# South Drain Water Level Management Plan

# Lower Brue Drainage Board and Upper Brue Drainage Board

# Approved April 2010

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# 1. Approval of the Water Level Management Plan

This Water Level Management Plan has been prepared by the Upper Brue and Lower Brue Drainage Boards for the South Drain area of the Drainage Board Districts. Contributions to the WLMP have been received from the Environment Agency, Natural England and others.

| **Water Level Management Plan – General details** | |
|---|---|
| Plan area | South Drain area (Lower Brue and Upper Brue Drainage Boards) |
| SSSI(s) covered | Catcott, Edington and Chilton Moors SSSI<br>Shapwick Heath SSSI<br>Sharpham Moor Plot SSSI<br>Street Heath SSSI<br>Westhay Heath 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 – Lower Brue Drainage Board | Jeff Fear | | |
| Chairman – Upper Brue Drainage Board | Martin Watts | | |
| 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 the control of water is important for the maintenance or rehabilitation of that interest. Priority is given to WLMPs for Sites of Special Scientific Interest (SSSIs), particularly those of international importance (e.g. Special Protection Areas, Ramsar Wetlands of international importance). The Plans are a means of balancing and integrating water level management for a range of land uses and activities within an area, including agriculture, recreation, flood risk and conservation.

The Government has established a Public Service Agreement (PSA) target to ensure that 95% of all SSSIs are in a favourable condition (or in an unfavourable but recovering condition) by December 2010. The PSA target is being applied to Natural England and to the Drainage Authorities operating within the WLMP area. In 2004, English Nature (now Natural England) carried out a review of wetland SSSIs in unfavourable condition and identified a number of priority sites where achieving appropriate water level management was critical to securing favourable condition. Five of the priority sites identified are within the area covered by this WLMP:

- Catcott, Edington and Chilton Moors SSSI (1083ha). Currently, 95% of the site is in unfavourable condition due to under management, water logging as result of three years of very wet conditions summers and low water levels in winter and spring resulting in a limited extent of surface water conditions.

- Shapwick Heath SSSI (394ha). Currently only one SSSI unit on Natural England's Canada Farm is in unfavourable condition due to poor water quality.

- Westhay Heath SSSI (25.9ha). This SSSI is in unfavourable recovering condition due to extensive scrub management works carried out in November 2009 and the correct water level regime.

- Sharpham Moor SSSI (0.5ha). This SSSI is in 100% favourable condition due to the correct grazing and water level regime.

- Street Heath SSSI (12.55ha). Currently 100% of the site is in unfavourable condition due to inappropriate water levels, scrub encroachment and ongoing peat extraction.

Catcott, Edington and Chilton Moors SSSI, Shapwick Heath SSSI and Westhay Heath SSSI form part of the Somerset Levels and Moors Special Protection Area (SPA) and Ramsar site. The Drainage Boards each recognise their status as a 'Competent Authority' for the purposes of the Conservation (Natural Habitats etc) Regulations 1994 when considering any plan or project which is likely to have a significant effect on features of European importance in the SPA. The Drainage Boards also recognizes their duty to further conservation as part of their statutory obligations under relevant legislation including the Land Drainage Act 1991, the Countryside and Rights of Way Act 2000 and the Natural England and Rural Communities Act 2006.

The WLMP will assist the Drainage Authorities, such as the Upper Brue and Lower Brue Drainage Boards and the Environment Agency, to carry out their nature conservation duties across the Plan area. In addition, the WLMP will help the Drainage Authorities to ensure that the investment in infrastructure is appropriate and maintenance of these assets continues in the future.

## 2.2. Plan area

The Plan area covers 12,172 acres (4,928 hectares) of the Brue Valley which is influenced by the South Drain which flows through areas managed by the Upper Brue and Lower Brue Drainage Boards. The location and extent of the Plan area is shown on Map 1.

The drainage area is bounded to the north by the River Brue and Division Rhyne, to the east by Glastonbury, and the Glastonbury Millstream, and to the west by the Cripps River.

## 2.3. Responsibility for preparation and implementation of the Plan

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

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

## 2.4. Consultation and Plan approval

The First Draft of the Water Level Management Plan was considered by the Upper Brue and Lower Brue Drainage Boards at their respective meetings in October 2009 and 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 November and December 2009.

Consultation responses, and any amendments to the WLMP arising from the consultation, were considered by the Boards in March 2010, before recommending the WLMP for approval by the Boards at their respective meetings.

## 2.5. Consultation and Plan approval

The First Draft of the Water Level Management Plan was considered by the Upper Brue and Lower Brue Drainage Boards at their respective meetings in October 2009 and endorsed for purposes of consultation with drainage ratepayers, Statutory Bodies and other organisations. Consultation on the WLMP will take place during a four week period in November and December 2009.

Consultation responses, and any amendments to the WLMP arising from the consultation, were considered by the Boards in March 2010, before recommending the WLMP for approval by the Boards at their respective meetings.

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

The following criteria will be used by the Lower Brue and Upper Brue Boards 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 Lower Brue and Upper Brue Boards will satisfy themselves 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 Boards to achieve;
- Will fulfil all the legal obligations of the Boards, 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 Lower Brue and Upper Brue Boards will satisfy themselves 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 Boards 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 Boards 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 Lower Brue and Upper Brue Boards will satisfy themselves 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 Boards 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 Boards, including those related to achieving favourable condition and biodiversity;
- Does not carry a significant risk that the Boards 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 Lower Brue and Upper Brue Boards 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).

# 3. Hydrology, watercourses and infrastructure

## 3.1. Topography and soils

The upland regions of the Brue catchment are characterised by the Polden Hills to the south, the Wessex Vales to the east and the Isle of Wedmore to the north, and water from these areas drains into the low lying Somerset Levels and Moors. The Polden Hills are characterised by Lias, whilst the eastern scarplands are characterised by Cornbrash, Oolitic limestones and the Kellaway Beds of impermeable clay. The coastal Levels are a wide belt of deep and stoneless calcareous clay soils over marine alluvium.

The inland Moors consist of deep organic peat soils derived from raised bog and fen peat over the last 6000 years. The land surface varies from levels of 8m above Ordnance Datum Newlyn (ODN) near the River Brue to 2m ODN further inland. Some flood water is prevented from inundating the low lying land by embankments along both banks of the River Brue.

The soils in the Catcott, Edington and Chilton Moors are principally of the Altcar series reed peat's which are overlain in parts by remnants of the Turbary Moor series moss peats. On the northern and southern fringes of the site the peat soils are overlain by Midelney series alluvial clay. The soils around Westhay, Meare, Glastonbury Heath and Waste area are mainly peat with a deeper covering of clay in the far eastern margin.

## 3.2. Water supply

The average annual rainfall for the Brue Valley catchment area from 1999 to 2007 is 773 mm. This figure has been calculated using five Environment Agency observer rain gauges located within and around the Brue Valley catchment area.

The River Brue and the South Drain are the principal watercourses supplying water in this Plan area.

The Brue originates in the Wessex Vales, near Bruton, flowing westwards through the low-lying peaty Moors and the slightly higher clay Levels. The Brue enters the Plan area to the south west of Glastonbury where it turns north to the B3151 road and then west towards Westhay and further downstream, Highbridge. At the confluence of Division Rhyne and the Brue, the Brue flows along the northern boundary of the Plan area to Cripps Farm. At Cripps Farm the Brue leaves the Plan area and eventually discharges into the Bristol Channel at Highbridge. A tidal sluice at Highbridge excludes the sea, thereby protecting the low-lying land from tidal inundation.

The South Drain originates at Actis Tunnel and flows west, forming the southern boundary of the Plan area as far as Buscott. From here the river turns north where the Glastonbury Canal joins the South Drain, and then flows west through the centre of the Plan area to Gold Corner Pumping Station.

The Brue provides water to the Plan area in several different ways. To the east, and outside of the Plan area, at Butt Moor Bridge the river supplies water to Kennard Moor (north of the Brue) and into Read Mead Rhyne. This rhyne is diverted under the Glastonbury Millstream and the Brue via Actis Tunnel and becomes the South Drain. The Brue also supplies water to the South Moor area (south of the Brue) at Butt Moor Bridge. This water eventually flows into Old Rhyne and into the South Drain, south of the Actis Tunnel, near Street. Additionally the Brue supplies the Glastonbury Millstream at Clyse Hole. The Glastonbury Millstream feeds New Close Moor before returning to the Brue at Cold Harbour Bridge. New Close Moor feeds into Aqueduct Sluice and the Glastonbury Canal.

The Brue Valley has some of the lowest lying land in Somerset, with some land lying four metres below the highest tide levels in the nearby Bristol Channel. Where the Brue crosses the peaty Moors it acts as a 'high-level carrier' conveying the water from the upland catchments at levels which are higher than the adjacent land. Most of the water in the Moors lies in a network of man-made channels (known locally as 'rhynes') often running in parallel to the river, but at a lower level. The rhynes provide a dual role of irrigating the Moors (acting as wet fences and to supply water for livestock) and draining the areas after periods of high rainfall. The water from these inland rhynes is lifted up to river level by pumping stations.

The water levels in both the Brue and the South Drain are, to a large extent, determined by control structures further downstream in the catchment area (i.e. Hackness Sluice and Highbridge Clyse on the Brue and Gold Corner Pumping Station and Shaking Drove Tilting Weir on the South Drain).

Details of these supply channels and inlets can be found in Section 3.7.1 and the locations of these structures are shown on Map 3.

## 3.3. Drainage

The principal outlets for water from the Plan area are the River Brue and the Huntspill River. In ideal conditions the South Drain is allowed to gravitate into the Cripps River and ultimately the Brue via Shaking Drove Tilting Weir. South Drain is also used to maintain a level in the Huntspill, as and when required, using Gold Corner Pumping Station. When the level in the Cripps River is too high to allow gravitation from the South Drain the South Drain is discharged into the Huntspill via Gold Corner Pumping Station. If the conditions in the South Drain are too dry, Shaking Drove Tilting Weir can be lowered and the gravitation flap adjusted to allow water from the Brue to be diverted via the Cripps into the South Drain.

In flood conditions, flood water from the River Brue can be diverted down the Cripps River via Gold Corner Sluice into the Huntspill and out into the Parrett Estuary.

The water level in the Huntspill can be lowered quickly to accommodate for the change in levels between the Cripps River and the Huntspill – for example when water is penned at Highbridge, or during flood, drought or tide-lock conditions.

Water levels in the Plan area are lowered in winter months by the Gold Corner Pumping Station to allow better drainage and to reduce the risk of overland flooding. However, most watercourses still retain a low pen level in winter to maintain the conservation interests and reduce frost damage and erosion of banks.

In parts of Catcott, Edington and Chilton Moors SSSI (the three existing Raised Water Level Areas), the watercourses are currently penned at higher levels in the winter and spring months to maintain the conservation interests of wet grassland habitats, and to provide suitable conditions for overwintering migratory wildfowl and waders. Details of these areas with seasonally higher water levels are given in Table 8 and are shown on Map 4.

During the summer months, the emphasis changes from drainage to irrigation, except during periods of heavy rainfall when there is a risk of flooding. From early April to the end of November, sluice gates or penning boards are generally operated to raise water levels in the rhynes and ditches to higher levels. The higher summer levels are required to:

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

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

c) Maintain the conservation interest of the watercourses.

The private ditches in some parts of the Plan area are maintained at a lower level by the landowner by means of private drainage schemes consented by the Drainage Board.

## 3.4. Asset management systems

The Environment Agency's Flood and Coastal Risk Management (FRCM) Department manages its assets using a "System" approach introduced in 2005. A 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.

There are four FRM systems which geographically cover the South Drain Plan Area:

- **FR/14/S022 South Drain (High)**
- **FR/14/S104 Glastonbury (High)**
- **FR/14/S016 Brue Glastonbury to Cripps (High)**
- **FR/14/S106 Huntspill River (Medium)**

The Environment Agency has adopted four maintenance categories to identify and prioritise risk for the systems, these are:

- **High** – Generally urban areas with high population, or areas containing Flood Storage Reservoirs where failure could cause risk to life. Watercourses and structures require highest level of maintenance.
- **Medium** – Urban to rural areas with relatively low population densities. Watercourses and structures require moderate too high level of maintenance.
- **Low** – Rural areas and agricultural land which is sparsely populated.

Performance specifications are given to each system and to the individual assets 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 most needed (i.e. people, property and environment) using a risk based approach.

Each Environment Agency owned 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 Drainage Boards manage their assets in the Plan area under comparable asset management systems.

## 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.
- *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 Brue provides an overview of flood risk management in the catchment for the next 100 years. The Plan will be reviewed every six 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 Environment Agency proposes to adopt Policy Option 3 for the floodplains of the Brue catchment. The Environment Agency, and others, must continue with existing or alternative actions to manage flood risk at the current level (accepting that flood risk will increase over time).

### 3.5.2. Catchment Abstraction Management Strategy

To ensure water resources are managed in a sustainable way the Environment Agency has developed Catchment Abstraction Management Strategies (CAMS) to assess the water availability in catchments in England and Wales. The Parrett CAMS (published in March 2006) and the Brue, Axe and North Somerset Streams CAMS (published in May 2006) are the current documents in circulation. However, these do not cover the Levels and Moors as the water availability assessment can only be used on flowing rivers, rather than those which are managed by control structures. As part of the Environment Agency's future CAMS, the current CAMS will be reassessed and the impact of the Somerset Levels and Moors will be included. There are two new documents which are in the process of being written, and will be completed by February 2011; they are:

- Parrett, Brue and West Somerset Streams CAMS (PBWSS)
- Bristol Avon, Little Avon, Axe and North Somerset Streams CAMS (BALAANSS)

The aim is to set an appropriate abstraction licensing policy for those rivers that are influenced by the inlets and pumping stations that control water levels within the Moors. The new CAMS will not assess or change the water levels held across the Levels and Moors. Instead, they will assume that the water levels stated in the Water Level Management Plans are appropriate. They will use the information held within the WLMPs to determine how much water will be taken from, and pumped into, the Main River carriers that flow through the Levels and Moors (e.g. River Brue). The Strategy will assess if these water inputs/outputs have the potential to compromise the ecology within these Main River carriers. If the Strategy 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 from the rivers.

## 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 of property and risk to human life. There are seven Main Rivers within the Plan area; the River Brue, Division Rhyne (although this Rhyne does not affect the Plan area and is only a boundary), Glastonbury Canal, Glastonbury Millstream, South Drain, Huntspill River, and the Cripps River.

The seven Main Rivers within the Plan area are summarised in Table 1. The locations of the Main Rivers are illustrated on Map 2. The control structures on these watercourses are listed in Tables 2 - 4.

### 3.6.2. IDB watercourses

The Drainage Boards maintain and controls a network of watercourses (known as “Viewed Rhynes”) within the Plan area which drain into the Main Rivers. These arterial watercourses extend to over 119 kilometres in the Plan area. Summary details of the Viewed Rhynes maintained by the Drainage Boards are set out in Table 1 below. The locations of the Viewed Rhynes are shown on Map 2. The control structures on these watercourses are listed in Tables 2 – 4 below.

### 3.6.3. Private ditches

In addition to the Main Rivers and Viewed Rhynes, ordinary watercourses occur throughout the Plan area and are maintained by 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 support a substantial part of the overall biodiversity interest of the Plan area.

