



**WILT18 STOCKHAM MARSH,
WILTSHIRE
FEASIBILITY REPORT**

SEPTEMBER 2024

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1. Introduction

Hydro-Morph Ltd has been commissioned by The Environment Bank to provide a review of the feasibility of proposals to modify drainage features as part of habitat improvement works proposed at Stockham Marsh Farm in Wiltshire. This work is to support a planning application for the proposed earthworks.

This report is to be read in conjunction with all associated documents and drawings submitted as part of this application.

1.1 BACKGROUND

The Environment Bank are working with a local landowner farming cluster to create a fully secured and funded, advanced off-site habitat creation and enhancement project at WILT18 Stockham Marsh, in support of delivering biodiversity net gain.

Habitat Banks are established in advance, delivering a significant uplift in biodiversity value that is translated, through the use of the Biodiversity Metric, into Biodiversity Units (BNG Units) that can be sold to developers to meet their BNG obligations. Environment Bank Habitat Banks are delivered at scale in order to meet the Lawtonian principles of “bigger, better and more joined up” (Lawton, 2010), delivering the very best outcomes for nature, benefitting from economies of scale in regard to management and monitoring activities, and contributing to the local nature recovery networks by adding strategic ecological value.

The Habitat Bank at Stockham Marsh (WILT18 Site) aims to take existing arable fields and isolated woodland and transform them into a more diverse mosaic of wildflower grassland, native mixed scrub, woodland, pond and wetland habitats. These habitats will provide a myriad of opportunities for increasing abundance and expanding populations of local species.

1.2 AIMS AND APPROACH

A short, targeted desk-based assessment has been undertaken to assess the feasibility of the proposals to improve the conveyance and storage of surface water flow through the Stockham Marsh site, with a focus on the water-based elements of the proposals. No site visit has been undertaken as part of this commission.

The specific aims of this study are as follows:

- To carry out a desk-based review of the hydrological characteristics of the site to identify and map baseline hydrological conditions across the site.
- To carry out a desk-based review of other relevant data and to identify any constraints.
- To use the information gathered to assess the proposals put forward for improving the hydrology and drainage of the site and taking into account the ecological objectives for the site.

This report is limited to an assessment of the existing above ground hydrology of the site (fluvial and surface water) and does not include any assessment of other sources of water such as contained within the buried foul sewer network.

1.3 DATA SOURCES

This study makes use of the following data sources:

Reports:

- WILT18 – Vision Document. Environment Bank. Jan 2024.
- Utilities Report. Produced by Promap. May 2023. Provided by the Environment Bank.
- WILT18- Stockham Marsh Flood Risk Assessment. Hydro-Morph Ltd. March 2024.

Data:

- Aerial photos (Google Earth)
- Topographic data (1m LiDAR DTM and DSM). Downloaded Sept 2023 from the Environment Agency: <http://environment.data.gov.uk/ds/survey/index.jsp#/survey>
- Drains map. Provided by the Environment Bank. Sept 2024.
- Surface depressions drawing. Provided by the Environment Bank. Sept 2023.
- Surface flow drawing. Provided by the Environment Bank. Sept 2023.
- Slope drawing. Provided by the Environment Bank. Sept 2023.
- British Geological Survey 'Geology of Britain' at <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>
- UK Soil Observatory Data at: [UK Soil Observatory \(bgs.ac.uk\)](http://www.bgs.ac.uk/soil/)
- Historic Ordnance Survey Mapping (source: National Library of Scotland)

2. Baseline review of existing data

2.1 SITE LOCATION

The WILT18 Stockham Marsh site is located to the east of the village of Foxham near Chippenham at Stockham Marsh Farm, as referenced in **Error! Reference source not found.** and shown in the Site Location Plan in Figure 2.1.

Table 2.1: Site Referencing Information

Site Address	Bremhill, Foxham, Wiltshire, SN15 4NL
Site Grid Refs	ST 99751 76815



Figure 2.1: Site Location Plan

2.2 LANDUSE

The site is currently a greenfield site comprising 67.8 hectares of agricultural land and predominantly comprises arable cropland and temporary grass ley, in rotation, bordered by hedgerows. The site is bounded by the Cade Burna watercourse to the north and the Foxham to Charlcutt minor B road to the east. The remainder of the site is bordered by existing hedgerows and ditches to the south and west, see Figure 2.2.



Figure 2.2: Current Landuse as shown from a Google Earth Aerial Image.

2.3 TOPOGRAPHY

LiDAR (1m resolution) topographic data is available for the site and appears to be representative of ground elevations across the site. The site sits within a shallow basin surrounded by an elevated ridge which wraps around the site to the north, east and south. The site slopes from east to west varying in level from 80m

AOD to 61m AOD as shown in Figure 2.3. The site slopes towards the Cade Burna watercourse which forms the western boundary of the site.

