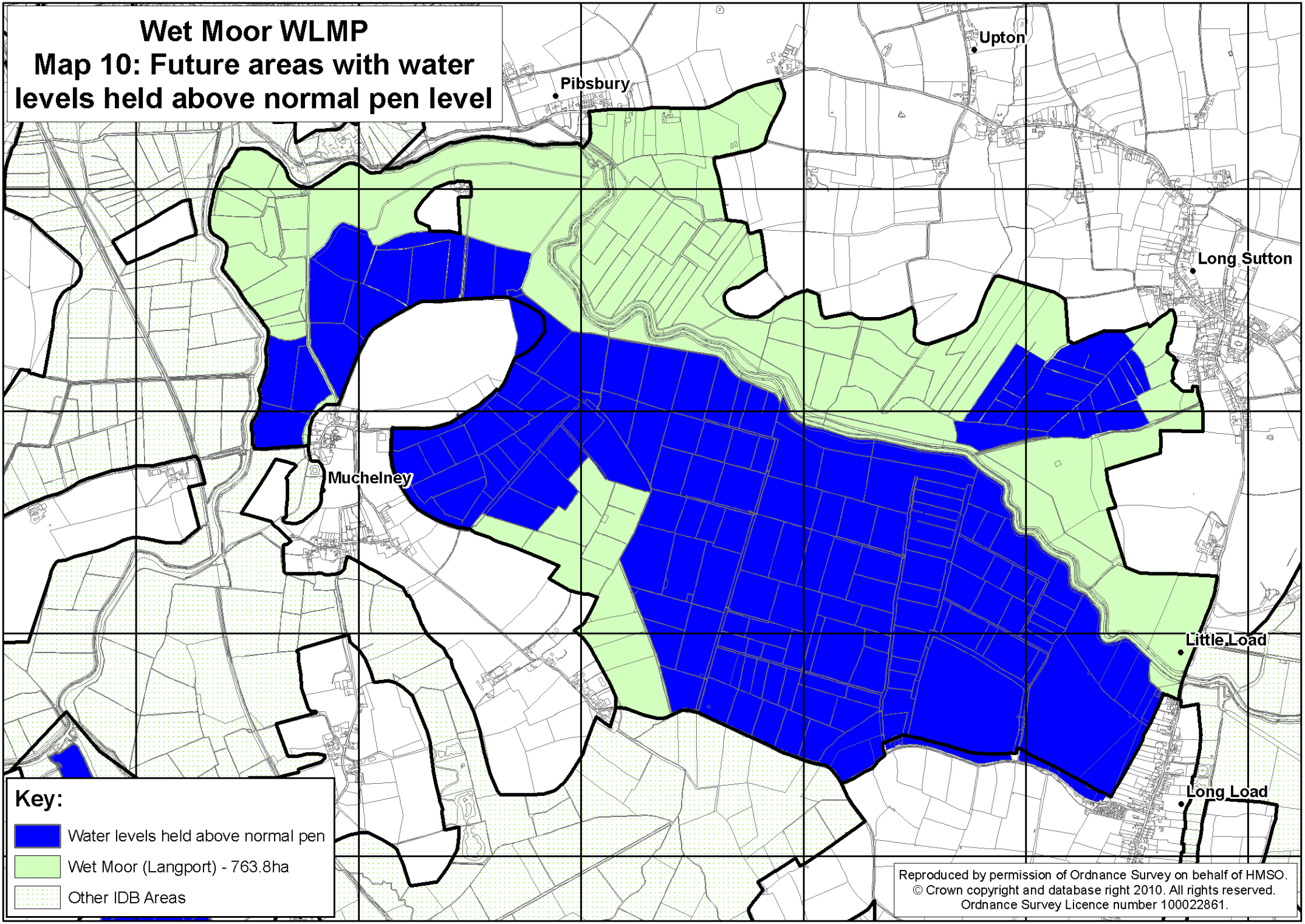
POST CONSULTATION SCHEME MAP

DATE		
JUNE 2010		
DRAWN BY	APPROVED	ISSUE
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DRAWING NUMBER

P/WTM/FC/P/

Wet Moor WLMP
Map 10: Future areas with water levels held above normal pen level



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