Appendix K Environmental Action Plan (EAP)

National Environmental Assessment Service

Environmental Action Plan

Project name	River Sowy and King Sedgemoor's Drain Enhancements Scheme: Phase 1
Project 1B1S reference	ENVRESW001353
Area	South West
Date	13/07/20
Version number	3
Author	Megan David/Miriam Olivier

Revision history

Revision date	Summary of changes	Author	Version number
23/07/20	Update to reflect scheme design changes and internal review comments	Miriam Olivier	3

EAP Approvals

Name	Signature	Title	Date	Version

Distribution

Name	Title	Date	Version

Purpose

This Environmental Action Plan (EAP) summarises the actions required to implement the environmental mitigation and outcomes contained within the ES (ES) that will be prepared following the Environment Agency's Minimum Technical Requirements. It sets out specific objectives and targets defining the way in which we wish the ES and its relevant findings to be addressed during the implementation phase of the project (detailed design, construction and post-construction phases). It also details roles and responsibilities of those involved in the proposal and refers to all **temporary** and **permanent** works.

These actions form part of the contract documentation and must be adhered to.

Roles

Each action in the table below has **one** named person or organisation who is responsible for ensuring that the action is implemented. It is ultimately the contractor's responsibility for ensuring the EAP commitments, which may include planning conditions, are delivered.

The EA National Environmental Assessment and Sustainability (NEAS) team are responsible for agreeing any changes to the EAP and for signing off, or agreeing to the signing off of, the actions.

The contractor and Project Manager are responsible for advising NEAS on any changes to method statements or the planned construction work as these may result in changes to the EAP or additional consultation with statutory consultees. NEAS will assess the significance of these changes and determine the appropriate course of action.

The contractor is also responsible for implementing good environmental practice on site, in line with their own environmental management systems (EMS). The environmental clerk of works (ECoW) will monitor adherence to the EMS and EAP. Typical issues include:

- Any working hour restrictions
- Dust suppression measures
- Traffic management
- Site waste management
- Materials management
- Maintenance of the carbon calculator
- Vehicle maintenance and management
- Pollution prevention and control (including storage, refuelling and incident response)
- Response procedures e.g. services strike, contaminated land
- Hazardous materials handling and storage
- Noise management
- Securing and delineation of working areas including signage
- Vegetation protection measures

Environmental Audits

The appended template should be used when undertaking any site audits during construction. Such audits can be undertaken by NEAS Environmental Project Managers (EPM) or delegated by NEAS to the ECoW or other individuals. Technical assistance can be obtained from

functional staff as appropriate. Site audits can potentially highlight good practice and can be separate to the review of EAP actions as undertaken in progress meetings. They do not replace the regular checks undertaken by the ECoW during the works; no set template has been provided for this.

Environmental Incident Reporting system

All environmental incidents must be reported to the Environment Agency Incident Hotline 0800 80 70 60 as per the Environmental Incident Reporting Poster at the earliest opportunity and then to the ECC Project Manager, Site Supervisor, Environment Agency Project Manager and Environment Agency NEAS Environmental Project Manager. In addition, near misses must be reported via the hotline where there was/is the potential for a significant impact and where lessons can be learned.

Initial reports for such incidents and near misses must be followed by a written report using the contractor's in-house forms. This must include the following information (project/location, date, contractor, NIRS reference number, details of what happened, cause of incident, lessons learned). This final and comprehensive investigation report is to be provided by the Contractor to the ECC Project Manager, Environment Agency Project Manager and Safety, Health and Environment Manager within 14 days.

Summary of scope of works

Phase 1 of the River Sowy and King's Sedgemoor Drain Enhancements Scheme (referred to as the Scheme) focusses on capacity enhancements between Monk's Leaze Clyce on the Sowy and Parchey Bridge on the KSD as shown in Figure 1. These include (i) raising existing informal flood embankments and (ii) channel widening through creation of ten Water Framework Directive (WFD) enhancement features (embayments, lengths of two-stage channel and back waters) and (iii) raising the headwall of two existing water control structures on the KSD (Cossington Right Rhyne outfall and Chilton Right Rhyne outfall). Strengthening works to two culvert crossings of Chedzoy New Cut and Cossington Right Rhyne are also required to facilitate plant access.

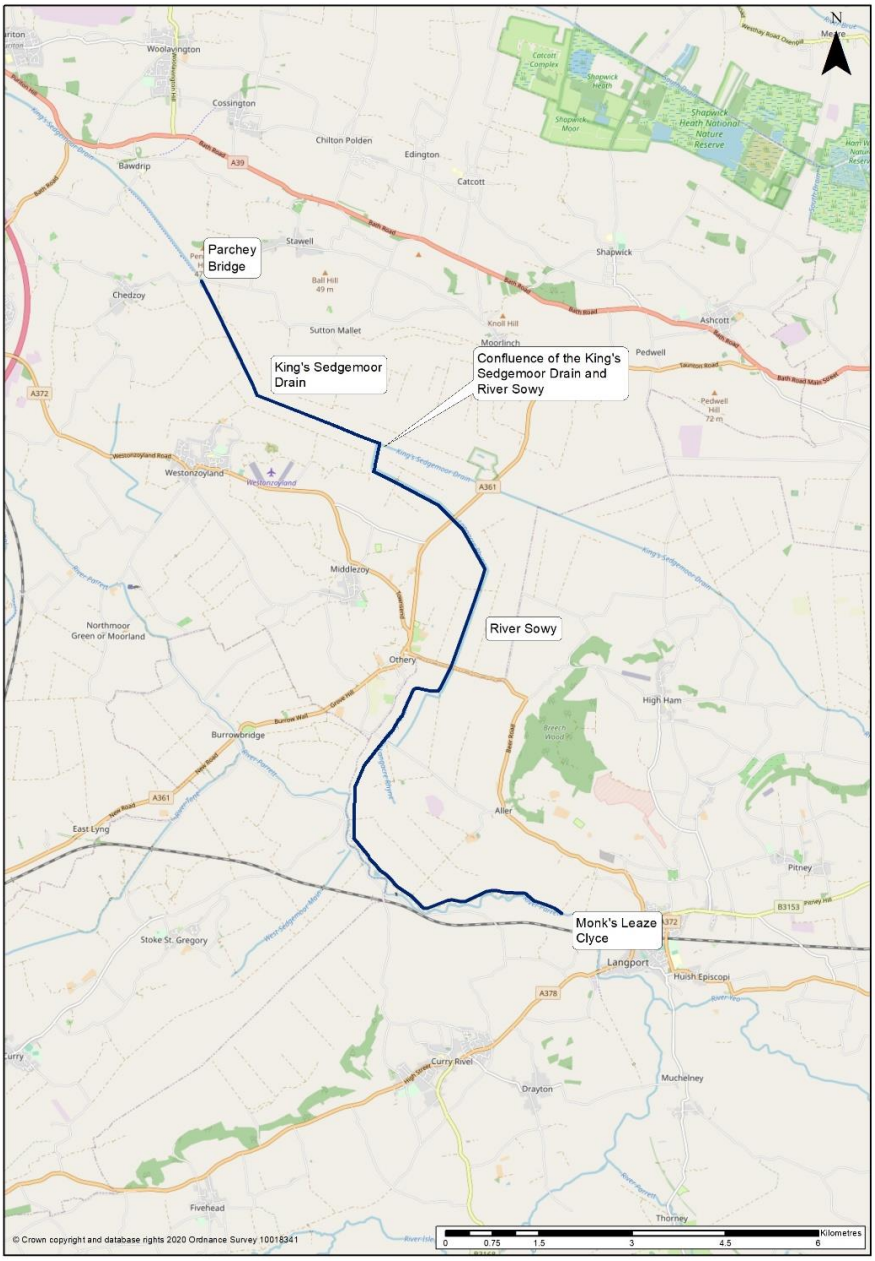


Figure 1 Scheme location

Construction works would take place between September and early November 2020 (pending agreement with Natural England), with the earthworks phase completed before the end of October. Works to existing informal flood embankments will be undertaken from the landward side wherever possible and tracking within 5m of the channel bank avoided except where water

vole displacement has been undertaken under licence or where specifically agreed by the Ecological Clerk of Works (ECoW). Material for bank raising on the King's Sedgemoor Drain (KSD) would be obtained from two borrow areas on the right and left bank of the KSD and would be imported under CL:AIRE for bank raising on the Lower Sowy (A372 Beer Wall to Sowy/KSD confluence) and Upper Sowy (A372 Beer Wall to Monk's Leaze Clyce).