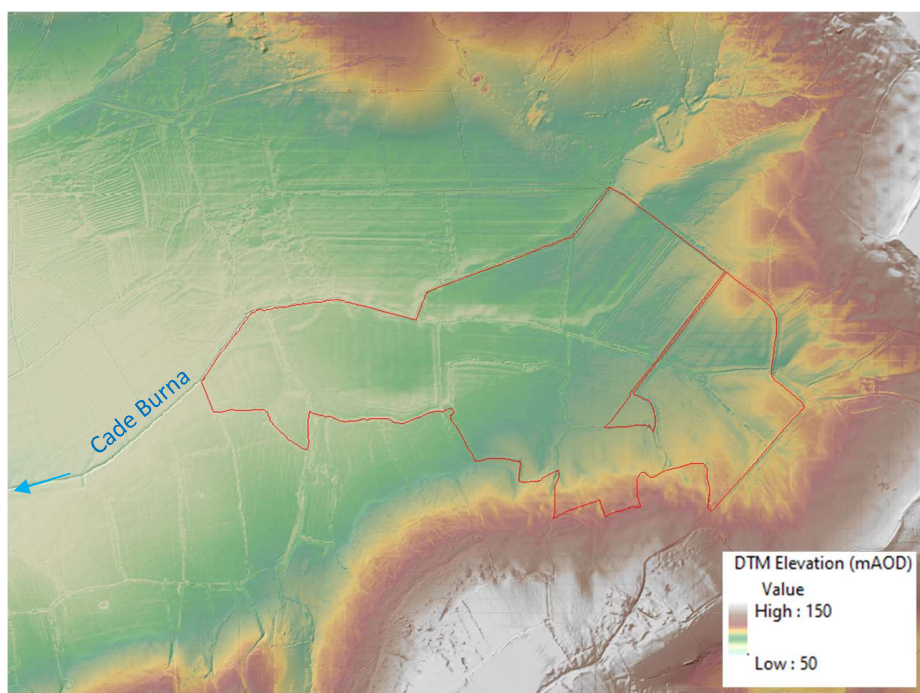


Figure 2.3: Topography of the Stockham Marsh site and surrounding area

2.4 GEOLOGY AND SOILS

The underlying geology of the site consists of Oxford Clay Mudstone, which is overlain by alluvium superficial deposits composed of clay and silt, which extends along the Cade Burna watercourse and some of the existing field drains, see Figure 2.4.

The elevated ridge to the north and east is formed from limestone associated with the Stanford Formation and there is also sandstone geology associated with the Hazelbury Bryan Formation and Highworth grit further east and south. The site therefore lies at the boundary between permeable and impermeable bedrock strata.

According to the British Geological Surveys GeoIndex database there is a borehole record at Foxham which is located within similar geology to the site. This record confirms the presence of Oxford Clay to depth of 128m, overlying chalk. The record also indicates that the village of Foxham is supplied with water from springs further east at Catcomb (which lies just outside the site to the east). The hills to the south and east that drain into the site are underlain by sandstone and limestone which is permeable and where the boundary between permeable and impermeable bedrock strata meets is where springs are likely to form. A borehole record from Catcombe Farm (located at this permeable/impermeable boundary) records the presence of a spring that supplies flow to Foxham further west and also to the village of Hilmarton to the south-east.

Soils across the site are characterised by deep clayey loam to silt loams associated with the underlying clay mudstone. Soils are slowly permeable and seasonally wet and therefore prone to seasonal waterlogging.

There are no groundwater aquifers underlying the site.



Figure 2.4: Geology and drift deposits underlying the Stockham Marsh site and surrounding area.

2.5 HYDROLOGY AND DRAINAGE

2.5.1 Rivers and streams

The site is in the headwaters of the Cade Burna, which is fed by springs that drain from the surrounding hills. The Cade Burna is a headwater tributary of the River Avon which it joins to the north-east of Chippenham, see Figure 2.1. The Cade Burna is classified as a 'Main River' within the site.

The Cade Burna has been historically artificially straightened, as evidenced by the presence of a more meandering channel alongside the existing watercourse as shown by the LiDAR DTM, see Figure 2.8. The straightening of the Cade Burna watercourse has caused the channel to become heavily incised and downcut so that the watercourse today is relatively confined by high, steep riverbanks. Channel incision has also disconnected the watercourse from its adjacent floodplain except for during the highest (less frequent) flood events.

The Environment Agency Flood Map for Planning shows areas within the site that are prone to fluvial flooding and there are low lying areas adjacent to the Cade Burna that are located within flood zone 3 (high risk), see Figure 2.5.

