

**Pevensey Levels Water Level
Management Plan review 2014**

ATKINS

Operating Manual: Section 1- 3

Environment Agency and Natural England

12/06/2015
Final



Notice

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Document History

JOB NUMBER: 5133823			DOCUMENT REF: 5133823DG006			
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised	Date
1	Draft for external review	A Gill	M Jordan	D Gasca	I Mathieson	12/12/14
2	Final	A Gill	M Jordan	D Gasca	I Mathieson	12/06/15

Acronyms used in the operating manual

Acronym	Description
DA	Drainage Area
HU	Hydrological Unit
IDB	Internal Drainage Board
IDD	Internal Drainage District
LLFA	Lead Local Flood Authority
SAC	Special Area of Conservation
SPA	Special Protected Area
SSSI	Site of Special of Scientific Interest
WLMP	Water Level Management Plan
WLMU	Water Level Management Unit

Table of contents

Chapter	Pages
1. Summary information on the Pevensy Levels and the manual	5
1.1. Who is this manual for?	5
1.2. Background on the Pevensy Levels	5
1.3. Water Level Management Plan Review 2014	5
1.4. Operating manual structure	6
2. Management responsibilities in the Pevensy Levels SSSI	8
2.1. Risk management authorities	8
2.2. Riparian owners	12
2.3. Changes in management responsibilities	12
3. Current approach to water level management	13
3.1. Operating guidance layout	13
3.2. Pevensy Levels hydrology	13
3.3. Water Level objectives	15
3.4. Monitoring water levels	16
3.5. Identifying water level issues and revising the manual	18
3.6. Cost of maintaining the Pevensy Levels SSSI	19
References	19

Tables

Table 3-1	Pevensy hydrology monitoring data	17
Table 3-2	Pevensy Levels unit costs based on current management (base date of costs begin in 2008)	19

Figures

Figure 2-1	Main structures and watercourses of the Pevensy Levels SSSI	9
Figure 2-2	Feed structure S35 (left) and P37 (right) along the Wallers Haven high level carrier	9
Figure 2-3	Retaining structures R42 and W42 in the Horse-eye drainage area along pumped drained ditches	10
Figure 2-4	Traditional rough grazing practices and poaching of ditch margins by cattle (left) are important to maintain the wetland habitat which supports the fen rafter spider (right)	11
Figure 2-5	The structural features of a characteristic drainage channel (Buisson <i>et al.</i> 2008)	12
Figure 3-1	Options considered as part of the 2006 WLMP	14
Figure 3-2	WLMUs, key structures and watercourses of the Pevensy Levels SSSI	15
Figure 3-3	Pevensy hydrology monitoring data	18

1. Summary information on the Pevensey Levels and the manual

1.1. Who is this manual for?

This manual has been developed to document the current best practice operation of the Pevensey Levels Site of Special of Scientific Interest (SSSI) for conservation and water level management. It can be used by future operators of the SSSI as a reference guide on management, as well as by landowners to understand how and why water levels are managed in a certain way.

This manual is a 'Live' document which should be updated as and when needed. The current version of the manual is version 1. An audit trail of versions and changes can be maintained in the version control table on page 2. More information on updating the manual is provided in Section 3.

1.2. Background on the Pevensey Levels

The Pevensey Levels SSSI, hereafter known as the SSSI, is a nationally and internationally important wetland site (also a Ramsar and Special Area of Conservation (SAC) site) of approximately 450km of freshwater ditches dissecting 3,500 ha of wet grassland. The site is nationally important for the wintering lapwing flocks which feed on the wet ditches, and is internationally important for the diversity of plants and animals found in the freshwater ditches. Stable ditch water levels year round are crucial for the nature conservation interest of the site. The SSSI is located between Eastbourne and Bexhill in East Sussex, and is predominantly located within the boundaries of Wealden District Council, with a small area in Rother District Council to the East.

The area at the time of writing had 60 active farms and approximately 200 landowners. Most of the SSSI is given over to cattle and sheep grazing, with some arable cropping on the periphery. The current green farming practices on the Levels – which include extensive grazing and rotational ditch management – are linked to the exceptional biodiversity value of the SSSI. Water level management also benefits farming practice on the Levels: by ensuring ditches provide wet fencing, drinking water and good quality grazing for livestock.

The main conservation interest of the SSSI lies in the resulting ditch flora and fauna. Of note, the SSSI is known for the following:

- In terms of its wetland ecology and aquatic mollusc fauna, the Pevensey Levels contain the most diverse ditch community of any grazing marsh or wet grassland in the UK.
- 68% of plants recorded in Great Britain described as aquatic can be found on the Pevensey Levels.
- The Pevensey Levels are one of only three sites in the country where populations of the fen raft spider *Dolomedes plantarius* are present. They represent the only expanding population in the UK, where it is closely associated with specific ditch vegetation communities.
- The site supports outstanding invertebrate populations and contains numerous Red Data Book rare, vulnerable or endangered molluscs, aquatic beetles, dragonflies, and spiders.
- The site is of national importance for its wintering lapwing *Vanellus vanellus*, with numbers exceeding 1% of the total British population.

The conservation and water level objectives are described further in Atkins (2007). Natural England supports and encourages good and less intensive farming practice on the site through the Higher and Entry Environmental Stewardship Scheme. At the time of writing, around two thirds of the SSSI area is in an Environmental Stewardship Scheme

1.3. Water Level Management Plan Review 2014

Management of water levels on the Pevensey Levels follows a Water Level Management Plan (WLMP). A WLMP provides a means of balancing and integrating the water level requirements for a range of activities (e.g. conservation, flood risk and agricultural) within an SSSI. The plan includes a written statement that outlines the objectives for a SSSI and how they may be achieved. Natural England and the Environment Agency have commissioned a review of the WLMP for the SSSI. The review comprises:

- An assessment of the success of the implementation of the 2006 Plan (Atkins 2006) and recommendations for improving water level management by future organisations through hydrological management changes
- An assessment of reducing the operation of the pumps and costs
- **The development of an operating manual to assist future organisations in managing water levels**