Relevant contact details

Project Sponsor	John Rowlands	[Redacted]
Project Executive	Graham Quarrier	[Redacted]
Project Manager	Gary Cutts	[Redacted]
NEAS	Will Maclennan	[Redacted]
ECoW	To be confirmed	To be confirmed
Project geomorphologist	To be confirmed	To be confirmed
LCoW	To be confirmed	To be confirmed
Contractor	To be confirmed	To be confirmed
Site Supervisor	To be confirmed	To be confirmed

Environmental Action Plan

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
A. Pre-construction						
General						
A1	Compliance with environmental legislation and/or conditions of consent for the Scheme under EIA legislation	Comply with all measures identified in: • this EAP • the Environmental Statement (ES) for Scheme (including any conditions imposed by the determining authority at consenting stage) • the Landscape Masterplan (LMP) for the Scheme, including provision of between 7 WFD enhancement features as identified in this document • the Landscape Maintenance and Management Plan (LMMP) • any European Protected Species (EPS) licences found to be required following further ecological survey effort as detailed in the ES and EAP • Scheduled Monument Consent (SMC), including any conditions imposed by Historic England (HE) on determination	EA Contractor	ES (document reference: ENVRESW001353-CH2-XX-400-RP-EN-1042) LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439) LMMP (Document reference: ENVRESW001353-CH2-ZZ-400-PL-EN-1096)		
Water						

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
A2	Reduce the risk of pollution of the water environment.	Produce an Emergency Pollution Response Plan (EPRP)	Contractor			
A3	Reduce the risk of pollution of the water environment.	Produce a Surface Water Management Plan (including measures to minimise site runoff) (SWMP) in agreement with our internal technical specialists	Contractor			
A4	Reduce the risk of pollution of the water environment.	Register for flood warnings	Contractor			
A5	Prevent the spread of invasive species	Carry out pre-construction survey for non-native invasive plant species.	Contractor			
A6	Prevent the spread of invasive species	Develop Invasive Species Management Plan.	Contractor			
A7	Reduce the risk of pollution of the water environment.	Identify areas of possible contamination on the Site Management Plan and erect signage to indicate them on site.	Contractor			
Flora and Fauna						
A8	To minimise the risk of loss/injury of otters and ensure compliance with the Wildlife and Countryside Act 1981 (as amended) and the Species and Habitats Regulations 2017.	• Carry out pre-construction check for otter holts should be conducted prior to works commencing. • If otter holts present an European Protected Species (EPS) licence may be required to permit activities that would otherwise be unlawful	Contractor			
A9	Minimise risk of loss/injury of badgers ensure compliance with the Protection of Badgers Act 1992	• A pre-construction survey should be undertaken to determine if any new badger setts are present on site.	Contractor			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
		• Where active badger setts would lost/disturbed by the works a licence may be required to permit activities that would otherwise be unlawful.				
A10	Avoid loss of trees with potential bat roost features.	• Trees with bat roost potential that are proposed for removal would be subject to appropriate survey effort to determine likely presence/absence of a roost. Trees found to be roosts would be retained. • Pre-construction check of trees with bat roost potential proposed for removal would also be carried out immediately prior to felling.	Contractor			
Cultural Heritage						
A11	Minimise impact on archaeological remains and deposits of paleoenvironmental and geoarchaeological interest	Produce Written Scheme of Investigation (WSI) in agreement with internal technical specialists, South West Heritage Trust (SWHT) and Historic England (HE).	Contractor EA			
A12	Compliance with Ancient Monuments and Archaeological Areas Act (1979)	Obtain SMC for works required within scheduled area and implement any mitigation identified as being required pre-construction, construction or post-construction as part of the SMC application process.	Contractor EA			
Resource and Waste Management						
A14	To minimise the amount of	Develop a Materials Management Plan (MMP) to be followed throughout the	Contractor			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	waste produced.	scheme.				
A15	Ensure any waste is disposed of appropriately	Develop a Site Waste Management Plan (SWMP) to be followed throughout the scheme.	Contractor			
Population and Human Health						
A16	To minimise disruption to agricultural businesses	• Liaise with agricultural businesses to understand access needs and timings of key agricultural practices and plan construction access and works accordingly	EA			
A17	To minimise disruption to agricultural businesses	• Liaise with agricultural businesses regarding temporary and permanent land take requirements, including any financial compensation for landowners • Provide clear accessible public information regarding proposed works for agricultural landowners	EA			
A18	Minimise disruption to recreational users of Public Rights of Way (PRoW) and bird watchers	Inform the local community of the nature and duration of works and alternative provisions of access through signage and webpage updates Inform local communities within the study area about the proposed haulage routes through signage and webpage updates. In addition, notices should also be placed on PRoW immediately adjacent to the proposed haulage routes prior and during the construction period to notify users of	Contractor			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
		these PRoW.				
Landscape						
A19	Minimise adverse effects on landscape and visual amenity receptors	Determine potential requirements for drying, dewatering or containment measures for material excavated from WFD enhancement features to ensure material is suitable for reseeding and can be utilised in reprofiling of embankments without generating adverse impacts on landscape and visual amenity	EA Contractor Landscape Clerk of Works (LCoW)			
A20	Minimise adverse effects on landscape and visual amenity receptors	Implement any design mitigation measures identified through the Tree Survey and Arboricultural Impact Assessment (AIA) (including 'Heads of Terms' Arboricultural Method Statement (AMS)) to ensure tree retention is prioritised	EA Contractor			
A21	Minimise adverse effects on landscape and visual amenity receptors	Develop site specific AMS based on 'Heads of Terms' AMS and final scheme design (if required)	EA Contractor			
Air Quality						
A22	To minimise the impact of dust emissions on human and ecological receptors.	Implement appropriate mitigation measures as recommended in Institute of Air Quality Management (IAQM) guidance Assessment of Dust from Demolition and Construction (IAQM, 2016).	Contractor	IAQM guidance Assessment of Dust from Demolition and Construction (IAQM, 2016)		
A23	To minimise the impact of dust during construction.	Develop and implement a Dust Management Plan (DMP) in agreement with the EA.	Contractor	IAQM guidance Assessment of Dust from Demolition and		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
				Construction (IAQM, 2016		
Climate						
None identified						
Traffic						
A24	To minimise the impact from construction vehicles.	Prepare a Construction Traffic Management Plan (CTMP), which will set out measures to mitigate risks and minimise their impact of construction vehicles.	Contractor			
B. During construction						
Water						
B1	To minimise risk of harm to fish and aquatic ecology	During summer months take dissolved oxygen (DO) readings whilst undertaking channel works to ensure water quality does not deteriorate rapidly. If DO levels drop below 20%, all operations stop immediately, including the operation of pumping stations, especially in summer. Stop works if the works combined with higher temperatures threaten to deplete dissolved oxygen	Contractor ECoW			
B2	To minimise risk of water pollution	Toolbox talks regarding water quality risks	Contractor ECoW			
B3	To minimise risk of water pollution and to ensure best ecological value obtained y guiding design of individual	Suitably experienced ECoW and project geomorphologist to supervise creation of WFD enhancement features	ECoW EA Project geomorphologist			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	features as best fits site specific locations					
B4	To minimise risk of water pollution	Use of silt curtains/booms for in channel works	Contractor			
B5	To minimise risk of water pollution	Use impermeable bases, flood bunds, and temporary covering of exposed material to minimise risks of leachate from material stockpiles	Contractor			
B6	To minimise risk of water pollution	Use of drip trays, which will be of adequate capacity and regularly maintained	Contractor			
B7	To minimise risk of water pollution	Store fuels in appropriately bunded areas, with refuelling activities will take place in designated areas away from the river	Contractor			
B8	To minimise risk of water pollution	Compliance with best practice pollutation prevention measures	Contractor			
Flora and Fauna						
B9	To minimise the disturbance of qualifying wintering and/or breeding bird features.	Ensure that there are working restrictions in the event of any severe, cold weather that would make bird displacement due to disturbance an issue.	Contractor ECoW			
B10	To minimise the disturbance of qualifying wintering and/or breeding bird features.	Suitably experienced ECoW to monitor and record presence of any significant numbers of birds (>1% of the current 5-year peak mean for any species) within the disturbance zone of influence (up to 300m).	Contractor ECoW			
B11	To reduce the loss of suitable foraging and roosting habitat wintering bird features of designated sites	Implement measures identified in River Sowy and King's Sedgemoor Drain Enhancement Scheme Mitigation Plan (MAP) Version 5 as provided in Appendix J of the ES for the Scheme and Appendix A	EA NE SDBC	ES (document reference: ENVRESW001353-CH2-XX-400-RP-EN-1042)		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
		of this document.				
B12	To minimise risk of loss or damage to notable habitats (coastal grazing marsh) and notable plant species (water dropwort and frogbit)	Install protective fencing and define working areas to exclude construction areas from surrounding habitats of value to be retained.	Contractor EA	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
B13	To minimise risk of loss or damage to notable habitats (coastal grazing marsh)	• Reseeding of grassland areas with an appropriate seed mix (to be agreed with NE). • Riparian planting to two backwater WFD enhancement features, planting of WFD enhancement features with pre-vegetated coir rolls/pallets and reseeding of disturbed channel bank areas with appropriate seed mix (to be agreed with NE)	Contractor	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
B14	To minimise risk of loss/mortality or damage/disturbance to priority habitat, notable plant species, eel, water vole and aquatic invertebrates	Implementation of standard good practice measures to control risk of water pollution through run-off/drainage management as detailed in the EPRP and SWMP	Contractor			
B15	To minimise disturbance of qualifying wintering and/or breeding bird features within statutory designed and non-designated sites	No working or lighting after dark close to any areas known to be favoured by birds (to be identified and agreed with NE)	Contractor			
B16	To reduce the risk of direct loss	Pull back excavated material by a short distance from the margin of the existing	Contractor			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	of aquatic invertebrates.	river and allow to rest for a short time to allow animals that can escape back in to the water				
B17	To reduce the risk of death or injury to great crested newt (GCN) and grass snakes.	Carry out works under a method statement (to include two-stage clearance) and supervision of an ECoW	Contractor			
B18	To reduce the risk of disturbance of wintering and breeding birds (not qualifying features of designated sites)	Works shall be conducted outside of the main breeding bird period (March to August inclusive) and ECoW should check potential nesting habitat prior to construction works. Where nesting is occurring, appropriate restrictions for the species shall be put in place to avoid the nest from being damaged or abandoned.	Contractor ECoW			
B19	Minimise risk of disturbance/mortality of badgers ensure compliance with the Protection of Badgers Act 1992	Carry out works under a Badger Method Statement, which would include measures such as: • Ensure buffer zones around known badger setts • Cover excavations at night • Any other measures identified as required following completion of a pre-construction survey, including compliance with EPS licence conditions if found to be required.	Contractor ECoW			
B20	To minimise direct loss or injury of water voles and the loss of burrows.	• Work undertaken in accordance with Environment Agency Organisational Licence, including timing of works and	Contractor ECoW			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
		displacement techniques. • Maintain 5m buffer from all watercourses • Pre-construction checks for burrows at any locations where a 5m standoff from watercourses cannot be maintained.	EA			
Cultural Heritage						
B21	Minimise risks to Prehistoric wooden trackway located approximately 670m to the south-east of Parchey Bridge (NHLE 1014430)	Install temporary matting where vehicle access required, and implement any other measures identified as required within SMC and conditions. Archaeological monitoring of groundworks in accordance with archaeological WSI (as per A11)	EA Contractor ECoW	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
B22	Minimise risks to non-designated heritage assets as identified on the LMPs LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)	Archaeological monitoring of groundworks during topsoil stripping in accordance with archaeological WSI (as per A11)	Contractor ECoW	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
B23	Minimise risks to unstratified finds within the Battle of Sedgemoor Registered Battlefield (NHLE 1000032)	Archaeological monitoring of groundworks augmented by metal detector survey in accordance with archaeological WSI (as per A11)	Contractor ECoW	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
B24	Minimise risks to previously unknown archaeological assets and deposits of	Archaeological investigation and recording (excavation and recording if preservation in-situ not achievable) in accordance with	Contractor ECoW	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	paleoenvironmental and geoarchaeological interest	archaeological WSI (as per A11) during creation of WFD enhancement features (embayments, two stage channels and backwaters)		5439)		
B25	Minimise risks to previously unknown archaeological assets (prehistoric metalwork and later finds) in the Greylake area	Archaeological monitoring of groundworks augmented by metal detector survey in accordance with archaeological WSI (as per A11)	Contractor ECoW	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
Resource and Waste Management						
No mitigation measures during construction have been identified for Resource and Waste Management.						
Population and Human Health						
B26	To minimise disruption to users of Public Rights of Way (PRoW)	Inform local communities of the nature and duration of the works through signage and webpage updates Informing local communities within the study area about the proposed haulage routes through signage and webpage updates. In addition, notices should also be placed on PRoW immediately adjacent to the proposed haulage during the construction period to notify users of these PRoW.	Contractor			
B27	To minimise disruption to agricultural businesses	Sign post any diversions to farm access routes required Provide access to drinking water for stock or implement alternative provisions	Contractor			
Landscape and Visual Amenity						