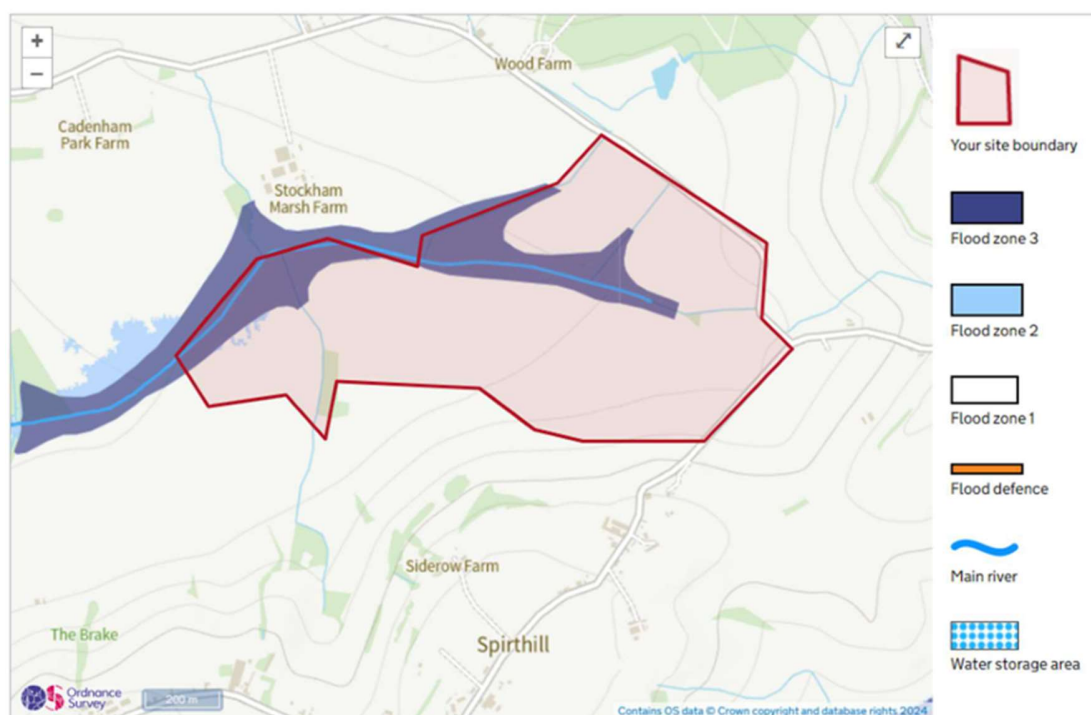


Figure 2.5: Fluvial flood risk within the Stockham Marsh site (extract from the Flood Map for Planning – Jan 2024).

The site is also located within an area identified within Wiltshire Councils Level 1 SFRA as having a high cumulative impact score due to impacts any changes could have on downstream flood risk¹. This means that any development that increases runoff or flows within this area could have a negative cumulative impact on flood risk downstream and within Chippenham.

The site is not at risk of groundwater flooding due to the underlying Oxford Clay geology.

2.5.2 Surface water drainage

A network of artificial ditches and drains conveys surface water flow through the Stockham Marsh site and into the Cade Burna watercourse. Most of the ditches and drains are confined to the edge of field boundaries, as shown in Figure 2.6. There are also known to be a large number of field drains (clay pipes) buried at a relatively shallow depth, which are able to convey infiltrated surface water rapidly down to the Cade Burna watercourse².

The Environment Agency Surface Water Flood Map for Planning shows areas within the site prone to surface water flows, see Figure 2.7. This mapping shows that some of the surface water pathways do not correspond to where there are existing drains and ditches. Given the underlying clay soil; the presence of springs from the adjacent hills and low topography through the site means that during heavy and sustained rainfall surface water will naturally pond on the ground surface within the site and will either infiltrate back into the ground to be conveyed away through the field drain network or eventually evaporate.

¹ More details contained within WILT18 Stockham Marsh Flood Risk Assessment.

² Personal communication.

A detailed hydrological basemap is shown in Figure 2.8.