## Table 1: Schedule of arterial watercourses in the South Drain area of the Brue Valley

| No. | Watercourse | Operating authority | Length (m) | Location & connections | Typical maintenance regime | Control structures (see Tables 2 - 4) |
|---|---|---|---|---|---|---|
| 7471 | River Brue | EA | 49000 approx | Originating in the Wessex Vales, near Bruton, the Brue flows west and enters the Plan area south of Glastonbury. It then turns north to the B3151 and then west to the Cripps River, where it leaves the Plan area. | W6 (FB) to two cuts per year between July and September between Glastonbury and Westhay Bridge. The section from Westhay Bridge and the Cripps River is cut once per year in September. | Hackness Sluice<br>Cold Harbour Bridge Weir<br>Bankers Style Hatch<br>Clyse Hole Weir<br>Throttle Culvert<br>Highbridge Clyse |
| 7651 | South Drain | EA | 15160 | Originating south of Glastonbury at Actis Tunnel the Drain flows west through the Plan area to Gold Corner. | Between Gold Corner and Ashcott Corner alternate banks are 60% (on review) weedcut once annually. Between Ashcott Corner and Street Road banks are cut using W2 specification, twice annually between July and October. Between Street Road and Clyce Hole banks are cut using W1 specification twice annually between July and October. | Shaking Drove Tilting Weir<br>Gold Corner Pumping Station<br>Black Hatches Weir<br>Actis Tunnel<br>A39 Culvert Weir<br>Hulk Moor Outfall (redundant structure) |
| 7654 | Huntspill River | EA | 8550 | The Huntspill originates at Gold Corner and discharges into the Parrett Estuary at Huntspill. | No weed cutting activities take place on this Main River. however the Environment Agency has riparian responsibilities to maintain the Huntspill Back Ditches, which are non Main River. Both north and south Back Ditches are maintained using W2 specification, 2-3 times annually depending on review. | Huntspill Sluice |
| 7500 | Cripps River | EA | 2590 | Originating at Gold Corner the Cripps joins the Huntspill and South Drain to the River Brue at Cripps Farm. | Both banks are flailed once annually using the W6 (FB) specification. | Cripps Sluice (redundant) |
| 7610 | Glastonbury Millstream | EA | 4110 | The Millstream flows from the Clyse Hole Control Structure south of Glastonbury and flows along the western edge of the town to the B3151 and then west to the Brue at Cold Harbour. | W5 (FB) and W1 2-3 cuts between June and August depending on review. Both banks are flailed and emergent weed is left on the non-working bank. | Coldharbour Sluice<br>Northload Penning Bay<br>Baileys Sluice(s)<br>Chisletts Weir |
| 7653 | Glastonbury Canal | EA | 3790 | From the Brue at Back River Drove to the South Drain at Ashcott Corner. | W6 (FB) 2 cuts between July and October. Both banks are flailed, the non working bank is flailed only to field ground level and emergent weed on both banks if retained. | Aqueduct Sluice |
| 7602 | Division Rhyne | EA | 6210 | Originating on the River Hartlake, this rhyne forms the northern boundary of the Plan area until its confluence with the Brue near Westhay village. | W6 (FB) twice annually in June and August. Both banks are flailed, although there are access problems from the right bank. | Upper Crannel Farm Sluice (Foundation Wall Clyse) |

**Table 1 (continued): Schedule of arterial watercourses in the South Drain area of the Brue Valley**

| No. | Watercourse | Operating authority | Length (m) | Location & connections | Typical maintenance regime | Control structures (see Tables 2 - 4) |
|---|---|---|---|---|---|---|
| C1 | Nidon Rhyne | LB DB | 2077 | From Shapwick Parish Boundary to Catcott Wall along Moorclose Drove East to Nidon Bridge in Edington Lane. | | C01 and C04 |
| C2 | Summerclose Rhyne | LB DB | 1299 | In a northerly direction along East Drove then east along Summerclose Drove to Black Ditch. | | |
| C3 | Middle Drove Rhyne | LB DB | 1464 | From Head Drove north to Higher Ropes Drove then in a westerly direction to Lady's Drove and in easterly direction to Jane's Drove. Also length to East Drove Rhyne connecting to Summerclose Rhyne. | | |
| C4 | West Drove Rhyne | LB DB | 600 | From Higher Ropes Drove south for 420 m and with a westerly spur to connect with Catcott Wall/Whitebar Junction. | | |
| C5 | Lady's Drove Rhyne | LB DB | 870 | From Higher Ropes Drove to South Drain Back Ditch | | |
| C6 | Catcott Wall | LB DB | 1095 | From Whitebar in a northerly direction to Catcott Bridge on the western side of Catcott Broad Drove. | | |
| C7 | Huntspill Drove | LB DB | 1522 | From Catcott Broad Drove easterly to Lower Stubbylawn Rhyne and from Sunnycroft in a southerly direction - along Catcott Broad Drove to Catcott Crossing. | | |
| C7a | Middle Rhyne | LB DB | 928 | From Catcott Broad Drove just north of Catcott Crossing in an easterly direction to Stubby Lawn Drove | | |
| C8 | Manor Rhyne | LB DB | 2393 | From Catcott Burtle Farm to River Brue plus an easterly spur through Catcott Grounds to Parish Boundary. | | |
| C8a | Black Ditch | LB DB | 239 | From Nydon Rhyne at the Board's boundary north to Shapwick Moor Rhyne. | | C05 |
| C9 | Nidon Rhyne | LB DB | 978 | From Nidon Bridge westwards to junction with Chilton Landshire Rhyne. | | |
| C10 | Whitebar | LB DB | 2085 | In a westerly direction from Catcott Wall then heading north past Millards Drove along Back Drove finally heading west to Chilton Landshire Rhyne. | | |
| C11 | Edington Road | LB DB | 991 | From Edington Road in a westerly direction to Back Drove and north to West Heath Drove and south to Millards Drove. | | |
| C12 | Improved Rhyne | LB DB | 1146 | In two parts: Part 1 - from Edington Road in a westerly direction to Chilton Landshire Rhyne: Part 2 - from South Drain Back Ditch to Drove adjacent to The Cottage. | | |
| C13 | New Edington Road East Side | LB DB | 1550 | From Back Ditch of South Drain to Catcott Wall. | | |

**Table 1 (continued): Schedule of arterial watercourses in the South Drain area of the Brue Valley**

| No. | Watercourse | Operating authority | Length (m) | Location & connections | Typical maintenance regime | Control structures (see Tables 2 - 4) |
|---|---|---|---|---|---|---|
| C14 | Burtle Wall | LB DB | 3051 | From Sands Ditch in an easterly direction to Manor Rhyne on the north side of the Drove plus west side of Green Drove in a southerly direction to Whites Farm plus east side of Drove from Whites Farm to realignment and spur off to Manor Rhyne. | | |
| C15 | Chilton Landshire Rhyne | LB DB | 1685 | From junction with Nidon Rhyne in a northerly direction to South Drain | | |
| C16 | West Burtle Rhyne | LB DB | 1385 | North from South Drain to dismantled railway. Also length from Plain Heath Drove to the South Drain. | | |
| C17 | Outer Furlong & Blackditch Rhyne | LB DB | 2326 | From Cripps River in an easterly direction to Halter Path Drove and extension north to Huntspill Road. | | |
| C18 | Middle Furlong | LB DB | 1244 | From West Burtle Rhyne eastwards and then northwards via West Drove for 200 m then eastwards towards Hurst Farm. | | |
| C19 | Nidon Rhyne | LB DB | 907 | From Chilton Landshire Rhyne in a westerly direction to Holywell Rhyne. | | |
| C20 | Newclose Rhyne | LB DB | 641 | From Chilton Road in a westerly direction to Manor Rhyne. | | |
| C21 | Nidon Brook | LB DB | 735 | From Parks Lane in a northerly direction to dismantled railway | | C03 |
| C22 | Holywell Rhyne | LB DB | 655 | From Holywell at end of Dole Lane to junction with Nidon Rhyne. | | |
| C23 | Manor Rhyne | LB DB | 1549 | From Holywell Rhyne northwards to South Drain. | | |
| C24 | Decoy Rhyne | LB DB | 1818 | From Newlands Drove eastwards along Eightacre/Gold Droves to Decoy Rhyne then northwards to South Drain. | | C02 and C06 |
| C25 | Cousney Rhyne | LB DB | 1287 | From Manor Rhyne westwards stopping 180 metres short of Sheepwash Rhyne plus spur northwards to Gold Drove. | | |
| 103 | Heath Rhyne (Lower) | UB DB | 2239 | From Westhay Road westwards to Black Ditch. | | |
| 104 | Heath Rhyne (Upper & Spur) | UB DB | 4502 | From Stileway Rhyne westwards to join Heath Rhyne (Lower) at Westhay Road. Heath Rhyne Spur links Heath Rhyne (Upper) to the South Drain. | | |
| 105 | Newclose Rhyne & Branch, Westhay | UB DB | 3447 | From Westhay village westwards to connect with the Black Ditch (north) | | |
| 109 | Stileway Rhyne | UB DB | 915 | From Stileway northwards to River Brue. | | |

**Table 1 (continued): Schedule of arterial watercourses in the South Drain area of the Brue Valley**

| No. | Watercourse | Operating authority | Length (m) | Location & connections | Typical maintenance regime | Control structures (see Tables 2 - 4) |
|---|---|---|---|---|---|---|
| 110 | Black Ditch, Burtle | UB DB | 3727 | In two parts: North – from River Brue to Heath Rhyne (Lower) and then on connect with the South Drain. South – Shapwick Moor Rhyne northwards to South Drain | | |
| 112 | Shapwick Moor Rhyne | UB DB | 4002 | From Land Rhyne, westwards to the Black Ditch. | | |
| 113 | Land Rhyne | UB DB | 3678 | Along southern edge of area, connecting with Shapwick Moor Rhyne to the west. | | |
| 114 | Ashcott Heath Rhynes | UB DB | 1574 | In two parts, one either side of the South Drain, close to the Ashcott Road. | | |
| 115 | Walton Heath Rhynes | UB DB | 573 | In Walton Heath, connecting with Railway Ditch, Sharpham in the north. | | |
| 116 | Railway Ditch, Sharpham | UB DB | 2044 | Along the southern side of the old railway line, westwards to connect with the South Drain. | | |
| 117 | Cuckoo Ditch | UB DB | 1190 | From Sharpham Drove northwest to the Railway Ditch. | | |
| 119 | Sharpham Road Rhyne | UB DB | 732 | East side of Sharpham Road. | | |
| 120 | Sharpham Drove Rhynes | UB DB | 671 | North side of Sharpham Drove, connecting with upstream end of Cuckoo Ditch. | | |
| 122 | Sharpham Moor Rhyne | UB DB | 1653 | East and west sides of Sharpham Road, north to connect with the South Drain. | | |
| 123 | Small Moor Rhyne | UB DB | 2397 | Through Small Moor eastwards to connect with the upstream end of Sharpham Moor Rhyne (west). | | |
| 124 | Bullmead Rhnye & Rowclose Rhyne | UB DB | 2422 | From northern fringes of Street northwards to the South Drain. | | |
| 125 | Hulk Rhyne | UB DB | 836 | Through Hulk Moor to connect with the South Drain. | | |
| 126 | New Close Rhyne, Glastonbury | UB DB | 1257 | Through New Close westwards to connect with the River Brue. | | |
| 129 | Abbeyshard Rhyne | UB DB | 659 | North east of Rocks Drove. | | |
| 130 | Rocks Drove & Wilderness Drove | UB DB | 3440 | Network of rhynes in the Rocks Drove area. | | |

## 3.7. Structures

### 3.7.1. Structures controlling inflows

A number of structures are currently operated to supply water to the Plan area, as set out in Table 2. Proposed changes to these arrangements are set out in Section 9.

**Table 2: Structures controlling inflows to the South Drain area of the Brue Valley**

| Asset no. | Inlet | Grid ref. | Owned by | Operated by |
|---|---|---|---|---|
| 1122474710502B01001 | Clyse Hole Weir/ Gauging Station | ST 4941 3775 | EA | EA |
| 1122474710502L01004 | Bankers Style Hatch | ST 4938 3776 | EA | EA |
| 112247476100120B02001 | Throttle Culvert | ST 4934 3777 | EA | EA |

### 3.7.2. Structures controlling outflows

A number of structures are currently operated to control the water leaving the Plan area, as set out in Table 3. Any proposed changes to these arrangements are set out in Section 9.

**Table 3: Structures controlling outflows from the South Drain area of the Brue Valley**

| Asset no. | Inlet | Grid ref. | Owned by | Operated by |
|---|---|---|---|---|
| 1122476510101B01002 | Gold Corner Pumping Station | ST 3672 4304 | EA | EA |
| 1122474710202B01001 | Hackness Sluice | ST 3323 4621 | EA | EA |
| 1122476540101B01001 | Huntspill Sluice | ST 2926 4573 | EA | EA |
| 1122475000104B01001 | Shaking Drove Tilting Weir | ST 3680 4317 | EA | EA |

### 3.7.3. Structures controlling water levels within the area

A large number of structures are currently operated to control water flows and water levels in the network of arterial watercourses within the Plan area. These are summarised in Table 4. Any proposed changes to these arrangements are set out in Section 9. The current water level management regime at key control structures is shown in Table 7.

There are numerous structures on private watercourses in the Raised Water Level Areas which affect water levels in the nearby locality.

## Table 4: Schedule of water level management structures in the South Drain area of the Brue Valley

| Control structure | Grid ref. | Owned by | Operated by | Watercourse (see Table 1) | Description | Dimensions & operating range |
|---|---|---|---|---|---|---|
| Hackness Sluice | ST 3323 4621 | EA | EA | River Brue | Pair of lifting sluices with tilting crests | Two 7m wide gates. |
| Highbridge Clyse | ST 3135 4724 | EA | EA | River Brue | Two vertical lifting gates and two tidal (mitre) doors | Each lifting gate is 7m wide and operated by an electrically operated winch. There are several operating systems, although generally the mitre doors open and close with the tide.<br>A fishing weir upstream provides the pen at this structure.<br>Mitre doors close and open automatically with the tide to prevent saline intrusion. |
| Gold Corner Pumping Station | ST 3672 4304 | EA | EA | South Drain | Pumping Station | Four pumps: three identical diesel engines, which are manually operated, and one electric pump. |
| Shaking Drove Tilting Weir | ST 3680 4317 | EA | EA | South Drain | Tilting weir and a flap | Tilting weir operated by an electric winch and the flap is manually operated. Stoplog grooves are located upstream and downstream of this structure. |
| Huntspill Sluice | ST 2926 4573 | EA | EA | Huntspill River | Two pairs of vertical lifting gates | 5m wide gates, situated in one of two channels. The upstream gate has a tilting weir crest, allowing summer or winter pen to be maintained. The downstream gate is used in emergencies to exclude the tide. Both of the two channels have tide exclusion flaps at the outlets. |
| Gold Corner Sluice<br>(including Gold Corner Penstocks) | ST 3670 4319 | EA | EA | Huntspill River/ Cripps River | Vertical lifting gate and two penstocks<br>(Culverts and penstocks) | 4.27m x 4.27m lifting gate. Two interconnected culverts, 760m and 450m long, with four associated penstock controls on the eastern and western abutments.<br>The culverts and penstocks are operated as required depending on prevailing conditions. |
| Cripps River Sluice (redundant) | ST 3608 4504 | EA | EA | Cripps River | Vertical lifting gate | Redundant. |
| Withy Drove Pumping Station | ST 3268 4416 | EA | EA | Huntspill River | Pumping Station | Two electrically driven submersible pumps controlled by time clock. |
| Sloway Lane Pumping Station | ST 3023 4513 | EA | EA | Huntspill River | Pumping Station | Two electrically driven submersible pumps controlled by time clock. |
| West Burtle Rhyne Sluice | ST 3744 4299 | EA | EA | South Drain Back Ditch | Penstock | 9.15mm diameter cast iron circular raising penstock.<br>This structure is not currently operated. Levels controlled by Gold Corner Pumping Station. |
| Chilton Railway Sluice (Edington Railway Sluice) | ST 3854 4276 | EA | EA | South Drain Back Ditch | Vertical lift sluice gate | 900mm wide vertical lifting sluice gate at the end of a 915mm Armco pipe through the bank.<br>This structure is not currently operated, but will be replaced in a tilting weir in 2010. |

**Table 4 (continued): Schedule of water level management structures in the South Drain area of the Brue Valley**

| Control structure | Grid ref. | Owned by | Operated by | Watercourse (see Table 1) | Description | Dimensions & operating range |
|---|---|---|---|---|---|---|
| Decoy Rhyne Sluice | ST 3695 4300 | EA | EA | Decoy Rhyne | Vertical lift sluice gate | Concrete headwall fitted with undershot penstock. |
| Decoy Rhyne Tilting Weir | ST 3695 4293 | Private | Private | Decoy Rhyne | Tilting weir | Control for Gold Corner RWLA. |
| Cossington Manor Rhyne | ST 3744 4295 | EA | EA | South Drain Back Ditch | Tilting weir | 1.5m tilting weir manually operated using a removable handle.<br>This structure is not currently operated, but will be replaced in a tilting weir in 2010. |
| Chilton Cottage Sluice | ST 3842 4275 | EA | EA | South Drain Back Ditch | Vertical lift sluice gate | A manually operated vertical lift gate sluice, 900mm wide, at the end of a 915mm Armco pipe through the bank.<br>This structure is not currently operated, but will be replaced in a tilting weir in 2010. |
| Burtle Rhyne Sluice | ST 3869 4273 | EA | EA | South Drain Back Ditch | Vertical lifting sluice gate | A manually operated vertical lift gate sluice, 900mm wide, at the end of a 915mm Armco pipe through the bank.<br>This structure is not currently operated, but will be replaced in a tilting weir in 2010. |
| Chilton Landshire Rhyne Sluice | ST 3868 4270 | EA | EA | South Drain Back Ditch | Tilting weir | A manually operated 1.5m tilting weir<br>This structure is not currently operated, but will be replaced in a tilting weir in 2010. |
| Catcott Burtle Sluice (Catcott Burtle Tilting Weir) | ST 4000 4242 | EA | EA | South Drain Back Ditch | Tilting weir gate with stop log grooves | Manually operated 1.2m tilting weir, with stoplog rebates<br>This structure is not currently operated, but will be replaced in a tilting weir in 2010. |
| Catcott Heath Sluice | ST 4003 4232 | EA | EA | South Drain Back Ditch | Vertical lift gate | Manually operated 1.2m vertical lifting sluice gate at the end of a 1.2m diameter pipe running under an embankment for an access road.<br>This structure is not currently operated, but will be replaced in a tilting weir in 2010. |
| Long Moor Drove Sluice | ST 3596 4330 | EA | EA | Huntspill Back Ditch | Penstock sluice gate with flap. | 900mm sluice gate and a 900mm diameter flap. |
| Gold Corner Drove Sluice | ST 3599 4332 | No data | No data | Huntspill Back Ditch | Penning boards | Headwall with penning boards approximately 900mm wide. |
| Gold Corner South Sluice | ST 3668 4302 | EA | EA | Huntspill Back Ditch | Sluice valve | Manually operated sluice valve across a culvert. |
| Whitchey Drove West Sluice | ST 3669 4300 | EA | EA | Huntspill Back Ditch | Removed sluice and concrete headwall | Redundant. |

