

Appendix B Revised project level HRA Stage 2 (AA) Assessment

Stage 2 Habitats Regulations Assessment



Environment Agency record of appropriate assessment

This is a record of the Appropriate Assessment required by Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended), undertaken by the Environment Agency in respect of the River Sowy and King's Sedgemoor Drain Enhancements Scheme. Due to the scale of the scheme it will be necessary to undertake the works in several phases. A strategic level HRA has previously been completed. This document is the project level HRA for Phase 1 of the full River Sowy and King's Sedgemoor Drain Enhancements Scheme and considers likely significant effects covered by the construction of the Phase 1 scheme only. The strategic level HRA considers the operational effects of Phase 1 of the full River Sowy and King's Sedgemoor Drain Enhancements Scheme as well as all further future phases.

Revision	Date	Description	Author	Checked	Reviewed	Approved
P01.1	21/04/20	Review draft	J Halls	M Olivier	L Rudd	I Ball
P0.2	08/07/20	Update post review	R Smedley	M Olivier	J Halls	I Ball
P0.3	21/07/20	Changes to design details etc.	R. Thompson	Cath Walker	Cath Walker	I Ball
P0.4	26/05/21	Changes to design details etc.	A. Davies	Cath Walker	Cath Walker	I Ball

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Permission, plan or project (PPP) details

Type of PPP:	Flood Risk Management Scheme (phased delivery)
Environment Agency reference no:	ENVRESW001353
National grid reference:	ST40932760 (Monk's Leaze Clyce, Sowy River) to ST35173774 (Parchey Bridge, King Sedgemoor Drain)
Site reference:	River Sowy and King's Sedgemoor Drain Enhancements Scheme: Phase 1

Note

This document has been updated to reflect changes in the proposed design and construction methodology of the Scheme following consultation on version 1 of the WFD Assessment in Summer 2020.

Changes in the scheme design and construction methodology, and in the assessment, are highlighted in yellow in the following sections. Text that is no longer relevant has been struck through.

Description of proposal

Introduction

The River Sowy and King's Sedgemoor Drain Enhancements Scheme aims to improve the options available for flood risk management in part of the Somerset Levels. The proposals form part of the 20-year *Somerset Levels and Moors Flood Action Plan*¹, which was published by the Somerset Rivers Authority (SRA) in spring 2014 in response to the extreme and prolonged flooding that the area suffered the previous winter. The primary objective of the completed Scheme is to reduce the risk, depth and duration of such flood events that threaten property and infrastructure. This will be achieved through increasing the capacity of the Sowy River (Sow) and parts of the King's Sedgemoor Drain (KSD), which operate as a flood relief channel for the River Parrett and its tributaries.

Due to the scale of the full River Sowy and King's Sedgemoor Drain Enhancements Scheme it will be necessary to undertake the works over several phases. This document represents the Stage 2 Habitats Regulations Assessment (HRA) of the first phase of works, termed the River Sowy and King's Sedgemoor Drain Enhancements Scheme: Phase 1 (the Scheme), that are planned to be undertaken in 2020-2021. It follows the completion of strategic level HRA Stage 1 and Stage 2 assessments for the full River Sowy and King's Sedgemoor Drain Enhancements Scheme. to examine the effects of the overall aim of increasing the flow capacity within the flood relief channel of up to 27m³/s (KSD) and 24m³/s (Sow). The strategic level HRA focussed on the potential operational effects and what mitigation measures would be required to ensure that the full River Sowy and King's Sedgemoor Drain Enhancements Scheme objectives are compliant with the Habitats Regulations.

Each phase of the full River Sowy and King's Sedgemoor Drain Enhancements Scheme will be undertaken under the Environment Agency's permitted development powers, although will still be subject to an appraisal of all environmental effects under the Environmental Impact Assessment (Land Drainage Improvement Works) (Amendment) Regulations 2017. The Environment Agency is therefore both proponent (with the SRA) and determining authority for the Scheme. It is also, therefore, a competent authority with respect to the Habitats

¹ <https://www.somersetiversauthority.org.uk/flood-risk-work/somerset-20-year-flood-action-plan/>

Regulations. However, because the full River Sowey and King's Sedgemoor Drain Enhancements Scheme is being progressed through permitted development, prior approval must also be sought from the local planning authority where any likely significant effects have been identified (Regulations 75-78).

This Stage 2 project level HRA is required because the Stage 1 assessment concluded there was likely to be some significant effects on the non-breeding bird features of the Somerset Levels and Moors SPA and Ramsar sites, as well as the Severn Estuary SPA and Ramsar sites (Table 1 below). This was partly because it is not possible at Stage 1 to take into account mitigation measures that are specifically required to avoid likely significant effects on European site features (see *Mitigation Measures* and *Incorporated Mitigation* below).

At the time that the Stage 1 HRA was completed there were still some design details to be finalised. Where these differ from the description in the Stage 1 document they have been highlighted below, with a full description available in the Environmental Statement. The final design has not led to any change in the conclusions of the Stage 1 assessment.

Access to the left bank for the Scheme requires vegetation to be cleared at the field boundaries that cross perpendicular to the raised flood bank. A separate HRA (Application reference: 1353/SOWYKSD/VEG/TREE/HRAv2) was submitted to NE by EA for these works on 08/06/2021.

Location

The Scheme focuses on raising the existing embankments situated between Monk's Leaze Clyce on the River Sowey and Parchey Bridge on the KSD to a level such that the capacity of the system is increased in the KSD and Sowey between Beer Wall and the confluence with the KSD. is located within the Somerset Levels, to the south-east of Bridgwater, along the whole length of the Sowey corridor and part of the KSD corridor (Appendix 1). The working corridor will run from Monk's Leaze Clyce, along the Sowey through to the KSD and as far downstream as Parchey Bridge. The KSD continues from here for a further 5.5 km before reaching the gravity outfall sluice into the River Parrett at Dunball, downstream of Bridgwater.

Part of the working corridor passes either through or close to several component SSSIs of the Somerset Levels and Moors SPA and Ramsar sites, notably the King's Sedgemoor SSSI (Appendix 1).

Scheme description

Design

In order to achieve the enhanced capacity targets, there is a need to reprofile the existing informal flood banks located along selected lengths of the left and right banks of both the Sowey and KSD, as summarised in Table 1 and shown in the drawings in Appendix 2.

Table 1. Summary of proposed works

Location		Bank raising	Channel widening
Upper Sowey	Sowey between Monk's Leaze Clyce and Beer Wall	Raising of existing informal flood banks on right bank by up to 0.5m to achieve capacity of 17m ³ /s..	None
Lower Sowey	Sowey between Beer Wall (A372) and A361	Raising of existing informal flood banks on left and right bank by up to 0.3m to achieve a capacity of 24m ³ /s.	On the right banks: <ul style="list-style-type: none"> • One embayment

Location		Bank raising	Channel widening
			<ul style="list-style-type: none"> One section of two-stage channel
	Sowy between A361 and Sowy/KSD confluence	Raising of existing informal flood banks on left bank by up to 0.3m to achieve a capacity of 24m ³ /s.	On the right bank: <ul style="list-style-type: none"> One embayment One section of two-stage channel
KSD	KSD between Sowy/KSD confluence and Parchey Bridge	Raising of existing informal flood banks on left and right bank by up to 0.5m to achieve a capacity of up to 27m ³ /s.	On the right bank: <ul style="list-style-type: none"> One embayment One backwater One section of two-stage channel

Where existing informal flood embankments are to be raised, the crest width will be designed and maintained at a minimum of 3m, with formed battered embankment sides of 1 in 3 slopes on the channel side and 1 in 5 slopes on the landward side (see Figure 1 below). Material required for raising of the existing informal flood embankments on the KSD will be won through reprofiling of the existing informal flood embankments on both the left and right bank. Material for bank raising along both the Upper and Lower Sowy would be imported under CL:AIRE Code of Practice from a soils processing plant located off the A372 near Westonzoyland. Material won through the channel widening works will be **used in bank raising if suitable, and otherwise placed on the landward side of the existing informal flood embankments.**

In addition to the embankment reprofiling, the opportunity will also be taken to create habitat enhancements that will help deliver Water Framework Directive (WFD) targets. The type and location of the enhancements are indicated under 'channel widening' in Table 1 and shown on the figures in Appendix 2. Indicative cross-sections are included in Appendix K of the Environmental Statement **which is available at the following weblink: <https://consult.environment-agency.gov.uk/wessex/river-sowy-and-ksd-enhancements/> and** but the approximate dimensions are:

- Two-stage channels: 150m in length, with channel widening of 1.5-2m and a c.5m marginal shelf with shelf level of 300mm below summer pen
- Embayments: 135-150m in length depending on location and 5-6m in width, with shelf level of 300mm below summer pen
- Backwater: back channel 5-6m wide and 100-150m in length, with a "planted island" of 5m width, with access to island via bridge provided for maintenance purposes

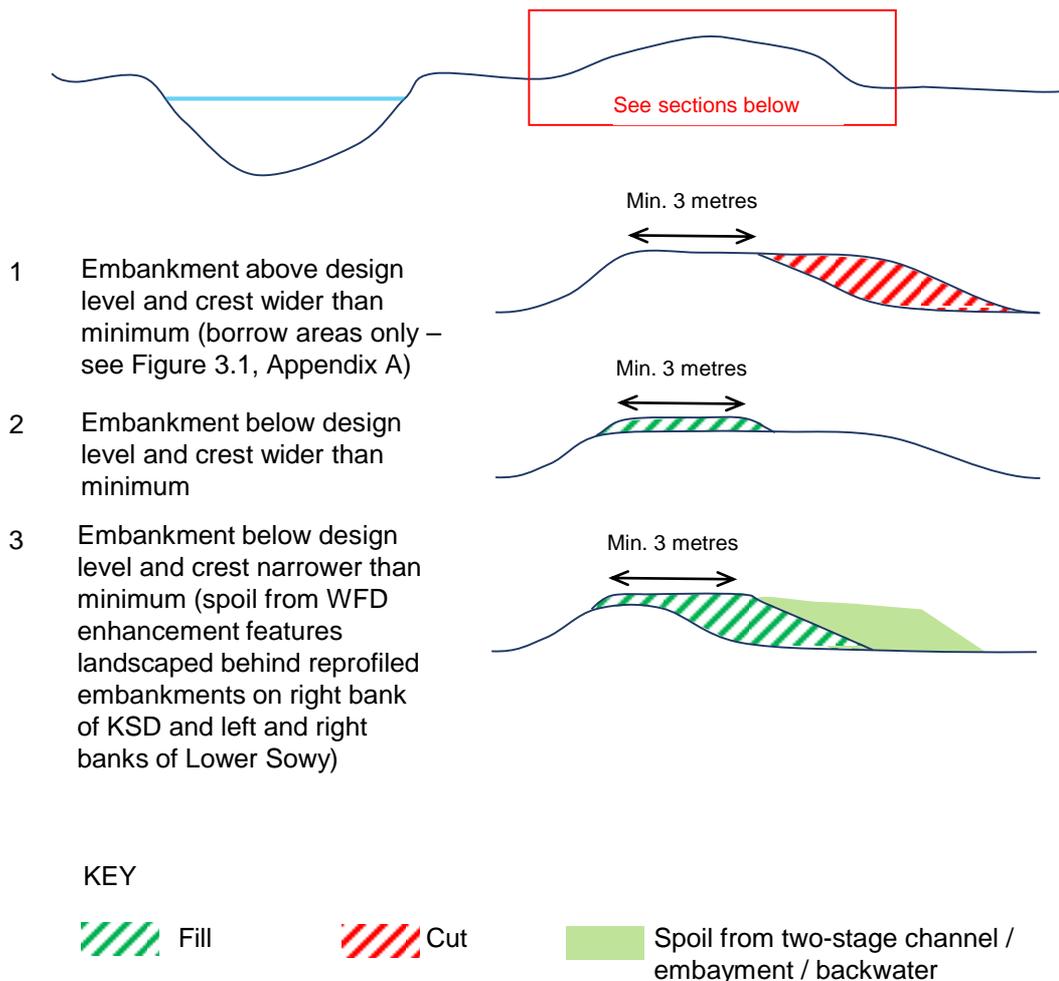


Figure 1. Schematic illustration of bank reprofiling process

In addition to the embankment works it will be necessary to replace the steel sheet-piled wing walls of the Cossington Right and Chilton Right outfalls on the KSD, as well as raise the existing concrete headwalls.