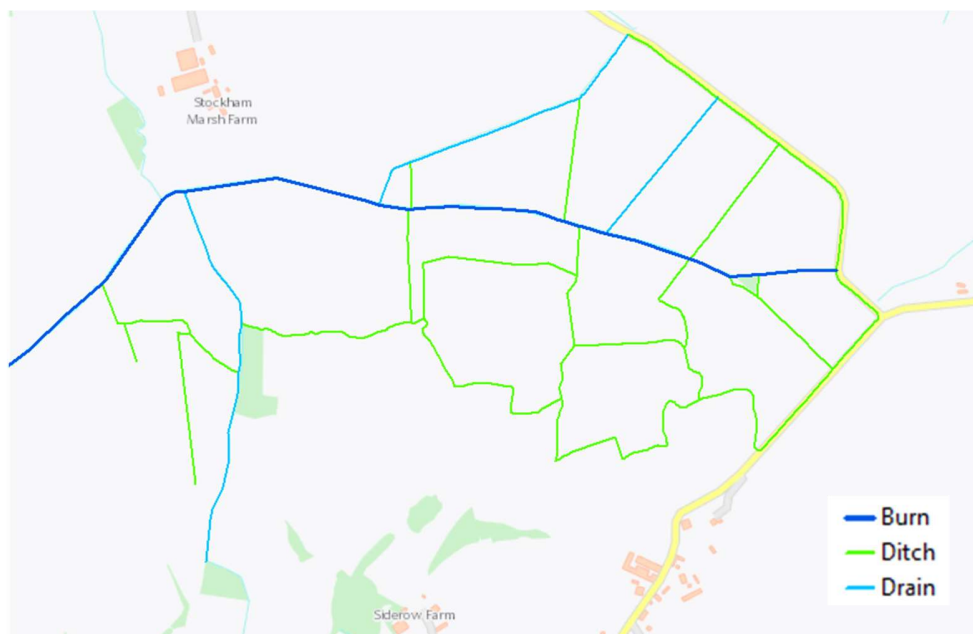


Figure 2.6: Existing artificial drain and ditch network within the Stockham Marsh site³.

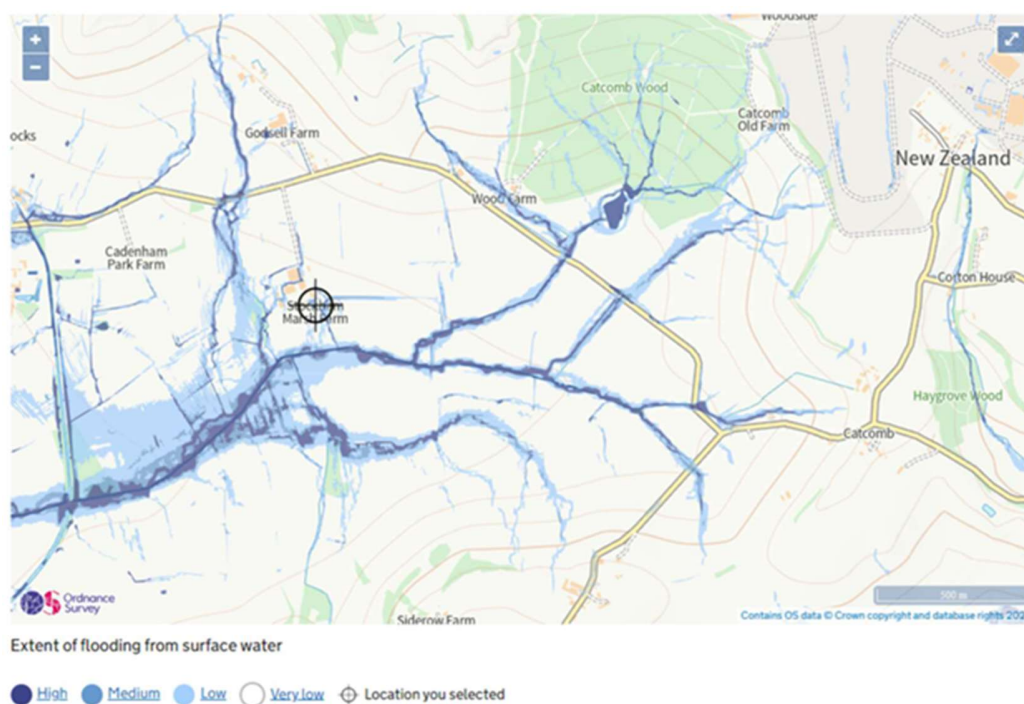


Figure 2.7: Surface water flood risk within the Stockham Marsh site (extract from the Surface Water Flood Map for Planning – Jan 2024).

³ Data provided by the landowner.