**Table 4 (continued): Schedule of water level management structures in the South Drain area of the Brue Valley**

| Control structure | Grid ref. | Owned by | Operated by | Watercourse (see Table 1) | Description | Dimensions & operating range |
|---|---|---|---|---|---|---|
| Whitchey Drove East Sluice | ST 3672 4298 | EA | EA | Huntspill Back Ditch | Sluice gate | 1m wide steel sluice gate, operated manually using a hand wheel. |
| Pyde Drove Sluice | ST 3564 4326 | EA | EA | Huntspill Back Ditch | Penstock | 900mm wide timber sluice gate, manually operated using a hand wheel. |
| Quaking Bridge Sluice | ST 3487 4347 | EA | EA | Huntspill Back Ditch | Overtopped Sluice | 1m wide steel sluice gate, operated manually using a hand wheel. |
| Cold Harbour Bridge Weir | ST 4798 4032 | EA | EA | River Brue | Fixed weir | Fixed weir of stones and trench sheets placed across the channel bed, 8m wide, with a crest profile of approximately 3.5m. |
| Pons Perilis Bridge Weir | ST 4870 3777 | EA | EA | River Brue | Stone / boulder weir | Fixed weir of stones in the channel bed. This is a Fisheries Weir with no Flood Defence purpose. |
| Clyse Hole Weir/ Gauging Station | ST 4941 3775 | EA | EA | River Brue | Fixed Weir | 12m wide fixed weir with a crest level of ~ 7.5m. |
| Bankers Hatch | ST 4938 3776 | EA | EA | River Brue | Penstock | Not operated for last 15 years. This is a manually operated penstock, 1.8m wide. It could lower the Brue to crest level at Clyse Hole Weir and divert into the Mill Stream if ever operated again. |
| Throttle Culvert | ST 4934 3777 | EA | EA | River Brue | Culvert | Culvert, 1.1-1.5m diameter pipe with an invert level of 6.55m ODN. |
| Cold Harbour Sluice | ST 4806 4033 | EA | EA | Glastonbury Millstream | Timber penstock | 12ft timber door in steel channel frame. |
| North Load Penning Bay (North Load Penning Boards) | ST 4932 3958 | EA | EA | Glastonbury Millstream | Penning Bays | Two penning bays with rebates for stoplogs. |
| Actis Tunnel | ST 4923 3773 | EA | EA | South Drain | Culvert | 1m diameter. |
| Aqueduct Sluice (Glastonbury Canal Aqueduct Sluice) | ST 4800 3924 | EA | EA | Glastonbury Canal | Penstock | Hand operated weir sluice, 1m wide and 0.75m high timber gate, situated u/s of a 900mm invert syphon under the Brue. Crest level 3.05m when fully closed. |
| New Close Balancing Pond | ST 4927 3927 | County Council | Private | Glastonbury Millstream | Off-line flood storage | The inlet is a spillway. Inlet Invert Level = 5.65m. |
| Chisletts Weir | ST 4910 3880 | Private | Private | Glastonbury Millstream | Stop-logs | Timber boards in a concrete headwall, 600mm high and 3m wide. |
| Baileys Sluices | ST 4872 3842 | Private | Private | Glastonbury Millstream | Redundant/ Removed | No data. |
| A39 Culvert | ST 4862 3749 | Highways | Highways | South Drain | Fixed Weir | Crest level ~3.7 (Fixed) |
| Manor Farm Weir | ST 4549 4184 | Riparian Owner | Riparian Owner | River Brue | Fixed Weir | Stones placed in the river bed to provide a pen in low flows. Possibly placed to counteract scouring effects. |
| Turnbridge Penning Bay | ST 4655 4126 | Riparian Owner | Riparian Owner | River Brue | Redundant | Stop log rebates, 7m apart on the upstream face of the bridge. Possibly placed to counteract scouring effects. |

**Table 4 (continued): Schedule of water level management structures in the South Drain area of the Brue Valley**

| Control structure | Grid ref. | Owned by | Operated by | Watercourse (see Table 1) | Description | Dimensions & operating range |
|---|---|---|---|---|---|---|
| River Farm Weir | ST 4588 4176 | Riparian Owner | Riparian Owner | River Brue | Fixed Weir | A row of stones extending 8m across the channel forming a low level fixed weir. Possibly placed to counteract scouring effects. |
| H14 | ST 3609 4210 | LB IDB | LB IDB | Reeds & Chilpitts Rhyne | Penstock | Concrete headwall with steel frame and timber undershot penstock. |
| H24 | ST 3665 4322 | LB IDB | LB IDB | Cripps River back ditch | Penstock | Concrete headwall with steel frame fitted with stop-logs. |
| H26 | ST 3630 4461 | LB IDB | LB IDB | Private ditch | Penstock | Steel trench sheets with steel flap lifted via chain. |
| H31 | ST 3610 4490 | LB IDB | LB IDB | Private ditch | Steel trench sheet bay | No data. |
| C01 | ST 3918 4062 | LB IDB | LB IDB | Nidon Rhyne | Stop-logs | Concrete headwall fitted with stop-logs. |
| C03 | ST 3780 4091 | LB IDB | LB IDB | Nidon Brook | Stop-logs | Concrete block headwall with steel frame and stop-logs. |
| C04 | ST 4074 3999 | LB IDB | LB IDB | Nidon Rhyne | Vertical railway sleepers | Vertical railway sleepers which can be moved to create an improvised v-shaped weir. |
| C05 | ST 4075 3999 | LB IDB | LB IDB | Black Ditch | Stop-logs | Concrete headwall fitted with stop-logs. |
| Whitehouse Drove | ST 4165 4331 | UB IDB | UB IDB | Heath Rhyne (Lower) | Penning Boards | Narrow access platform and handrailing on one side. |
| Sharpham Road Feed Valve | ST 4691 3870 | Private | Private | Sharpham Road Rhyne | Valved feed pipe | Privately owned structure valve operated by landowner and/or adjacent resident. |

### 3.7.4. Gauge boards

The principal gauge boards within the South Drain 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. Known differences between gauge board reading and ODN are detailed in Table 5.

**Table 5: Gauge boards operated in the South Drain area of the Brue Valley**

| Location of gauge board | Grid ref. | Notes | Operator |
|---|---|---|---|
| ***River Brue*** | | | |
| Hackness Sluice | ST 3323 4621 | Environment Agency telemetry on site | EA |
| Highbridge Clyse | ST 3135 4724 | Environment Agency telemetry on site | EA |
| Cow Bridge | ST 5020 3750 | Upstream only reads above 8.0m therefore only used in flood conditions | EA |
| Westhay Bridge | ST 4377 4267 | Upstream | EA |
| Cold Harbour Bridge | ST 4796 4036 | Upstream only reads above 5.5m due to silt accumulation | EA |
| Pons Perlis Bridge | ST 4866 3775 | Upstream board in two sections immediately next to each other | EA |
| Clyse Hole | ST 4941 3775 | Environment Agency telemetry on site u/s not set to ordnance datum and refers to depth of water above the weir | EA |
| ***South Drain*** | | | |
| Gold Corner Pumping Station | ST 3672 4304 | Environment Agency telemetry on site upstream and downstream | EA |
| Shaking Drove Tilting Weir | ST 3680 4317 | Environment Agency telemetry on site | EA |
| Shapwick Bridge | ST 4230 4120 | Upstream | EA |
| Ashcott Bridge | ST 4490 3940 | Upstream only reads above 2.0m | EA |
| ***Huntspill River*** | | | |
| Huntspill Sluice | ST 2926 4573 | Environment Agency telemetry on site | EA |
| Gold Corner Sluice | ST 3670 4319 | | EA |
| ***Cripps River*** | | | |
| Eastern Moor Bridge | ST 3685 4434 | Upstream (South Drain side) | EA |
| ***South Drain Back Ditches*** | | | |
| West Burtle Rhyne Sluice | ST 3869 4273 | Upstream | EA |
| Chilton Railway Sluice | ST 3854 4276 | Upstream | EA |
| Cossington Manor Rhyne | ST 3744 4295 | Upstream | EA |
| Chilton Cottage Sluice | ST 3842 4275 | Upstream | EA |
| Chilton Landshire Rhyne Sluice | ST 3868 4270 | Downstream | EA |
| Catcott Burtle Sluice | ST 4000 4242 | Upstream | EA |
| Catcott Heath Sluice | ST 4003 4232 | Upstream | EA |

**Table 5 (continued): Gauge boards operated in the South Drain area of the Brue Valley**

| Location of gauge board | Grid ref. | Notes | Operator |
|---|---|---|---|
| ***Catcott, Edington and Chilton Moors*** | | | |
| Outer Furlong | ST 3720 4440 | | IDB |
| Middle Furlong | ST 2780 4370 | | IDB |
| West Burtle | ST 3800 4310 | | IDB |
| Burtle Wall | ST 3980 4390 | | IDB |
| Huntspill Drove | ST 4020 4280 | | IDB |
| Boundary | ST 4130 4280 | | IDB |
| Newclose | ST 3790 4140 | | IDB |
| Whitebar West | ST 3930 4100 | | IDB |
| Whitebar East | ST 3930 4100 | | IDB |
| Lady's Drove | ST 3990 4140 | | IDB |
| ***Huntspill Back Ditches*** | | | |
| Long Moor Drove Sluice | ST 3596 4330 | Upstream | EA |
| Gold Corner Drove Sluice | ST 3599 4332 | Upstream | EA |
| Gold Corner South Sluice | ST 3668 4302 | Upstream | EA |
| Whitchey Drove West Sluice | ST 3669 4300 | Upstream | EA |
| Whitchey Drove East Sluice | ST 3671 4298 | Upstream | EA |
| Pyde Sluice (west side) | ST 3564 4326 | Upstream | EA |
| Stones Sluice (Quaking Bridge) | ST 3516 4334 | Upstream | EA |
| ***Glastonbury Millstream*** | | | |
| Northload Bridge | ST 4936 3951 | Downstream board in 2 sections: one reads from 0.5m the other reads below 5.0m | EA |
| Baileys Sluice(s) | ST 4872 3842 | Upstream | EA |

### 3.7.5. Water level telemetry

The Environment Agency has installed telemetry where there is an operational need to be kept informed of current water levels, and to alert staff to changes in water levels which are communicated as alarms.

The following sites within the Plan area are fitted with telemetry upstream and downstream:

- Gold Corner Pumping Station
- Clyse Hole Gauging Station
- Highbridge Clyse Sluice
- Shaking Drove Sluice (via Gold Corner telemetry)
- Huntspill Sluice
- Hackness Sluice

Outside the Plan area, the following telemetry sites have some influence or bearing on water management for the South Drain.

- North Drain Pumping Station
- Lovington GS
- Bruton Surgery
- Bruton Dam

The telemetry site at the Gold Corner Pumping Station monitors water levels remotely in both the South Drain and the Huntspill River. The Pumping Station has agreed summer and winter level ranges, 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 Drainage Boards and Natural England regarding its consideration of any application for an abstraction licence.

There are two abstraction licences within the Plan area. These are summarised in Table 6.

**Table 6: Abstraction licences in or near the South Drain area of the Brue Valley**

| Licence No | Description | Point name | Max daily vol. ($m^3$) | Max annual vol. ($m^3$) |
|---|---|---|---|---|
| 16/52/011/S/052<br>(Only valid from 1 January to 30 April each year) | Aquaculture (make-up or top-up water) | South Drain<br>ST 4580 3850 | 250 | 7500 |
| 16/52/011/S/046<br>(Only valid from 1 March to 31 December each year) | Spray irrigation | Glastonbury Canal<br>ST 4640 3940 | 45.5 | 9000 |

## 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.

The principal discharge to the watercourses of the South Drain Plan area is from the Wessex Water Services Ltd (Sewage Treatment Works) at Glastonbury which discharges treated sewage into the Glastonbury Millstream.

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.

In the event of a pollution incident being noted, assistance will be sought immediately from the Environment Agency's incident pollution hotline on 0800 80 70 60.

# 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 Drainage Boards recognise 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 Boards also recognise 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 units in the area 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 SSSIs in the plan area, 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 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, the low lying nature of the Plan area, and its known risk of flooding, means that it is more vulnerable than others to the adverse effects of development.

The Local Authorities consult the Environment Agency and the Drainage Boards 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. Peat extraction

Peat extraction takes place within defined areas of the Brue Valley to the west of Glastonbury, supplying about 8-10% of the UK domestic market for horticultural peat each year. The future development of the peat extraction industry is determined by the Somerset Minerals Local Plan (2004). The existing Minerals Plan is being reviewed by the County Council, as part of the Minerals Development Framework, and is likely to be replaced by a new Minerals Core Strategy for Somerset in 2011.

The current area of active peat extraction within the Plan area is about 450 ha. The depth of peat in the area varies but is usually 2 - 3 metres deep. The management of water in the active extraction sites is determined by the conditions attached to the planning permission for the site. The active workings are usually pumped drained while the peat is extracted over a 10 – 20 year period down to the underlying clay (around zero metres ODN). They do not receive irrigation water from the pen system.

In addition to the active sites, the Plan area contains about 670ha of previous extraction sites which have been, or are in the process of being, reclaimed in line with the relevant planning permission and the policies of the Mineral Local Plan, with water levels being restored to the summer pen level adopted for that area.

The operators of peat extraction works must apply to the Drainage Boards or to the Environment Agency for consent to pump water from their workings into the Main River or into Viewed Rhynes as appropriate. As the peat excavation is excavated the water levels may be reduced to as low as - 1m ODN. When peat excavation is completed the water level is normally left to rise naturally and then fluctuates with the nearest ditch level.

## 4.4. Recreation

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

## 4.5. Fisheries

The Environment Agency has a duty to maintain freshwater and Eel fisheries, both of which play an important role in the wildlife interest of the Plan area. The fisheries are a major part of the wildlife interest especially Eels which are widely distributed and are the favourite food of Otters and a staple food of fish-eating birds. Planned 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 in summer that can result in de-oxygenation. Removal of this duckweed is difficult and is only effectively controlled by floating booms across the watercourse, which can help prevent complete coverage of the water surface.

The Main Rivers in the South Drain Plan area contain a wide array of fish species and support many angling societies and fisheries. The Huntspill River is one of the premier coarse fisheries in the country. Fish stocks in the Huntspill are dominated by Roach and Bream, and from a fisheries point of view it is desirable to maintain a winter water level of 2.74m. The South Drain hosts a wide range of fish including Roach, Bream, Tench and Pike. Similar species occur in the Cripps and Brue although Pike are particularly common on the Brue and fresh water cyprinids such as Chub may be found in the here in winter. In the Back Ditches high numbers of fish fry and Perch, which tend to feed on the smaller fish, can be found. Eels, and sometimes Carp, can be found in all the water courses in the Plan area.

The large man-made watercourses of the Brue Valley, including the South Drain, add considerably to the amount of slow and still water fisheries. Fish populations can travel between the various watercourses at certain times of the year and may be excluded at others.

Generally less is known about the fish interest in the Back Ditches. The resource here is dependent to a large extent on water quality, water levels and the ease with which fish can move from the Main Rivers to the Back Ditches, which in turn depends on the operation of the sluices. In addition the eel population may be dependent on the method of ditch cleaning adopted and the water level management regime. Several watercourses in the Plan area have U-shaped profiles with very steep banks resulting in very high velocities in flood which may adversely affect fish populations.

Regular angling takes place on the Brue downstream of Bruton. The Huntspill, South Drain, Cripps and Brue are all important angling waters and are important venues for match fishing competitions. On the peat moors around Glastonbury there are a number of private and open fisheries in worked out peat diggings, including Walton Ponds, Westhay Lake and Avalon Lakes.

# 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, Yellow Wagtail,

b) Part of a large wetland of international importance for its overwintering and migratory populations of waterfowl, and in particular Bewick's Swan, Golden Plover, Teal 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.

***The Plan area includes:***

a) Catcott, Edington and Chilton Moors SSSI (1083ha) notified in 1986;

b) Westhay Heath SSSI (26ha) notified in 1990;

c) Shapwick Heath SSSI (394ha) notified in 1986;

d) Sharpham Moor Plot SSSI (0.5ha) notified in 1986;

e) Shapwick Heath NNR (481ha) managed as a National Nature Reserve by Natural England;

f) Street Heath SSSI (12.5ha) (part managed as a Nature Reserve by the Somerset Wildlife Trust);

g) Ham Wall NNR (184ha) managed as a National Nature Reserve by the RSPB;

h) Catcott, Edington and Chilton Moors SSSI, Shapwick Heath SSSI and Westhay Heath SSSI are part of the Somerset Levels and Moors 'Special Protection Area' (SPA) which was designated under the European Communities Directive on the Conservation of Wild Birds in June 1997;

i) Catcott, Edington and Chilton Moors SSSI are 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.

## Box 2: 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 South Drain area of the Brue Valley are considered to be a habitat of primary importance in the UK Biodiversity Action Plan (1996). Furthermore, the 119 km of Main Rivers and Viewed Rhynes in the Plan area, and the associated network of ditches and ponds, are a rich source of biodiversity interest, supporting good populations of Water Vole and are regularly used by Otters.

The Drainage Boards and the Environment Agency have a duty to further the conservation and enhancement of biodiversity, as public bodies under the Land Drainage Act 1991 and the Natural Environment and Rural Communities Act 2006. The Implementation Plan of the DEFRA Internal Drainage Board Review commits every IDB to producing its own Biodiversity Action Plan (BAP) by April 2010. Guidance has been produced by the Association of Drainage Authorities, DEFRA and Natural England to assist the Drainage Boards meet this commitment.

Through their water level management activities, the Drainage Boards and the Environment Agency already achieve much for conservation and biodiversity. By introducing Biodiversity Action Plans for all IDBs, it is hoped that the conservation and enhancement of biodiversity, particularly outside the boundaries of Sites of Special Scientific Interest (SSSI), can be better integrated into IDB planning and work programmes. In addition, Biodiversity Action Plans will provide IDBs with a formal mechanism to better demonstrate and record the contribution to biodiversity that they already make.