This operating manual has drawn on information from a range of sources:

- Hydrology and hydrometry data for the SSSI
- An understanding of the design of the Levels water level management system and how it was managed historically
- The 2006 WLMP review and implementation
- The 2014 condition assessment to inform the revised operation of structures where required
- Site visits in areas where water level objectives are not being achieved to ascertain the reasons why and identify how any issues can be resolved
- Discussions and workshops between Environment Agency staff, Natural England staff and local landowners

1.4. Operating manual structure

The operating manual is divided into 4 main sections as defined below:

Section 1 - Summary information on the Pevensy Levels and the operating manual

Summary information on the manual and the SSSI

Section 2 - Management responsibilities in the Pevensy Levels SSSI

Outlines the roles and responsibilities of the main stakeholders with responsibilities for water level management across the Pevensy Levels SSSI, including

- the Environment Agency
- Natural England
- the Internal Drainage Board (IDB) and
- local landowners

The consultation programme during the 2014 WLMP update highlighted a disparity between the Environment Agency and Internal Drainage Board (IDB) responsibilities, and the expectations of landowners. It is important that the obligations on each of the different stakeholder groups are clearly stated to enable positive collaboration on the ground.

Section 3 – Current approach to water level management

This section provides reference information on the water level management of the SSSI including:

- Pevensy Levels hydrology
- Water level objectives to work to
- Maintaining a water level monitoring programme
- How to identify water level issues
- Revising the manual
- Costs of managing the SSSI

Section 4 – Operating guidance

This is designed to be the main reference section of the manual. Due to the size of the site, and to make this manual as easy to use as possible, the SSSI has been split into Drainage Areas (DAs) and Water Level Management Units (WLMUs). This section of the manual provides a one page (2 sided) management summary for each WLMU in the SSSI. In most cases therefore, a user of the manual in most cases will be only required to refer to one page.

Operating practicalities and alternative management arrangements are also documented in the one pagers for consideration of the manual users.

Due to the large size of the manual – it has been divided into 3 documents:

- Section 1 – 3 giving overall information on water level management
- Section 4 giving detailed WLMU information
- Appendices providing supporting information to the main manual.

This document encompasses section 1 – 3.

2. Management responsibilities in the Pevensey Levels SSSI

Landowners and risk management authorities all have responsibility to share for the management of the SSSI. This section summarises these responsibilities. Further information can be sought from Environment Agency (2013).

2.1. Risk management authorities

A risk management authority has powers and responsibilities to manage flood risk and work with others to improve the river environment in England and Wales. There are three risk management authorities who have powers over and responsibilities for watercourse management:

1. The Environment Agency;
2. Lead Local Flood Authorities (LLFAs) and Local Authorities;
3. IDBs.

Environment Agency (main river)

The Environment Agency has discretionary powers which allow it to work on main rivers - these are typically larger streams and rivers, but some are smaller watercourses of local significance. In England, Defra decides which watercourses are the main rivers, and the Welsh Government does this in Wales. Main rivers can include any structure that controls or regulates the flow of water in, into or out of the channel.

The Catchment Flood Management Plan (Environment Agency 2009) shows that the SSSI is broadly under flood management policy 6; “*Areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits*”

On the Pevensey Levels, the current Environment Agency position on flood risk management is that structures on main river such as the main gates and tidal flaps would continue to be operated and maintained by the Environment Agency. Key feed structures coming off main river would also be maintained.

However, the Environment Agency does not have to maintain or construct new works on main rivers or the sea. It is unlikely to maintain a watercourse to improve the amenity of the river or to stop erosion that does not increase flood risk. Main river and associated structures are shown in Figure 2-1 below. Figure 2-2 shows some of the structures and channels maintained by the Environment Agency.