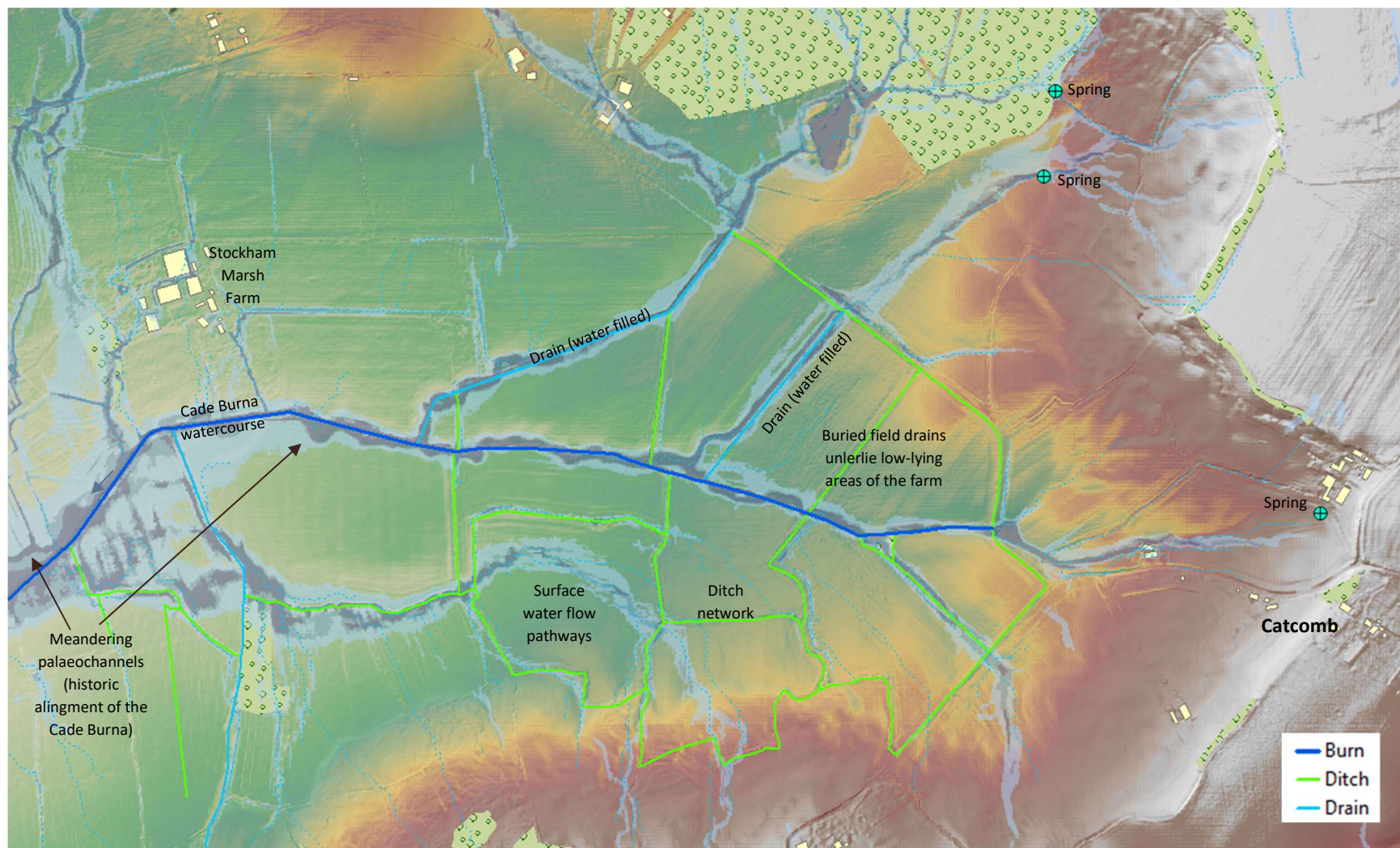


Figure 2.8: Hydrological map of Stockham Marsh (WILT18) site showing key baseline features identified during the desk assessment.

3. Other factors and potential constraints

Baseline data has been reviewed and the following potential constraints have been identified, which may impact the type and scale of options that can be considered for the Stockham Marsh Site, see Table 3.1.

3.1 UTILITIES

The Environment Bank commissioned a utilities search from Promap in May 2023, which has identified the following utilities within the Stockham Marsh site:

- Electricity (high voltage) overhead mains (Scottish and Southern Electricity)
- Water – potable water main (Wessex Water)
- Telecommunications – buried fibre (Gigaclear)
- Telecommunications – overhead cable (BT)

Utilities that lie close to or within the Stockham Marsh site, which could impact on the development of options have been mapped and are shown in Figure 3.1.

3.2 SITE BOUNDARY & LANDOWNERSHIP

The Stockham Marsh 72ha site is owned by several landowners who have formed a farming cluster and who are all positive about the project. Where drainage features (watercourse, ditches and drains) lie at the edge of the site boundary and outside the farming cluster area, this will limit the potential opportunities to one side of the drainage feature, rather than the ideal approach which would be to look for opportunities along both sides of where the topography is more favourable.

3.3 PUBLIC ACCESS

There is a public bridleway that crosses through the site extending from north to south, see Figure 3.1

3.4 HERITAGE

There are no statutory heritage assets within the site, however a search of the Wiltshire Historic Environment Record has identified three historic non-statutory features close to or within the Stockham Marsh Farm site. The features identified are shown on Figure 3.1 and include:

- Site of Outfarm southeast of Stockham Marsh Farm (Ref: MW166686). The HER record suggests this is a site of a demolished outfarm and all records of the farmstead and historic buildings have been lost.
- Stockham Marsh Farm – Grade II listed farm, listed as a medieval farmstead (Ref: ST97NE462) and partial 17th century farmstead (Ref: MW166683).