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
B28	To reduce the risk of damage to the wetland vegetation.	Temporarily re-locate and store marginal wetland vegetation which cannot be retained in appropriate conditions conducive to its continuing survival for re-placement once the widening works have been completed.	Contractor	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
B29	To minimise any damage to the access route.	Any damage to sward/vegetation at Sowy maintenance access route shall be remediated as part of works	Contractor	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
B30	Minimise adverse impacts on landscape and visual amenity receptors	Reseeding of areas of bare ground created by bank raising and reprofiling works on the KSD using a bespoke neutral wet grassland (NWG) mix or other appropriate seed mix following pre-seeding preparatory works (weed control and cultivation).	Contractor	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
B31	Minimise adverse impacts on landscape and visual amenity receptors	Reseeding of areas of bare ground created by bank raising and reprofiling works on the Lower Sowy using a bespoke NWG mix or other appropriate seed mix following pre-seeding preparatory works (weed control and cultivation).	Contractor	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
B32	Minimise adverse impacts on landscape and visual amenity receptors	Reseeding of any newly created channel bank (through creation of embayments, two-stage channels and backwaters) and any maintenance access routes with a bespoke NWG mix or other appropriate seed mix following pre-seeding preparatory works (weed control and cultivation).	Contractor	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
B33	Minimise adverse impacts on landscape and visual amenity receptors	Newly created marginal shelves on the embayments and two-stage channels and the backwater channel will be planted with appropriate marginal wetland species introduced by installing: • Pre-vegetated coir rolls along the riverside edge of the marginal shelves or edges of the backwater channels • Pre-vegetated coir pallets closer to the landward edge of the marginal shelves • Pre-planting any marginal plants lifted from the channel edges at WFD enhancement locations prior to excavation and stored on site in suitable locations Backwater islands will be planted with appropriate wet scrub species (grey willow, goat willow, osier, downy birch, dog rose, elder, hawthorn and bramble) to provide biodiversity habitat value for a range of species and to assist provide long-term stabilisation of the banks.	Contractor	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
B34	Minimise adverse impacts on landscape and visual amenity receptors	Implement measures under site specific Arboricultural Method Statement (SS AMS)	Contractor			
B35	Minimise adverse impacts on landscape and visual amenity receptors	Mark up Root Protection Areas (RPAs) of any trees not included within the SS AMS and install tree protection barriers. Avoid tracking within these areas where	Contractor ECoW			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
		practicable. Where not practicable, install appropriate tree protection barriers and ground protective measures as advised by a suitably qualified arboriculturalist.				
Noise						
B36	To minimise the potential for disturbance.	Ensure Best Practical Means (BPM), including noise shrouding and plant specification and maintenance, will be applied throughout the construction period.	Contractor			
B37	To minimise the potential for noise disturbance to sensitive receptors located near haulage routes and access points	Implement measures including: • Minimise the use of rapid breaking or accelerating • Avoid the use of horns, unless required for safety reasons on narrow tracks • Brief drivers on the existing quiet nature of the areas surrounding haul routes and the need to minimise noise generated through haulage • Inform residents of Church Path, Church Drove, Aller Drove and Coombe Lane regarding the nature of vehicles passing, timescales and durations of the works	Contractor			
Climate						
B38	Minimise impact on CO_2	Maintain carbon calculator for the Scheme	EA			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	emissions during construction					
B39	Minimise impact on CO_2 emissions during construction	Implementing the following targets as part of the works: • Avoiding the use of inefficient or oversize machinery to complete the works • No idling of vehicles • Use of new plant where necessary • Avoiding unnecessary night time site working • Reduction of the overordering of material to reduce waste onsite	Contractor			
Traffic						
B41	To minimise the impact from construction vehicles on traffic and minimise risks to archaeological remains and deposits	Store construction plant in a site compound or on site overnight to reduce the movements to and from site and within the site boundary	Contractor			
C. Post construction						
Water						
C1	To reduce the risk of adverse water quality from maintenance activities	Monitor the oxygen levels using a dissolved oxygen monitor and stop maintenance works should they approach trigger levels.	Environment Agency			
C2	To minimise risks to water	Carry out erosion control planting as per	Contractor	LMP (drawing numbers:		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	quality.	landscape drawings.		ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
C3	To ensure successful establishment of landscaping planting proposals	Post-construction monitoring and maintenance	Contractor Landscape Clerk of Works (LCoW)	LMP (drawing numbers: ENVRESW001353-CH2-XX-400-DR-EN-5425 to 5439)		
Flora and Fauna						
C4	Comply with requirements of EA organisational licence for water vole displacement	Post-construction monitoring as required under organisational licence	Contractor EA			
C5	To reduce the loss of suitable foraging and roosting habitat wintering bird features of designated sites and minimise adverse effects on agricultural land holdings	Implement measures identified in River Sowy and King's Sedgemoor Drain Enhancement Scheme Mitigation Plan (MAP) Version 5 as provided in Appendix J of the ES for the Scheme and Appendix A of this document.	EA NE SDBC	ES (document reference: ENVRESW001353-CH2-XX-400-RP-EN-1042)		
Cultural Heritage						
None identified						
Resource and Waste Management						
None identified						
Population and Human Health						
C6	To minimise adverse effects on agricultural land holdings	Ensure effective liaison with agricultural businesses to discuss mitigation measures agreed with NE regarding environmental	EA			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
		stewardship agreements and any potential financial compensation for landowners				
Landscape and Visual Amenity						
C7	To minimise effects on the landscape and visual amenity	Monitoring and maintenance of landscape planting in accordance with the LMMP	EA Contractor LCoW	LMMP (Document reference: ENVRESW001353-CH2-ZZ-400-PL-EN-1096)		
Noise						
None identified						
Air Quality						
None identified						
Climate						
None identified						
Traffic						
None identified						

Environmental audit record

Project		**Project ref.:**	
Project Manager:		**NEAS EPM:**	
Location		**Grid reference**	

Site Visit Audit Details

Visit During/Post Construction:		**Date of Visit:**		**Time of Visit:**	
Audit Officer:		**Photos taken (y/n):**		**Referenced to Pre-Photos(y/n):**	

Does the Site Supervisor have an up to date copy of the EAP? Yes / No

General comments

Appendix A

River Sowy and King's Sedgemoor Drain Enhancements Scheme

Parrett Dredging and River Sowy and King's Sedgemoor Drain Enhancements Scheme Mitigation Plan

Version 5: update to IDB Mitigation Plan for Parrett Dredge (Version 3: published in IDB Environmental Statement) to also include River Sowy and King's Sedgemoor Drain Enhancements Scheme (hereon referred to as Sowy projects for ease) effects (Table B & Maps 3 & 4) and incorporate an Implementation plan (Table 3) for mitigation actions for both projects. Version 4 used for comment to update in version 3

Tables 3 & 4 and Maps 3 & 4 are included in Annex 1.