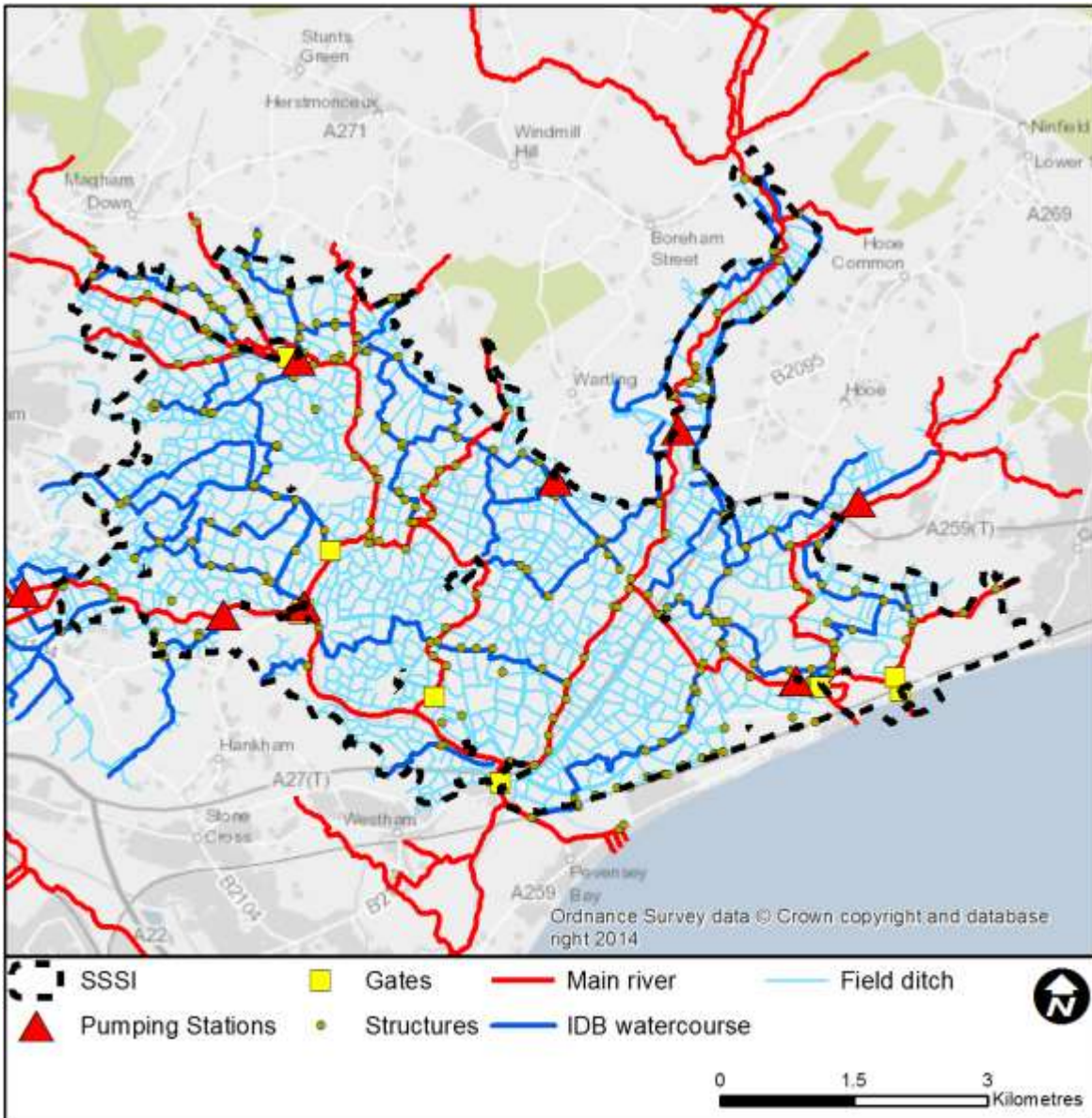


Figure 2-1 Main structures and watercourses of the Pevensey Levels SSSI



Figure 2-2 Feed structure S35 (left) and P37 (right) along the Wallers Haven high level carrier

Local authorities & IDBS (ordinary river)

An ordinary watercourse is every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows, but which does not form part of a main river. The local authority or IDB has powers on ordinary watercourses similar to the Environment Agency's powers on main rivers. As the SSSI falls under the Pevensley Internal Drainage District (IDD), it is the duty of the IDB to supervise land drainage, water level management and flood risk management works and regulation on ordinary watercourses in the IDD. Similar to the Environment Agency, an IDB's powers are discretionary. Ordinary river and associated structures are shown in Figure 2-1 above. Figure 2-3 shows two drains in the Horse-eye drainage area where water levels are entirely managed through ordinary watercourse, although fed by structures from main river.



Figure 2-3 Retaining structures R42 and W42 in the Horse-eye drainage area along pumped drained ditches

Conservation & Natural England

The local authorities, IDB and the Environment Agency also have responsibilities regarding conservation ensuring the SSSI achieves its objectives; under the EU Habitat Regulations, the Wildlife and Countryside Act, and the EU Water Framework Directive. Examples of important habitat and species are shown in Figure 2-4. Further information is found in Atkins (2007). Consenting on Flood Defence works in the SSSI would require the authorities to undertake a Habitat Regulations assessments, with support from Natural England.

Natural England encourage good water course/structure management through agri-environment schemes to some extent (although funding in future schemes is likely to be more limited and not include capital items to repair structures like sluices). Natural England also undertakes the following tasks alongside the risk management authorities:

1. Checking watercourses are being managed appropriately and that structures are set at appropriate levels.
2. Taking action where structures or watercourses are not managed appropriately
3. Taking action where destructive management takes place
4. Consenting all watercourse and water structure management



Figure 2-4 Traditional rough grazing practices and poaching of ditch margins by cattle (left) are important to maintain the wetland habitat which supports the fen rafter spider (right)

Maintenance activities

Currently, riparian owner and landowners within the SSSI pay a levy for the IDB to maintain the structures and channels along ordinary watercourse. The SSSI has close to 300 structures and 450km of ditches across the SSSI. The IDB and Environment Agency prioritises works which are necessary to reduce flood risk and maintain the depressed water levels required for farming and conservation purposes. Based on the current scale of management at the WLMU level (x42), this currently requires approximately two key structures to be operated per unit, as well as other key gates required for feeding the WLMUs equating to one third of structures requiring active management. Approximately 57 km of watercourse are managed per year on a rolling three year programme covering ~110km of watercourse. Buisson *et al.* (2008) provides good practice drainage channel maintenance work for flood risk and biodiversity.

Maintenance of the remaining structures and channels which are not critical for flood risk management or conservation purposes, will not be actively managed by the IDB or Environment Agency. In these instances – riparian owners will have a role to play – see below.