By setting objectives and targets to conserve and enhance wetland species and habitats, IDB Biodiversity Action Plans will help to link the ongoing conservation work of IDBs to the national and local BAP targets and actions. It will also facilitate the recording of BAP habitat gain to be set against the DEFRA flood risk management Outcome Measures target for UK BAP habitat creation. In April 2010, the five Somerset Drainage Boards published an IDB Biodiversity Action, which will be implemented over the same five year period as this WLMP. Progress on the implementation of all IDB WLMPs in Somerset will be reported through the Somerset IDB BAP.

## 5.3. Conservation management

The current practices adopted by the Drainage Boards 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.

The Environment Agency follows strict local guidelines for weed cutting and general vegetation management that have been developed through best practice and with the expertise of specialist teams. The Environment Agency is currently developing national guidelines.

Financial support for the conservation management of land is available to farmers and landowners from Natural England who administer 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, whereby payment is made in return for following land management practices which 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 preceding Somerset Levels & Moors Environmentally Sensitive Area (ESA) Scheme.

## 5.4. Brue Valley Living Landscapes Project

The Brue Valley Living Landscape Project is a landscape scale conservation project covering 12500Ha of land in the Brue Valley. The project area stretches from Glastonbury in the east towards the M5 in the west, covering the floodplain between the Polden and Mendip Hills.

The project will work in the following ways:

- Mapping, modelling and research: The project will provide an up to date habitat map of the entire project area, not just the SSSIs. This will feed into targeting and research on how land use and habitats may change under different climate change scenarios. The project will work with conservation partners to create a biodiversity vision for the project area that will plan the process of building a Living Landscape.
- Building a Living Landscape: The project will work on Nature Reserves and with landowners to restore, recreate and reconnect wildlife habitats. The project will provide a free advisory service to landowners to enable a smooth transition from the old Environmentally Sensitive Area scheme to Environmental Stewardship.
- Community engagement. The project will use the research commissioned in the Mapping, Modelling and Research phase to work with stakeholders and the local community to create a 50 year Local Vision for the project area.

To achieve a Living Landscape in this area, it is essential that relevant organisations and individuals work together and play to their own strengths in contributing to the vision. In such a time of change for the landscape and land use sector, this project aims to provide the capacity and energy for that partnership work to happen. Key partner organisations include Natural England, Somerset County Council, RSPB, Environment Agency, Internal Drainage Boards, Hawk and Owl Trust, Wessex Water and European partners through the WAVE project.

## 5.5. 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 artifacts.

The peat itself, and the precious information contained within it, are 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 gradually 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 (SMR) 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 SMR represents only a fraction of the total archaeological resource that lies below the surface.

Much of the top peat in the Plan area has been removed, possibly since Roman Times. The main archaeological potential in the Plan area can be summarised as follows:

### *Prehistoric trackways*

Throughout the prehistoric period, wooden trackways were built across the peat bogs from Edington Burtle, southwards towards Nidons, eastwards to Westhay and probably also north to the Wedmore Ridge, although none have been found in this direction.

Neolithic and Bronze Age brushwood trackways have been noted in the fields running between Nidons and Burtle. Fields containing these trackways have been notified as Scheduled Ancient Monuments. The trackways themselves are often no more than 40 – 70cm below the field surface and a high year round water level is essential to the survival of these 5500 year old structures.

Between Westhay and Burtle another Scheduled Ancient Monument has been assigned to protect the Neolithic trackways in this area.

### *Briquetage mounds*

Upstanding mounds where salt, and possibly pottery, was made during the late Roman period have been noted on the moor since the early 19$^{th}$ century. Excavations have shown that the wood sometimes survives in these working areas and that organic artefacts including leather bags may also be present.

### *Unknown sites*

Wetland settlement sites, log boats, bog oaks, fish traps and other chance finds may exist within the area by analogy with the area to the south of Westhay. The location of these is impossible to predict at this time.

### *The peat over the entire area*

The very peat contains pollen, and the remains of plants, beetles, snails and insects which together form a vital record of the past environment over many thousands of years, not just about the moor itself but also informing us about activity on the dry land, and changes in climatic conditions and sea levels. Such information is vital to our understanding of past human activity in the area.

Numerous Scheduled Ancient Monuments can be found across the entire South Drain Plan area, and these include the remains of a number of important prehistoric timber trackways. The most famous of these is the Sweet Track c3807 BC, which is one of the oldest man-made trackways so far discovered in Europe. Other historic areas of interest include the site of Meare Pool and the associated Abbots Fish House.

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 sites, the applicant is obliged to consult Natural England, and the Environment Agency will only consider giving consent on the basis that there is no objection to the proposal from Natural England.

This condition will also apply to proposals that lie outside the boundary of an SSSI or designated site but which may impact on them.

## 6.2. Works adjacent to IDB rhynes

Under the Land Drainage Act 1991, the Drainage Board 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 Board's Byelaws. The Board exercises this administrative control using a series of policy documents adopted by the Board for this purpose.

The Byelaws of the Drainage Boards 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 an SSSI, the Boards consult Natural England before arriving at its decision. The form of consent given by the Boards 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 either occupied 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 at 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. Varying of water levels to achieve conservation objectives (e.g. within SSSI areas) will most sustainably be achieved 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.

The dates upon which these changes in water level are implemented each year are normally 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 dates, depending on the prevailing weather conditions at the time. 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 Drainage Boards to advance or delay these seasonal operations. Should these requests require operations to be advanced or delayed by more than the two weeks either side of the 'normal operating dates', then the Drainage Boards will seek the views of Natural England on this proposal. Requests requiring relevant site operations are recorded. A situation report detailing requests and Environment Agency actions will be issued to associates at regular intervals in order to strengthen the working partnership.

### 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 conserve water, whilst all abstraction licence holders will be encouraged to minimise water abstraction. There will be close liaison between the Environment Agency and the Drainage Boards to conserve what water is available and to ensure its fair distribution between all occupiers so far as possible.

If there is an exceptional shortage of rain, and a serious deficiency in the supply of water or a deficiency in flows or low water levels that threatens flora or fauna, drought permits or orders may be issued.

Drought permits are applied for by the Water Companies and issued by the Environment Agency to enable 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.

Close liaison will be maintained between the Drainage Boards and the Environment Agency to conserve what water is available and to ensure its fair distribution between all occupiers so far as possible.

### 7.1.2. Current target water levels

The current water level management regime at key control structures is shown in Tables 7. The Drainage Boards will consult Natural England 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 related to Ordnance Datum Newlyn (ODN). It is important to note that in 2005 the gauge board at the Gold Corner Pumping Station was raised by 70mm to correct an error in the level and relate the gauge board to ODN. As a result, the current summer water level of 1.61m for the South Drain is equivalent to the

2000 WLMP summer level of 1.68m. A similar correction has been applied to the winter level for Gold Corner.

**Table 7: Current target summer and winter water levels for the South Drain area**

| Water level control structures | Grid ref. | Operated by | Summer level (m ODN) | Winter level (m ODN) | Flood operations |
|---|---|---|---|---|---|
| Hackness Sluice | ST 3323 4621 | EA | 1.60 – 1.95 | Not penned | Open |
| Gold Corner Pumping Station | ST 3672 4304 | EA | 1.61 | 1.45 | Pumping when conditions allow |
| Shaking Drove Tilting Weir | ST 3680 4317 | EA | 1.61 | 1.45 | Non-return gate closed |
| Huntspill Sluice | ST 2926 4573 | EA | 3.00-3.50 | 2.2-2.9 | Open |
| Gold Corner Sluice | ST 3670 4319 | EA | Closed 1.65-2.00 | Open Variable | Open |
| West Burtle Rhyne Sluice | ST 3744 4299 | EA | Not penned | Not penned | Not penned |
| Decoy Rhyne Tilting Weir | ST 3695 4293 | Private | Not penned | 2.10m | Not penned |
| Chilton Railway Sluice (Edington Railway Sluice) | ST 3854 4276 | EA | Not penned | Not penned | Not penned |
| Cossington Manor Rhyne Sluice | ST 3744 4295 | EA | Not penned | Not penned | Not penned |
| Chilton Cottage Sluice | ST 3842 4275 | EA | Not penned | Not penned | Not penned |
| Burtle Rhyne Sluice | ST 3869 4273 | EA | Not penned | Not penned | Not penned |
| Chilton Landshire Rhyne Sluice | ST 3868 4270 | EA | Not penned | Not penned | Not penned |
| Catcott Burtle Sluice (Catcott Burtle Tilting Weir) | ST 4000 4242 | EA | Not penned | Not penned | Not penned |
| Catcott Heath Sluice | ST 4003 4232 | EA | Not penned | Not penned | Not penned |
| Long Moor Drove Sluice | ST 3596 4330 | EA | 4.16 | Not penned | Not penned |
| Gold Corner Drove Sluice | ST 3599 4332 | EA | 4.16 | Not penned | Not penned |
| Gold Corner South Sluice | ST 3668 4302 | EA | 3.50 | Not penned | Not penned |
| Whitchey Drove West Sluice | ST 3669 4300 | EA | 3.50 | Not penned | Not penned |
| Whitchey Drove East Sluice | ST 3672 4299 | EA | 3.50 | Not penned | Not penned |
| Pyde Sluice (west side) | ST 3564 4326 | EA | 4.27 – 4.28 | Not penned | Not penned |
| Quaking Bridge Sluice | ST 3487 4347 | EA | 4.30 | Not penned | Not penned |
| Cold Harbour Bridge Weir | ST 4798 4032 | EA | Fixed 3.50 (approx) | Fixed 3.50 (approx) | Fixed 3.50 (approx) |
| Pons Perilis Bridge Weir | ST 4870 3777 | EA | Fixed 4.00 (approx) | Fixed 4.00 (approx) | Fixed 4.00 (approx) |
| Cold Harbour Sluice | ST 4806 4033 | EA | 4.40 | 3.70 | Open |
| North Load Penning Bay | ST 4932 3958 | EA | 4.95 | 4.35 (approx) | Open |
| Aqueduct Sluice (Glastonbury Canal) | ST 4800 3924 | EA | 3.10 - 3.20 | Open | Open |
| Chisletts Weir | ST 4910 3880 | Private | 5.20 (approx) | 5.20 (approx) | 5.20 (approx) |
| Clyse Hole Weir/ Gauging Station | ST 4941 3775 | EA | Fixed 7.50 (approx) | Fixed 7.50 (approx) | Fixed 7.50 (approx) |

**Notes:** **Summer season:** Aim to achieve summer pen levels in the Main Drain from 1 April.
**Winter season:** Aim to achieve winter pen levels in the Main Drain by 1 December.
**ODN:** Ordnance Datum Newlyn.

### 7.1.3. Raised Water Level Areas

There are several areas in which ditch water levels are kept seasonally higher than the general level in the moor by isolating the watercourses from the Drainage Board system. In these Raised Water Level Areas the desired water levels are maintained by means of privately operated water management systems. In the Raised Water Level Areas on Catcott, Edington and Chilton Moors SSSI, the winter levels are currently raised from 1 December through to 1 May. Details of these areas are given in Table 8 and they are shown on Map 4.

**Table 8: Current areas with seasonally higher water levels in the Plan area**

| Raised water area | Name of occupier | Area in hectares | Area in acres |
|---|---|---|---|
| Catcott Lows | Somerset Wildlife Trust | 50.0 | 123.6 |
| Gold Corner RWLA | Mr C Stradling | 90.0 | 222.4 |
| Burtle Whites | Somerset Wildlife Trust | 14.6 | 36.1 |

A number of private pump drainage schemes are operated by landowners on a seasonal basis to lower water levels in the ditches around their fields for agriculture, or within peat voids for the purposes of peat extraction. The total area in such schemes is currently unknown. Details of these areas will be added to Table 9 below, as the Board establishes their extent and operation.

**Table 9: Current areas with seasonally lower water levels in the Plan area**

| Lower water area | Name of occupier | Area in hectares | Area in acres |
|---|---|---|---|
| Lowland Farm | Mr Porter | 26.2 | 64.7 |

## 7.2. Current flood management regime

The Environment Agency has permissive powers to carry out works to reduce flood risk on Main Rivers. Within this Plan area the primary flood defences are raised earth embankments located on either side of the River Brue. 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 also carried out when necessary.

The Environment Agency regularly inspects and operates the main inlet structures into the Plan area. Where possible these are closed when water levels in the Main Rivers rise in order to minimise risk of flooding from the river.

During high flows or a flood event water is pumped up, and out of the South Drain into the Huntspill River through Gold Corner Pumping Station and then out to sea. Excess water can also be drawn off the River Brue via the Cripps River into the Huntspill River.

### 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. The Environment Agency also carries out emergency works as required to protect people and property.

The Environment Agency and the Drainage Boards are currently discussing the benefits of pre-emptive lowering of Main Rivers. In the event of extreme weather conditions, especially in summer, 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. This joint work is currently in the early stages of investigation.

The Drainage Boards 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 areas 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 defences 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 and the sea, where the chance of flooding in any one year is less than 0.1% (i.e. a 1 in 1000 chance).

Zone 2 - is shaded turquoise and shows the area between Zone 1 and Zone 3. This represents an area with the chance of flooding in any one year between 0.1% and 1% fluvial or 0.5% tidal (i.e. between a 1 in 1000 and a 1 in 100 fluvial chance, or 1 in 200 tidal 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. The chance of flooding in any one year is greater than or equal to 1% (i.e. a 1 in 100 chance) for river flooding and greater or equal to 0.5% (i.e. a 1 in 200 chance) for coastal and tidal flooding.

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 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, annual maintenance is targeted towards high risk systems.

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, but carries out essential maintenance using tractors and large tracked vehicles to cut vegetation on the banks and in-channel.

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 works are completed as requested. Where the Environment Agency owns land, it will carry out any required tree maintenance.

Intermittent maintenance is not normally carried out by the Environment Agency without prior consultation with the Drainage Boards and with Natural England. The Environment Agency will inform Natural England of any repairs or maintenance affecting designated sites required during emergency situations as soon as is practically possible.

The majority of the watercourses in the Plan area receive a high level of maintenance due to their potential flood risk and critical conveyance requirements. The South Drain is being studied in preparation for de-silting works to be carried out in the winter months of 2009-10. This work is being done to improve the ecological condition of the Drain and its ability to convey flood water, to improve water quality and to maintain fish populations more effectively in the long term. The Glastonbury Canal was dredged in early 2009 as an initial trial. The Canal is now being monitored to determine whether the works were successful. The Environment Agency will reconsider its intermittent maintenance practices based on the outcome of the de-silting works undertaken in 2009-10.

### 7.3.2. Drainage Board maintenance practices

The Drainage Boards maintain all Viewed Rhynes in the South Drain 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 Boards, 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 Boards have powers under their Byelaws to require occupiers to fulfil their obligations in this respect where they fail to do so.

Water control structures are inspected by the Drainage Boards on a regular basis and repaired as necessary. The Boards do 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 Boards. The Drainage Boards do 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 Boards for gaining access to a channel, or where damage has been caused by works carried out on behalf of the Boards.

# 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 to 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(s) in the Plan area helps to secure, or makes significant progress towards achieving, these SSSIs 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 or rights of way.

***Objective 8 – Watercourse maintenance operations***
Maintain the watercourses in the Plan area on rotation and in a sympathetic manner, so as 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 chemical 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***
Avoid prolonged and deep flooding where this is damaging to the biodiversity and agricultural interests of the Plan area.

***Objective 11 – Drought management***
Avoid prolonged drought where this is damaging to the soils, biodiversity, archaeology and agricultural interests of the Plan area.

# 9. Proposed water management practices

## 9.1. Proposed continuation of current good practice

Many of the current management practices by the Upper Brue and Lower Brue Drainage Boards, 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 and winter penning levels, as set out in Table 13, will continue to be maintained by the Drainage Boards and the Environment Agency.

Reason: The current target water levels outside the Catcott, Edington and Chilton Moors SSSI are considered suitable for farming and nature conservation. The current summer and winter penning levels that will continue to be maintained by the Drainage Boards and the Environment Agency are set out in Table 13 (see Proposal 6).

### Proposal 2: Maintenance of the current Viewed Rhyne network will continue to be undertaken by the Drainage Boards.

Reason: The Drainage Boards will continue to maintain the existing Viewed Rhyne network and are of the opinion that their current maintenance procedures help to achieve favourable condition, and further conservation and biodiversity, in the Catcott, Edington and Chilton Moors SSSI. The Boards will keep their maintenance procedures under review. See proposal 11 for actions regarding the timing of routine maintenance and desilting of Viewed Rhynes.

## 9.2. Proposed changes to water control infrastructure

Natural England has advised the Drainage Boards that the management of water in winter and in spring in some parts of Catcott, Edington and Chilton Moors SSSI do 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 Environment Agency and the Drainage Boards to change the management of water levels in winter and spring in order to help achieve favourable condition across the SSSI, and help maintain favourable condition in the future.

### Proposal 3: Capital improvement works will be carried out by the Environment Agency to help achieve favourable condition on Catcott, Edington and Chilton SSSI.

Reason: The South Drain Back Ditch system must be isolated from the Drain itself in order to maintain a higher level in parts of the SSSI during the winter as recommended by Natural England. The South Drain is lowered in winter to provide storage capacity and reduce flood risk. Most of the structures that are in place have not been used for many years, so they will be refurbished or replaced as required in order to provide an accurate and efficient operating system when required. This work is being done in consultation with the Drainage Boards and will be operated in accordance with the new Water Level Management Plan. The structures to be improved are listed in Table 10 and their locations are shown on Map 9.