Version 1- 4 ***10/6/2020*** ***Philip Brewin*** ***Parrett IDB***	***Version 5*** ***22/06/2020*** ***John Rowlands*** ***Environment Agency***

1. Introduction

The Somerset Levels and Moors provides exceptional wetland habitat for 10,000s of over-wintering wildfowl and waders (waterbirds). The availability and quality of this habitat depends on effective water level management. The conservation requirements for water level management include maintenance of extensive wet grasslands with wet ditches and large areas of splash flooding in the winter months of December, January and February. For the Parrett Dredging and Sowy projects to be legally compliant, the work must not cause a deterioration in these conditions.

The primary purpose of this mitigation plan is to ensure no deterioration in SPA habitat availability or quality, as a consequence of the Dredging and Sowy projects. It is important to highlight that this plan covers the effects of a full River Sowy and KSD Enhancements scheme (increasing capacity up to 24 cubic metres of water - cumecs) and an IDB dredge project which was planned to increase conveyance by 8 cumecs. The impact of both these projects will initially be less than shown by the modelling outputs within this plan. The Phase 1 Sowy projects will deliver a 17 cumec capacity and the dredge a 3- 4 cumec increase. This plan will allow any future phases of work to have agreed mitigation in place and therefore be legally compliant. It was agreed by all partners that this strategic and phased plan would be the best approach to take in delivering such a large project.

This change will be most apparent for the Langport Moors and the Sowy/KSD corridor. Small winter floods, resulting from minor overtopping of spillways or simply from rainfall and runoff overwhelming watercourses on the Moors, are beneficial to waterbirds. Especially important is their dynamic nature and the consequential fluctuations in water levels that result in the short-term wetting up of low-lying meadows. Another important

aspect is how the projects affect areas of suitable habitat beyond the boundaries of the protected sites. These areas provide supporting habitat (functionally linked land) and are typically wet grassland meadows with few trees that provide feeding opportunities (areas of splash flooding) in wet conditions and are important refuges during larger floods, when waterbirds are displaced from the lower, wetter, sites by deep floods. Hydraulic modelling indicates the projects will, in effect, reduce the magnitude, and therefore the frequency, of small winter floods.

2. Mitigation Objectives

Over the last 30 years, an extensive network of Raised Water Level Areas (RWLA) has been developed and operated across many of the moors. Water levels are maintained close to ground level in these wetland schemes to create surface water conditions in winter months, which are used by waterbirds as night-time feeding sites or daytime safe roost sites. RWLAs are the primary mechanism for achieving the conservation objectives of the SPA. The total area of land under RWLA management in the Parrett catchment is 2,000ha. These areas help mitigate the effects of flood and water management, which generally reduce the wetness of the low-lying meadows in winter and therefore prevent the habitat requirements of the SPA from being met. RWLAs will also act to protect the SPA from the potential impacts of the Dredging and Sowy projects on small winter floods. It is essential that this mitigation plan supports the ongoing maintenance and operation of the existing RWLA network.

This mitigation plan proposes to sustain the existing area of RWLA, recognising that investment will be required for renewal, operation and maintenance of these schemes. If the total area was to fall below current levels, then the mitigation plan will seek to replace the lost area with an equivalent area elsewhere. This is a basic requirement for ensuring that there is no deterioration in SPA habitat availability or quality, and that the SPA retains its favourable status.

The existing Water Level Management Plans (WLMPs) will be complied with and the WLMPs will be reviewed and updated to take account of infrastructure improvements and operational changes and ensure favourable conditions are sustained.

This mitigation plan also includes actions for each Moor to ensure no change to the impact of the Dredging and Sowy projects on the extent, duration and frequency of small winter floods outside of RLWAs. As hydraulic modelling indicates the majority of change will occur outside of protected areas, these actions should focus on the functionally linked land (outside designated areas). Mitigation actions include changing target water levels in winter, to ensure ditches remain wet and surface water features are created during wet conditions.

Alternative options for mitigation have also been identified, including the potential to develop new RWLAs, on functionally linked land. Similar mitigation actions can also be undertaken within designated sites, where there is potential to

extend/consolidate existing wetland schemes or generally improve water level management. Mitigation actions will take into account the broader conservation objectives for each area, including condition status and any remedial actions required to achieve favourable condition.

3. Impacts

The impacts of the Dredging and Sowy projects on the duration and extent of small, environmentally beneficial, winter floods have been identified through hydraulic modelling and mapping. This is summarised in Figures D3.1 and D3.2, which were included in the HRA Appropriate Assessments (see text box below). Table D3.1 further summarises the model output for each area.

Extract from HRA Appropriate Assessment: Summary of hydraulic modelling of the potential impact of the Dredging and Sowy projects on the duration and extent of small, environmentally beneficial, winter floods.

A hydrological modelling study compiled by SDBC has been used to inform this HRA (Appendix 1). The EA hydraulic flood model for the lower Parrett and Tone was used to assess the potential effects of conveyance improvements. Light Detecting and Ranging (LiDAR) land level data were used to calculate the area of land which the model indicated would have at least 50 mm depth of water (splash conditions) at the peak flood level of model runs for the 2012 summer floods. The 2012 summer floods are considered to be a suitable reference event for winter floods that have an estimated probability in occurrence (i.e. a 1 in 3 year to a 1 in 5 year flood event).

The modeling includes the following caveats and assumptions:

The model is calibrated to analyse large flood flows and not changes in more frequent small flood events which are the focus of the study to inform the HRA;

The model uses reference flow events, rather than flows of known probability;

The model does not include the ditch networks or water level management infrastructure; and

Modelling includes the length of the River Parrett from Oath to Burrowbridge which is approximately 50% more than the actual length of proposed dredging from Stathe to Burrowbridge, therefore the actual increase in conveyance will be less.

The model has used the full Sowy scheme outputs (24 cumecs) but with a phase 1 scheme (17 cumecs) being promoted, the impacts will be less than modelled and shown here.

The model has predicted changes to the level and duration of winter surface splash flooding in the following areas outlined in Table D3.1 as a result of the dredging of the River Parrett. The results of the hydrological modelling are also presented in Figures D3.1 and D3.2.

Using the 2012 summer floods as a proxy for a small winter flood, hydraulic modelling of current baseline conditions indicates a total flood area across all Parrett Moors of nearly 3,500 ha. This reduces by nearly 300 ha as a result of the Parrett dredging in the model. Across all moors there is an approximate 7% reduction in flood area. Changes in flood extent are greatest (70%) outside the areas of SSSI (200 ha) and 80% is outside of Raised Water Level Areas (RWLAs) (230 ha). It must be noted that the reductions will in fact be smaller initially for the proposed project dredging and Sowy projects, as the dredging is approximately 50% of the modelled scheme and the improved conveyance for the Phase 1 Sowy projects is less than the full scheme improvements.

Langport Moors, West Sedgemoor, Aller Moor, King's Sedgemoor and Chedzoy experience the greatest change in flood extent and have a predicted minimum 10% reduction in flooding. Reductions in flood duration are relatively small: typically, a 12-hour to a 2-day reduction in flooding due to increased flood flow conveyance of the River Parrett.

RWLAs considerably contribute to achieving and sustaining wetland condition of the SPA and maintain the required conditions during December to February. It is possible to compare RWLA to the effect of dredging in terms of area and duration: ha/days (the length time flooded multiplied by area). Assuming 50% the area within RWLAs achieves the required winter conditions, RWLAs contribute 167,300 ha/days, which compares with a reduction of 1500 ha/days for a typical winter flood as a consequence of the proposed Parrett Dredge. This represents a 1% reduction in SPA winter flood conditions due to dredging, when compared to the combined contribution of RWLAs. The potential effect associated with water level management upon the Somerset Levels and Moors SPA and Ramsar site is predicted to be minor adverse.