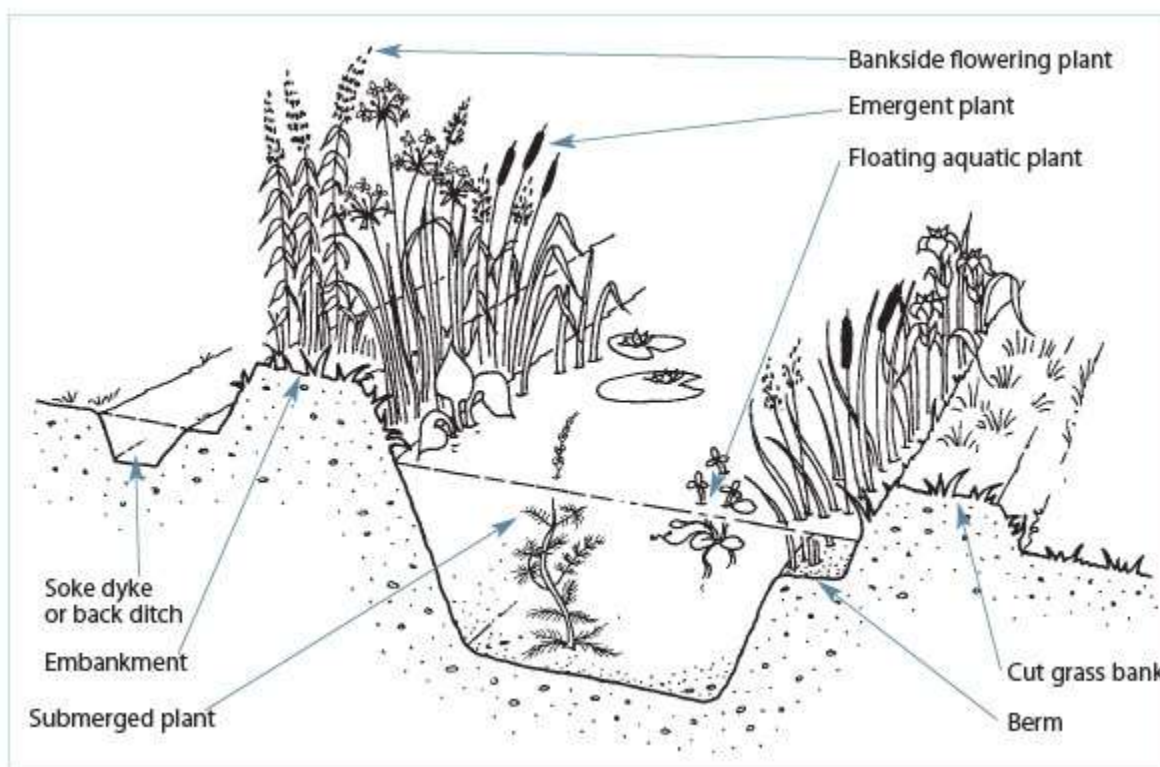


Figure 2-5 The structural features of a characteristic drainage channel (Buisson *et al.* 2008)

2.2. Riparian owners

If a land boundary is next to a watercourse, the owner is a 'riparian owner' and it is generally assumed that the land up to the centre of the watercourse is owned. Occasionally a watercourse, will be the responsibility of a third party, and this should be noted in the deeds. No matter who manages the SSSI, the riparian owners will generally have the following responsibilities:

- Responsibility to pass on flow without obstruction, pollution or diversion affecting the rights of others.
- Accept flood flows through their land, even if caused by inadequate capacity downstream. There is no common law for a landowner to improve the drainage capacity of a watercourse.
- Maintain the bed and banks of the watercourse (including trees and shrubs growing on the banks) and for clearing any debris, natural or otherwise, including litter and animal carcasses, even if it did not originate from their land.
- Must not cause any obstructions either temporary or permanent that would prevent the free passage of fish.
- Responsible for keeping the bed and banks clear from any matter that could cause an obstruction either on their land or by being washed away by high flow to cause an obstruction at a structure downstream. Rivers and their banks should not be used for the disposal of any form of garden or other waste.
- Must keep any structures clear of debris. These structures include culverts, trash screens, weirs and mill gates.
- The responsibility for protecting the property from seepage through natural or man-made banks. Where such seepage threatens the structural integrity of a flood defence it may become the concern of the Environment Agency
- Discuss the maintenance of flood defences on riparian owner's property with the relevant risk management authority
- Any works which will create or alter an obstruction to the flow of a watercourse will require a Flood Defence Consent from the risk management authority responsible for that watercourse
- The landowner is usually responsible for work to reduce bank erosion. Risk management authorities usually only get involved where natural erosion threatens a flood defence

Riparian owners cannot deliberately damage the SSSI and will need permission for works in or near a watercourse from Natural England as well as the risk management authority if the proposed works are on or may affect a site protected by law, or are on a site which supports a legally protected species. However, duty of care remains with the risk management authority.

More information on riparian responsibilities is found in Environment Agency (2013).

Funding for works

Good watercourse and structure management is in the landowners' interest as it ensures farming practice can continue, provided the economic burden of such management is not above the benefits of the management to the farmer. There may be scope for Natural England to encourage water course/structure management through agri-environment schemes to some extent (although funding in future schemes is likely to be more limited and not include capital items to repair structures like sluices).

Additional funding sources can be documented here in future revisions of this manual as they become apparent.

2.3. Changes in management responsibilities

Management responsibilities between the flood risk management authorities can change through the conversion of watercourse from main river to ordinary watercourse (and vice versa) or through boundary changes of the IDD. These will generally be minor changes. For example, some stretches of ordinary watercourse in Eastbourne have been converted to main river, and main river on the Isle of Sheppey is being "de-mained" to IDB drain.

The main changes in management responsibility that could take place on the Levels in the future is if the IDB ceases to be the risk management authority. If this happened, responsibility would return to the Local Authorities across the IDD. More information on possible management changes is discussed further in Atkins (2014a).

3. Current approach to water level management

3.1. Operating guidance layout

This section provides operating guidance on managing the structures of the SSSI, principally for conservation although management operations are also provided to reduce flood risk. The layout of this section is as follows:

- Summary of the Pevensy Levels hydrology
- Water level objectives
- Monitoring water level management and resolution
- Costs of maintaining the Pevensy Levels SSSI
- Guidance on manual revisions

3.2. Pevensy Levels hydrology

Two principal river systems cross the Levels as embanked high level carriers. To the east the Wallers Haven drains to the sea at Normans Bay. A major public water supply abstraction is located on this river. To the west a network of rivers converge to form the Pevensy Haven which discharges at Pevensy Bay. The effluent from two wastewater treatment works at Hailsham constitutes a significant proportion of total flow to the western system, particularly during the summer.