The Environment Agency has commissioned the detailed design phase of its capital works within the Plan area. The Agency's proposed capital improvement scheme was approved in June

2009. Some refurbishment work will be completed summer 2009, and the main construction phase is planned for summer 2010.

**Table 10: Proposed capital improvement works by the Environment Agency to help achieve favourable condition on Catcott, Edington and Chilton Moors SSSI.**

| Structure | Description of the proposed capital works to help achieve favourable condition on Catcott, Edington and Chilton Moors SSSI | Date of construction |
|---|---|---|
| Shaking Drove Tilting Weir | The existing tilting weir will be replaced with a new, two-way tilting weir and a new, high density plastic flap and actuator which will be lighter and easier to use. | 2010 |
| Black Hatches Weir | Existing sheet piling downstream of the weir will be strengthened with tie bars and the banks re-profiled. Rock armour will be placed at the toe of the weir to stop erosion. | 2010 |
| Catcott Burtle Tilting Weir | Refurbish the existing tilting weir and improve operator H&S. | 2009 |
| Chilton Landshire Rhyne Sluice | Refurbish the existing tilting weir and improve operator H&S. | 2009 |
| Cossington Manor Rhyne Sluice | Refurbish the existing tilting weir and improve operator H&S. | 2009 |
| Catcott Heath Sluice | A new tilting weir will be constructed up-stream of the existing structure. The existing concrete structure will remain. | 2010 |
| Burtle Rhyne Sluice | Existing penstock will be replaced with a new tilting weir just up-stream of the existing structure. The penstock will be stripped out and the concrete structure will remain. | 2010 |
| Chilton Cottage Sluice | Existing penstock will be refurbished. | 2010 |
| Chilton Railway Sluice | Existing penstock will be replaced with a new tilting weir just up-stream of the existing structure. The penstock will be stripped out and the concrete structure will remain. | 2010 |
| West Burtle Rhyne Sluice | Existing penstock will be replaced with a new tilting weir just up-stream of the existing structure. The penstock will be stripped out and the concrete structure will remain. | 2010 |
| Clyse Hole | Revetment work downstream of structure. | |
| Highbridge Clyse | Refurbishment of hydraulic door system. | |
| Cold Harbour Sluice | Maintenance of structure. | |
| Gold Corner Pumping Station | Weed screen repairs and various other mechanical repairs/upgrades. | |

## Proposal 4: Capital improvement works will be carried out by the Drainage Boards to help achieve favourable condition on Catcott, Edington and Chilton SSSI

Reason: A number of capital improvement works to the water management infrastructure are proposed in order to help achieve the objective of favourable condition on Catcott, Edington and Chilton Moors SSSI. These proposed works are listed in Table 11 and the locations of the hydrological blocks are shown on Map 9.

**Table 11: Proposed capital improvement works by the Drainage Boards**

| IDB Action Ref. | Description of the proposed capital works to help achieve favourable conditions on Catcott, Edington and Chilton Moors SSSI | Works to be constructed (indicative date only) |
|---|---|---|
| **Block 1** | | |
| Cap 1.1 | Construct new tilting weir on South Drain Back Ditch. | 2012 |
| Cap 1.1 | Construct replacement culverts on South Drain Back Ditch. | 2012 |
| Cap 1.2 | Construct new earth bund on South Drain Back Ditch. | 2012 |
| Cap 1.3 | Construct new culverts on Plain Heath Drove. | 2012 |
| Cap 1.4 | Improve field ditches between Plain Heath Drove and Middle Furlong Drove as 'In View' watercourse. | 2012 |
| Cap 1.5 | Construct new penstock on existing culvert at Middle Furlong Drove. | 2012 |
| **Blocks 2 & 3** | | |
| Cap 2.1 | Construct new tilting weir to reconnect Decoy Rhyne to Cousney Rhyne next to Gold Drove. | 2011 |
| Cap 2.2 | Construct replacement culverts on Decoy Rhyne. | 2011 |
| Cap 2.3 | Construct replacement culvert with non-return value on Decoy Rhyne (Gold Drove). | 2011 |
| Cap 3.1 | Construct replacement culvert on Cousney Rhyne. | 2011 |
| Cap 3.2 | Construct new tilting weir on South Drain back ditch near 'Horn Farm'. | 2011 |
| Cap 3.3 | Construct culvert under Eight Acre Drove on Decoy Rhyne. | 2011 |
| Cap 3.4 | Provide new 'Low level' drainage route at 'Horn Farm'. | 2011 |
| Cap 3.5 | Construct replacement culverts on South Drain Back Ditch. | 2011 |
| Cap 3.6 | Improve field ditches between West Drove and South Drain Back Ditch as 'In View' watercourse and construct replacement culverts. | 2011 |
| Cap 3.7 | Repair retained earth bunds and construct new earth bunds. | 2011 |
| **Block 4** | | |
| Cap 4.1 | Construct new 1200mm dia. outfall to South Drain Catcott Broad Drove (west side) with new tilting weir. | 2012 |
| Cap 4.2 | Construct replacement culverts on South Drain Back Ditch west of Catcott Broad Drove. | 2012 |
| Cap 4.3 | Construct culvert under Edington Drove north of Box Farm. | 2012 |
| Cap 4.4 | Provide new 'Low level' drainage route between 'Box Farm' and 'Tween Cottage' with culverts and earth bunds. | 2012 |
| Cap 4.5 | Replace culvert with earth bund on South Drain Back Ditch. | 2012 |

| IDB Action Ref. | Description of the proposed capital works to help achieve favourable conditions on Catcott, Edington and Chilton Moors SSSI | Works to be constructed (indicative date only) |
|---|---|---|
| Cap 4.6 | Construct replacement culvert on Chilton Landshire Rhyne. | 2012 |
| Cap 4.7 | Construct replacement culvert on Whitebar Rhyne at Edington Road. | 2012 |
| Cap 4.8 | Construct replacement culverts on Whitebar Rhyne west of Edington Road. | 2012 |
| Cap 4.9 | Repair retained earth bunds and construct new earth bunds. | 2012 |
| **Block 5** | | |
| Cap 5.1 | Construct new tilting weir on New Edington Road East Side Rhyne at East Heath Drove. | 2011 |
| Cap 5.2 | Construct replacement culverts on New Edington Road East Side Rhyne. | 2011 |
| Cap 5.3 | Construct new earth bunds. | 2011 |
| **Block 6** | | |
| Cap 6.1 | Construct new tilting weir on Shepherds Drove Rhyne near Ladys Drove Rhyne. | 2010 |
| Cap 6.2 | Construct new tilting weir on Middle Drove Rhyne near Ladys Drove Rhyne at Catcott Broad Drove. | 2011 |
| Cap 6.3 | Construct replacement culverts on Lady's Drove Rhyne. | 2011 |
| Cap 6.4 | Construct new road culvert to connect West Drove Rhyne and Ladys Drove Rhyne at Catcott Broad Drove and block existing road culvert under Catcott Broad Drove that connects West Drove Rhyne to Middle Drove Rhyne. | 2011 |
| Cap 6.5 | Improve field ditches between Lady's Drove Rhyne at Shepherds Drove and Nidon Rhyne as 'In View' watercourse and construct replacement culverts. | 2010 |
| Cap 6.6 | Construct new earth bunds. | 2010 |
| Cap 6.7 | Construct new water control structures on Nidon Rhyne at junction with Black Ditch. | 2011 |
| **Block 7** | | |
| Cap 7.1 | Improve field ditches between Nidon Rhyne and Whitebar Rhyne as 'In View' watercourse and construct replacement culvert under Moorclose Drove. | 2012 |
| Cap 7.2 | Construct new water control structure on Nidon Rhyne at Nidon Bridge (Holy Well Road). | 2012 |
| Cap 7.3 | Construct replacement culverts on Nidon Rhyne east of Nidon Bridge. | 2012 |
| Cap 7.4 | Construct replacement culverts on West Drove. | 2012 |
| Cap 7.5 | Construct replacement culvert on Middle Drove Rhyne. | 2012 |
| Cap 7.6 | Construct replacement culvert on East Drove Rhyne at Summerclose Drove. | 2012 |
| Cap 7.6 | Improve field ditch between Nidon Rhyne and Whitebar Rhyne (east of Holywell Road) and construct replacement culvert with penstock structure. | 2010 |
| **Block 8** | | |
| Cap 8.1 | Construct new tilting weir on Huntspill Drove Rhyne east of Cattcott Broad Drove, Burtle. | 2012 |
| Cap 8.2 | Construct replacement culvert on Huntspill Drove Rhyne. | 2012 |
| Cap 8.3 | Construct new tilting weir on Middle Rhyne east of Cattcott Broad Drove, Burtle. | 2012 |

| IDB Action Ref. | Description of the proposed capital works to help achieve favourable conditions on Catcott, Edington and Chilton Moors SSSI | Works to be constructed (indicative date only) |
|---|---|---|
| Cap 8.4 | Construct replacement culverts on South Drain Back Ditch at Skimmers Drove. | 2012 |
| Cap 8.5 | Construct new earth bunds. | 2012 |
| **Block 9** | | |
| | No capital works required. | |

## Proposal 5: Additional gauge boards and telemetry stations will be installed by the Environment Agency and the Drainage Boards in the Plan area.

Reason: To improve their capabilities regarding the management of water levels in the South Drain area, the Drainage Boards propose to install additional telemetry units and gauge boards in the locations set out in Table 12. The telemetry units will record water levels, and alarms settings will be set up to report the water levels directly to the Drainage Board offices.

The Environment Agency has replaced gauge boards within the Plan area over the last few years. The Environment Agency proposes to install new telemetry sites within the Plan area in order to improve its water level management capabilities.

**Table 12: Proposed additional gauge boards and telemetry stations in the South Drain area**

| Location | Grid ref. | Notes | Operator |
|---|---|---|---|
| Catcott Bridge | ST 4001 4236 | Telemetry outstation | EA |
| SCC owned Shapwick Bridge | ST 4233 4120 | Telemetry outstation | EA |
| Ashcott Railway Bridge | ST 4509 3955 | Telemetry outstation | EA |

## 9.3. Proposed changes to target water levels

**Proposal 6: The Drainage Boards and the Environment Agency will adopt the target water levels, as set out in Table 13, and trial these levels to ensure they meet the agreed objectives.**

Reason: Natural England has advised the Drainage Boards that some parts of Catcott, Edington and Chilton Moors SSSI require an increase in winter and spring water levels to provide a minimum depth of water in ditches for aquatic plants and invertebrates, splashy fields in winter for wintering water birds and wet ground conditions in spring for breeding waders. Therefore, the current winter and spring water levels at some control structures need to be changed to help achieve the objective of favourable condition on Catcott, Edington and Chilton Moors SSSI

The proposed improvements to the water control infrastructure outlined above will help the Drainage Boards and the Environment Agency to achieve and maintain the water levels required for favourable condition on the SSSI. The proposed changes in target water levels are set out in Table 13. The locations of areas with seasonally higher water levels are shown on Map 10 and target conditions and seasonal water levels are detailed in Box 2 and Table 14.

The current summer level in the South Drain of 1.61m is considered too high for the management of grasslands, especially during wet summer conditions. The Drainage Boards and Natural England propose to trial a 50mm reduction in summer level of the South Drain for the first two to three years of the Plan to assist land management on the SSSI, which has suffered from exceptionally wet summer conditions in recent years. In addition, the Drainage Boards and the Environment Agency propose to improve the monitoring and reporting of levels from key locations away from the Pumping Station, and to trial a more flexible water level regime for the South Drain that is more responsive to prevailing weather conditions (see Proposals 8). The Drainage Boards and the Environment Agency will develop detailed operations and maintenance procedures for the South Drain system by 2013, based on the outcomes of the water level and de-silting trials.

The Drainage Boards acknowledge that there may be potential to increase the area managed with raised water levels in the winter and/or the spring months on Catcott, Edington and Chilton Moors SSSI and the wider Plan area. The Drainage Boards 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 proposed improvements to the water management infrastructure in this Plan would support and not prejudice the realisation of these opportunities in future years.

**Table 13: Proposed target summer and winter water levels for the South Drain area**

| Water level control structures | Operated by | Current summer water levels (m ODN) | Current winter water levels (m ODN) | Proposed summer water levels (m ODN) | Proposed winter water levels (m ODN) |
|---|---|---|---|---|---|
| Hackness Sluice | EA | 1.60 - 1.95 | Not penned | 1.60 - 1.95 | Not penned |
| Gold Corner Pumping Station | EA | 1.61 | 1.45 | 1.56 | 1.45 |
| Shaking Drove Tilting Weir | EA | 1.61 | 1.45 | 1.56 | 1.45 |
| Huntspill Sluice | EA | 3.00 - 3.50 | 2.2-2.9 | 3.00 - 3.50 | 2.2-2.9 |
| Gold Corner Sluice | EA | Closed 1.65 - 2.00 | Open Variable | Closed 1.65 - 2.00 | Open Variable |
| West Burtle Rhyne Sluice (Block 10) | EA | Not penned | Not penned | Not penned | **1.45** |
| Decoy Rhyne Tilting Weir (Block 2) | Private | Not penned | 2.10m | [1] | 2.10m |
| Gold Drove Tilting Weir (Block 2) | IDB | New structure | New structure | [1] | [1] |
| Cossington Manor Rhyne Sluice (Block 3) | EA | Not penned | Not penned | Not penned | 1.80m |
| Chilton Railway Sluice (Block 1) | EA | Not penned | Not penned | Not penned | **1.45** |
| West Drove Sluice (Block 1) | IDB | New structure | New structure | Not penned | 1.70m |
| Chilton Cottage Sluice (Block 3) | EA | Not penned | Not penned | Not penned | 1.80m |
| Burtle Rhyne Sluice | EA | Not penned | Not penned | Not penned | Not penned |
| Chilton Landshire Rhyne Sluice (Block 4) | EA | Not penned | Not penned | Not penned | **1.75** |
| New Edington Road East Sluice (Block 5) | IDB | New structure | New structure | Not penned | **1.75** |
| Catcott Burtle Tilting Weir (Block 8) | EA | Not penned | Not penned | Not penned | **1.45** |
| Catcott Wall Rhyne Sluice | IDB | New structure | New structure | Not penned | **1.45** |
| Catcott Heath Sluice (Block 7) | EA | Not penned | Not penned | Not penned | **1.45** |
| Shepherd's Drove Tilting Weir (Block 6) | IDB | New structure | New structure | Not penned | **1.70** |
| Higher Ropes Drove Tilting Weir (Block 6) | IDB | New structure | New structure | Not penned | **1.55** |
| Long Moor Drove Sluice | EA | 4.16 | Not penned | 4.16 | Not penned |
| Gold Corner Drove Sluice | EA | 4.16 | Not penned | 4.16 | Not penned |
| Gold Corner South Sluice | EA | 3.50 | Not penned | 3.50 | Not penned |
| Whitchey Drove West Sluice | EA | 3.50 | Not penned | 3.50 | Not penned |
| Whitchey Drove East Sluice | EA | 3.50 | Not penned | 3.50 | Not penned |
| Pyde Sluice (west side) | EA | 4.27 – 4.28 | Not penned | 4.27 – 4.28 | Not penned |
| Quaking Bridge Sluice | EA | 4.30 | Not penned | 4.30 | Not penned |
| Cold Harbour Bridge Weir | EA | Crest level 3.50 (approx) | Crest level 3.50 (approx) | Crest level 3.50 (approx) | Crest level 3.50 (approx) |
| Pons Perilis Bridge Weir | EA | Crest level 4.00 (approx) | Crest level 4.00 (approx) | Crest level 4.00 (approx) | Crest level 4.00 (approx) |
| Cold Harbour Sluice | EA | 4.40 | 3.70 | 4.40 | 3.70 |
| North Load Penning Bay | EA | 4.95 | 4.35 (approx) | 4.95 | 4.35 (approx) |
| Aqueduct Sluice (Glastonbury Canal) | EA | 3.10 - 3.20 | Open | 3.10 - 3.20 | Open |
| Chisletts Weir | Private | 5.20 (approx) | 5.20 (approx) | 5.20 (approx) | 5.20 (approx) |
| Clyse Hole Weir/ Gauging Station | EA | Crest level 7.50 (approx) | Crest level 7.50 (approx) | Crest level 7.50 (approx) | Crest level 7.50 (approx) |

**Notes:**
- **Summer season:** Aim to achieve summer pen levels in the Main Drain from 1 April.
- **Winter season:** Aim to achieve winter pen levels in the Main Drain by 1 December.
- **[1]:** level unknown (to be determined by trial).
- **ODN:** Ordnance Datum Newlyn.