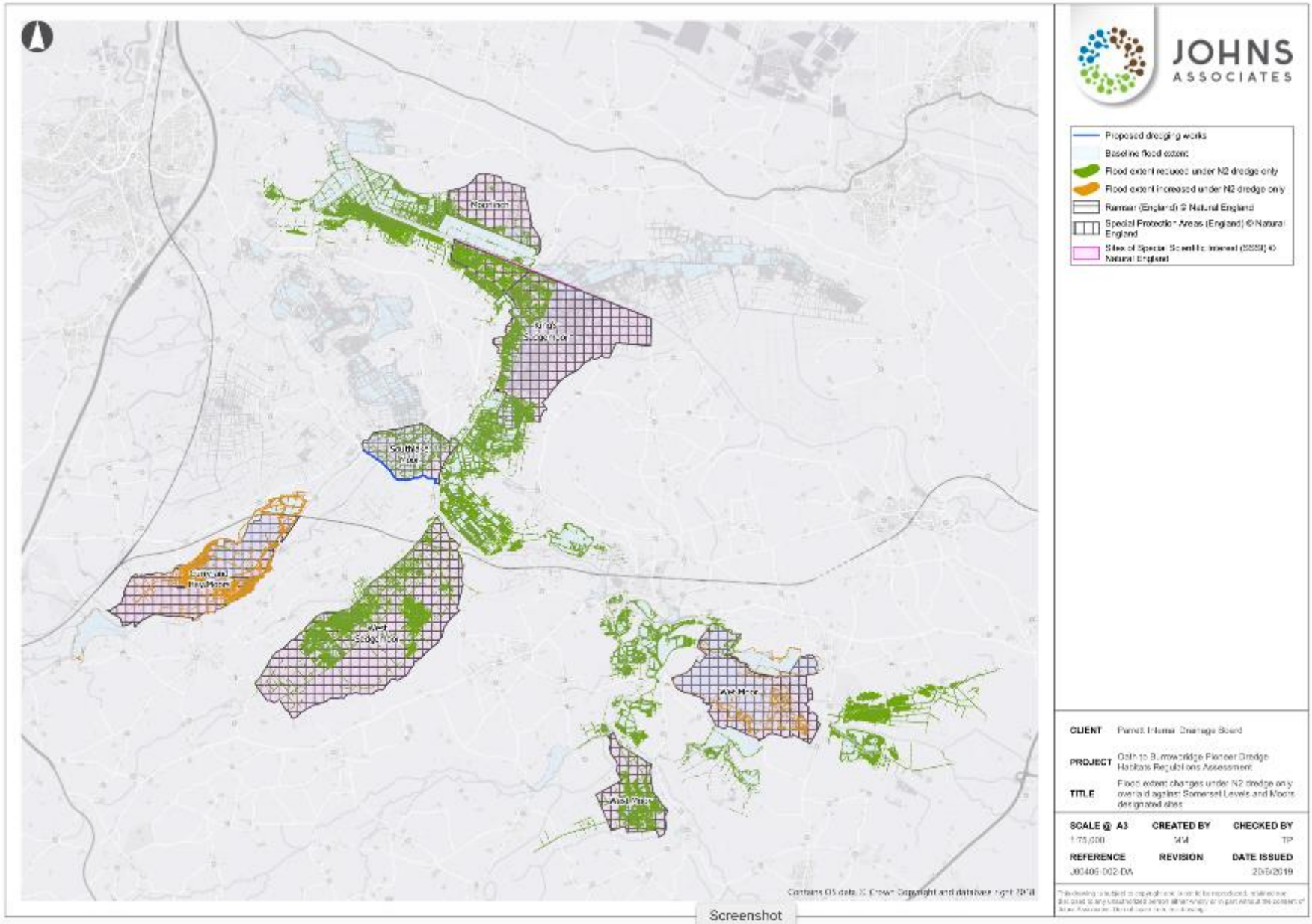


Figure D3.1 (from HRA and Appropriate Assessment): Analysis of Indicative Changes in Flood Extent for the Parrett Dredge

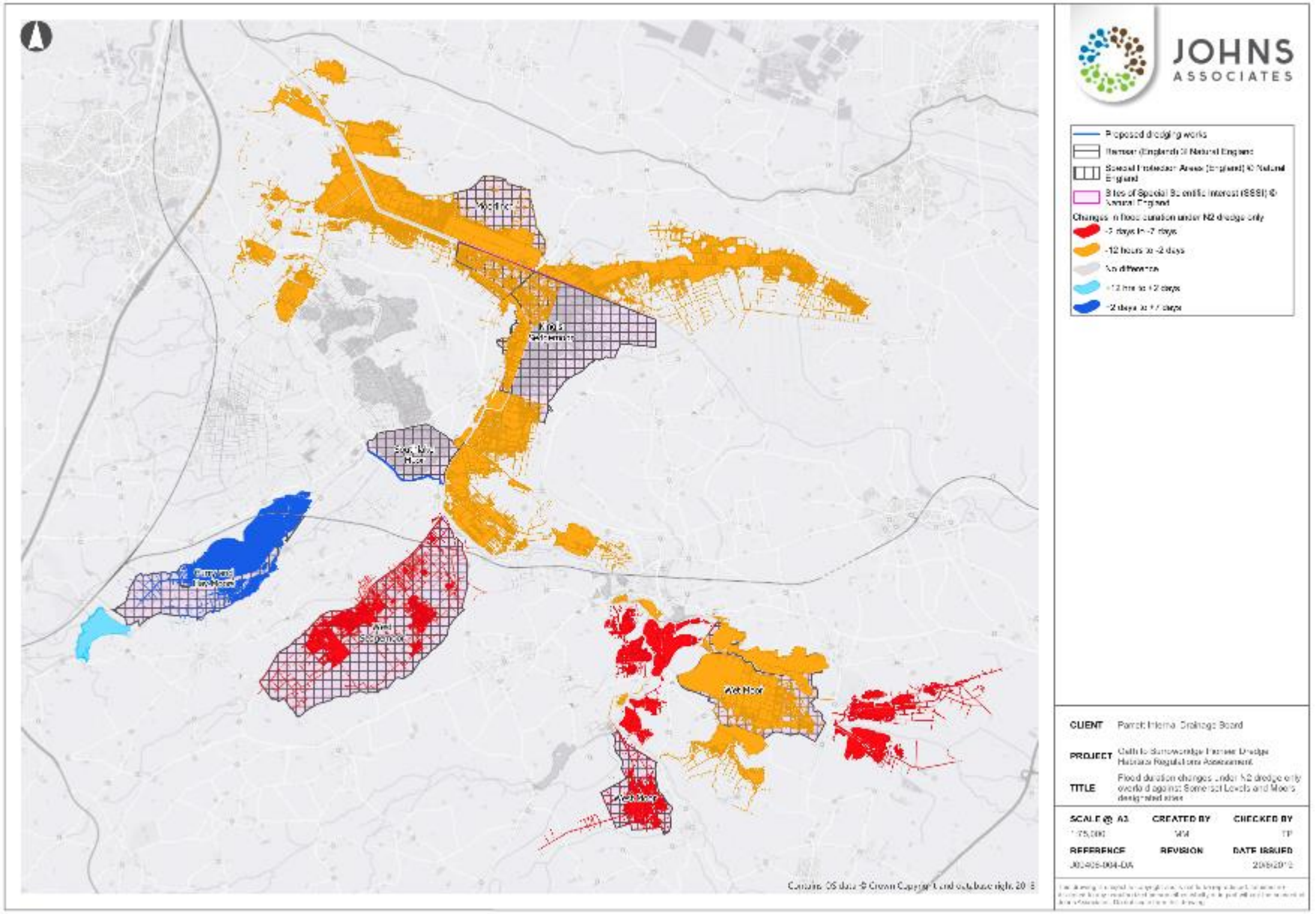


Figure D3.2 (from HRA and Appropriate Assessment): Analysis of Indicative Changes in Flood Duration for the Parrett Dredge

Table D3.1 - Indicative change in flood extent and duration for the Parrett Dredge

Hydraulic modelling was used to identify potential changes in the level and duration of flooding, for a small winter flood, as a consequence of the Parrett Dredge. Table D3.1.

Area	Change (ha)	Change within SSSI	Change outside SSSI	Change within RWLAs	Change outside RWLAs	Change in flood duration
Long Load	-69.4	0	-69.4	0	-69.4	-2 days to -7 days
Wet Moor	-29.7	0.3	-30	1.21	-31.09	6 Areas: -12 hrs to -2 days
						4 Areas: -2 days to -7 days
West Moor	-22	-21.8	-0.2	-12.78	-9.22	-2 days to -7 days
South Moor	-2.2	0	-2.2	0	-2.2	1 Area -2 days to -7 days
						1 Area: -12 hrs to -2 days
						3 Areas: No difference
Huish Level	-4.9	0	-4.9	0	-4.9	-2 days to -7 days
Langport Moors	-0.9	0	-0.9	0	-0.9	1 Area: -12 hrs to -2 days
						1 Area: No difference
West Sedgemoor	-58.5	-57.7	-0.8	-36.42	-22.08	2 Areas: No difference
						1 Area: -2 days to -7 days
Stanmoor	0	0	0	0	0	No difference
Currymoor	59	43.5	15.5	2.41	56.59	1 Area +12 hrs to +2 days
						2 Areas: +2 daysto +7 days

Area	Change (ha)	Change within SSSI	Change outside SSSI	Change within RWLAs	Change outside RWLAs	Change in flood duration
Northmoor	0	0	0	0	0	No difference
Aller Moor	-65.2	-6.1	-59.1	-6.24	-58.96	7 Areas: -12 hrs to -2 days
						1 Area: No difference
King's Sedgemoor (SSSI)	-39.3	-35.9	-3.4	-1.05	-38.25	4 Areas: -12 hrs to -2 days
						1 Area: No difference
King's Sedgemoor (Butleigh & Walton)	0	0	0	0	0	No difference
Moorlinch	-7	-2	-5	-3.65	-3.35	-12 hrs to -2 days
Southlake	-1.8	-1.7	-0.1	-1.78	-0.02	No difference
Earlake	0	0	0	0	0	No difference
Langmead & Weston	0	0	0	0	0	No difference
Chedzoy	-47.2	0	-47.2	0	-47.2	-12 hrs to -2 days
Bawdrip & Bradney	0	0	0	0	0	No difference
TOTAL	-289	-81	-208	-58	-231	

4. Mitigation Action Plan

Based on the impacts identified from the modelling, mitigation options have been attributed to each area and developed into actions, through consultation with EA, NE and PIDB.

The following Table 1 “General Water Management Mitigation Measures” identifies mitigation actions that are applicable to all areas. Site specific and detailed actions are included in section 5 and Table 2 “Site Specific Water Management Mitigation Measures”

Following implementation of the mitigation measures identified in Table 2, the proposed Dredging and Sowy projects are unlikely to have a significant effect on the Somerset Levels and Moors SPA.

Table 1. General Water Level Management Mitigation Measures: These actions apply to all areas. Site specific actions are identified in Table 2 below.