A review of the WLMP in 2006 (Atkins 2007), identified three scales of possible water level management in the SSSI:

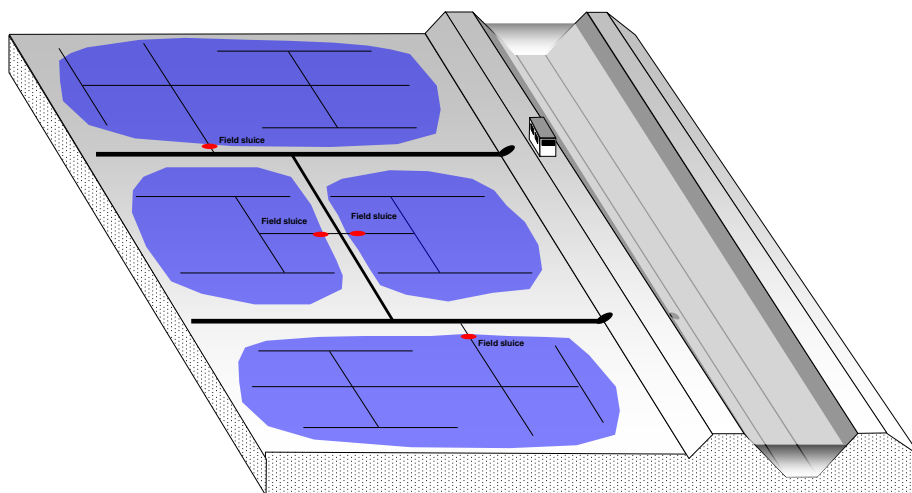
1. Hydrological Units (HU), 104
2. Water Level Management Units (WLMU), 42
3. Drainage Areas (DA), 8

At the HU level (Option 1 in Figure 3-1), water levels could be managed flexibly across the SSSI but this would entail a high cost for maintaining and operating structures. HU scale management requires a greater onus on landowners to operate structures on their land using structures which are not currently operated by the IDB or Environment Agency. At a DA scale (Option 3 in Figure 3-1), managing water levels by altering the water levels at which the pumps switch on and off, would be comparatively inexpensive, but would be associated with a loss of flexibility in water level management across large areas of the Levels was not supported by local landowners, and could lead to water levels in some parts of the SSSI being too deep or too shallow for conservation purposes.

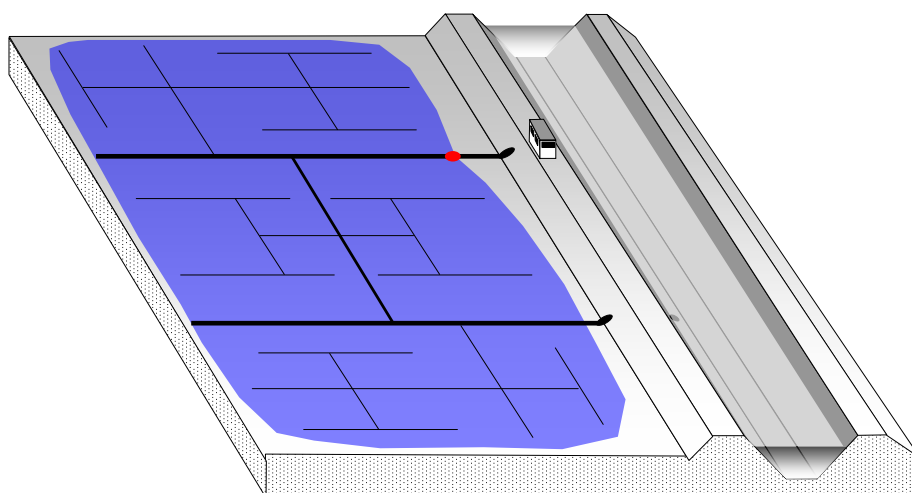
At a WLMU scale (Option 2 in Figure 3-1), some of the flexibility under the HU option is retained using fewer structures and at lower cost. This was identified as the preferred option during the 2006 WLMP review (Atkins 2006) approved for implementation.

Implementation occurred between 2009 – 2011. The implementation programme was an important milestone, since without it the ageing structures, would have provided declining water control in many areas, increasing reversion to poor conditions – affecting both the ecology and farming livelihoods on the SSSI. Follow up consultation with landowners during the 2014 review, showed that management at the WLMU scale continues to be the favoured option.

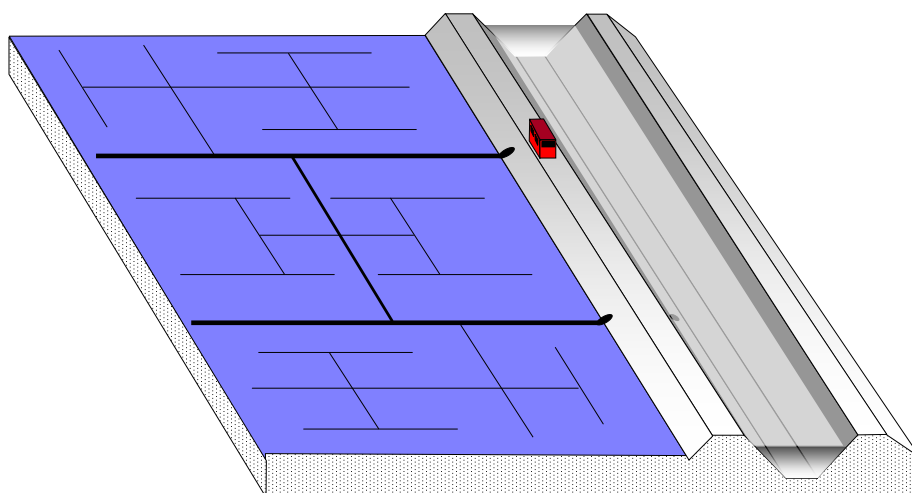
Water management extents under the current WLMU approach is shown in Figure 3-2. In the summer the carriers maintain high water levels through the use of gate structures. This allows feed structures operated by the IDB to transfer water into two thirds of the Levels, keeping the ditches wet. In the winter, the gate levels are lowered to maintain flood storage capacity and conveyance, whilst the eight pumping stations located around the Levels pump water out into the carriers to maintain water levels for farming and conservation.