Habitat change

Within the Scheme corridor the main permanent habitat changes will result from the construction of the WFD enhancements:

- Increase in open water through channel widening – 0.08ha
- Increase in marginal, emergent vegetation on berms due to embayments and two-stage channel, plus within the new backwaters – 0.42ha
- Increase in rough/wet grassland adjacent to marginal vegetation and extending to the reprofiled embankments – 0.20ha

As part of the baseline ecological study for the Scheme, a Phase 1 Habitat survey was undertaken between August and September 2019. This covered a 100m wide corridor either side of the Sowy and KSD. The results are presented in Appendix G of the Environmental Statement. With respect to habitats that will be directly affected by the WFD enhancement features and embankment raising and reprofiling, the survey showed that the existing embankments and other terrestrial habitat through to the watercourse margins predominantly comprise species-poor grassland and tall ruderal vegetation. Neutral semi-improved grassland was frequent throughout the study area although always beyond the embankments.

In addition to the permanent habitat changes there will be some temporary changes through the working corridor due to the movement and operation of plant. These areas will be restored through appropriate ground preparation and re-seeding with bespoke neutral wet grassland mix (or alternative appropriate seed mix). The areas will be available again for grazing (where relevant) once the EA is satisfied that they have re-established satisfactorily.

Design uncertainties

It should be noted that it is currently uncertain whether the full programme of works set out in Error! Reference source not found. can be undertaken within the currently available funding and within the programme outlined below.

Should funding or programme constrain delivery of the Proposed Scheme, raising of the existing informal flood embankments on the Lower Sowey (between the confluence of the Sowey and KSD and Beer Wall) and the Upper Sowey (between Monk's Leaze Clyce and Beer Wall) will be prioritised along with the WFD enhancement features along this stretch. The next priority for Phase 1 delivery will then be raising of the existing informal flood embankments on the KSD along with the WFD enhancements along this stretch. Any works not delivered in Phase 1 will be undertaken as part of the Phase 2 proposals.

The HRA is based on the full programme being delivered. There would be no additional risks or increase in existing identified risks to the designated site features if only part of the Scheme was completed in 2021.

Construction programme

Construction would commence at the earliest in August 2021 and finish in early November (or early November pending agreement with Natural England), taking a maximum of eight 12 weeks for the of earthworks activities, reseeded of the reprofiled embankments and planting of the embayments, two-stage channels and backwater.

There would be up to five gangs working at any one time during the 812 week construction period, with two gangs starting on each of the left and right bank of the KSD and left and right bank of the Lower Sowey concurrently. Within the Lower Sowey, raising will start at the mid-point between access locations, working backwards towards the access locations. This will prevent the need for construction traffic to cross areas of completed raising work. Once the gang on the KSD have completed their works, they would move onto the right bank of the Upper Sowey to complete the works in this section whilst bank raising on the Lower Sowey is completed. The fifth gang would focus on creation of the WFD enhancement features, starting on the right bank of the KSD working from north to south, and then moving onto the Lower Sowey.

Maintenance

Current reactive maintenance undertaken on the section of the KSD included within the Proposed Scheme may include removal of fallen branches or occasional desilting. Desilting works were undertaken at Parchey Bridge during 2018.

The principal current maintenance activity along the Sowey is routine weed cutting and clearing carried out at least once, and sometimes twice, per year depending on need. In theory, this work is undertaken from alternate banks in order to share the burden of deposited cut weed on the adjacent farm land. However, the majority of the work is undertaken from the right bank as there are fewer access (and therefore safety) constraints.

A longer-term maintenance regime will be developed in conjunction with our internal specialist teams, however the onus will remain on newly created WFD enhancement feature habitats developing naturally following completion of the initial construction aftercare period.

Map showing project location and European sites

See Appendix 1.

Summary of Stage 1 (likely significant effect) conclusion

At Stage 1 it was not possible to rule out the likelihood of significant effects, and those potential effects relating to the construction phase of the Scheme that require appropriate assessment are summarised below in Table 2.

Table 2. Stage 1 likely significant effect risk summary based on EA bird group

EA bird group	Risk	Likely significant effect alone	Likely significant effect in combination [#]
Somerset Levels and Moors SPA and Ramsar			
Severn Estuary SPA and Ramsar			
3.4 Birds of lowland wet grassland	Habitat loss	Uncertain	No
3.6 Birds of lowland freshwaters and their margins			
3.7 Birds of farmland (for this Scheme any cropped or grassland areas which do not function as wet grassland at any time of year)			

[#] Where a likely significant effect alone is identified at the screening there is no need to consider in combination effects at that stage. If the appropriate assessment concludes no adverse effect alone on site integrity then the potential for in combination effects will be considered.

The relevant species and which EA bird groups they fall into, based on the types of habitat that could be affected, are shown in Table 3 below. EA species and habitat groups are used to consider species with similar habitat requirements and sensitivities as a whole and are particularly useful at the screening stage. As can be seen from Table 3, each species can belong to more than one bird group.

Table 3. Qualifying features and bird groups

Site and qualifying feature	Bird group		
	3.4	3.6	3.7
Somerset Levels and Moors SPA and Ramsar	3.4	3.6	3.7
Bewick's Swan	Y	Y	Y
Golden Plover	Y		Y
Lapwing	Y		Y
Teal	Y	Y	
Waterfowl assemblage	Y	Y	Y
Severn Estuary SPA and Ramsar			
Bewick's Swan	Y	Y	Y
Dunlin	Y		
Redshank	Y	Y	
Gadwall		Y	
Shelduck		Y	
Greater White-fronted Goose	Y		
Waterfowl assemblage	Y	Y	Y

Table 4 lists the 'main component' species of the waterfowl assemblage of the designated sites i.e. those that fall in one or more of the following categories:

- i) present in nationally important numbers ($\geq 1\%$ GB population);
- ii) migratory species present in internationally important numbers ($\geq 1\%$ biogeographic population);
- iii) those species comprising $\geq 2,000$ individuals (i.e. $\geq 10\%$ of minimum total to qualify for an internationally-important assemblage);
- iv) 'named components' otherwise listed on the SPA citation.

Other important component species that do not fall in the above categories but need to be considered by the assessment are 'red-listed' Birds of Conservation Concern and/or those included on Section 41 of the Natural Environment and Rural Communities Act 2006.

Table 4. Components of waterfowl assemblage apart from named qualifying features

Site / species	Peak mean to 2017/18 ²	Named component species	Red List	Section 41
<i>Somerset Levels and Moors SPA</i>				
Mute Swan	1,097	-	-	-
Gadwall	688	-	-	-
Shoveler	1,333	-	-	-
Wigeon	21,835	-	-	-
Pintail	780	-	-	-
Pochard	216	-	Y	-
Bittern	11	-	-	Y
Little Egret	117	-	-	-
Whimbrel	0	Y	-	-
Curlew	16	-	Y	Y
Black-tailed Godwit	205	-	Y	Y
Ruff	8	-	Y	-
Snipe [#]	829	Y	-	-
Green Sandpiper	8	-	-	-
<i>Severn Estuary SPA and Ramsar*</i>				
Mute Swan	420	-	-	-
Shoveler	487	-	-	-
Wigeon	7,751	Y	-	-
Teal	5,374	Y	-	-
Pintail	745	Y	-	-
Pochard	291	Y	Y	-
Tufted duck	812	Y	-	-
Little Egret	198	-	-	-
Curlew	3,571	Y	Y	Y
Whimbrel	221	Y	-	-

² Wetland Bird Survey (WeBS) data from Waterbirds in the UK 2017/18 © copyright and database right 2019. WeBS is a partnership jointly funded by the BTO, RSPB and JNCC, in association with WWT, with fieldwork conducted by volunteers

Site / species	Peak mean to 2017/18 ²	Named component species	Red List	Section 41
Black-tailed Godwit	765	-	Y	Y
Ruff	35	-	-	-
<i>Peak mean above that of importance at the international (biogeographic) level</i>				
<i>Peak mean above that of importance at the GB level</i>				

Non-breeding snipe are notoriously difficult to census by the count method. Although numbers do not reach the threshold of GB importance this is still the highest peak mean of all WeBS sites.

* Excludes species that don't utilise the Somerset Levels or are only likely to be found very infrequently and in small numbers, so there is no risk of likely significant effects on the SPA population (e.g. Grey Plover).

The only component species of the Severn Estuary SPA and Ramsar that isn't a component of the Somerset Levels and Moors (SLM) SPA is tufted duck. Relatively small numbers occur on the SLM, with a peak mean of 205 birds to 2017/8 compared to the GB threshold of 1,100.

Conservation objectives³

The appropriate assessment will consider the implications of the proposal in view of the site's conservation objectives. The conservation objectives for the sites requiring appropriate assessment are below:

Table 5. Conservation Objectives for the Special Protection Areas

Somerset Levels and Moors SPA (UK9010031) (Natural England 2020a) ⁴
With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified and subject to natural change: Ensure that the integrity of the site is maintained or restored as appropriate, and to ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:
<ul style="list-style-type: none"> - the extent and distribution of the habitats of the qualifying features - the structure and function of the habitats of the qualifying features - the supporting processes on which the habitats of the qualifying features rely - the populations of the qualifying features, and - the distribution of the qualifying features within the site.
Severn Estuary SPA (UK9015022) (Natural England 2020b) ⁵
With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified and subject to natural change: Ensure that the integrity of the site is maintained or restored as appropriate, and to ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:
<ul style="list-style-type: none"> - the extent and distribution of the habitats of the qualifying features - the structure and function of the habitats of the qualifying features - the supporting processes on which the habitats of the qualifying features rely - the populations of the qualifying features, and - the distribution of the qualifying features within the site.

There are currently no conservation objectives for any Ramsar sites. However, given that it is only the Ramsar non-breeding bird features that are being considered they are adequately covered by the SPA objectives.

³ Generic conservation objectives are based on 'Natural England (2014) Conservation Objectives for European Sites in England Strategic Standard 01/02/2014 V1.0'

⁴ <http://publications.naturalengland.org.uk/publication/4598158654963712>

⁵ <http://publications.naturalengland.org.uk/publication/5601088380076032>

The individual species that are qualifying features of the sites are listed in Table 3 above, with additional notable species within the waterfowl assemblage shown in Table 4.

Supplementary Advice

In addition to the generic SPA objectives, Natural England has recently published supplementary advice on the Conservation Objectives for the Somerset Levels and Moors SPA (Natural England, 2019b). These provide site-specific attributes and associated targets for each of the qualifying features, which are primarily used for condition monitoring in relation to maintenance or restoration, but which are also relevant when undertaking a HRA. A summary of the ones relevant to this assessment are shown in Table 6.