**Table 14: Proposed target summer and winter water levels for the principal hydrological blocks in Catcott, Edington and Chilton Moors SSSI**

| Structure | Target conditions – winter and spring | Current summer water levels (m ODN) | Current winter water levels (m ODN) | Proposed target summer water levels in the future (m ODN) | Proposed target winter water levels in the future (m ODN) |
|---|---|---|---|---|---|
| Chilton Moor North (Block 1) | Secure ditch water levels | 1.61m | 1.45m | 1.56m | 1.45m |
| Chilton Moor North (Block 1a) | Winter splash | 1.61m | 1.45m | 1.56m | **1.70m** |
| Gold Corner (Block 2) | Winter splash | 1.61m | 2.10m | 1.56m | 2.10m |
| Manor Rhyne & Chilton Moor South (Block 3) | Winter splash | 1.61m | 1.45m | 1.56m | **1.80m** |
| West Edington Heath (Block 4) | Winter splash | 1.61m | 1.45m | 1.56m | **1.75m** |
| East Edington Heath (Block 5) | Winter splash | 1.61m | 1.45m | 1.56m | **1.75m** |
| Catcott Lows (Block 6) | Winter splash/roost and spring splash | 1.61m | 1.45m | 1.56m | **1.70m** |
| Catcott Moor (Block 7) | Secure ditch water levels | 1.61m | 1.45m | 1.56m | 1.45m |
| Burtle Moor (Block 8) | Secure ditch water levels | 1.61m | 1.45m | 1.56m | 1.45m |
| Catcott Grounds and Burtle Whites (Block 9) | Secure ditch water levels | 1.61m | 1.45m | 1.56m | 1.45m |

**Notes:** **Summer season:** Aim to achieve summer pen levels in the Main Drain from 1 April.

**Winter season:** Aim to achieve winter pen levels in the Main Drain by 1 December.

**In blocks managed for winter splash (Dec – Feb incl.):** Maintain water levels to provide splash conditions during core winter months

**In blocks managed for spring splash (Mar – May incl.):** Water levels gradually falling during April and May from target winter levels to target summer levels, dependant on the weather conditions.

**ODN:** Ordnance Datum Newlyn.

**Proposal 7: The Drainage Boards will support private water management schemes in the Plan area as set out in Table 15.**

Reason: Within the framework provided by the operation of the arterial watercourses and control structures, individual farmers may need to operate private structures on their land in order to achieve the winter and spring splash required for wintering waterfowl and breeding waders. The Drainage Boards will support the management of these areas where they do not adversely affect neighbouring land. Where conflict does occur the IDB will work with landowners to achieve the best water management solution.

The seasonal water levels for private management schemes are set out in Table15, and the locations of these areas are shown on Map 10.

**Table 15: Proposed target summer and winter water levels in private schemes holding seasonally higher water levels in Catcott, Edington and Chilton Moors SSSI**

| Structure | Name of occupier | Summer water levels (m ODN) | Winter water levels (m ODN) |
|---|---|---|---|
| Catcott Lows | Somerset Wildlife Trust | Level unknown | Level unknown |
| Gold Corner RWLA | Mr C Stradling | Level unknown | 2.10 |
| Burtle Whites | Somerset Wildlife Trust | Level unknown | Level unknown |

## 9.4. Proposed changes to operational procedures and responsibilities

**Proposal 8: The Drainage Boards and the Environment Agency will adopt a flexible operating regime that allows variations in water levels and seasonal penning dates in response to weather conditions.**

Reason: The Drainage Boards consider 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 held both 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 Drainage Boards 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, unless the Plan indicates otherwise;
- the normal water level can range up to 100 mm below the level specified in the Plan during wet conditions, unless the Plan indicates otherwise.

The Environment Agency and the Drainage Boards have agreed to meet three weeks before the normal seasonal changeover date to confirm summer/ winter penning dates based on catchment conditions. This will improve communication and flexibility surrounding the normal operating date.

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

### Proposal 9: The Drainage Boards, 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 Drainage Boards will report on the outcomes of this monitoring at least once a year for the first three years after the implementation of the Plan.

Several organisations are involved in monitoring environmental information that is relevant to the WLMP, as set out in Table 16.

**Table 16: Monitoring arrangements in the South Drain area**

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

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

### Proposal 10: The Environment Agency and Drainage Boards will work together to resolve operational issues regarding the South Drain and its Pumping Station in order to manage flood risk and to maintain appropriate water levels for farming and conservation.

Reason: The operation of the Gold Corner Pumping Station is critical to holding the target water levels and to flood evacuation in the Plan area. The provision of new infrastructure at the Pumping Station, and in other parts of the Plan area, enables the Environment Agency and the Drainage Boards to review the operation of the Pumping Station (and the maintenance of the South Drain – see Proposal 12) so that the service standards regarding water management, conveyance and flood risk can be best achieve the agreed objectives for the area.

The Environment Agency and the Drainage Boards recognise that several issues need to be resolved regarding the operation of the Gold Corner Pumping Station including (a) greater flexibility when changing between summer and winter penning levels, and (b) the pre-emptive lowering of water levels in Main Rivers immediately prior to flood events. The latter is especially relevant in summer months for the Drainage Boards to avoid the flooding of farmland, and the Environment Agency to avoid undesirable environmental impacts.

## Proposal 11: The Drainage Boards and the Environment Agency will resolve the proposed changes in ownership and responsibility of selected water control structures and watercourses in the Plan area.

Reason: There are merits in one Operating Authority managing a greater proportion of the smaller structures that control water levels within a defined system. The Environment Agency and the Drainage Boards are negotiating the handover of ownership and operational responsibility for some of the control structures currently owned 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 owns 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.

One possible option is for the Drainage Board to take over the ownership and management of these watercourses and structures, in order to continue a system of professional management and continuity for the benefit of land owners and wildlife. The structures identified for this proposal are listed in Table 17.

**Table 17: Proposed changes in ownership and responsibility of water control structures**

| Structure | Current owner | Current operator | Proposed owner | Proposed operator |
|---|---|---|---|---|
| Withy Drove Pumping Station | EA | EA | Lower Brue DB | Lower Brue DB |
| Sloway Lane Pumping Station | EA | EA | Lower Brue DB | Lower Brue DB |
| Catcott Burtle Tilting Weir | EA | EA | Lower Brue DB | Lower Brue DB |
| Chilton Landshire Rhyne Sluice | EA | EA | Lower Brue DB | Lower Brue DB |
| Cossington Manor Rhyne Sluice | EA | EA | Lower Brue DB | Lower Brue DB |
| Catcott Heath Sluice | EA | EA | Lower Brue DB | Lower Brue DB |
| Burtle Rhyne Sluice | EA | EA | Lower Brue DB | Lower Brue DB |
| Chilton Cottage Sluice | EA | EA | Lower Brue DB | Lower Brue DB |
| Chilton Railway Sluice | EA | EA | Lower Brue DB | Lower Brue DB |
| West Burtle Rhyne Sluice | EA | EA | Lower Brue DB | Lower Brue DB |

## 9.5. Proposed changes to maintenance practices

### Proposal 12: The Lower Brue Drainage Board will change the timing of its routine maintenance of Viewed Rhynes in Catcott, Edington and Chilton SSSI from winter to late summer, and de-silt selected Viewed Rhynes where high silt levels are affecting ditch habitats.

Reason: The Lower Brue Drainage Board will change the timing of its routine maintenance from winter to late summer in the Catcott, Edington and Chilton Moors SSSI. This will allow the system to function more effectively in wet summer conditions, benefit agriculture and conservation and allow changes in winter water levels to be implemented. The Drainage Boards are aware of problems caused by high silt levels in some parts of the Viewed Rhyne system and therefore propose to establish a de-silting programme in order to restore and enhance the quality of ditch habitats in the affected areas.

### Proposal 13: The Environment Agency will de-silt parts of the South Drain in winter 2009-10 to ensure that the watercourse provides the appropriate service standards for flood risk management, farming and conservation.

Reason: There is a widespread view held locally that the South Drain does not convey water to the Gold Corner Pumping Station as effectively as it did in the past, and that the lack of de-silting in the last decade is to blame. The intermittent de-silting of the South Drain has now been reviewed by a joint working group of the Environment Agency and the Drainage Boards and they will continue to work together to find a satisfactory way forward regarding the management of the South Drain and its Pumping Station. A detailed method for de-silting sections of the South Drain is being developed by the joint working group, and a programme of work is expected to be underway by winter of 2009.

### Proposal 14: The Environment Agency will complete its review of the maintenance of the Main Rivers.

Reason: The Environment Agency, in consultation with the Drainage Boards, is currently reviewing the regular maintenance of Main Rivers within the Plan area in the response to changing priorities. This relates specifically to a national risk based approach where the highest standards of maintenance are directed to where they are most needed to protect people and property.

# 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 Drainage Boards on these matters and the mitigation or adaptation required in water management to accommodate these impacts.

**Somerset Wildlife Trust**

The Somerset Wildlife Trust are concerned that this change in the South Drain summer pen level has been made in the context of three unusually wet seasons and will prove to be risky if normal to dry summer conditions prevail in the future. The Trust would prefer the issue of under-management to be handled within the range of flexibility around the 1.6m pen level.

The Trust are also concerned that:

- Large areas of the SSSIs will continue to be managed with inappropriate water levels;
- The wider Brue Valley landscape is not dealt with in detail;
- The majority of the peat soils remain outside of raised water level areas.

**Royal Society for the Protection of Birds**

The RSPB support the general direction of the plan and welcome the proposed scale of RWLA extensions. However, the RSPB are unable to give support to the overall plan as they have significant reservations about the water level proposals for Catcott, Edington and Chilton SSSI.

- The RSPB consider Natural England target to establish splash winter conditions on Catcott, Edington and Chilton SSSI for wintering waders to be a helpful first step, but inadequate. The RSPB believe the plan should seek to establish regular shallow flooding of up to 25cm deep for wintering waterfowl in addition to splash conditions.
- The RSPB are also concerned that the South Drain WLMP proposals for Catcott, Edington and Chilton SSSI are unlikely to go far enough to reverse the recent historic declines of breeding waders.

The RSPB has provided the Drainage Boards with detailed information on the changes in breeding wader populations since 1977 on the Catcott, Edington and Chilton SSSI. This information will be used to inform decisions regarding opportunities to restore former breeding wader populations to the Catcott, Edington and Chilton Moors SSSI. The information provided by the RSPB has been included in the Environmental Report that accompanies the new WLMP for the South Drain Area.

**Mr GJ and ED Porter Lowlands Farm**

Details of the low level drainage route from the Edington Road area and how this will affect the pumped drained area managed by Mr GJ and ED Porter of Lowlands Farm remain under review. The Drainage Board intends to resolve these issues in 2010.

# 11. Amendments agreed during the period of the Plan

Amendments to this Plan which are agreed by Drainage Boards, the Environment Agency and Natural England are set out in Table 18.

**Table 18: Amendments agreed during the period of the Plan**

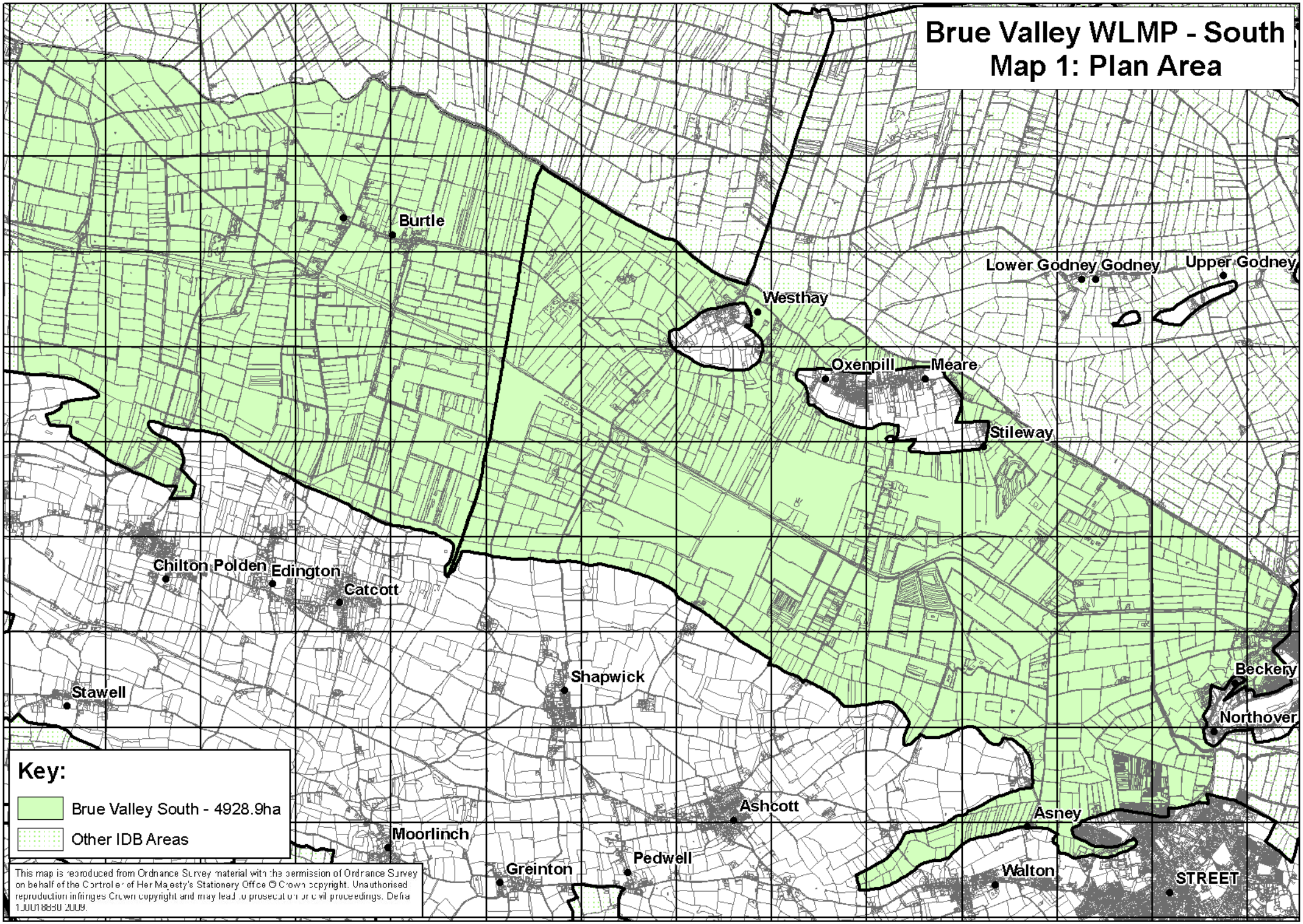
| No. | Date | Amendment | Agreed |
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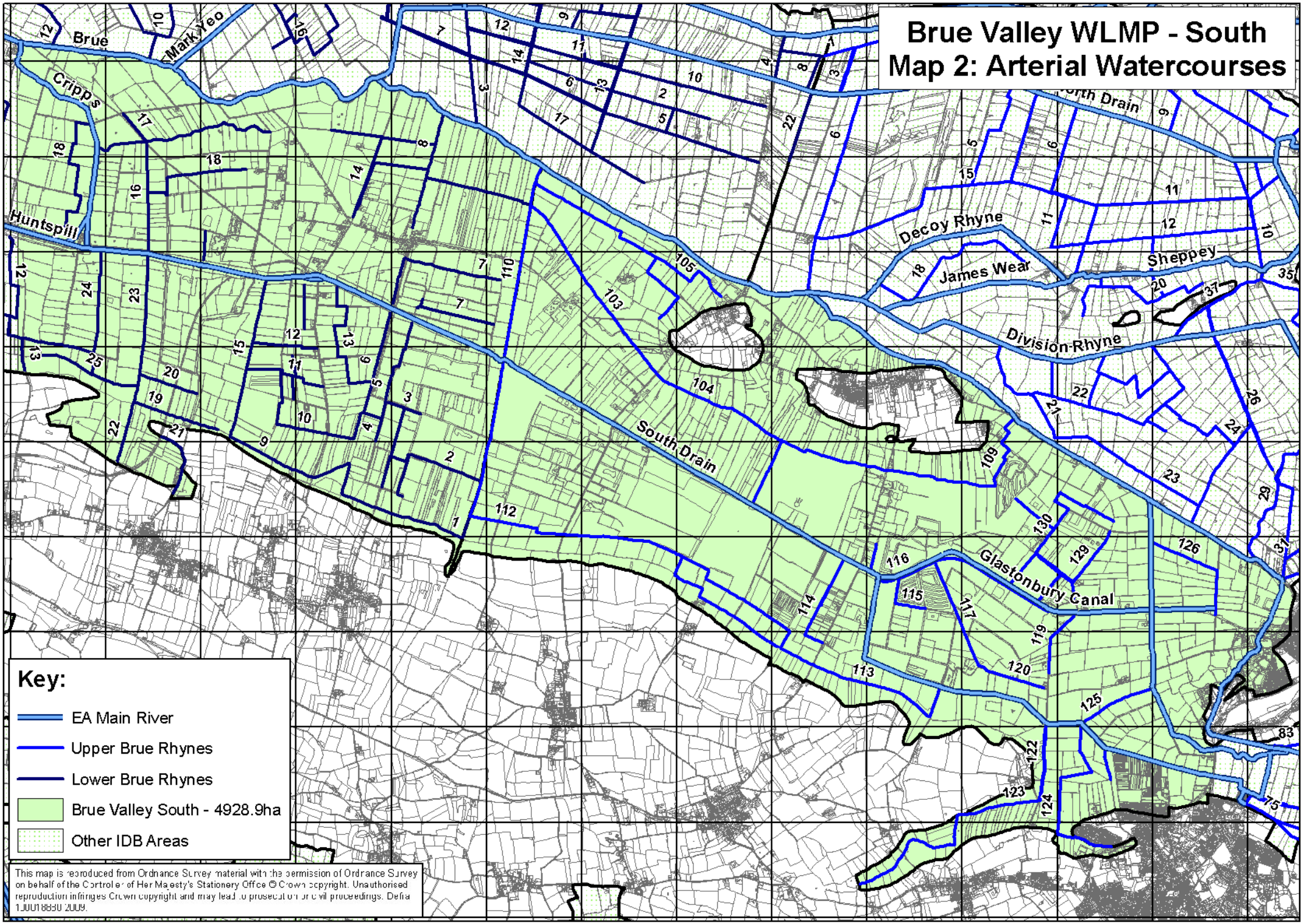
# 12. Review arrangements

The Drainage Boards propose 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 Drainage Boards, the Environment Agency and Natural England and can agreed as interim measures pending the full review.