Option 1 – HU scale management



Option 2 – WLMU scale management



Option 3 – DA scale management

Figure 3-1 Options considered as part of the 2006 WLMP

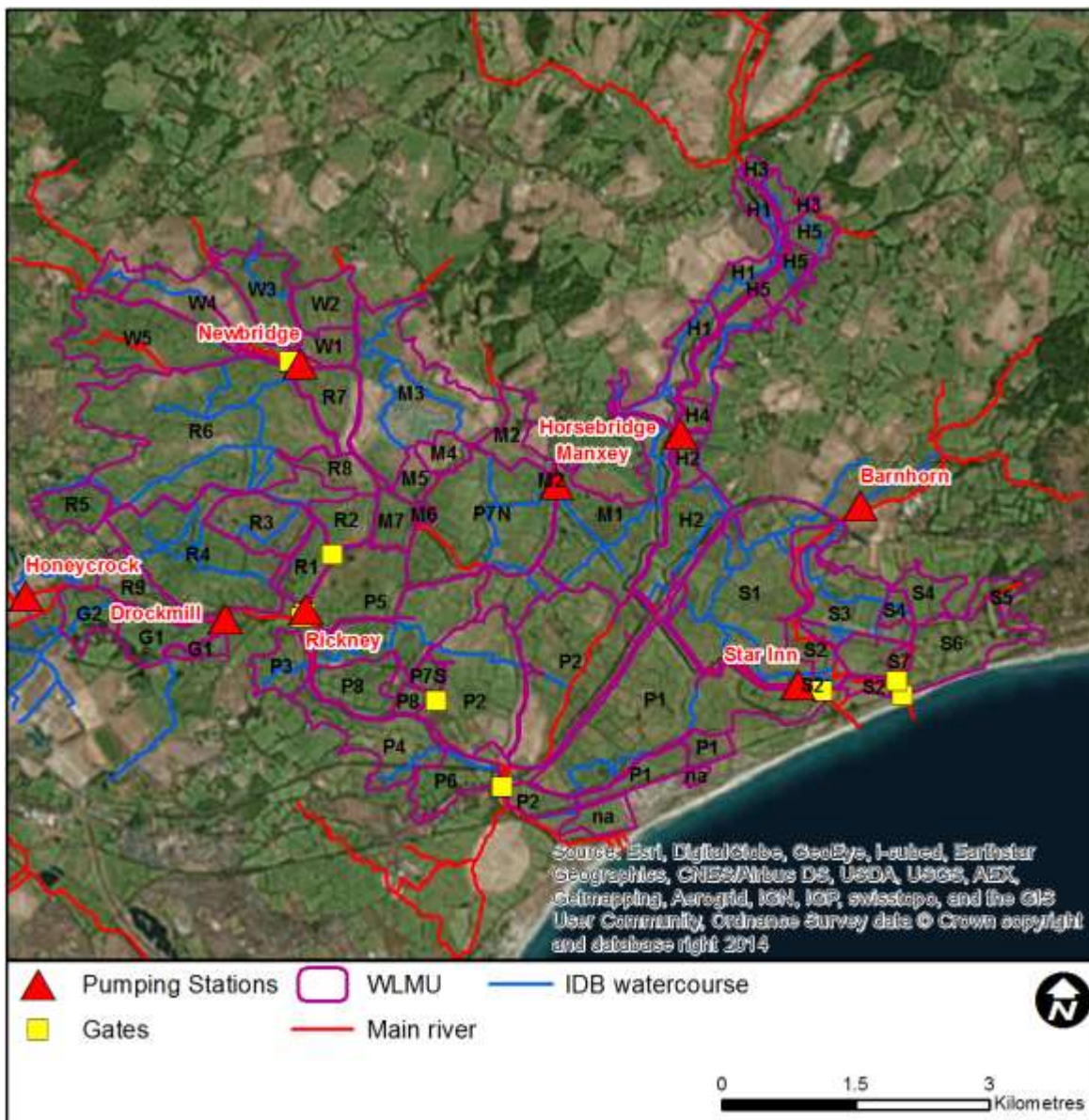


Figure 3-2 WLMUs, key structures and watercourses of the Pevensy Levels SSSI

3.3. Water Level objectives

The 2006 WLMP showed that the water level objectives and targets varied from feature to feature, species to species however it was considered that a simplified water level objective of 0.3m below mean ground level could apply to all the features and species.

The 2014 review has revised the target water levels, which has generally lowered the objectives by 0.1 – 0.5m in two thirds of the WLMUs. The operating summaries below and Appendix A shows the revised water level objectives.

The 2014 review revealed that that objectives could be mis-interpreted as inflexible ‘hard targets’ to achieve all the time. In fact, the water level objectives are designed to be a ‘starting point’ with which to manage water levels within each management unit, they are not hard targets to achieve all year round. They can be refined to suite local circumstances and constraints if required, and a degree of water level fluctuation is acceptable, as occurs in natural systems.

The 2006 WLMP addendum (Atkins 2014b) details how the water level objectives were revised. In summary, the revised water level objective is for ‘stable water levels within 10cm of the target water level for 75% of the year’. The specific sub-objectives are defined as follows:

1. **Water level target tolerance of +/- 10cm;** A degree of flexibility is acceptable since water levels will naturally rise and fall in natural dry and wet periods, and 10cm was seen as within the uncertainty bounds of the water level objective analysis and monitoring approaches used.
2. **Water level stability tolerance of +/- 30cm;** A review of Table 8.2 and Table 8.3 from the 2006 WLMP reveals that the conservation features and species generally tolerate water level fluctuations of +/- 30cm. This agrees with the latest Water Framework Directive hydrology standards (UKTAG 2014) for shallow lakes, which suggests that water level changes of 20 - 50cm are acceptable to achieve 'Good' Status.
3. **Water level duration tolerance;** Water levels will rise and fall naturally above and below the objectives due to natural variation. Water levels will also be artificially raised to increase flooding of parts of the SSSI to support Agri-Environment schemes, and artificially lowered to reduce flood risk. A 9 month duration in achieving the water level stability and target objectives has been identified as acceptable to indicate WLMUs where there are areas of extended depressed water levels i.e. more than 3 months.

3.4. Monitoring water levels

The water level objectives require monitoring in order to determine the degree of success of the WLMP implementation and ongoing management. Table 3-1 and Figure 3-3 shows the water level monitoring currently undertaken across the Pevensay Levels SSSI.