General actions	Description	Type	Responsible Body	When	Actions
All areas	Ensure water level management (especially in winter) meets the operational requirements (target water levels) of the agreed WLMPs. Report annually on status of WLMP implementation.	WLMP compliance	IDB/EA	ongoing	All WLMPs for the Parrett area are nearly 10 years old and need updating to take account of investments and operational changes since the plans were last produced. WLMPs will be the primary documents for ensuring protected sites achieve and sustain favourable condition status and to implement mitigation actions for Parrett Dredging and the Sowy.
All areas	Maintain and update WLMPs, extend WLMPs to include Functionally Linked Land (FLL) here necessary. Report annually on status of WLMP development outside of SSSIs.	WLMP update	IDB	Autumn 2020	Areas impacted by Dredging and Sowy projects, where current WLMPs do not include winter penning levels for nature conservation including: Aller Moor, Chedzoy and Kings Sedgemoor.
All areas	Sustain existing RWLA network. Maintain existing schemes, seek opportunities to improve the operation, or extend existing schemes. Implement new areas if existing schemes fall out of operation. Report annually on status of RWLA network.	RWLAs	IDB/EA	Ongoing	Significant investment has been made in recent years to improve RWLA management. Existing RWLAs that are currently failing to meet this requirement include West Moor and Moorlinch.
All areas	Maintain and improve existing water management infrastructure required to achieve the conservation objectives of the protected sites and the wider area (FLL). Report annually on status of water management infrastructure.	Water management infrastructure	IDB/EA	Ongoing	Significant investment has been made in recent years to improve water management infrastructure. Notable areas, where further investment is required, include: King's Sedgemoor and West Moor.
All areas	Channel maintenance. Ensure channel maintenance is sympathetic to nature conservation. In particular, ensure maintenance is undertaken at the most appropriate time of year and in accordance with agreed specifications. Report annually on maintenance programme.	Operations (channel maintenance)	IDB/EA/farmers (supported by agri-environment funding)	Spring 2020	Parrett IDB will review maintenance programmes before the end of 2019 and will agree maintenance specifications and timings with NE.

General actions	Description	Type	Responsible Body	When	Actions
Within SSSIs See Table 2 (below) for details	Mitigate for the predicted changes in small winter floods as a consequence of Dredging and the Sowy projects. Modelling indicates that the combined impact of these schemes across all Parrett wetland SSSIs is 100ha less of splash flooding, with duration of flooding typically reduced, by 2 days, to one week for a flood of the same magnitude as the summer 2012 flood. No assessment of the impacts on flood frequency could be made, but it can be assumed that Dredging and the Sowy projects will reduce the frequency of small floods in winter. Report annually on this requirement.	Strategic planning and operational delivery. Structures and operations (water levels).	IDB/EA	Spring 2020	See site specific actions (Table 2) for a list of potential measures that can, in combination, meet this requirement. Not all actions identified in Table 2 will be practical and achievable. Given potential uncertainties over the achievability of some actions, more actions have been identified than will be required for mitigation. The minimum requirement is to mitigate for reduced winter flooding on 100ha SSSI land.
Outside SSSIs See Table 2 (below) for details	Mitigate for the predicted changes in small winter floods as a consequence of Dredging and the Sowy projects. Modelling indicates that the combined impact of these schemes across all non-designated areas of the Parrett is 500ha less of splash flooding, with duration of flooding typically reduced, by 2 days, to one week for a flood of the same magnitude as the summer 2012 flood. No assessment of the impacts on flood frequency could be made, but it can be assumed that Dredging and the Sowy projects will reduce the frequency of small floods in winter. Report annually on this requirement.	Strategic planning and operational delivery. Structures and operations (water levels).	IDB/EA	Spring 2020	See site specific actions (Table 2) for a list of potential measures that can, in combination, meet this requirement. Not all actions identified in Table 2 will be practical and achievable. Given potential uncertainties over the achievability of some actions, more actions have been identified than will be required for mitigation. The minimum requirement is to mitigate for reduced winter flooding on 500ha of non-designated land.

5. Site Specific Mitigation Actions

5.1. Monitoring of effects

5.1.1. **Ecological monitoring –** The primary source of ecological data, relating to the SPA, is bird count data from the British Trust for Ornithology (BTO). BTO data will be collected by Natural England and analysed once a year to identify any changes in the number of birds using the SPA. This data will help identify ecological change that may require mitigation.

5.1.2. **Water level monitoring –** Where detrimental change is likely as a consequence of the Dredging or Sowy projects, continuous water level data will be collected by the Environment Agency at key locations for each moor and analysed once a year for any discernible trends that might be attributed to the Dredging or Sowy projects. Historical water level records will be used to identify trends in data collected after the Dredging and Sowy projects have been implemented. If necessary, new telemetry will be installed to monitor conditions in specific locations. Data analysis will focus on identifying changes in the frequency and duration of small winter floods. If detrimental trends in water levels are detected, further meteorological and climate data such as rainfall and temperature will be analysed in order to better understand the causes of those trends.

5.2. Mitigation measures including Water Level Management Mitigation Measures

Where detrimental change, as a consequence of the Dredging or Sowy projects, has been identified and confirmed by monitoring, appropriate mitigation measures will be deployed. Mitigation measures will be agreed with the partners (Natural England, IDB and EA) prior to implementation.

5.2.1. **Replacement or new water control structures –** Replace failing structures, or build new structures, that are necessary to effect 'no change' to existing surface water conditions during winter months (December to February) and ensure no detrimental change in SPA condition as a consequence of the Dredging and Sowy projects.

5.2.2. **Operational protocols –** Where monitoring indicates it is necessary, and it is agreed that other measures are less suitable, existing water level control structures such as pumping stations and sluices can be operated to effect 'no change' to existing conditions during winter months (December to February) and ensure no detrimental change as a consequence of the Dredging and Sowy projects. This could be achieved by evacuating excess flood water in accordance with existing protocols but suspending evacuation for a short period of time once an agreed level is achieved to safeguard the 'splash conditions' that would

otherwise be lost. If required, these changes will only be implemented during small winter floods that pose no increased flood risk to homes, businesses and infrastructure (e.g. local roads). And the operational risk for each location will need to be carefully considered and the agreed protocols incorporated into the Water Level Management Plan for each area.

5.2.3. Water Level Management Plan (WLMP) – Water Level Management Plans will be reviewed with partner organisations by 2022. Changes to water control structures and water levels, agreed in the intervening period, will be incorporated in WLMPs.

5.2.4. Maintain a depth of water (minimum of 300mm) in ditches through the winter period – This will include the ditch network within and outside the designated sites where ditches have sufficient depth to achieve this without increasing flood risk.

5.2.5. Creation of in-field wet features – To maintain surface water conditions for waterbirds in winter, such as creation of shallow water scrapes and wet field gutters.

Table 2. Site specific Water Level Management Mitigation Measures: the current condition status of Parrett SSSIs, and existing remedial actions required for each site to achieve favourable condition status, have been used to inform selection of mitigation measures required to effect 'no change' to existing surface water conditions during winter months (December to February) and ensure no detrimental change in SPA condition as a consequence of the Dredging and Sowy projects. Refer to Table D3.1 (above): for potential size and probably location of effect.

Area	Description	Mitigation type	Responsible Body	When	Actions
Aller Moor	Monitor surface water conditions in winter, new telemetry required for Aller Moor, upstream of Aller Drove.	Monitoring	IDB/EA	Report annually	Implement operational changes to effect 'no change' in winter months. Informed by monitoring.
	Remedial Work at Beer Wall to prevent water bypassing structure during high flows.	Rebuild structures	EA	Completed 2019	Part of Sowy project, but not mitigation, due to defect causing unanticipated changes in surface water conditions on Aller Moor in winter.
	Implement changes in the operation of Langacre and Beer Wall or IDB structures on Aller Moor	Operational Protocols	EA/IDB	Winter 2020/21	Implement operational changes to effect 'no change' in winter months. Informed by monitoring. Use EA structures Church Drove, Oxleaze Drove and IDB structure Stathe Drove to pen winter level. Operate IDB weirs Lucas Rhyne, Black Withies and Leazeway to maintain water levels in winter.
King Sedgemoor (Non SSSI) Butleigh and Walton Moor, 18 ft rhyne	Monitor surface water conditions in winter, new telemetry required for Butleigh and Walton Moor, 18 ft rhyne.	Monitoring	IDB/EA	Report annually	Implement operational changes to effect 'no change' in winter months. Informed by monitoring.
	Update WLMP.	WLMP	IDB	2022	To agree and formalise target water levels and operational protocols.
	Land purchase to create new RWLA.	New structures	IDB/NE	2025	Potential to mitigate changes in surface water conditions in winter.

Area	Description	Mitigation type	Responsible Body	When	Actions
	Monitor water levels using telemetry at Greylake and Nythe structure.	Monitoring	IDB	2020 – 2022	Operate to effect 'no change' in winter months. Informed by monitoring.
	Implement changes in the operation of Greylake sluice, or other alternative.	Operating protocols	IDB	2022	If required and feasible, as informed by monitoring.
West Sedgemoor	Monitor surface water conditions in winter.	Monitoring	IDB/EA	Report annually	Implement operational changes to effect 'no change' in winter months. Informed by monitoring.
	Update WLMP.	WLMP	IDB	2022	To agree and formalise target water levels and operational protocols.
Long Load	Monitor surface water conditions in winter.	Monitoring	IDB/EA	Report annually	Area has low SPA potential due to disturbance and flood risk management constraints.
	Implement changes in the operation of Long Load pumping station and syphon.	Operational protocols	EA	2021	Operate to effect 'no change' in winter months. Only if effect seen through monitoring?
	Prepare WLMP (no existing WLMP for this area).	WLMP	IDB	2025	To agree and formalise target water levels and operational protocols. Area has low SPA potential due to land use and disturbance constraints.
Wet Moor SSSI	Monitor surface water conditions in winter.	Monitoring	IDB/EA	Report annually	Implement operational changes to effect 'no change' in winter months. Informed by monitoring.
	Implement changes in the operation of North barrier Sluice to sustain surface water conditions in winter.	Operational protocols	EA	2021	Operate to effect 'no change' in winter months. Informed by monitoring.
	Update WLMP.	WLMP	IDB	2022	To agree and formalise target water levels and operational protocols.