Table 6. Summary of attributes and targets for qualifying features of the SLM SPA

Attribute	Target
Population abundance	<p><i>Bewick's Swan</i>: restore size to a level at or above that at the time of classification (310 birds).</p> <p><i>Golden Plover</i>: maintain at a level above that at the time of classification.</p> <p><i>Teal</i>: maintain at a level above that at the time of classification.</p> <p><i>Lapwing</i>: restore size to a level at or above that at the time of classification.</p>
Assemblage abundance	Maintain the overall abundance of the non-breeding assemblage at a level above 20,000 individual wintering wetland birds. There were 58,093 individuals (5-year peak mean) at the time of classification and the current figure is 93,946.
Diversity of species that make up the assemblage	Maintain the species diversity of the waterfowl assemblage. The species composition and numbers of individuals of all species within the assemblage will clearly change over time. However, the focus of the target is maintenance and restoration of populations of the 'main component' assemblage species (Table 2 above).
Extent and distribution of supporting non-breeding habitat	Maintain the extent and distribution of suitable habitat within and outside the SPA boundary, which supports the qualifying features for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding).
	Within the SPA boundary maintain 6,394.18ha of habitat, including grazing marsh, fen, reedbeds, neutral grassland, open water, rivers, artificial drainage channels and ditches
	Outside the SPA boundary: an unquantified area of land of functional importance for qualifying features. Such land includes arable, species-poor and species-rich grassland and a variety of high-quality wetland sites as nature reserves such as RSPB Greylake.
Supporting habitat (within and outside the SPA): water quantity	<p>Maintain the supply of water to a standard, which provides the necessary conditions to support the qualifying features of the SPA. In winter the flood regime must provide a mixture of splash, shallow and deep flooded areas (target depths and area of flooding is provided in the <i>Supplementary Advice</i>).</p> <p>The provision of suitable conditions depends on an integrated approach to water level and flood risk management. The use of Raised Water Level Areas (RWLAs) within the SSSIs contributes to this.</p>
Supporting habitat (within	The SPA qualifying features are relatively insensitive to organic

Attribute	Target
and outside the SPA): water quality	and nutrient pollution. The current water quality of the Somerset Levels and Moors is likely to be adequate to support the SPA qualifying features. However, it should be noted that some of the component SSSIs are currently listed as <i>unfavourable – declining</i> due to elevated phosphorous levels that are having an adverse effect on aquatic plant and invertebrate communities.
Supporting habitat (within and outside the SPA): conservation measures	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to maintain the structure, function and/or the supporting processes associated with the feature and its supporting habitats. For non-breeding birds the key measures are sward management (grazing and cutting), water level management and maintenance of watercourses and associated structures.
Supporting habitat (within and outside the SPA): air quality	Maintain concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).
Supporting habitat (within and outside the SPA): minimising disturbance caused by human activity	Reduce the frequency, duration and/or intensity of disturbance within close proximity of affecting roosting, foraging, feeding, moulting and/or loafing birds so that the qualifying features are not significantly disturbed.
Supporting habitat (within and outside the SPA): landscape structure	Maintain open and unobstructed terrain within and around roosting and feeding areas with no overall decrease in field sizes.
Supporting habitat (within and outside the SPA): connectivity with supporting habitats	Maintain the safe passage of birds moving between roosting and feeding areas within and outside the component SSSIs and between the Somerset Levels and Moors and Severn Estuary SPAs. The advice notes that research into the role of the flyway between the estuary and inland moors and the extent and importance of functionally-linked land outside the SPA boundary is required.
Supporting habitat (within and outside the SPA): Food availability within supporting habitat	<i>Bewick's Swan</i> Maintain the availability of cereal grains, rape, potatoes and sugar beet, where these sources are locally important to feeding flocks. <i>Golden Plover and Lapwing</i> Maintain the availability of key invertebrate prey species (e.g. earthworms and beetles) of preferred prey sizes. <i>Teal</i> Maintain the cover/abundance of preferred food plants (e.g. <i>Polygonum</i> , <i>Eleocharis</i> , <i>Rumex</i> , <i>Ranunculus</i> , and <i>Juncus</i>). <i>Assemblage</i> Maintain the cover/abundance of preferred food plants and availability of key invertebrate prey species.

For population abundance it should be noted that where the current 5-year peak mean (see Table 8 below) is in excess of the figure at the time of classification there is a requirement to maintain and avoid deterioration from the current level. For lapwing and Bewick's swan, where

current levels are below that at the time of classification then there is a need to restore the size of the populations to the original baseline.

For the Severn Estuary SPA, advice formerly given under Regulation 33 of the Conservation (Natural Habitats & c.) Regulations was published in 2009 (Natural England and Countryside Council for Wales, 2009). Although this identifies some hazards and vulnerabilities of the SPA features these all relate to saltmarsh and other intertidal habitats within the estuary (despite the fact that the boundary includes some coastal grazing marsh on the landward side of the sea walls), so is not relevant to this assessment.

Site Improvement Plans for the Somerset Levels (Natural England 2015a) and Severn Estuary (Natural England 2015b) provide a high-level overview of the issues (both current and predicted at the time of publication) affecting site condition and outline the priority measures required to improve the condition of the features. They include actions relevant to water level management, including dealing with summer flooding and prolonged, deep winter flooding.

Site condition and conservation status of qualifying features

Somerset Levels and Moors SPA and Ramsar sites

The SPA and Ramsar have 12 component SSSIs, with five located in the Brue valley and seven on the floodplains of the Rivers Parrett and Tone. The Scheme has the potential to affect, directly or indirectly, the seven sites in the Parrett and Tone floodplains so it is those that will be included in this assessment. Table 7 summarises the site condition of each component SSSI based on information published on Natural England's Designated Sites View webpages (Natural England 2019a).

Table 7. Site condition of component SSSI of the Somerset Levels and Moors SPA and Ramsar in the Parrett and Tone floodplains

SSSI	Condition
Curry and Hay Moors	<p><i>Overall:</i> All but one of the 24 units in Unfavourable - recovering, mainly due to high phosphate levels, the presence of Nuttall's waterweed and a poor range of ditch succession.</p> <p><i>Non-breeding birds:</i> Relatively few birds noted as using the site due to lack of suitable splash conditions.</p>
King's Sedgemoor	<p><i>Overall:</i> All 21 units are listed as <i>Unfavourable - Declining</i> following site checks made in 2017. The stated reason is elevated levels of phosphorous in the ditch network, resulting in algal dominance and loss of vascular plant diversity since the previous assessment. Most other site features, including birds, are in favourable condition.</p> <p><i>Non-breeding birds:</i> The site supports relatively high numbers of waders and wintering waterfowl, the key locations being the RWLAs where they can feed and roost without suffering any significant disturbance.</p>
Moorlinch	<p><i>Overall:</i> 10 of the units <i>Unfavourable - recovering</i> and the other one (doves) <i>Favourable</i>.</p> <p><i>Non-breeding birds:</i> No recent figures or condition quoted - favourable based on data up to 2011-12.</p>

SSSI	Condition
Southlake Moor	<p><u>Overall:</u> All 3 units are listed as <i>Unfavourable - Declining</i> due to elevated levels of phosphorous in the ditch network, resulting in algal dominance and loss of vascular plant diversity since the previous assessment.</p> <p>Most other site features, including birds, are in favourable condition.</p> <p><u>Non-breeding birds:</u> The site consistently supports large numbers of birds due to the provision of both shallow and deep-water conditions between December and February. This is partly achieved through taking water directly from the Soway and the ability to discharge it back when required.</p>
West Moor	<p><u>Overall:</u> All 10 units <i>Unfavourable - declining</i> due to water quality issues plus lack of full range of ditch succession stages in most units.</p> <p><u>Non-breeding birds:</u> No specific reference though appropriate splash conditions noted in 5 of the 10 units.</p>
West Sedgemoor	<p><u>Overall:</u> All 7 units are listed as <i>Unfavourable - Declining</i> following site checks in 2016. Elevated levels of phosphorous in the ditch network, resulting in algal dominance, are having a negative effect on plant communities.</p> <p>Most other site features, including birds, are in favourable condition.</p> <p><u>Non-breeding birds:</u> West Sedgemoor supports considerable numbers of waterfowl due to the provision of extensive areas of shallow flood where birds can safely roost and feed.</p>
West Moor	<p><u>Overall:</u> Of the 20 units, 12 are listed as <i>Unfavourable - recovering</i>; 7 as <i>Favourable</i> and 1 (the River Yeo) as <i>Unfavourable - no change</i>.</p> <p><u>Non-breeding birds:</u> Considered to be favourable in terms of numbers of birds and the presence of suitable splash conditions in those units where these features are mentioned.</p>

The SSSI condition status gives an indication of the health of each SPA component site, though in the case of non-breeding birds it should be noted that some sites are more important to these features than others. Raised Water Level Areas (RWLA) within some of the sites are managed between December and February to provide suitable conditions for waterbirds, ranging from 'splash' to shallow water through to deeper water.

Furthermore, many of the qualifying species will also utilise areas of functional / supporting habitat outside of the SSSIs. Unless specifically managed as part of an agri-environment scheme, functional habitat tends to only be of value when there is standing water present and that is often the result of pluvial and/or fluvial flooding. The exception is for species such as lapwing, golden plover, Bewick's swan and mute swan that regularly utilise cropped fields and non-flooded grassland for feeding.

Wetland Bird Survey

Wetland Bird Survey (WeBS) data provides useful figures and information about non-breeding bird populations at the SPA level as well as the ability to query and compare individual species data across sites. The WeBS Report Online (Frost et al 2019) details the latest published peak mean counts together with 'Alerts'. The latter analyses trends in abundance of waterbird features on designated sites and highlights those where there is a >25% decline (Amber Alert) or more than 50% decline (Red Alert) over the short (5 years), medium (10 years) and long-term

(up to 25 years) periods. The latest WeBS Alerts were published in 2019 utilising data up to 2017/18 (Woodward *et al* 2019).

Table 8. Somerset Levels and Moors SPA and Ramsar features, 5-year peak mean numbers⁶

Feature	Peak mean at classification	Peak mean to 2017/18	Peak mean to 2016/17	Peak mean to 2015/16	Peak mean to 2014/15	Peak mean to 2013/14
Bewick's swan	310	4	5	4	16	22
Golden Plover	3,110	12,881	12,578	12,778	10,370	9,638
Teal	7,476	17,906	21,908	21,816	25,707	23,328
Lapwing	36,565	33,779	32,662	31,651	39,783	37,041
Waterfowl assemblage	58,093	93,946	90,183	94,737	107,391	101,751

Annex 1 species (Article 4.1)

The large drop in numbers of Bewick's swan is reflected in both national and regional (south-west) trends since the mid-1990s. However, reductions on the Somerset Levels pre-dated the national declines so there are likely to be some site-specific drivers of decline.

The increase in golden plover numbers is reflected in national and international trends. They are far less dependent upon areas of shallow flood and spend most of their time feeding (daytime, but more particularly at night) on permanent pasture and ploughed fields. They will roost on the latter but may also move to coastal areas (Brown and Grice 2005).

Migratory / non-breeding species (Article 4.2)

Increases in teal are also a reflection of national and regional trends over the last 30 years. The current lapwing peak is lower than at the time of classification, but they still represent the most numerous single species and SLM is the most important site for them in the whole of Britain.