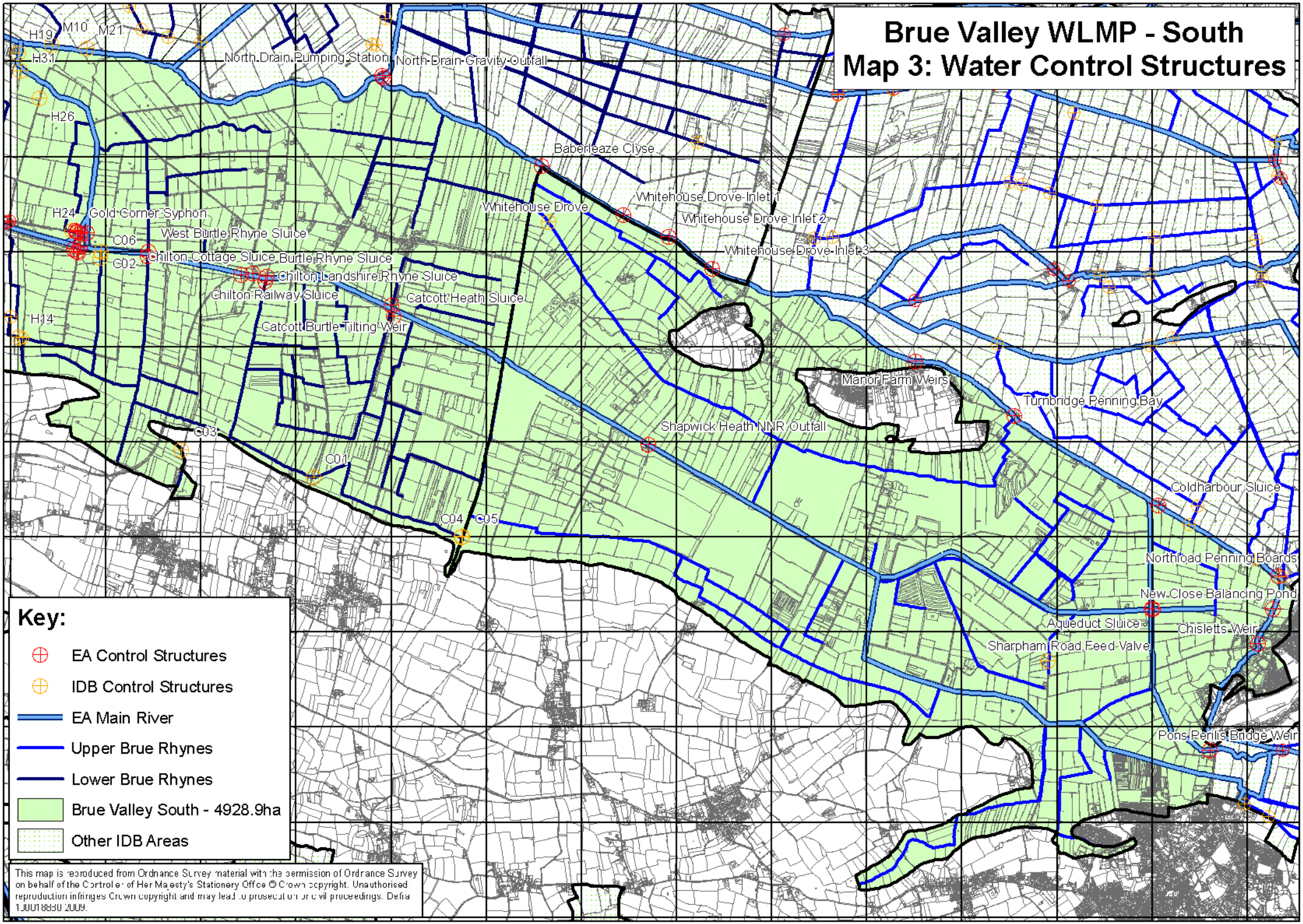
# 13. Timetable of actions: Brue Valley – South Drain area WLMP

| | | |
|---|---|---|
| | **Proposed continuation of current good practice** | |
| 1: | The current summer and winter penning levels, as set out in Table 13, will continue to be maintained by the Drainage Boards and the Environment Agency. | **Ongoing** |
| 2: | Maintenance of the current Viewed Rhyne network will continue to be undertaken by the Drainage Boards. | **Ongoing** |
| | **Proposed changes to water control infrastructure** | |
| 3: | Capital improvement works will be carried out by the Environment Agency to help achieve favourable condition on Catcott, Edington and Chilton SSSI. | **Complete by end 2010** |
| 4: | Capital improvement works will be carried out by the Lower Brue Drainage Board to help achieve favourable condition on Catcott, Edington and Chilton SSSI. | **Complete by end 2013** |
| 5: | Additional gauge boards and telemetry stations will be installed by the Environment Agency and the Drainage Boards in the Plan area. | **Complete by end 2012** |
| | **Proposed changes to target water levels** | |
| 6: | The Drainage Boards and the Environment Agency will adopt the target water levels, as set out in Table 13, and trial these levels to ensure they meet the agreed objectives. | **Complete by end 2013** |
| 7: | The Drainage Boards will support private water management schemes in the Plan area. | **Ongoing** |
| | **Proposed changes to operational procedures and responsibilities** | |
| 8: | The Drainage Boards and the Environment Agency will adopt a flexible operating regime that allows variations in water levels and seasonal penning dates in response to weather conditions. | **Immediate** |
| 9: | The Drainage Boards, 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 Environment Agency and Drainage Boards will work together to resolve operational issues regarding the South Drain and its Pumping Station in order to manage flood risk and to maintain appropriate water levels for farming and conservation. | **Complete by end 2011** |
| 11: | The Drainage Boards and the Environment Agency will resolve the proposed changes in ownership and responsibility of selected water control structures and watercourses in the Plan area. | **Complete by end 2011** |
| | **Proposed changes to maintenance practices** | |
| 12: | The Lower Brue Drainage Board will change the timing of its routine maintenance of Viewed Rhynes in Catcott, Edington and Chilton SSSI from winter to late summer, and de-silt selected Viewed Rhynes where high silt levels are affecting ditch habitats. | **From winter 2010 Complete by end 2014** |
| 13: | The Environment Agency will de-silt parts of the South Drain in winter 2009-10 to ensure that the watercourse provides the appropriate service standards for flood risk management, farming and conservation. | **Winter 2009** |
| 14: | The Environment Agency will complete its review of the maintenance of the Main Rivers. | **Complete by end 2011** |

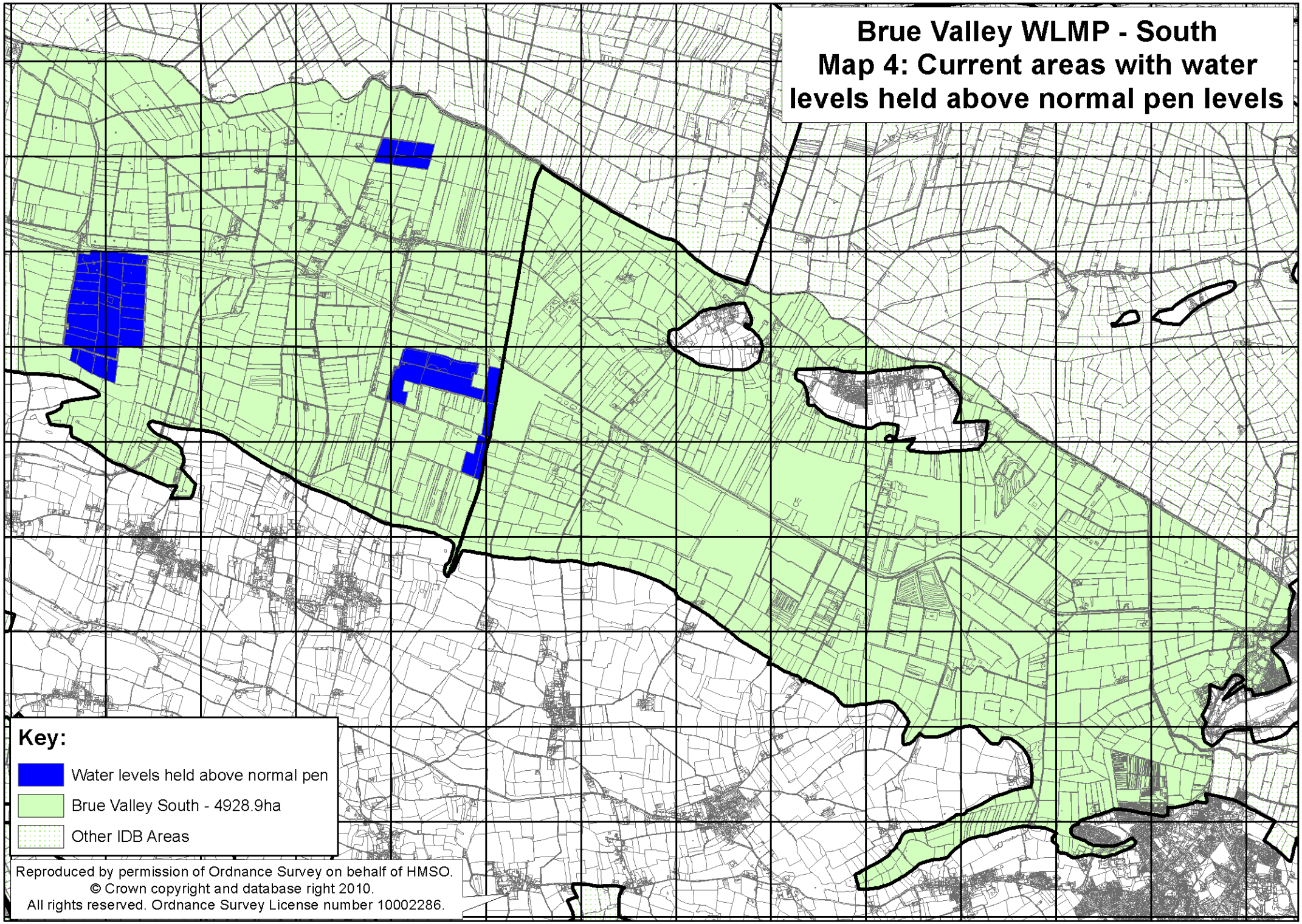

Brue Valley WLMP - South
Map 1: Plan Area
Burtle
Westhay
Lower Godney
Godney
Upper Godney
Oxenpill
Meare
Stileway
Chilton Polden
Edington
Catcott
Shapwick
Stawell
Beckery
Northover
Ashcott
Asney
Moorlinch
Greinton
Pedwell
Walton
STREET
Key:
Brue Valley South - 4928.9ha
Other IDB Areas
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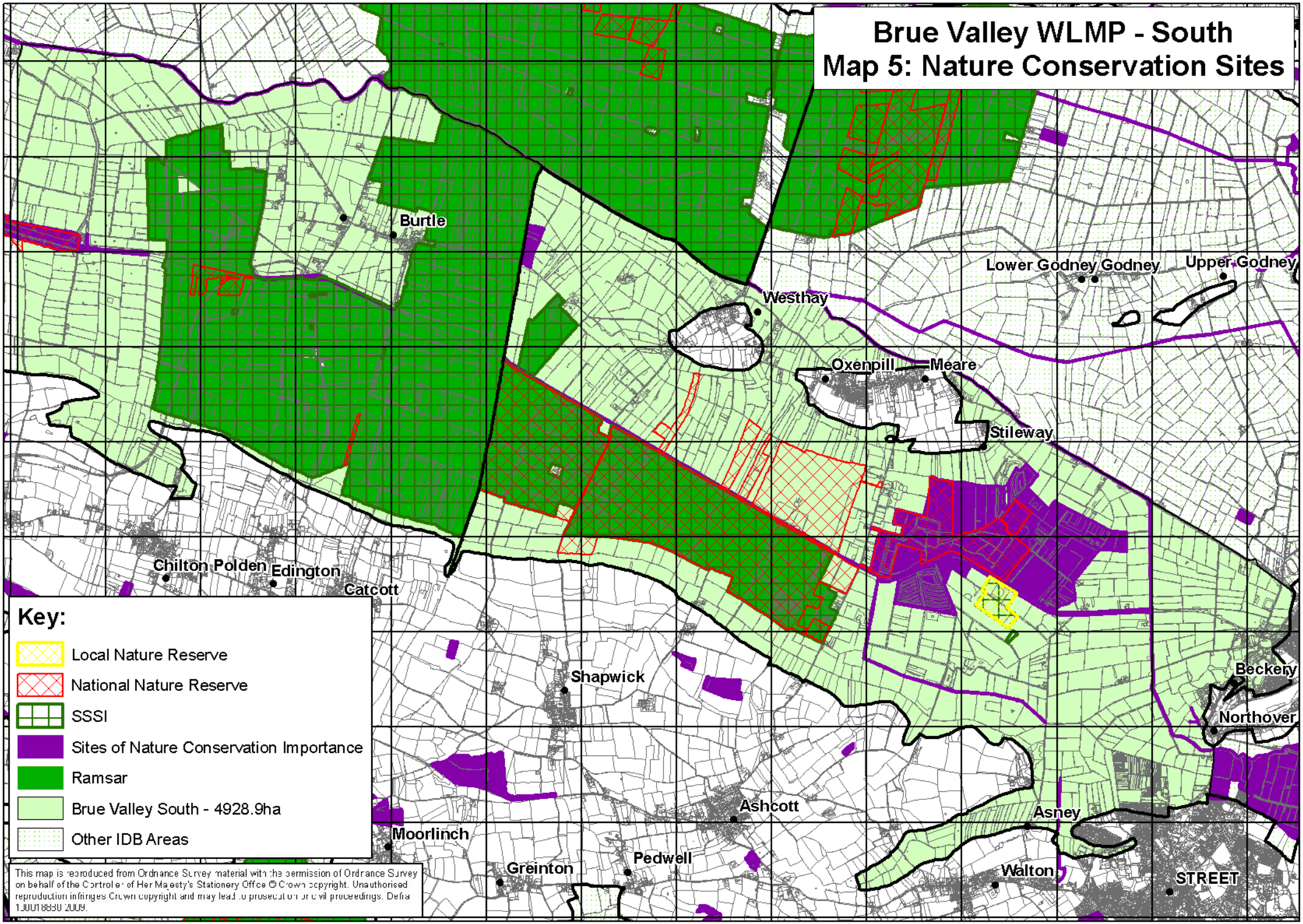

Brue Valley WLMP - South
Map 3: Water Control Structures
H19
M10
M21
H31
North Drain Pumping Station
North Drain Gravity Outfall
H26
Baberleaze Clyse
Whitehouse Drove
Whitehouse Drove Inlet 1
Whitehouse Drove Inlet 2
Whitehouse Drove Inlet 3
H24
Gold Corner Syphon
West Burtle Rhyne Sluice
C06
C02
Chilton Cottage Sluice Burtle Rhyne Sluice
Chilton Landshire Rhyne Sluice
Chilton Railway Sluice
Catcott Heath Sluice
Catcott Burtle Tilting Weir
H14
Manor Farm Weirs
Turnbridge Penning Bay
Shapwick Heath NNR Outfall
C03
C01
C04
C05
Coldharbour Sluice
Northload Penning Boards
New Close Balancing Pond
Aqueduct Sluice
Chisletts Weir
Sharpham Road Feed Valve
Pons Perlis Bridge Weir
Key:
EA Control Structures
IDB Control Structures
EA Main River
Upper Brue Rhynes
Lower Brue Rhynes
Brue Valley South - 4928.9ha
Other IDB Areas
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# Brue Valley WLMP - South
# Map 4: Current areas with water levels held above normal pen levels