Area	Description	Mitigation type	Responsible Body	When	Actions
West Moor	Monitor surface water conditions in winter.	Monitoring	IDB/EA	Report annually	Implement operational changes to effect 'no change' in winter months. Informed by monitoring.
	Rebuild and maintain existing RWLA including syphons, bunds and flap valves.	Refurbishment / Rebuild structures	EA construction IDB maintenance and operation	2020/21	Refurbish 68 structures in total (works varying from replacing fences to replacement of trench sheet dams) Possibility to extend the RWLA, re resilient wet grassland project.
	Update WLMP.	WLMP	IDB	2022	To agree and formalise target water levels and operational protocols.
Huish Level	Monitor surface water conditions in winter.	Monitoring	IDB/EA	Report annually	Area has low SPA potential due to disturbance and flood risk management constraints.
	Prepare WLMP (no existing WLMP for this area).	WLMP	IDB	2025	To agree and formalise target water levels and operational protocols. Area has low SPA potential due to disturbance and flood risk management constraints.
Moorlinch	Monitor surface water conditions in winter.	Monitoring	IDB/EA	Report annually	Implement operational changes to effect 'no change' in winter months. Informed by monitoring.
	Rebuild and maintain existing RWLA, including bunds and flap valves, and consider extension to the east.	Refurbishment / Rebuild structures and operational changes	EA construction IDB maintenance and operation	2020/21	Refurbish 28 structures in total (works varying from replacing fences to refurbishment of existing structures) Restoration of neglected ditch habitats (low water depth and very poor water circulation through SSSI ditches) is impacting habitat quality and water level management.
	Implement changes in the operation of IDB weirs to extend existing RWLA to the east.	Operational changes	IDB	2021	Operate to effect 'no change' in winter months. Informed by monitoring.

Area	Description	Mitigation type	Responsible Body	When	Actions
	Update WLMP.	WLMP	IDB	2022	To agree and formalise target water levels and operational protocols.
King Sedgemoor (SSSI)	Monitor surface water conditions in winter.	Monitoring	IDB/EA	Report annually	Implement operational changes to effect 'no change' in winter months. Informed by monitoring.
	Rebuild Egypt Clyse.	Rebuild structures	Rebuild structures	2020/21	Refurbishment of upstream headwall and discharge culvert. Maintain current operational practices (closed in winter).
	Maintain existing RWLA.	Rebuild structures	IDB	2020	Extreme high silt levels in SSSI ditches and rhynes have compromised the summer feed to KSM and is impacting SSSI condition. Bunds and fencing need repair and maintenance.
	Update WLMP.	WLMP	IDB	2022	To agree and formalise target water levels and operational protocols.
Currymoor	Monitor surface water conditions in winter.	Monitoring	EA	Continuation of existing EA mitigation programme	Monitor surface water conditions in winter
	Update WLMP.	WLMP	IDB	2022	To agree and formalise target water levels and operational protocols.
Southlake Moor	Monitor surface water conditions in winter.	Monitoring	IDB/EA	Report annually	Implement operational changes to effect 'no change' in winter months. Informed by monitoring.
	Update WLMP.	WLMP	IDB	2022	To agree and formalise target water levels and operational protocols.
Chedzoy	Monitor surface water conditions in winter.	Monitoring	IDB/EA	Report annually	Implement operational changes to effect 'no change' in winter months. Informed by monitoring.

Area	Description	Mitigation type	Responsible Body	When	Actions
	Update WLMP.	WLMP	IDB	2022	To agree and formalise target water levels and operational protocols.

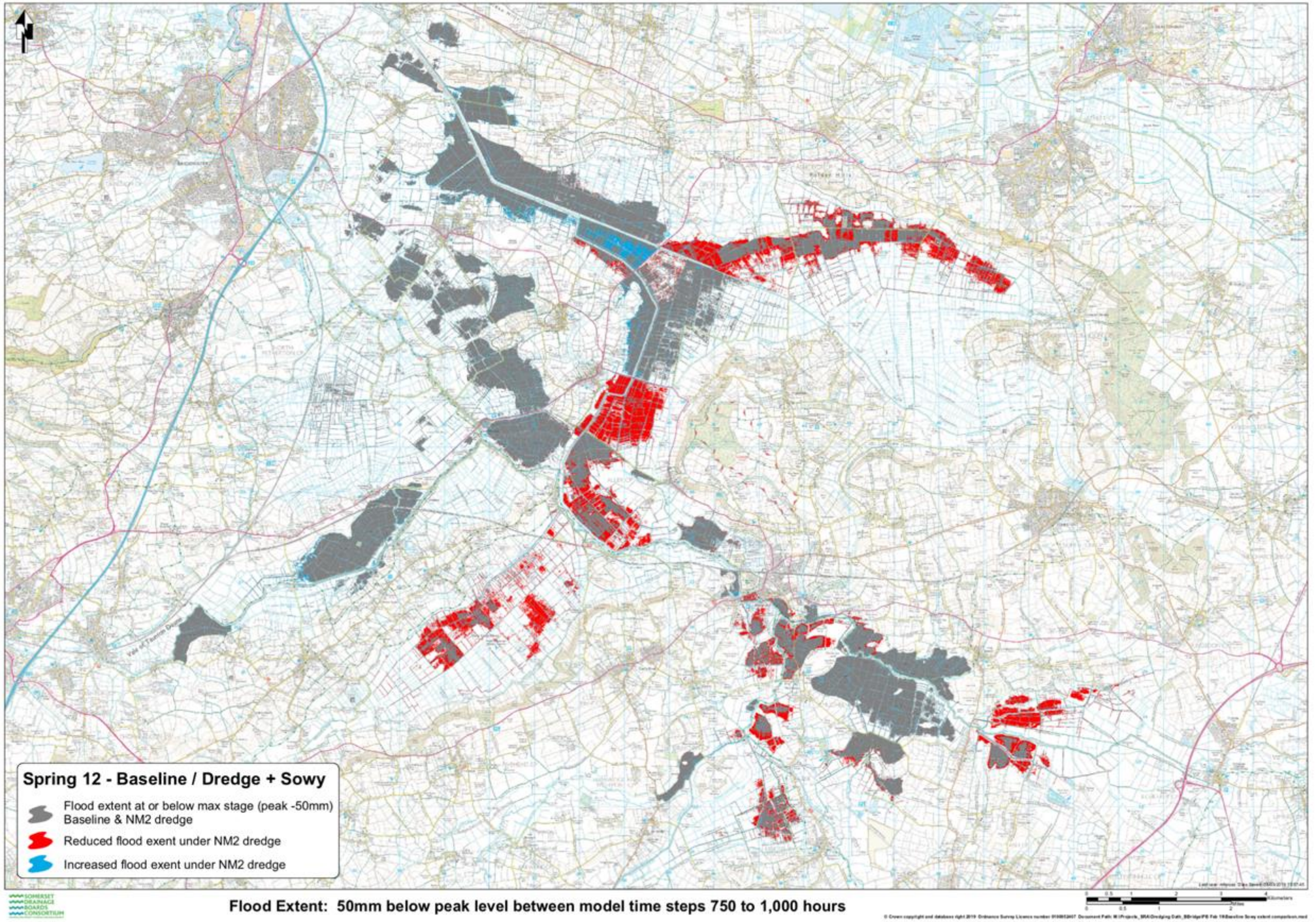
ANNEX 1

Table 3: Indicative change in flood extent and duration for the Parrett Dredge and Sowy Project combined

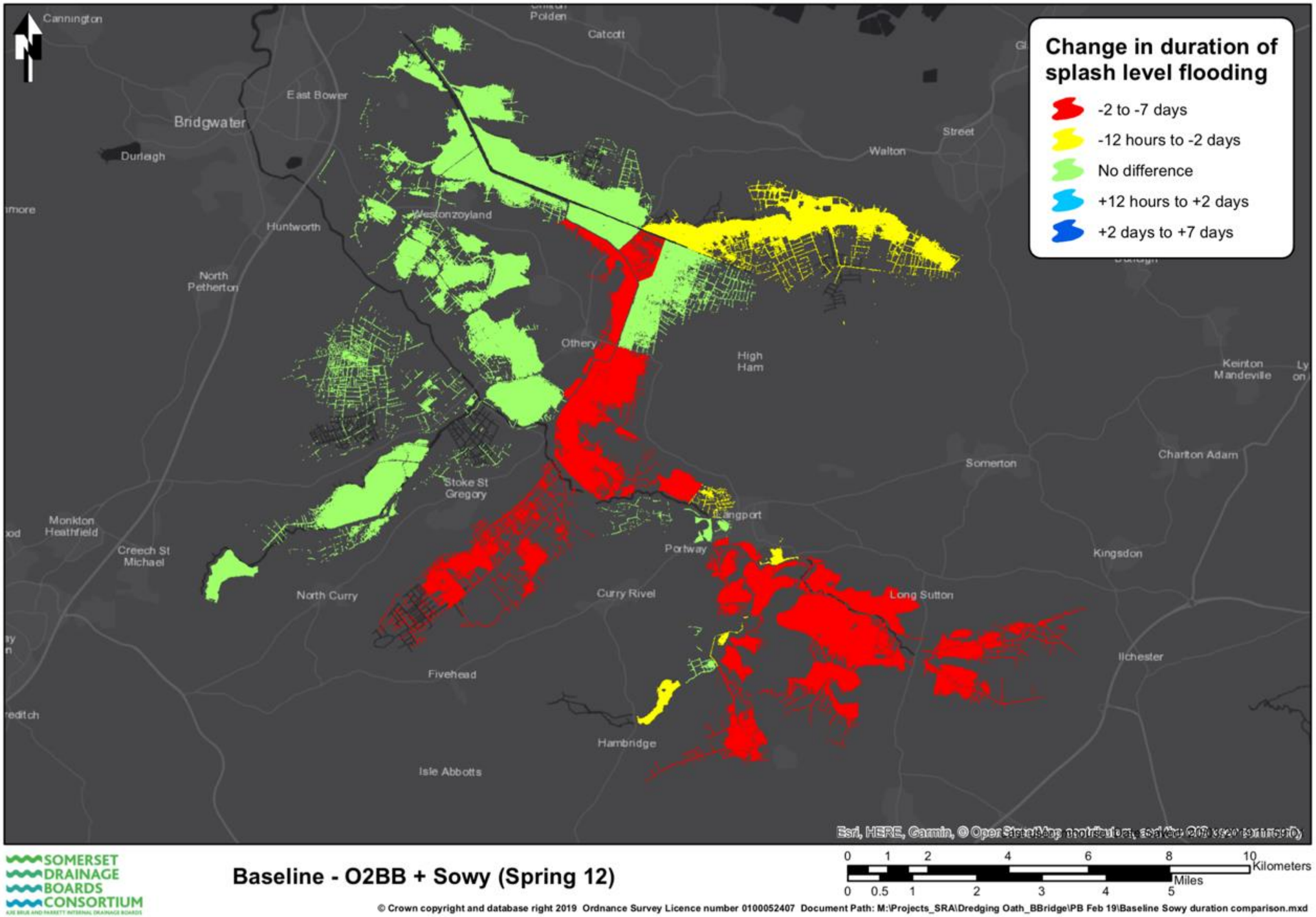
Hydraulic modelling was used to identify potential changes in the level and duration of flooding, for a small winter flood, as a consequence of the combined Parrett Dredge and River Sowy and King's Sedgemoor Drain Enhancement Scheme.