Waterfowl assemblage (Article 4.2)

At the time of classification, in addition to the Annex 1 and migratory species referenced above, the following assemblage species occurred in nationally important numbers: gadwall, wigeon, shoveler, pintail, snipe and curlew. The current status of these and additional species which now occur in nationally or internationally important numbers are shown in Table 4 above.

Severn Estuary SPA and Ramsar sites

The site comprises 12 component SSSIs extending to 24,488 ha, of which approximately 10% is grazing marsh and other habitats landward of the sea defences. For the purpose of this assessment, the Bridgwater Bay SSSI has been considered as the site from where there is most likely to be an interchange of birds within the Somerset Levels.

Bridgwater Bay SSSI is divided into 30 units of which 14 are listed as 'neutral grassland (lowland)', so are assumed to be grazing marsh or similar. The condition of 12 of the neutral grassland units is Unfavourable - recovering and the other two as Favourable. Two of the units have RWLAs.

Qualifying species

Data on the qualifying species has been obtained from WeBS online⁷ and the SPA and Ramsar citations.

⁶ Contains Wetland Bird Survey (WeBS) data from Waterbirds in the UK 2017/18 © copyright and database right 2019. WeBS is a partnership jointly funded by the BTO, RSPB and JNCC, in association with WWT, with fieldwork conducted by volunteers

⁷ Frost et al 2019 <https://app.bto.org/webs-reporting/>

Table 9. Severn Estuary SPA features that may use the Somerset Levels and Moors

Feature	Peak mean at classification	Peak mean to 2017/18	Peak mean on SLM 2017/18
<i>Article 4.1</i>			
Bewick's swan	289	150	4
<i>Article 4.2</i>			
Shelduck	2,892	4,450	68
Gadwall	330	190	688
Redshank	2,013	5,720	6
Dunlin	41,683	29,189	777
Greater white-fronted goose	3,002	125	0
<i>Waterfowl assemblage</i>	68,026	88,178	93,946
Mute swan	n/a	420	1,097
Shoveler	n/a	487	1,333
Wigeon	3,977	7,751	21,835
Teal	1,998	5,374	17,906
Pintail	523	745	780
Pochard	1,686	291	216
Tufted duck	913	812	475
Little egret	n/a	198	117
Curlew	3,096	3,571	16
Whimbrel	246	221	0
Spotted redshank	3	8	0

Bewick's swan: This is the only Annex 1 qualifying feature. As with the Somerset Levels and Moors SPA, numbers of this species have declined since the site was classified in 1993, with a peak mean of 289 birds (1988/89-1992/93), to 122 for the period 2017/18. These birds are all probably concentrated around the Slimbridge Wetland Centre and unlikely to use the Somerset Levels over the wintering period or on migration.

Shelduck: Primarily associated with estuaries and other coastal habitats throughout the year although some birds will use freshwater wetlands, though typically never that far inland. The large numbers that use the Severn Estuary are partly a reflection of the post-breeding moult gathering in Bridgwater Bay.

Gadwall: Most birds will be associated with coastal grazing marsh, but the overall numbers are much lower than within the SLM, though there is likely to be a movement of birds from the estuary inland at the time of harsh winter weather conditions on the coast.

Redshank: Primarily an estuarine species, but birds will nest inland in freshwater environments, as they do in the SLM. Very few birds are recorded in the SLM during WeBS counts and the peak numbers are often recorded in March, which is likely to represent bird returning from elsewhere to breed.

Dunlin: Primarily a coastal species but birds will use inland sites whilst on migration and during harsh weather. The SLM peak mean is currently 777 birds and it is highly likely that some of

these will be using Bridgwater Bay and/or the wider Severn estuary. They will feed on bare, muddy margins.

Greater white-fronted goose: The number of geese has declined markedly since classification, in line with national trends. Most of the birds that currently use the Severn estuary will be in and around Slimbridge. The current peak mean for SLM is 0 although there is suitable habitat present and they used to occur regularly.

Appropriate assessment: assessing the impacts alone

Scoping of qualifying features

Rather than undertake the assessment based on 'bird groups' (see Table 2 above), each of the qualifying species of the designated sites that are listed in Tables 3 and 4 have been considered. Initially this has involved scoping out species where there is either considered to be no likelihood of any effect whatsoever (in the absence of the incorporated mitigation measures), or that if there was the prospect of any effects then they would be so small or inconsequential that they would neither be significant alone, nor could they combine with other plans and projects to result in a significant effect.

Table 10. Bird features that have been scoped out of the assessment

Feature	SLM	Severn Estuary	Reason for scoping out
Bewick's swan <i>Annex 1</i>	Y	Y	A reduction in the extent, frequency and duration of shallow flood events would not have any effects on the few birds that currently occur, nor would it compromise the ability to restore the relatively small numbers of birds that there were at the time of the SLM classification (310). The birds favour permanent bodies of deeper water for roosting and a variety of agricultural land for feeding and daytime loafing. Suitable deep-water roost sites exist at Southlake and West Sedgemoor in the Parrett valley as well as at the complex of flooded peat workings in the Brue valley. Although Bewick's swan will utilise areas of shallow flood in cultivated fields and pasture they are not dependent upon it and will feed on sites with no standing water whatsoever. Sufficient habitat would therefore remain throughout the SPA even if there were a reduction in the extent of shallow water.
Golden plover <i>Annex 1</i>	Y	-	This species tends to roost on coastal flats and feed (daytime and night-time) on ploughed fields and permanent pasture. The presence of areas of shallow flood within the SLM is not critical to either feeding or roosting. Furthermore, the current peak mean is four times that at the time of classification (and rising), suggesting that overall environmental conditions are favourable.

Feature	SLM	Severn Estuary	Reason for scoping out
Shelduck	-	Y	Numbers of birds on the Severn Estuary SPA have remained stable long-term, and there are no Alerts over any of the three time periods. The figures include the long-established post-breeding moult gathering in Bridgwater Bay. The peak mean count for the SLM is just 68 (cf 4,450 for the Severn) and birds are more likely to be found on permanent deeper waterbodies where they do occur inland. Suitable deep waterbodies can be found during the winter months at Southlake and West Sedgemoor in the Parrett valley as well as at the complex of flooded peat workings in the Brue valley.
Greater white-fronted goose	-	Y	Numbers have been declining in the Severn Estuary SPA and nationally for many years. The majority of birds use Slimbridge, and whilst the SLM has plenty of suitable habitat they are rarely recorded here and would be unlikely to be dependent upon this area even if numbers in the Severn recovered to the peak at the time of classification (3,002).
Bittern	Y	-	This species is not dependent upon areas of splash or shallow flood.
Gadwall	Y	Y	The current peak mean for SLM is 688 and the Severn Estuary 190. Although the former exceeds the threshold for a site of international importance, the vast majority of birds using the larger, permanent waterbodies in the Brue valley with very few recorded in the Parrett and Sowey/KSD corridors (including the RSPB reserves of West Sedgemoor and Greylake which are used by large numbers of other duck such as teal and shoveler).
Pochard	Y	Y	A diving duck that tends to be found on permanent, deeper waterbodies and will not be reliant on RWLAs or other areas of shallow flood.
Tufted duck	-	Y	As pochard.
Curlew	Y	Y	The current peak mean is 16, which is highest that it has been since 1991/92 when it was 33. Whilst a Red List and section 41 species, there is no prospect of there being any significant adverse effect. The ability to reduce the extent and duration of flooding in late spring and summer represents a small beneficial effect on the breeding population.

Feature	SLM	Severn Estuary	Reason for scoping out
Whimbrel	Y	Y	Although a component of the waterfowl assemblage on the SLM classification, the current peak mean is 0 so there is no prospect of any significant effect.
Redshank	-	Y	The current peak mean is eight and the highest that it has been historically back to 1991/92 is 52 so, there is no prospect of there being any significant adverse effect. The ability to reduce the extent and duration of flooding in late spring and summer represents a small beneficial effect on the breeding population.
Spotted redshank	-	Y	There are no recent records from the WeBS counts for SLM and the current peak mean for the Severn is only eight birds.
Green sandpiper	Y	-	Although numbers exceed those of importance at the GB level, the peak mean is just eight birds so there is no prospect of any significant effect.
Ruff	Y	-	Although numbers exceed those of importance at the GB level, the peak mean is just eight birds so there is no prospect of any significant effect.

This leaves the following species that are considered to be highly dependent upon the existence of temporary areas of splash and shallow flood in the SLM during the core winter period (December to February inclusive):

- Mute swan
- Dabbling ducks – shoveler, teal, pintail, wigeon (mostly grazing but always in close proximity to water)
- Little egret
- Waders – lapwing, dunlin, snipe and black-tailed godwit

The waterfowl assemblage calculation for the SLM incorporates all species, however the majority of the peak mean total (currently 93,946) is accounted for by lapwing, wigeon, teal, golden plover, shoveler and mute swan (total 87,831 for species contributing at least 1,000 birds). Of these species, golden plover (12,881) is the only one that has been scoped out of the assessment.

Change in flow or velocity regime during operation

The Scheme will not result in any changes in flow or velocity regime that would compromise the Conservation Objectives and therefore there will be no adverse effect on the integrity of the designated sites. No mitigation measures are required to reach this conclusion. These impacts are assessed for the full River Sowy and King's Sedgemoor Drain Enhancements Scheme in the strategic level HRA Stage 2 Assessment report.

Changed water chemistry during operation and maintenance

The Scheme will not result in any changes in water chemistry that would compromise the Conservation Objectives and therefore there will be no adverse effect on the integrity of the

designated sites. Standard environmental protection measures will be used to minimise impacts, but nothing is required specifically for any risk to the designated site features. These impacts are assessed for the full scheme in the strategic level HRA Stage 2 Assessment report.

Changes in physical regime within the flood relief channels

The Scheme will not result in any changes in physical regime within the Sowey/KSD that would compromise the Conservation Objectives. Consequently, there will be no adverse effect on the integrity of the designated sites from this risk. No mitigation measures are required to reach this conclusion. These impacts are assessed for the full scheme in the strategic level HRA Stage 2 Assessment report.

Changes in surface water flooding

The increase in capacity to accommodate flows of 27m³/s in the KSD, 24m³/s in the Lower Sowey and 17m³/s in the Upper Sowey, subject to the implementation of the incorporated mitigation measures, will not have an adverse effect the integrity of the designated sites. These impacts are assessed for the full scheme in the strategic level HRA Stage 2 Assessment report.

Habitat loss

The Scheme works will result in a net loss of terrestrial habitat (species-poor grassland and ruderal) and an increase in open water and marginal habitats. The latter changes are a consequence of the WFD enhancements. Material for reprofiling and raising the embankments will be sourced from re-use of existing material of site (KSD) and through material import under CL:AIRE (Upper and Lower Sowey).

The net increase in open water and marginal habitats comprise

- Increase in open water through channel widening – 0.08ha
- Increase in marginal, emergent vegetation on berms due to embayments and two-stage channel, plus within the new backwaters – 0.69ha
- Increase in rough/wet grassland adjacent to marginal vegetation and extending to the reprofiled embankments – 0.35ha

The main value of habitats within the scheme corridor are the watercourses (Sowey, Langacre Rhyne and KSD), which are used by the wildfowl species. They become particularly important during severe cold weather as they provide an open water refuge when the moors are frozen (S. Parker, Natural England, *pers. comm.*). The grassland alongside these channels is unlikely to be used by large numbers of over-wintering birds during daylight because it provides sub-optimal feeding compared to the moors proper and is also constrained by poor sight lines and disturbance in places viz. low embankments, undulating ground; presence of trees and hedge lines; proximity to roads, footbridges and buildings in places. However, there is no specific survey data to confirm this and it is also possible that some species could use the corridor at night-time. There is evidence that the corridor is used for feeding in the early spring by breeding waders, in particular redshanks and curlews (John Leece *pers. comm.*).