Natural England currently monitor water level across a network of 16 pressure transducers the SSSI. These are located upstream of some of the main structures that were installed as part of the 2006 WLMP and are primarily on IDB and field scale watercourses. The Natural England water level monitoring network can be viewed live and historic data downloaded from a website (<http://www.timeview2.net/>; username Natural England; password 15736).

The Environment Agency also monitor water levels on some of the Main Rivers and at some pumping station. They also maintain raingauges and flow measurement stations at a number of locations. Pumping volumes and times, and discharge volumes for sewage treatment works can also be obtained on request from the Environment Agency. All Environment Agency data is available through a data request via the Solent and South Down Enquiries team (SSDEnquiries@environment-agency.gov.uk).

The Natural England monitoring does not currently cover all the WLMUs in the SSSI, only those which were considered to not be in favourable condition due to depressed water levels in 2006. To ensure sufficient water level monitoring coverage across the SSSI, whilst balancing resourcing constraints on monitoring, the following is recommended:

1. Where these are not present, stage boards levelled in to mAOD installed adjacent to the main controlling structure of all WLMUs (if not already done) to help water level management and structure operation to ensure that water level objectives are being met. Spot checks can be undertaken and recorded on a periodic basis e.g. monthly or seasonally. These records can be benchmarked against continuous monitoring data, and spot monitoring replaced with continuous in areas of concern. Farmers or volunteers could be used to record water levels. The water level target range can be marked on the stage boards for easy reference.
2. If water level monitoring in a WLMU suggests that water levels are consistently being achieved across a WLMU, the monitoring installation can be relocated to another WLMU where there is currently no continuous monitoring.
3. Annual review of telemetered monitoring

This approach provides a risk based monitoring framework where monthly spot measurements can be used to identify priority monitoring locations i.e. where continuous monitoring and further investigation is required, and low priority sites where monitoring can remain or devolve to monthly monitoring as a consequence of water levels being achieved.

Table 3-1 Pevensay hydrology monitoring data

Organisation	Monitoring Location	Type of monitoring (T = telemetry)	Resolution
Natural England	P35	Water level (T)	15 mins
Natural England	P32 (upstream of P32)	Water level (T)	15 mins
Natural England	S32	Water level (T)	15 mins
Natural England	R29 (upstream of R29)	Water level (T)	15 mins
Natural England	P12A	Water level (T)	15 mins
Natural England	Cj	Water level (T)	15 mins
Natural England	S09	Water level (T)	15 mins
Natural England	H17	Water level (T)	15 mins
Natural England	P25	Water level (T)	15 mins
Natural England	H20	Water level (T)	15 mins
Natural England	P03	Water level (T)	15 mins
Natural England	W42	Water level (T)	15 mins
Natural England	P29	Water level (T)	15 mins
Natural England	M42	Water level (T)	15 mins
Natural England	P06	Water level (T)	15 mins
Natural England	P07	Water level (T)	15 mins
Environment Agency	Folkington TBR	Rainfall	15 mins
Environment Agency	Pevensay TBR	Rainfall	15 mins
Environment Agency	Powdermill TBR	Rainfall	15 mins
Environment Agency	Newbridge PS	Water level	15 mins
Environment Agency	Honeycrocks PS	Water level	15 mins
Environment Agency	Rickney PS Downstream	Water level	15 mins
Environment Agency	Rickney PS Upstream	Water level (T)	15 mins
Environment Agency	Horsebridge PS	Water level (T)	15 mins
Environment Agency	Manxey PS	Water level (T)	15 mins
Environment Agency	Star PS	Water level (T)	15 mins
Environment Agency	Pevensay Bridge US	Water level (T)	15 mins
Environment Agency	Pevensay Bridge DS	Water level (T)	15 mins
Environment Agency	Star Sluice	Water level (T)	15 mins
Environment Agency	Boreham Bridge gauging station	Flow (T)	15 mins
Environment Agency	Tilley, Hammer Wood, Henley and Combe Bridge gauging stations	Flow (T)	15 mins
Environment Agency	MORECS square 185	Rainfall, evaporation, runoff and soil moisture deficits	Monthly
South East Water	Abstraction from the Waller's Haven	Abstraction volume	Daily
Southern Water	Hailsham North sewage works	Discharge volume	Monthly
Southern Water	Hailsham South sewage works	Discharge volume	Monthly