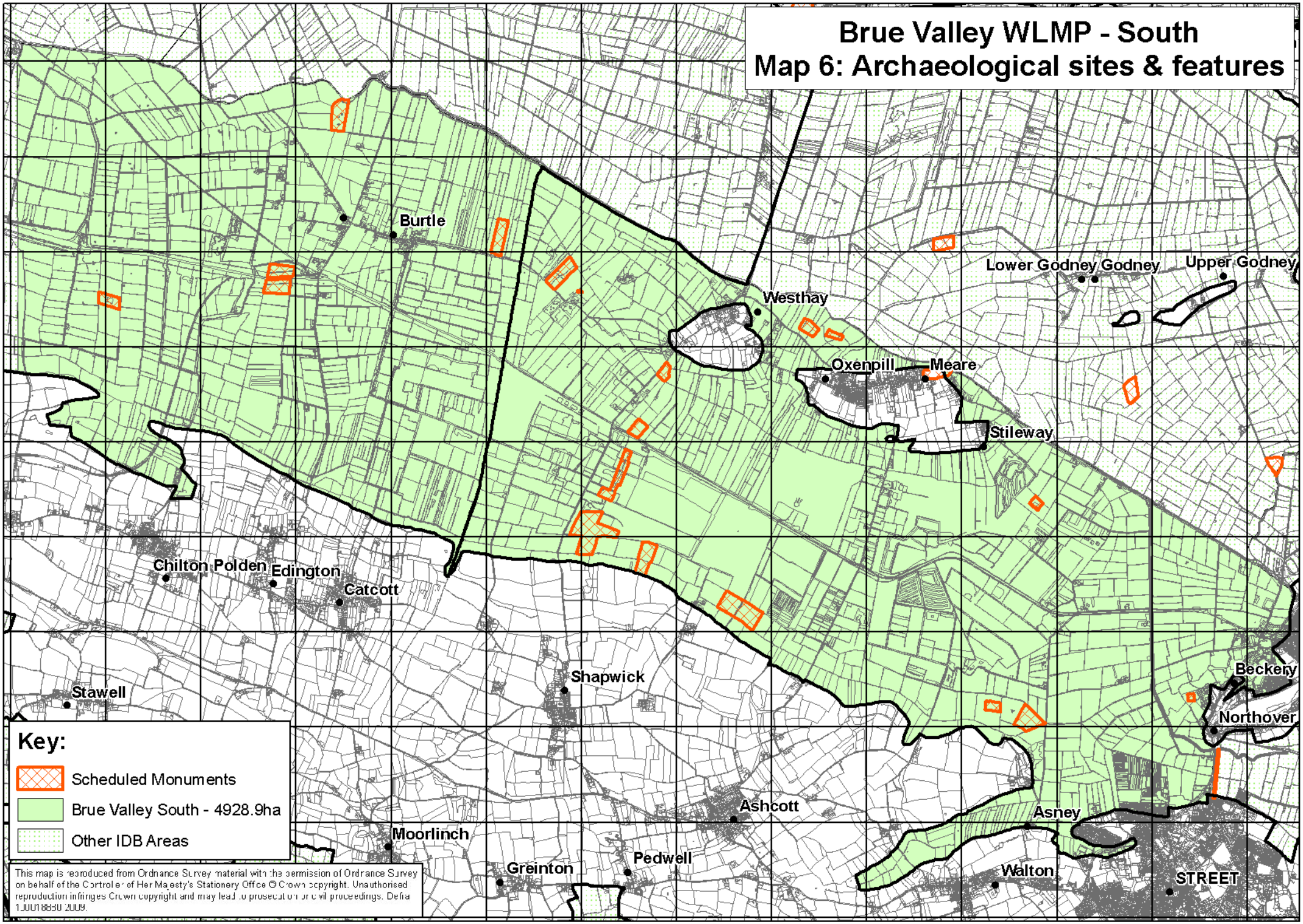

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# Brue Valley WLMP - South
# Map 5: Nature Conservation Sites



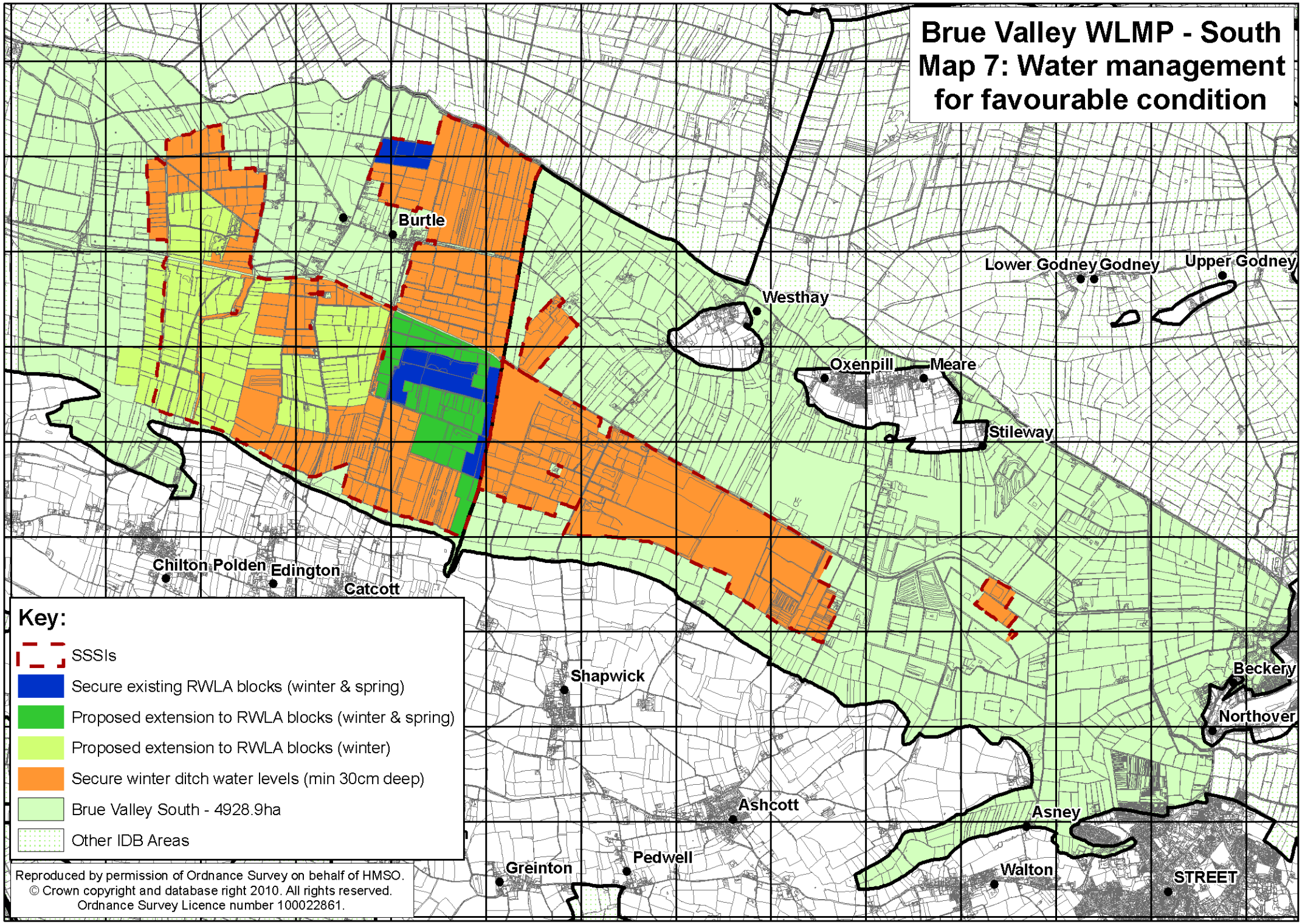

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# Brue Valley WLMP - South
# Map 6: Archaeological sites & features



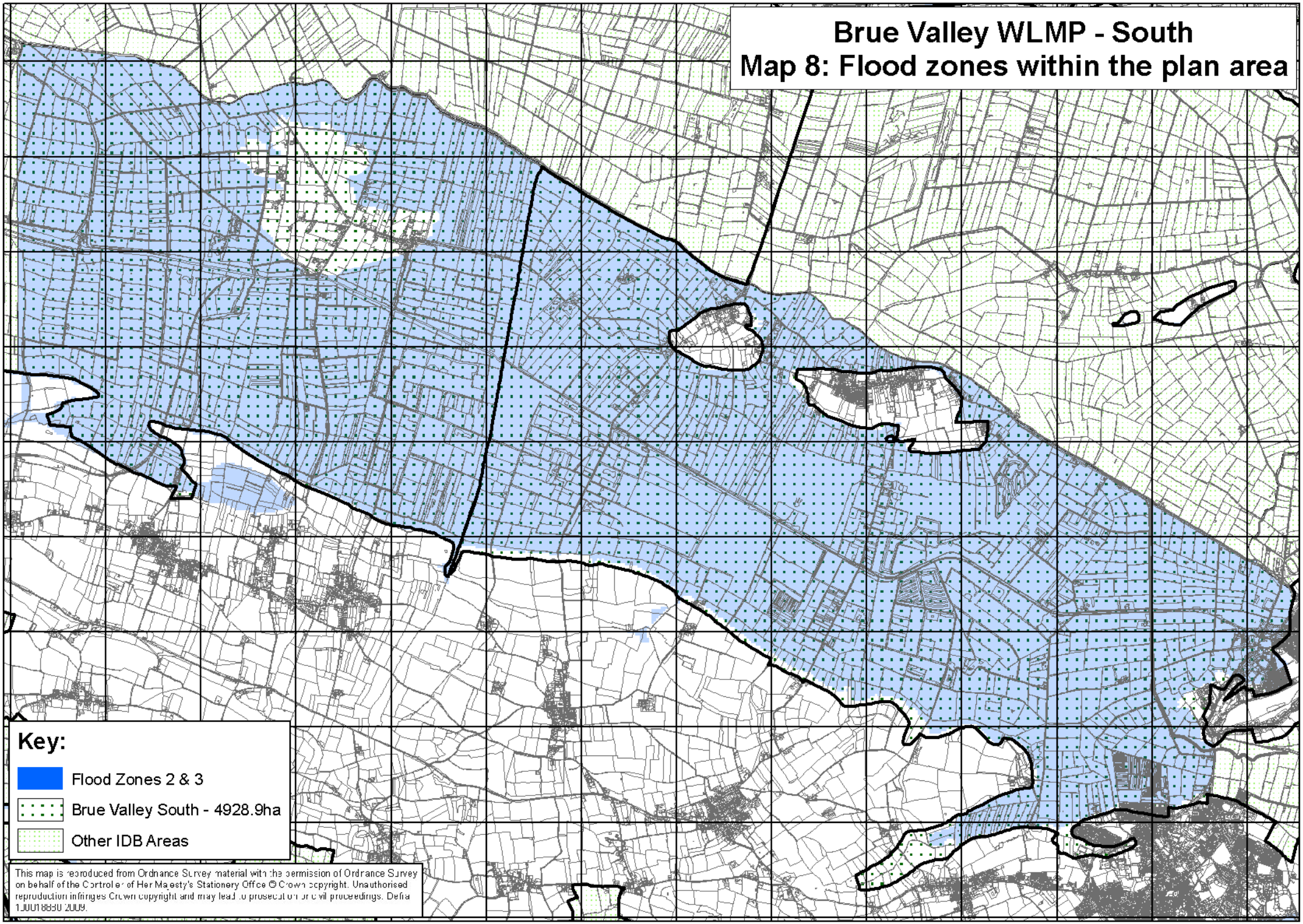

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# Brue Valley WLMP - South
# Map 7: Water management for favourable condition



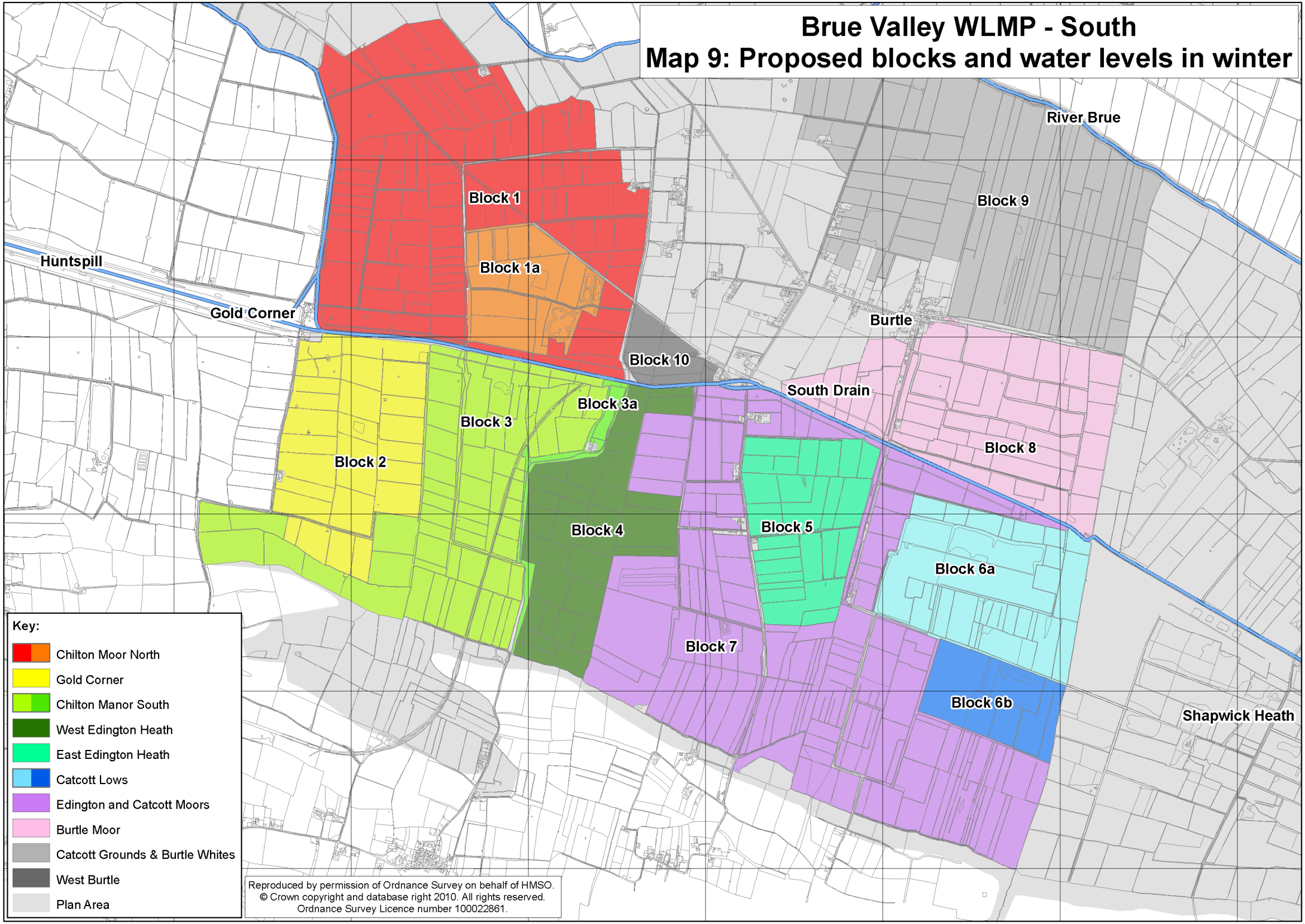

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# Brue Valley WLMP - South
# Map 8: Flood zones within the plan area



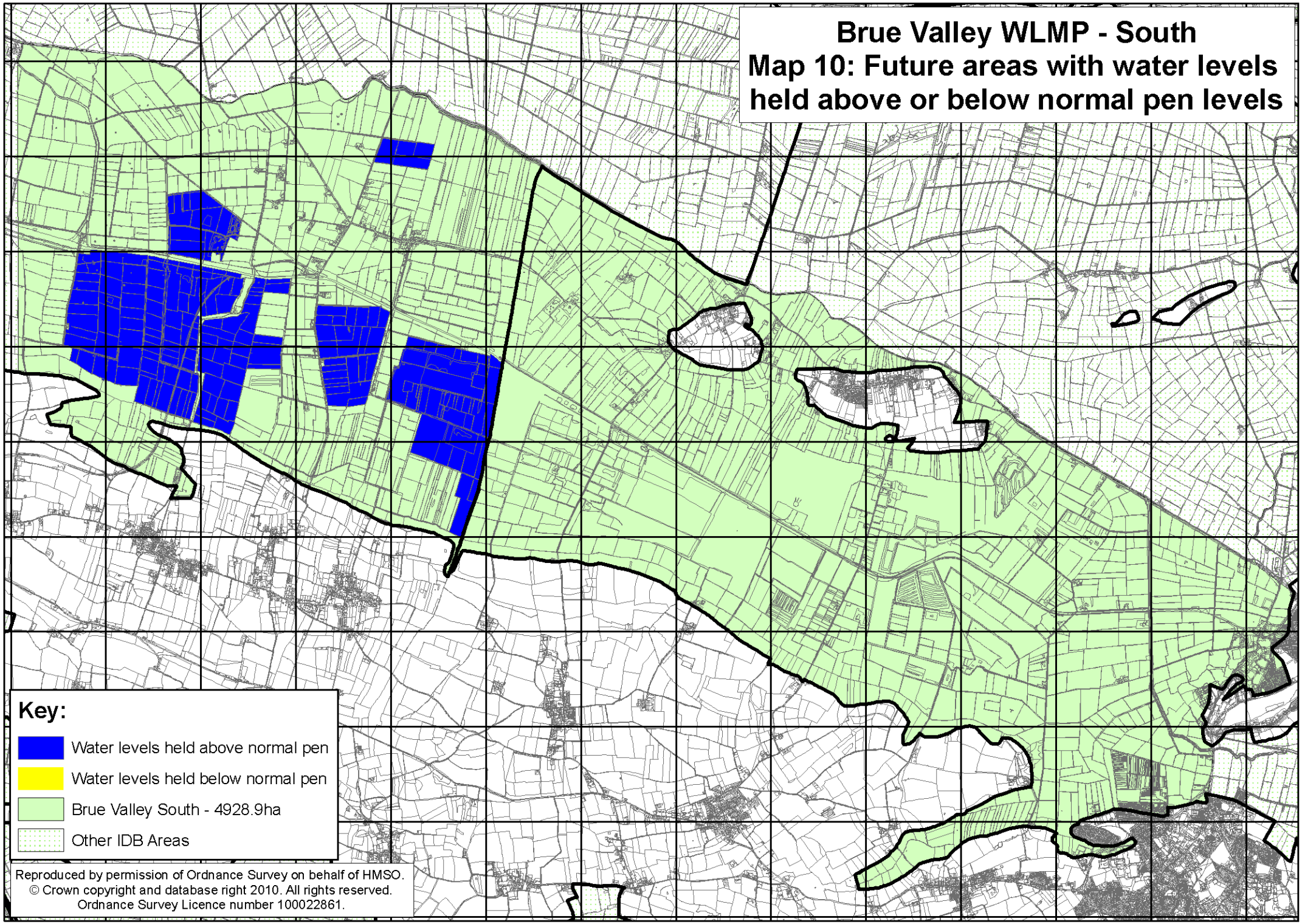

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# Brue Valley WLMP - South
# Map 9: Proposed blocks and water levels in winter




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# Brue Valley WLMP - South
# Map 10: Future areas with water levels held above or below normal pen levels




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