The Supplementary Advice on conserving site features (Natural England, 2019b) notes that maintaining the extent and distribution of supporting non-breeding habitat is a key attribute and measure for site integrity. In this case the loss of grassland is from within a corridor that is not important to non-breeding birds, irrespective of the fact that the main change is to open water and marginal habitats that are of greater value in this context.

The small net loss of grassland habitat within the working corridor will not compromise the Conservation Objectives; indeed there may be a minor beneficial effect for non-breeding

waterbirds as a result of the increase in open water and marginal habitat. Consequently, there will be no adverse effect on the integrity of the designated sites. No mitigation measures are required to reach this conclusion.

Habitat /community simplification

There will be no operational changes following implementation of the Scheme. Although there may be a reduction in out of bank flooding this would not lead to any changes in the type or extent of wet grassland features (vegetation type and structure) that non-breeding waterbirds depend upon. Consequently, there will be no adverse effects on the integrity of the designated sites. No mitigation measures are required to reach this conclusion. These impacts are assessed for the full River Sowy and King's Sedgemoor Drain Enhancements Scheme in the strategic level HRA Stage 2 Assessment report.

Appropriate assessment: conclusion alone

The permanent habitat changes from the Scheme works, specifically the increase in open water and marginal vegetation at the expense of grassland and ruderal vegetation due to the WFD enhancements, are small-scale and may be beneficial for non-breeding waterbirds.

The other risks considered will not result in any adverse effect on designated site integrity.

Appropriate assessment: assessing the impacts in combination

The assessment of impacts alone has concluded that there will be no adverse effects on the integrity of the designated sites. The strategic mitigation package has been designed and agreed with Natural England to take account of the combined effects (which would be additive) of the full Scheme (including future phases of work) with recently completed and planned dredging on the River Parrett.

Other routine maintenance works along the Sowy and KSD, including small-scale dredging around bridges and other structures, would not result in additional effects that in combination could result in an adverse effect on site integrity.

Appropriate assessment: conclusion in combination

The Scheme, when incorporating of the proposed mitigation measures for the full River Sowy and King's Sedgemoor Drain Enhancement Scheme, will not result in any adverse effects to the integrity of the designated sites, either alone or in-combination with other plans or projects, or impede the ability of the sites to achieve their conservation objectives.

Stage 2 Habitats Regulations Assessment conclusion

Qualifying Feature	Predicted Risk	Potential Impact on Conservation Objective	Will scale of impact lead to adverse effect on integrity of the site alone?	Will scale of impact lead to adverse effect on integrity of the site in combination?	Can adverse effects be avoided or mitigated?
<p>All species from the SLM and Severn Estuary SPA and Ramsar sites scoped into the assessment:</p> <p><i>Mute swan</i> <i>Shoveler,</i> <i>Teal,</i> <i>Pintail,</i> <i>Wigeon</i> <i>Little egret</i> <i>Lapwing</i> <i>Snipe</i> <i>Dunlin</i> <i>Black-tailed godwit</i></p>	Habitat loss	There will be some small-scale changes in the relative amounts of grassland and open water along the Sowy-KSD channel. Any reduction in important habitat could compromise Conservation Objectives.	No. The nature and extent of habitat changes is considered to be insignificant given the location and scale of impact on terrestrial habitat that are of low value for the bird features.	No.	N/A

Stage 2 Habitats Regulations Assessment summary

Somerset Levels and Moors SPA
Somerset Levels and Moor Ramsar
Severn Estuary SPA
Severn Estuary Ramsar

The Scheme (Phase 1 of the full River Sowy and King's Sedgemoor Drain Enhancement Scheme), as proposed, has no adverse effect on the integrity of any of these sites. The mitigation measures proposed for future phases of the full River Sowy and King's Sedgemoor Drain Enhancement Scheme will cancel the effects of a reduction in the frequency and volume of uncontrolled over-topping that contributes to the maintenance of suitable splash and shallow flood conditions along the Sowy/KSD corridor. The Scheme will not result in any significant construction related effects, either through disturbance or changes in habitat (temporary and permanent).
No additional conditions or restrictions on the way that the plan is implemented are required.

Advice

Natural England advice

Natural England officers have been involved in discussions throughout Scheme development, including providing advice on potential impacts and the formulation of suitable mitigation measures. Natural England will be the owners of the Mitigation Implementation Plan (MIP), which will be accepted and delivered by all partner organisations involved in water level management, to ensure mitigation for the full Scheme is in place prior to future phases commencing.

A separate HRA (Application reference: 1353/SOWYKSD/VEG/TREE/HRAv2) was submitted to NE by EA on 08/06/2021 for vegetation clearance and tree removals works within King's Sedgemoor SSSI which requires vegetation to be cleared at the field boundaries that cross perpendicular to the raised flood bank.

Third party advice

None specifically on the HRA.

Somerset Drainage Board Consortium (incorporating the Parrett IDB) have been involved in discussions on the potential in-combination effects of dredging in the River Parrett and the mitigation measures required to counter these both in the short term and with respect to completion of the full Sowy-KSD enhancements. They undertook the hydraulic modelling analysis to identify the potential changes in extent and duration of flooding following an increase in the capacity of the River Parrett and the Sowy-KSD.

The RSPB have also contributed local land management experience and advice on the mitigation measures.

References

Brown, A. and Grice, P. (2005). Birds in England. T & D Poyser, London

Chown, D.J. (2003). Night-time use of the Somerset Levels and Moors floodplain by waterfowl: final report, winters 2001/02 – 2002/03. Unpublished report to English Nature Somerset Team.

Environment Agency (2020). River Soway and King's Sedgemoor Drain Enhancement Scheme: Phase 1 Environmental Statement (draft). Unpublished report

Frost, T.M., Austin, G.E., Calbrade, N.A., Mellan, H.J., Hearn, R.D., Robinson, A.E., Stroud, D.A., Wotton, S.R. and Balmer, D.E. (2019). *Waterbirds in the UK 2017/18: The Wetland Bird Survey*⁸. BTO/RSPB/JNCC. Thetford. Accessed online 14/03/20 at: <https://app.bto.org/webs-reporting/>

Johns Associates (2019). Oath to Burrowbridge Dredging. Habitats Regulations Assessment (Appendix 6 of Environmental Impact Assessment produced on behalf of the Parrett Internal Drainage Board). Available at:
https://somerse drainboards.gov.uk/media/Volume_2_Environmental_Statement1.pdf

Natural England (2015a). Site Improvement Plan for the Somerset Levels and Moors SPA (SIP 221). Accessed online 14/03/20 at:
<http://publications.naturalengland.org.uk/publication/6561001356918784?category=5755515191689216>

Natural England (2015b). Site Improvement Plan for the Severn Estuary. Accessed online 14/03/20 at:
<http://publications.naturalengland.org.uk/publication/4590676519944192>

Natural England (2019a). Designated Sites View. Accessed online 14/03/20 at:
<https://designatedsites.naturalengland.org.uk/SiteSearch.aspx>

Natural England (2019b). European Site Conservation Objectives: Supplementary advice on conserving and restoring site features – Somerset Levels and Moors SPA. Available at
<http://publications.naturalengland.org.uk/publication/4598158654963712?category=5374002071601152>

Natural England (2020a) European Site Conservation Objectives: Somerset Levels and Moors SPA. Accessed online 14/03/20 at:
<http://publications.naturalengland.org.uk/publication/4598158654963712>

Natural England (2020b) European Site Conservation Objectives: Severn Estuary SPA. Accessed online 14/03/20 at: <http://publications.naturalengland.org.uk/publication/5601088380076032>

PINS Note 05/2018. Consideration of avoidance and reduction measures in Habitats Regulations Assessment: People over Wind, Peter Sweetman v Coillte Teoranta
Accessed online 14/03/20 at:
https://www.aylesburyvaldc.gov.uk/sites/default/files/page_downloads/ED32A%20PINS%20note%20052018_0.pdf

Somerset Rivers Authority (2014). *Somerset Levels and Moors Flood Action*. Accessed online 14/03/20 at:
<https://www.somerse riversauthority.org.uk/flood-risk-work/somerset-20-year-flood-action-plan/>

Tyldesley, D. and Chapman, C. (2013). *The Habitats Regulations Handbook*, Dec 2019 edition UK. DTA Publications Limited www.dtapublications.co.uk

⁸ Contains Wetland Bird Survey (WeBS) data from *Waterbirds in the UK 2017/18* © copyright and database right 2019. WeBS is a partnership jointly funded by the BTO, RSPB and JNCC, in association with WWT, with fieldwork conducted by volunteers

Woodward, I.D., Frost, T.M., Hammond, M.J., and Austin, G.E. (2019). Wetland Bird Survey Alerts 2016/2017. Changes in numbers of wintering waterbirds in the Constituent Countries of the United Kingdom, Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs) and Areas of Special Scientific Interest (ASSSIs). BTO Research Report 721. BTO, Thetford. www.bto.org/webs-reporting-alerts

Decision

The Environment Agency has completed the appropriate assessment and the draft conclusion is that the plan would not have an adverse effect on the integrity of the following sites, either alone or in combination with other plans and projects:

- Somerset levels and Moors SPA
- Somerset Levels and Moors Ramsar
- Severn Estuary SPA
- Severn Estuary Ramsar

Name of Environment Agency officer:	Will Maclennan
Job title:	Senior Environmental Project Manager, NEAS
Date:	30 th June 2021

This appropriate assessment has been sent to Natural England for consultation

Date sent to Natural England:	30 th June 2021
Date response received from Natural England:	

Natural England comments:

Natural England advise:

Delete as appropriate

- that the operation can go ahead
- against the issuing of the PPP

Please ensure that Natural England's response is attached to this Formal Notice.

Name of Natural England officer:	
Job title:	
Date:	

Final appropriate assessment record

This is a record of the appropriate assessment required by Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (SI 2017/1012), undertaken by the Environment Agency.

The Stage 1 assessment concluded that the Scheme (River Sowey and King's Sedgemoor Drain Enhancements Scheme: Phase 1) would be likely to have a significant effect on the following site(s):

- Somerset levels and Moors SPA
- Somerset Levels and Moors Ramsar
- Severn Estuary SPA
- Severn Estuary Ramsar

An appropriate assessment has been undertaken of the implications of the proposal in view of the relevant site conservation objectives.