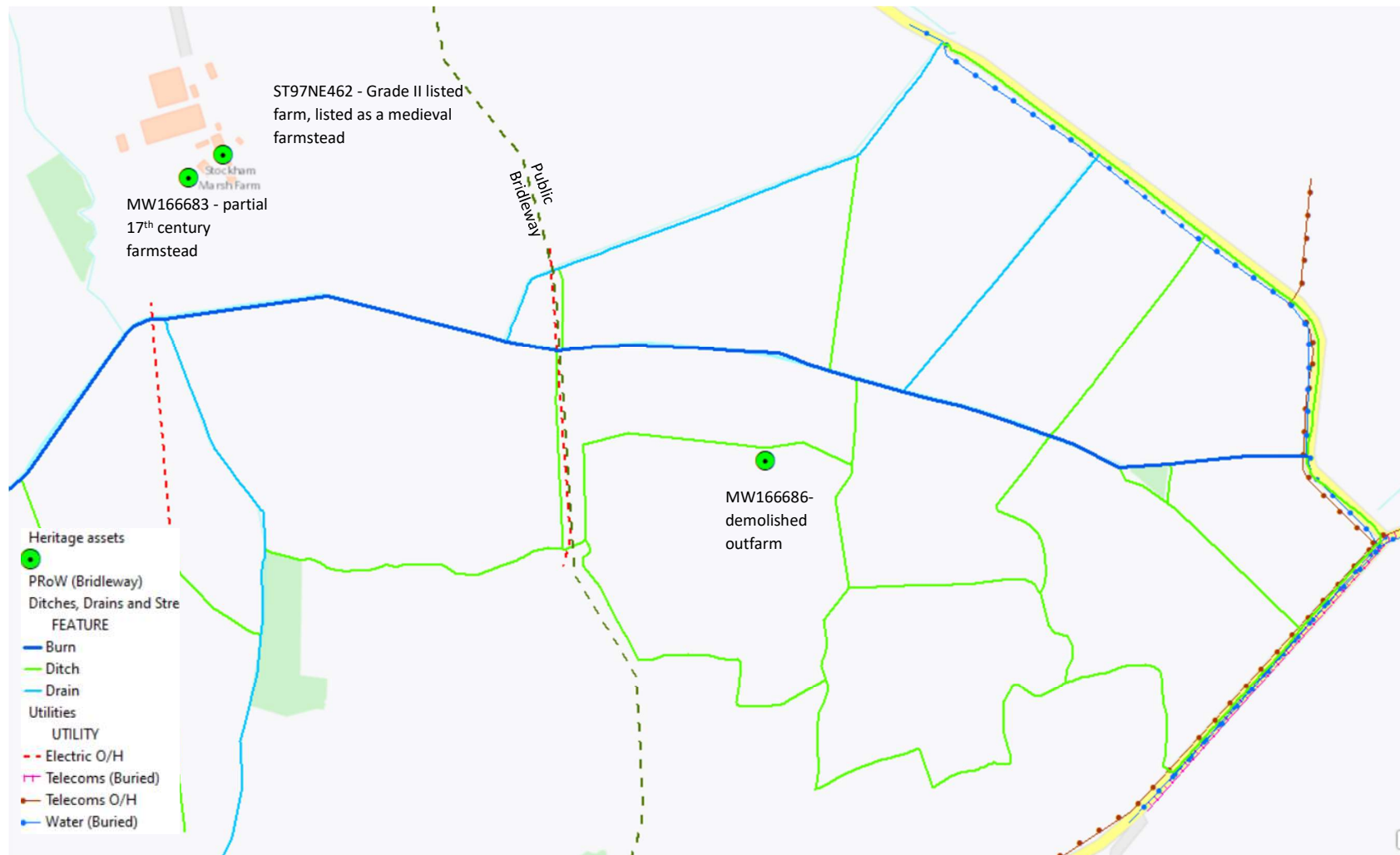


Figure 3.1: Constraints identified within or close to the Stockham Marsh site.

4. Options appraisal

The desk assessment has been used to assess the land drainage and landscaping works proposed by the Habitat Bank at the Stockham Marsh (WILT18) site.

4.1 OPTION IDENTIFICATION

Several opportunities have been identified to improve the habitat within the Stockham Marsh site. These are outlined in Table 4.1.

Table 4.1: Options identification table.

Option	Key Benefits	Possible Constraints	Option taken forward Y/N	Reason
Pond creation	Capture surface water flow and temporarily store it within ponds to: • provide diverse new pond habitat. • create new wetted marginal habitat at the pond margins. • store and holds surface water flow which will help to reduce runoff. • improving surface water storage may help to reduce the cumulative impact on flood risk downstream elsewhere within the catchment.	Ground conditions are understood to be dominated by clay soils, which will support the formation of ponds, however, site specific ground investigation has been undertaken at this time.	Y	Confident local soil conditions will support the creation of ponds. Confident there is sufficient surface water flow to create seasonally wet ponds. Relatively low-cost option.
Restore sinuosity and floodplain connection along the Cade Burna	Opportunity to restore the Cade Burna watercourse which has become heavily incised due to historic modification (straightening).	Cade Burna is main river – Consent from the Environment Agency is required. Not all the Cade Burna watercourse is within the site boundary.	N	High cost to implement. Possible option for the future if additional landowners can be brought on board.
Larger wetland area (reed bed) creation	Create a large area of permanent wetland to capture and store surface water flow to: • provide diverse new permanent wetland habitats. • creates new wetted marginal habitat.	No groundwater connection to facilitate the creation of permanent wetland features (large areas of open water). The topography of the site is gently sloping which does	N	Moderate cost to implement. Lack of connectivity to groundwater to maintain water levels.