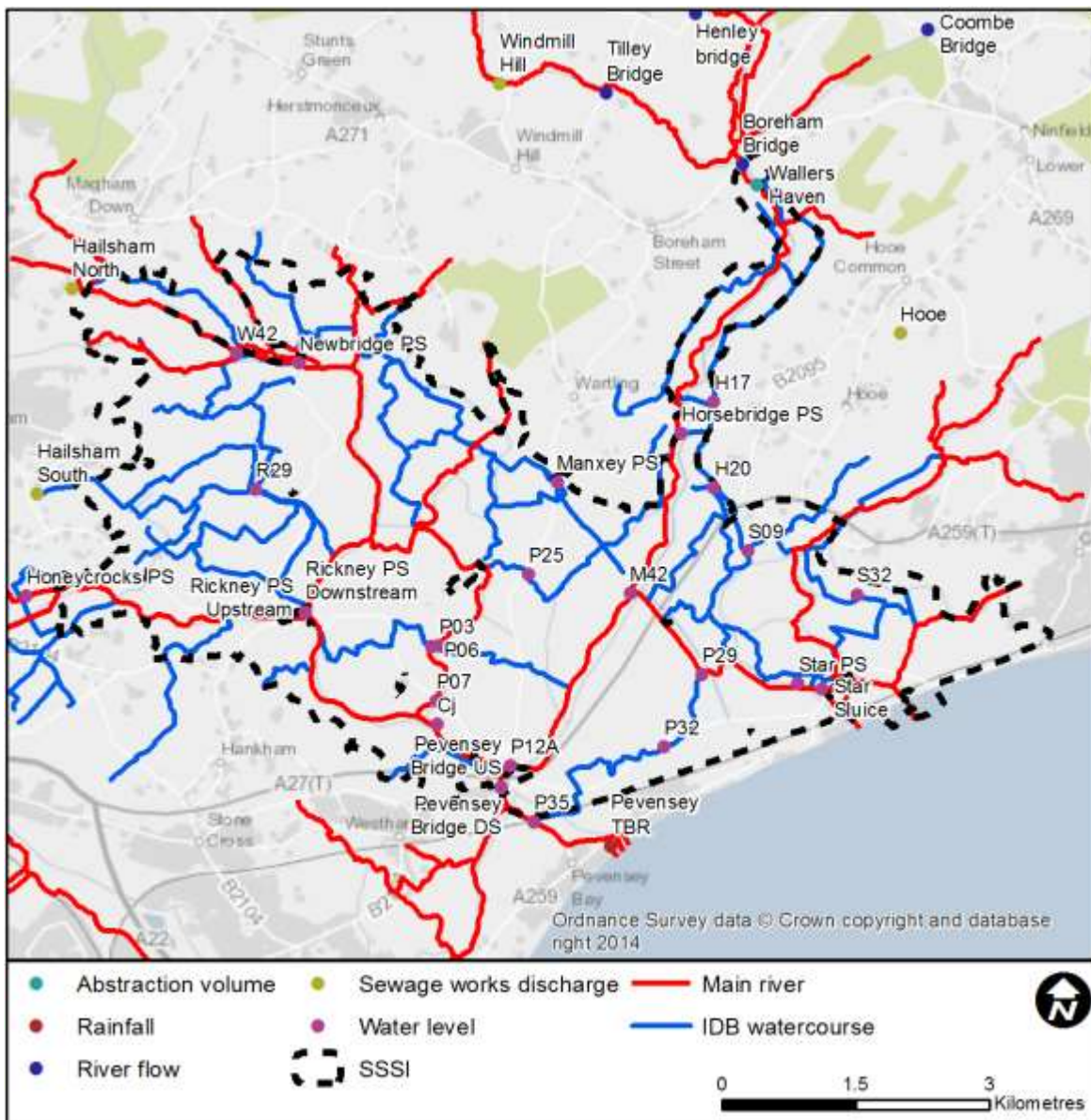


Figure 3-3 Pevensy hydrology monitoring data

3.5. Identifying water level issues and revising the manual

The hydrological data can be used together to determine not only the relative achievement of the water level objectives but also the potential causes of low water levels across the WLMUs. The monitoring and analysis approach described in section 3.3 - 3.4 should be used to identify if WLMUs are not achieving their objectives. In these cases, further investigation is required to ascertain the cause of the problem. Investigation should cover the following checklist:

1. Key retaining water level structures in the WLMU are at the correct level and operating correctly – Key water level structures in each WLMU are highlighted in section 4
2. Key feed structures are operating correctly in all feed structures directly or indirectly influencing water levels in the WLMU. Indirect impacts can come from other feeds ‘over feeding’ in other WLMUs or DAs. Key feed structures for each WLMU are highlighted in section 4
3. Water levels in the high level carriers used to feed the WLMUs are at a sufficient retaining level - Operating levels and practicalities of the key gates used to retain water in the carriers are described in section 4.
4. Pumping stations are not depressing water levels upstream of retaining structures in the WLMUs
5. If 1 – 4 is not identifying the issues – a walkover survey of the WLMU is required to identify and resolve the problem

The operating guidance is based on the best available information at the time of writing. The manual may need to be updated to reflected revised knowledge on the operation of the WLMUs or from a change in circumstances affecting operation. In these instances, the manual should be updated to reflect the changes. The structure tables and descriptions can be edited directly in the word version of the manual, whilst supporting spatial data can be updated in ArcGIS using the GIS projects in Appendix B. To maintain version control, the version of the manual and the authors should be added to the audit tables on page 2.

3.6. Cost of maintaining the Pevensley Levels SSSI

A cost assessment calculator was developed as part of the WLMP 2014 Review to understand how much it would cost to run the IDB under different institutional and hydrological scenarios. More information on the approach is provided in (Atkins 2014a). To provide an understanding of the maintenance costs associated with managing the SSSI, Table 3-2 below provides unit costs per year.

Three types of expenditure are defined: 'Replacement', 'Maintenance' and 'Running'. The three types of maintenance are categorised on the basis of the site-wide infrastructure: 'watercourses', 'control structures' and 'pumping stations'. The first concerns clearing of channels and care of embankments and the second and third relate to the structures and pumping stations (respectively) controlling water levels within these channels. The costs does not include the maintenance of the gates on main river.

On 15th January 2010, the Eels (England and Wales) Regulations 2009 came into force. These regulations afford new powers to the Environment Agency to implement measures for the recovery of European eel stocks and have important implications for operators of abstractions and discharges. Appendix C outlines the costs for retrofitting / replacing the pumping stations to make them fish or eel friendly.

Table 3-2 Pevensley Levels unit costs based on current management (base date of costs begin in 2008)

Maintenance	Replacement	Maintenance/yr	Running/yr	Replacement years
Watercourses (per km)				
Bank repairs and levelling	-	£1,200	-	-
Flail and weedcut	-	£1,000	-	-
Pennywort control	-	£1,200	-	-
Control Structures (No.)				
Automatic feed	£15,000	£430	-	Every 25 years
Manual feed	£10,000	£215	-	Every 25 years
Automatic retention structure	£30,000	£430	-	Every 25 years
Manual retention structure	£7,000	£215	-	Every 25 years
Pumping Stations				
Barnhorn	£60,000	£4,560	£465	2015
Drockmill	£45,000	£3,580	£645	2020
Horsebridge	£130,000	£6,280	£1,515	2019
Newbridge	£340,000	£6,180	£2,515	2030
Manxey	£230,000	£8,100	£2,905	2030
Honeycrock	£135,000	£7,390	£5,425	2030
Rickney	£225,000	£7,900	£5,135	2025
Star Inn	£225,000	£7,300	£3,000	2030

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