The Environment Agency has concluded that the plan would not have an adverse effect on the integrity of the following sites, either alone or in combination with other plans and projects:

- Somerset levels and Moors SPA
- Somerset Levels and Moors Ramsar
- Severn Estuary SPA
- Severn Estuary Ramsar

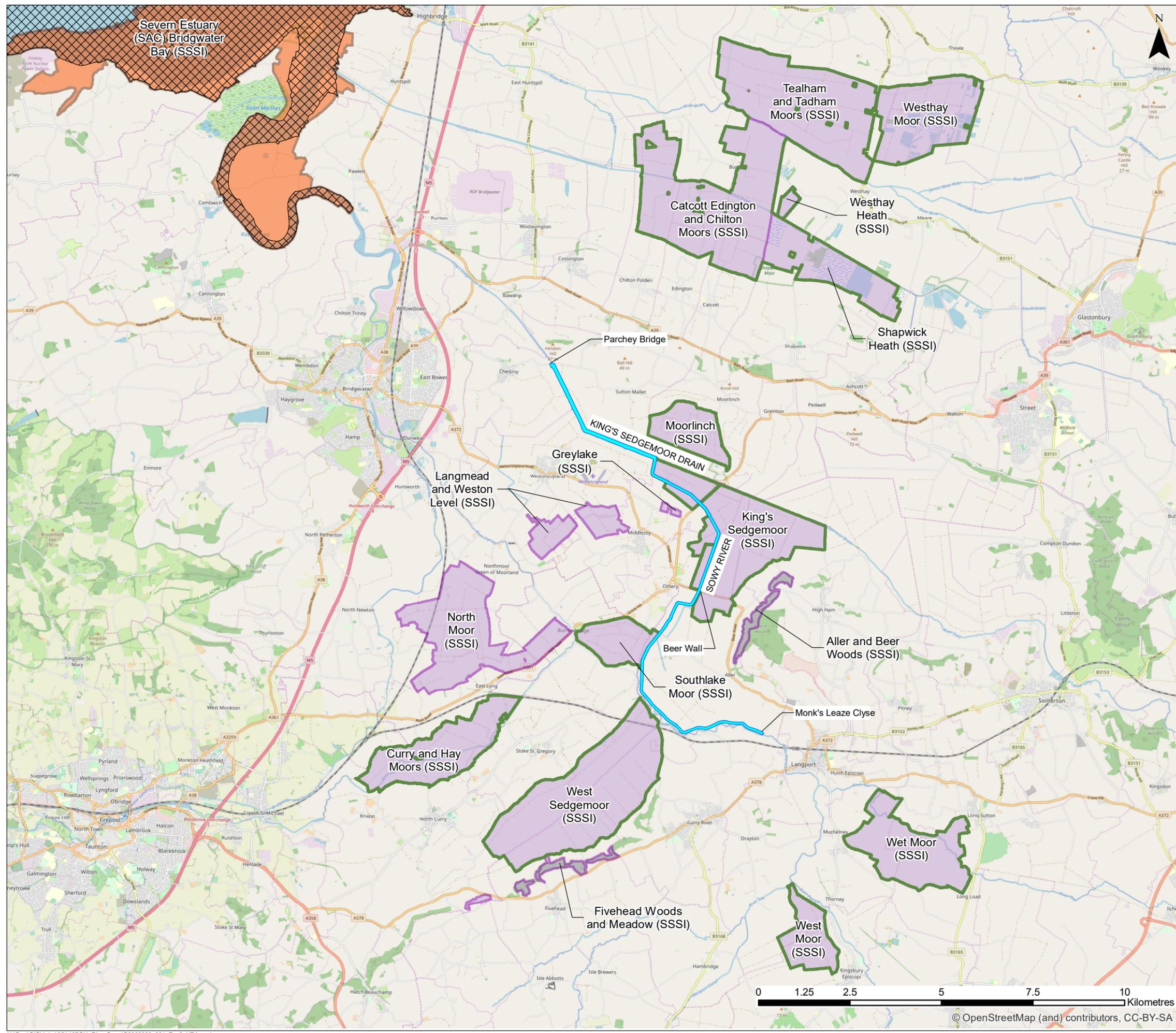
Natural England were consulted on the appropriate assessment and the Environment Agency's conclusions on [date] and their representations, to which the Environment Agency has had regard, are attached in Annex 1. The conclusions of this appropriate assessment are in accordance with the advice and recommendations of Natural England.

Name of Environment Agency officer:	Will Maclennan
Job title:	Senior Environmental Project Manager, NEAS
Date:	TBC

Appendix 1 – Figure showing scheme location in relation to designated sites

FIGURE 1

- Legend**
-  Main works area
 -  Somerset Levels and Moors Ramsar and Special Protection Area (SPA)
 -  Severn Estuary Special Protection Area (SPA) and Ramsar site (Bridgwater Bay SSSI component)
 -  Severn Estuary Special Area of Conservation (SAC)
 -  Site of Special Scientific Interest (SSSI)



P00	24/09/2019	First issue	FL	JH	LR	IB
Rev.	Date	Description of revision	Drawn	Check'd	Rev'd	Appr'd



Client


Project
 River Sowy and King's Sedgemoor Drain Enhancements Scheme: Phase 1

Drawing Title
 Scheme location in relation to designated sites

ENVRESW001353-CH2-XX-400-DR-EN-1055		
Scale @ A3	1:100,000	DO NOT SCALE
Jacobs No.	B2368000	



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This drawing is not to be used in whole in or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Appendix 2 - Temporary and permanent works proposed under the Scheme

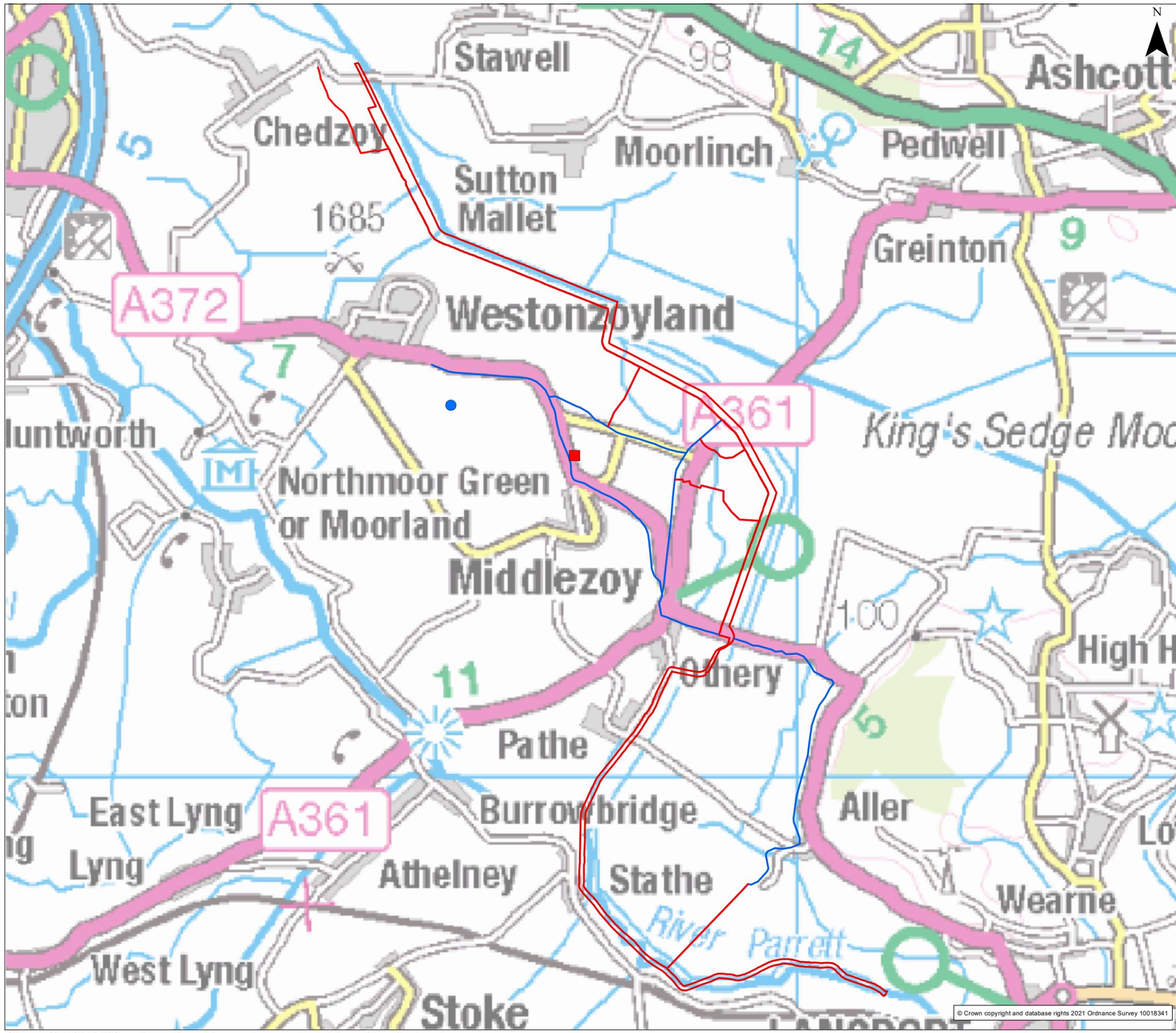
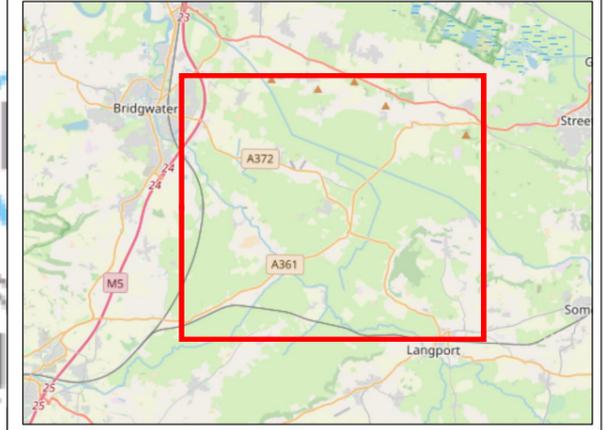


FIGURE 2

- Legend**
- Construction (temporary) works**
- Construction footprint
 - 'Just in time' stockpiles
 - Mobile welfare locations
 - Main compound (offsite)
 - Source of imported material
 - ▲ Chedzoy New Cut culvert
 - ▲ Cossington Right Rhyne culvert
 - Existing flood embankments reprofiled to generate fill
 - Haulage route
 - Temporary stockproof fencing
- PRoW**
- Bridleway
 - Footpath
 - Restricted Byway
 - River Parrett Trail
- Water Framework Directive (WFD) enhancements**
- Backwater (max. dimensions 150m length and 15m width)
 - Embayment (max. dimensions 150m length and 5m width)
 - Two stage channel (max. dimensions 150m length and 6m width)
- Bank raising (min. 3m crest width and 1:5 back slope)**
- 0-0.1m
 - 0.1-0.3m
 - 0.3-0.5m
- Sluice upgrade – raising of headwall**
- ▲ Chilton Right Rhyne outfall
 - ▲ Cossington Rhyne outfall



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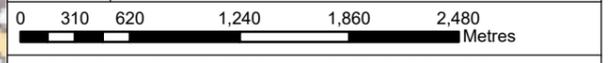


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 River Sowy and King Sedgemoor's Drain Enhancements Scheme: Phase 1