Option	Key Benefits	Possible Constraints	Option taken forward Y/N	Reason
	- store and holds surface water flow which will help to reduce runoff. - Improving surface water storage may help to reduce the cumulative impact on flood risk downstream elsewhere within the catchment.	not favour the creation of large areas of open water. Artificial bunding would be required.		
Break up or remove field drains	- Relatively simple and low-cost option (landowners have the equipment needed). - Will help to reduce land drainage and hold water on the site without the need for costly earthworks.	Unknown location of field drains. May not be possible to remove or break them all - some field drainage may remain.	Y	Relatively low-cost option If undertaken first as part of a phased approach could help to refine and reduce the volume of earthworks required (i.e. pond creation).

4.2 PREFERRED OPTION AND PHASING OF WORKS

The preferred option for improving biodiversity across Stockham Marsh (WILT18 Site) as identified in Table 4.1 is to break up and remove field drains and to create new ponds. The Environment Bank propose to carry out the works using a phased approach:

- The first phase is to break up the existing buried drainage pipes that are known to run underground across the site.
- The second phase is to create a series of offline ponds and wetland habitats along existing surface water flow pathways.

Options identified to improve the Cade Burna watercourse and improve floodplain connection were also considered favourably, however at this time, due to the potential high costs involved for doing works along a main river watercourse and consenting required, it was felt that this could be undertaken as a further phase in the future. Therefore, no works are proposed to the Cade Burna watercourse or within 8m of it and land levels adjacent to the river or in the wider floodplain will not be raised as part of these works. Site-won material will be used where possible to do so but without impacting on existing levels within the floodplain.