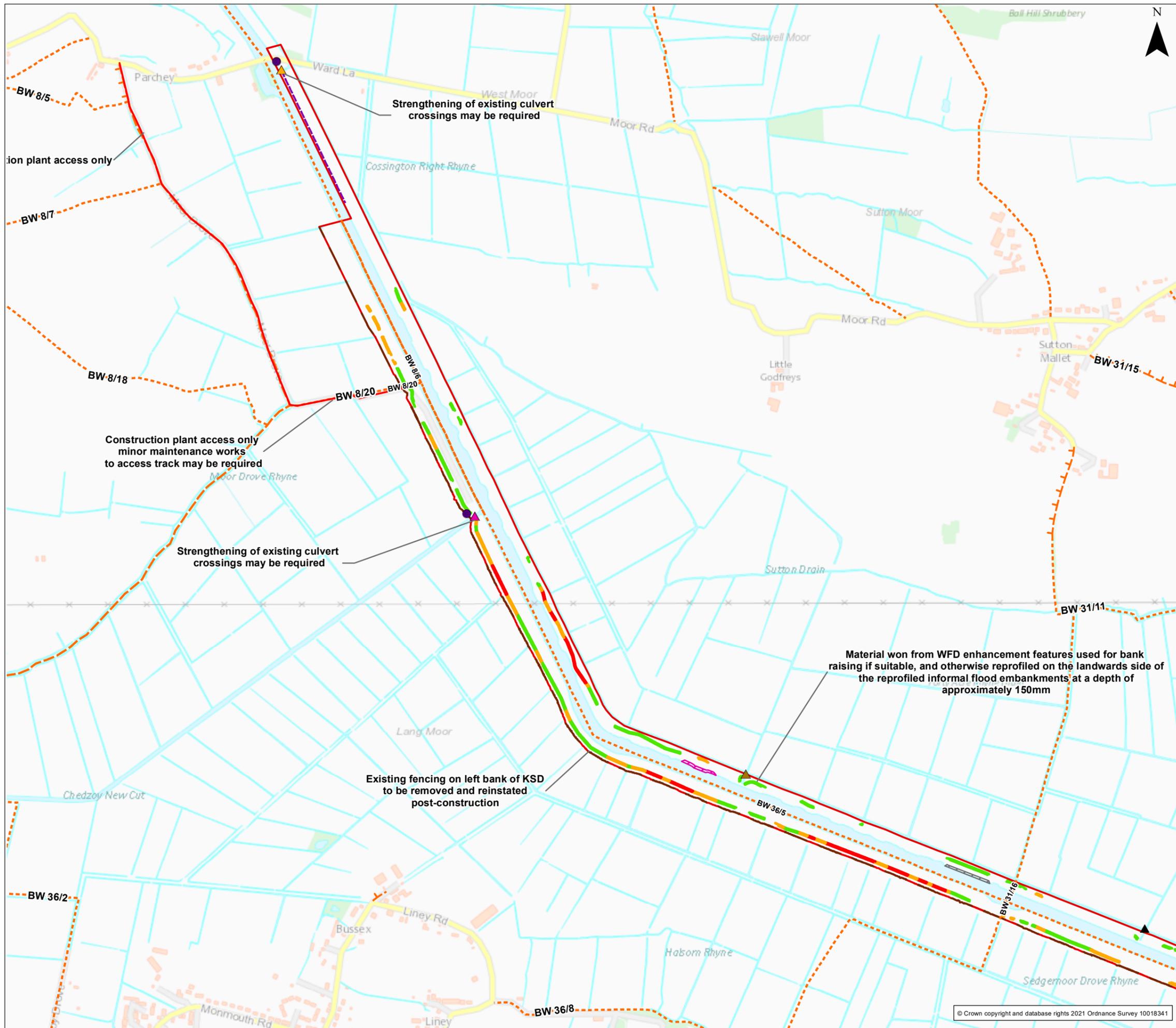
Drawing Title
 Temporary and permanent works under the Proposed Scheme
 Sheet 1 of 6

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FIGURE 2



Legend

Construction (temporary) works

- Construction footprint
- 'Just in time' stockpiles
- Mobile welfare locations
- Main compound (offsite)
- Source of imported material
- Chedzoy New Cut culvert
- Cossington Right Rhyne culvert

Permanent works

Bank raising (min. 3m crest width and 1:5 back slope)

- 0-0.1m
- 0.1-0.3m
- 0.3-0.5m

Sluice upgrade – raising of headwall

- Chilton Right Rhyne outfall
- Cossington Rhyne outfall

Existing flood embankments reprofiled to generate fill

Haulage route

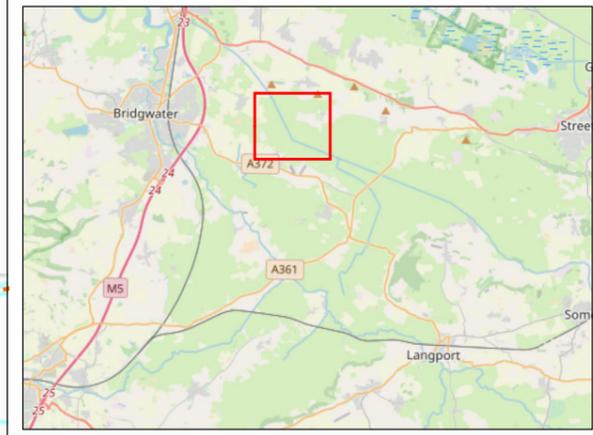
Temporary stockproof fencing

PRoW

- Bridleway
- Footpath
- Restricted Byway
- River Parrett Trail

Water Framework Directive (WFD) enhancements

- Backwater (max. dimensions 150m length and 15m width)
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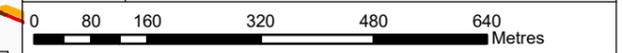


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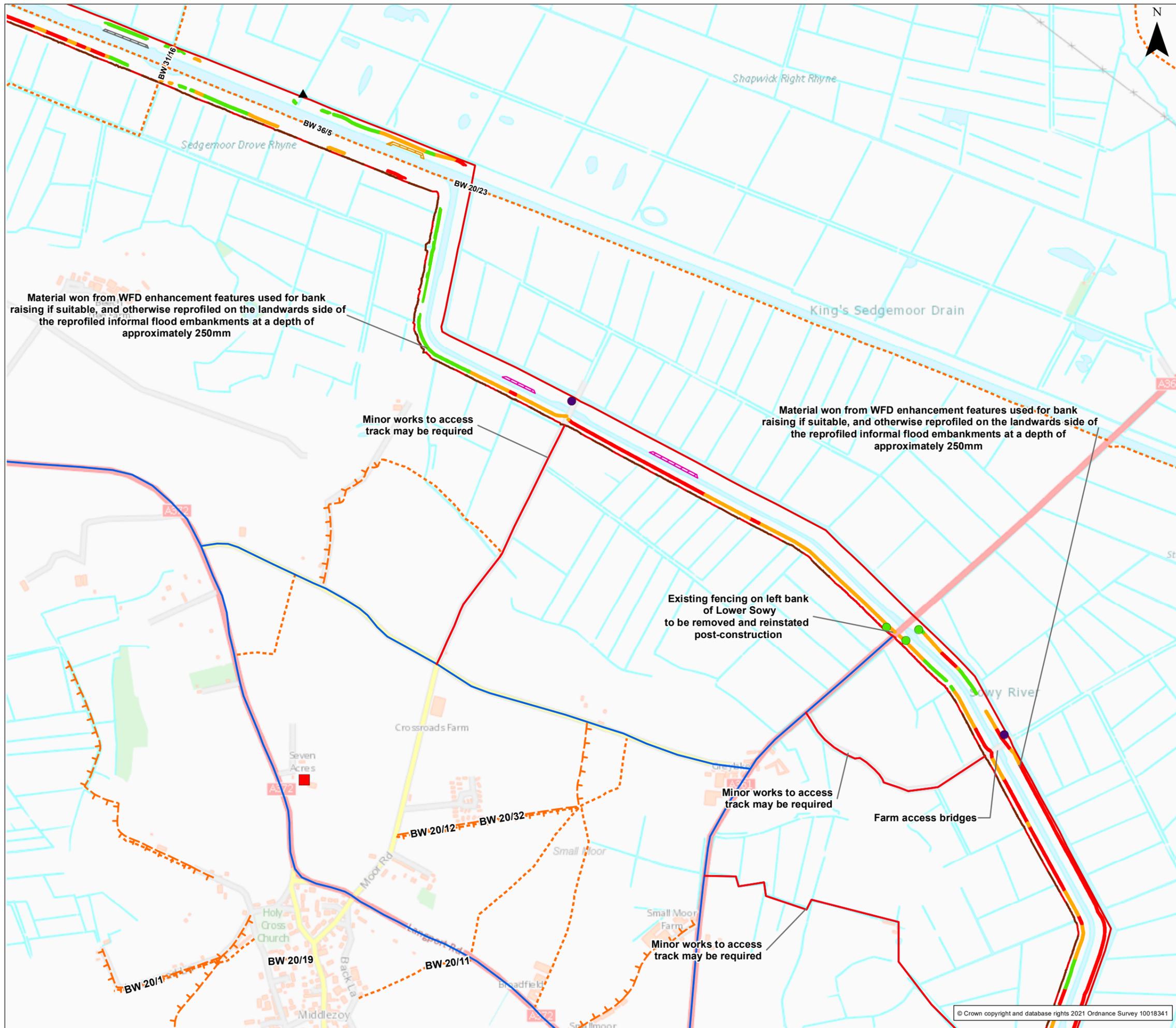
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Sheet 2 of 6

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FIGURE 2



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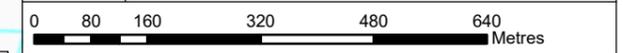
Project: River Sowy and King Sedgemoor's Drain Enhancements Scheme: Phase 1

Drawing Title: Temporary and permanent works under the Proposed Scheme
Sheet 3 of 6

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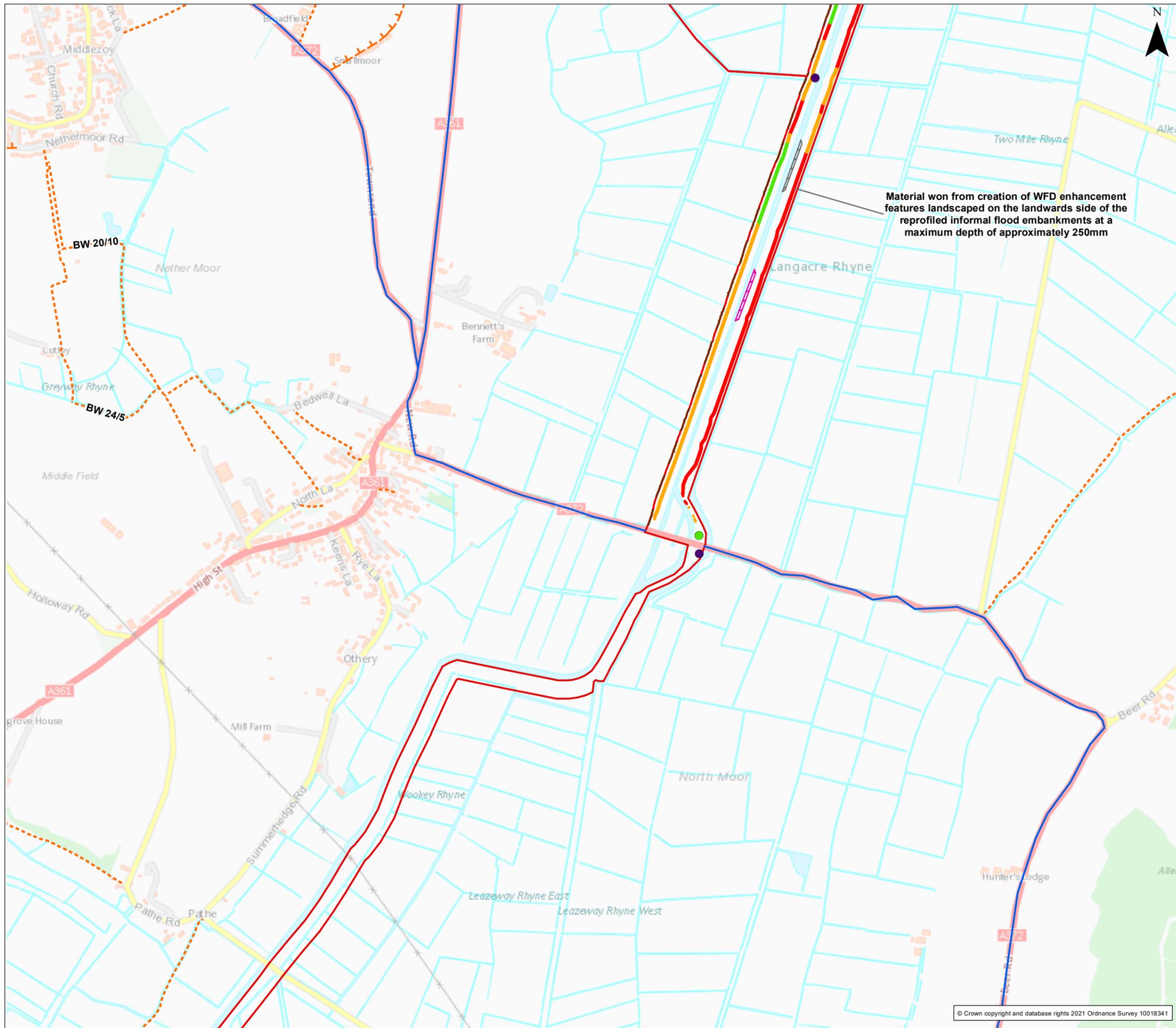
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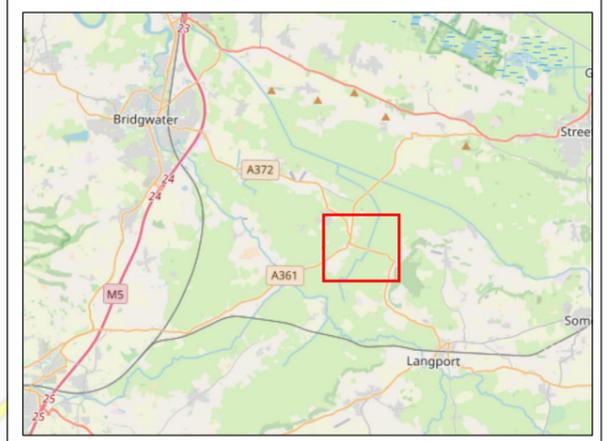


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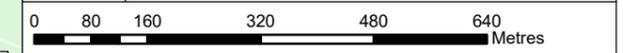
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 Temporary and permanent works under the Proposed Scheme
 Sheet 4 of 6

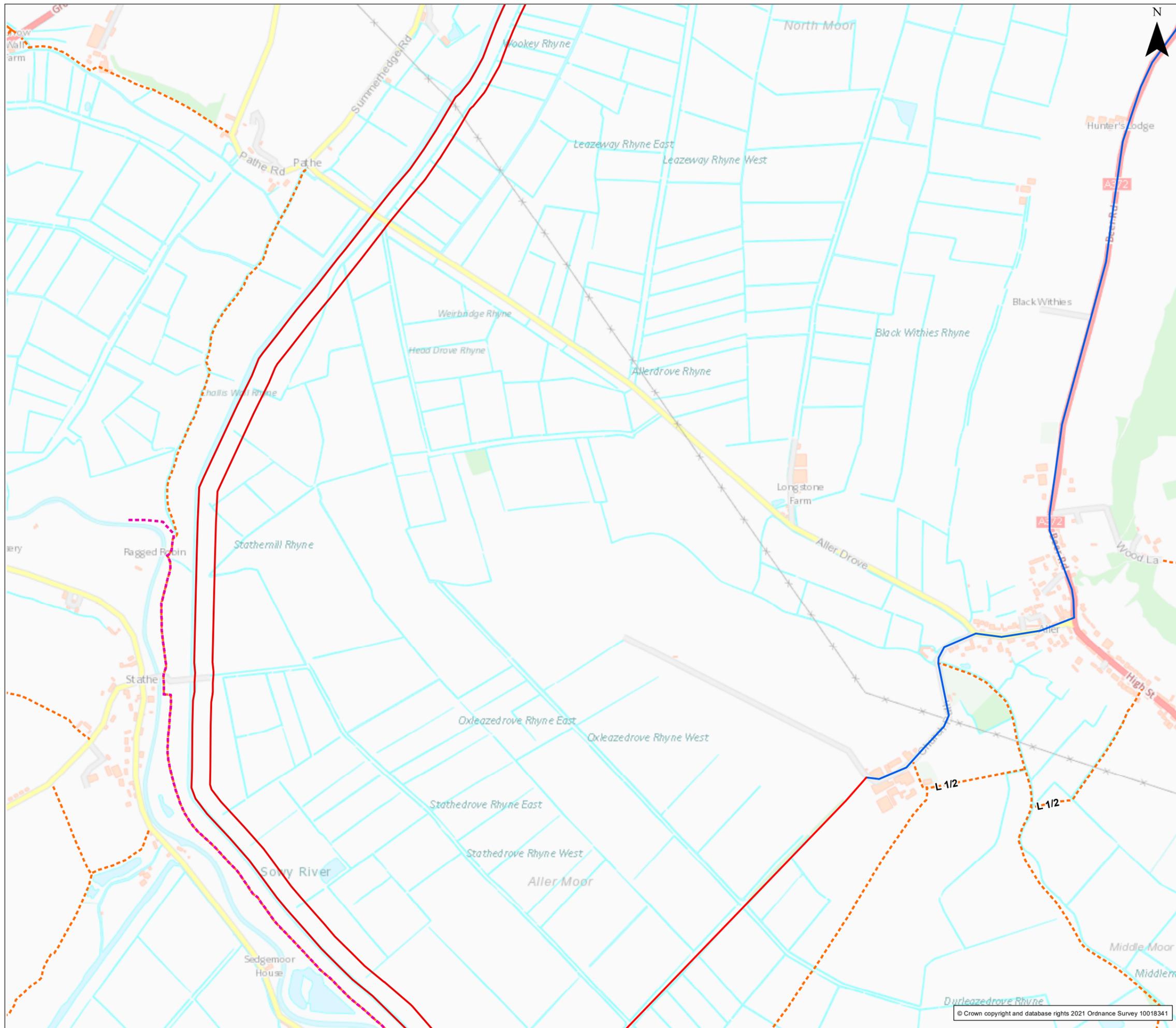
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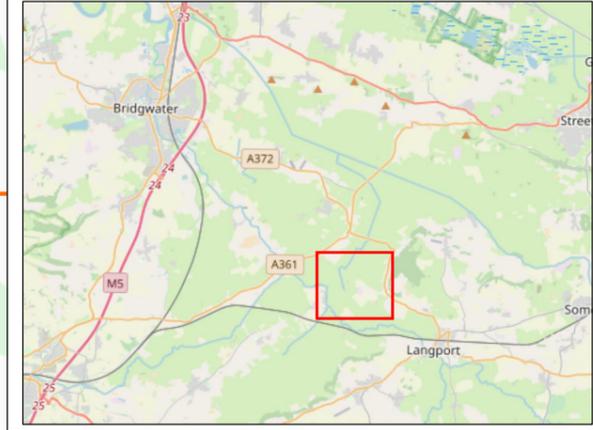
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FIGURE 2



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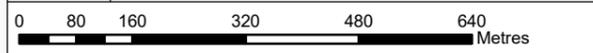
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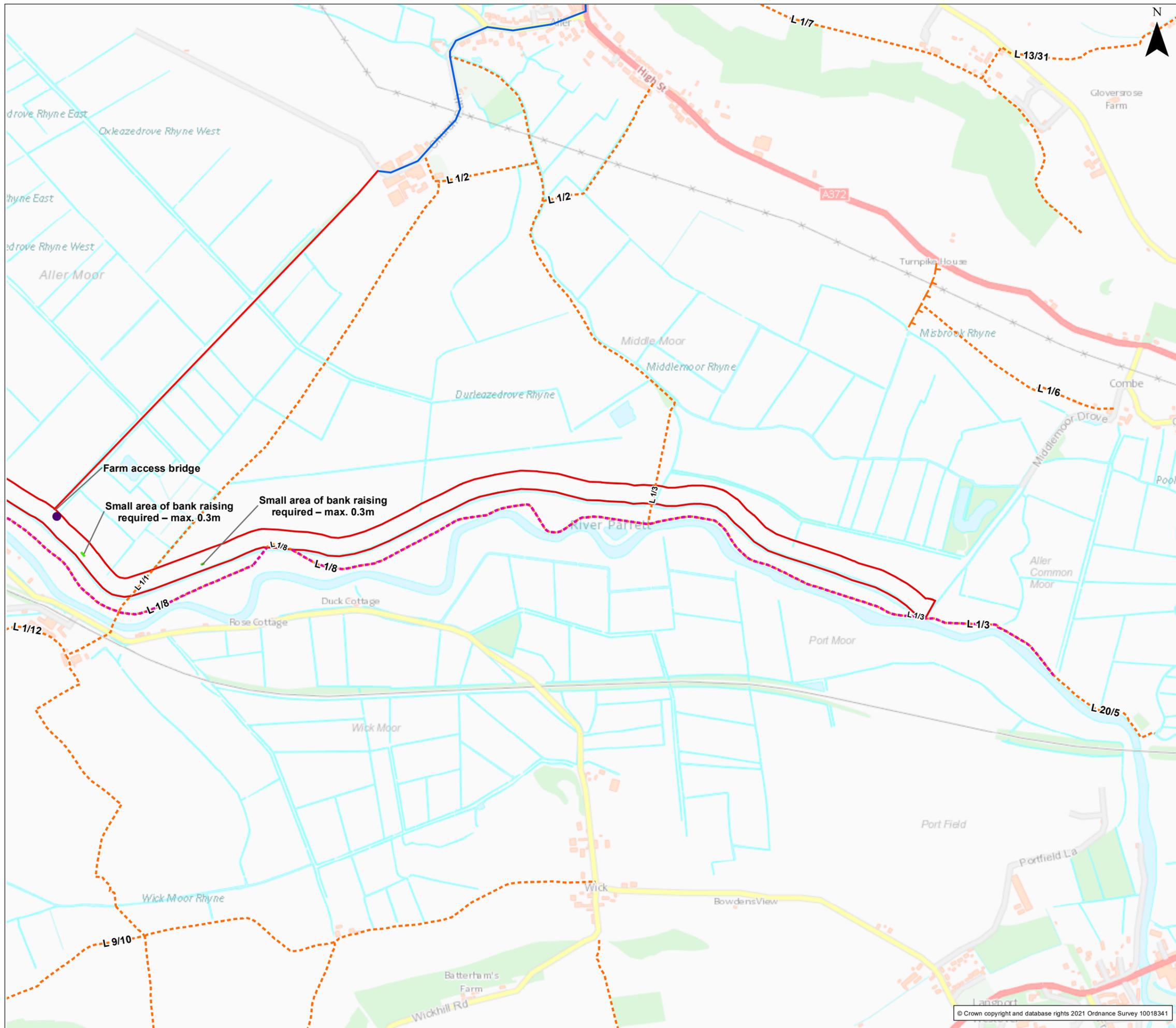
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 Temporary and permanent works under the Proposed Scheme
 Sheet 5 of 6

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 Sheet 6 of 6

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0 80 160 320 480 640 Metres

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