The proposed works are shown in **Error! Reference source not found..**

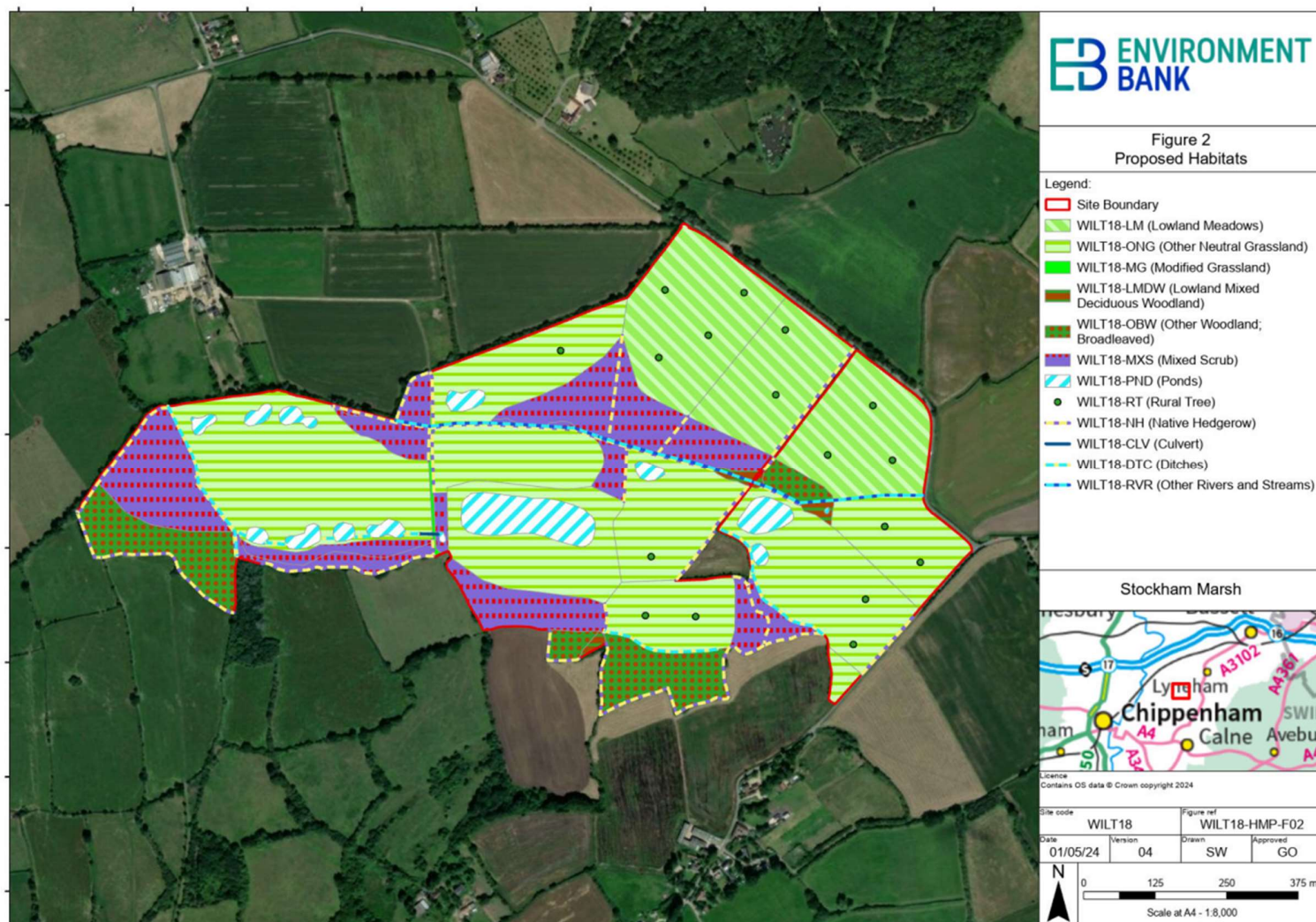


Figure 4.1: Proposals for the Stockham Marsh site (May 2024).

5. Impact assessment summary

The Stockham Marsh (WILT18) site is located at the top of the River Avon catchment and has the potential to have a positive impact on the downstream catchment by storing and holding back water in the landscape during peak rainfall events. The proposed works have been superimposed onto surface water flowpath mapping, shown in Figure 4.2 below. This shows the location of the proposed earthworks (ponds) across the site. The ponds are to be located either along or close to existing flow pathways so they capture surface water runoff coming into the site from adjacent fields or from the ditches that convey spring-fed flows into this area. Additionally tree planting and scrub habitat is to be positioned across flow pathways, which will help to increase surface roughness and slow surface water runoff.

The proposals take into account the expected ground conditions across the site (clay), which has been utilised to create a varied mix of wetland habitats. There will be no permanent large open water features as the ground conditions do not support their creation. The ponds will therefore be seasonally wet. Their location along flow pathways means it is unlikely they will become permanently dry, which should help to sustain the wetland habitats even during periods of sustained drought.

No earthworks are proposed where there are identified constraints, i.e. public utilities, public bridleway or heritage assets (see Figure 3.1).

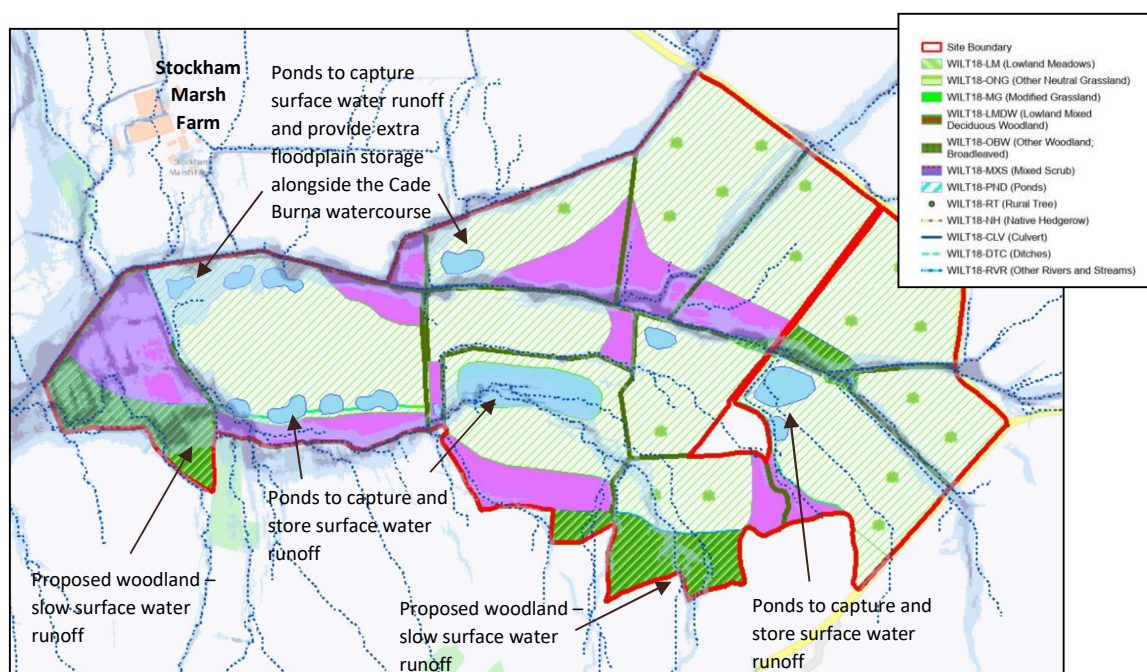


Figure 4.2: Surface water flow pathways overlaid by the location of proposed works

6. Conclusions

Overall, the proposed works will not only provide improvements to biodiversity, enabling new habitats to be created and existing habitats to expand and flourish, but also will help to slow the runoff of surface water which may help to reduce the cumulative impact on flood risk downstream elsewhere within the catchment.