Area	Change (ha)	Change within SSSI	Change outside SSSI	Change within RWLAs	Change outside RWLAs	Change in flood duration
Long Load	-84.1	0	-84.1	0	-84.1	-2 days to -7 days
Wet Moor	-63.4	-1.3	-62.1	0.94	-64.48	-2 days to -7 days
West Moor	-26.1	-25.8	-0.3	-15.26	-10.84	-2 days to -7 days
South Moor	-3.9	0	-3.9	0	-3.9	1 Area -2 days to -7 days 2 Areas: -12 hrs to -2 days 2 Areas: No difference
Huish Level	-21.7	0	-21.7	0	-21.7	-2 days to -7 days
Langport Moors	-5.8	0	-5.8	0	-5.8	1 Area -2 days to -7 days 1 Area: -12 hrs to -2 days
West Sedgemoor	-88.9	-87.7	-1.2	-54.49	-34.41	2 Areas: No difference 1 Area: -2 days to -7 days
Stanmoor	0	0	0	0	0	No difference
Currymoor	11.8	8.5	3.3	0.8	11	No difference
Northmoor	0	0	0	0	0	No difference

Area	Change (ha)	Change within SSSI	Change outside SSSI	Change within RWLAs	Change outside RWLAs	Change in flood duration
Aller Moor	-205.4	-33.7	-171.7	-15.61	-189.79	6 Areas: -2 days to -7 days
						1 Area: -12 hrs to -2 days
						1 Area: No difference
King's Sedgemoor (SSSI)	47.3	45.4	1.9	-1.1	48.4	3 Areas: -2 days to -7 days
						2 Areas: No difference
King's Sedgemoor (Butleigh & Walton)	-188.8	0	-188.8	-5.81	-182.99	No flood duration model output available
Moorlinch	7.4	-0.5	7.9	-0.84	8.24	No difference
Southlake	-3.8	-3.8	0	-3.8	0	No difference
Earlake	0	0	0	0	0	No difference
Langmead & Weston	0	0	0	0	0	No difference
Chedzoy	21.7	0	21.7	0	21.7	No difference
Bawdrip & Bradney	0	0	0	0	0	No difference
TOTAL	-604	-99	-505	-95	-509	



Map 3. Indicative change in flood extent for a typical annual winter flood determined from hydraulic modelling of the Parrett Dredging and Sowy projects



Map 4. Indicative change in flood duration for a typical annual winter flood determined from hydraulic modelling of the Parrett Dredging and Sowy projects.

Table 4. Implementation of operational protocols: the current condition status of Parrett SSSIs, and existing remedial actions required for each site to achieve favourable condition status, has been used to inform the selection of mitigation measures. These are required to effect 'no change' to existing surface water conditions during winter months (December to February) and ensure no detrimental change in SPA condition as a consequence of the Parrett Dredging and Sowy projects. Indicative change in flood extent and duration for a typical annual winter flood determined from hydraulic modelling (see Table 3 and maps 3 and 4). Abbreviations: WLMP – Water Level Management Plan, RWLA – Raised Water Level Area.

Early warning monitoring – Where there is a high degree of certainty that there will be no adverse effect. Monitoring could provide early warning of any adverse effects.
Validation monitoring – A monitoring plan put in place to validate predicted effects after implantation of required mitigation.

Area	Projected indicative change extent and duration for a typical annual winter flood	Potential mechanism off change (typical winter flood)	Mitigation type	Mitigation objective	Short-term infrastructure improvements	Required mitigation operational protocols	Responsible Body	WLMP update (to incorporate mitigation protocols)	Strategic mitigation options
Long Load	**Reduced flood duration (2 to 7 days) and reduced extent (25-100ha).**	Increased conveyance in Sowy and Parrett.	Validation monitoring and operational protocols.	Manage water levels to effect 'no change' in winter months. Confirm with monitoring.	None proposed.	Adjust winter operation of Long Load pumps and syphon to maintain a minimum water level in ditches and mitigate reduced flood conditions.	EA develop and implement operational protocols (winter 2020/21 - Dec 20 to Feb 21)	No WLMP (prepare 2025)	Operate pumps to sustain wetland conditions in winter.
Wet Moor	**Reduced flood duration (2 to 7 days) and reduced extent (25-100ha).**	Increased conveyance in Sowy and Parrett.	Validation monitoring and operational protocols.	Manage water levels to effect 'no change' in winter months. Confirm with monitoring.	None proposed.	Adjust winter operation of HEPS pumps and North Barrier Sluice to mitigate reduced flood conditions.	EA develop and implement operational protocols (winter 2020/21- Dec 20 to Feb 21)	2022	None proposed.
West Moor	**Reduced flood duration (2 to 7 days) and reduced extent (25-100ha).**	Increased conveyance in Sowy and Parrett.	Validation monitoring, infrastructure improvements and operational protocols.	Manage water levels to effect 'no change' in winter months. Confirm with monitoring.	Refurbish and maintain existing RWLA including refurbishment works on 68 structures.	Adjust winter operation of Midelney pumps to mitigate reduced flood conditions.	EA infrastructure (2020) EA develop and implement operational protocols (2020)	2022	Remove RWLA structures to restore connectivity and operate pumps to sustain wetland conditions in winter.
South Moor	**Reduced flood duration (2 to 7 days) and reduced extent (<25ha).**	Increased conveyance in Sowy and Parrett.	Early warning monitoring.	Provide evidence of adverse effects.	None proposed.	None proposed.		No WLMP	None proposed.
Huish Level	**Reduced flood duration (2 to 7 days) and reduced extent (<25ha).**	Increased conveyance in Sowy and Parrett.	Early warning monitoring.	Provide evidence of adverse effects.	None proposed.	None proposed.		No WLMP	None proposed.
Langport Moors	**Reduced flood duration (2 to 7 days) and reduced extent (<25ha).**	Increased conveyance in Sowy and Parrett.	Early warning monitoring.	Provide evidence of adverse effects.	None proposed.	None proposed.		No WLMP	None proposed.
West Sedgemoor	**Reduced flood duration (2 to 7 days) and reduced extent (25-100ha).**	Increased conveyance in Sowy and Parrett.	Validation monitoring and operational protocols.	Manage water levels to effect 'no change' in winter months. Confirm with monitoring.	None proposed.	Adjust winter operation of IDB weirs (North East Block) to maintain a minimum water level in ditches. Adjust winter operation of pumps and Black Smock Sluice to mitigate reduced flood conditions.	EA/IDB develop and implement operational protocols (2020)	2022	Consolidation of Northside RWLA and operational protocols for enhance floodplain connectivity and floodwater storage in Southside Black Smock system.

Area	Projected indicative change extent and duration for a typical annual winter flood	Potential mechanism off change (typical winter flood)	Mitigation type	Mitigation objective	Short-term infrastructure improvements	Required mitigation operational protocols	Responsible Body	WLMP update (to incorporate mitigation protocols)	Strategic mitigation options
Stanmoor	**No change in flood duration(<12hrs) or extent (<25ha).**	None. Small pump system unconstrained by river flows and no bank overtopping.	Early warning monitoring.	Provide evidence of adverse effects.	Monitoring: telemetry required for Saltmoor (remote from pumps).	None proposed.		No WLMP	
Currymoor	**No change in flood duration(<12hrs) or extent (<25ha).**	Pump system influenced by level at Parrett Tone confluence. Interaction between increased conveyance in Parrett and Sowy.	Early warning monitoring and operational protocols.	Provide evidence of adverse effects.	None proposed.	None proposed.		2022	Operate pumps to sustain wetland conditions in winter by either increasing winter pen level or the retention of splash conditions.
Northmoor	**No change in flood duration(<12hrs) or extent (<25ha).**	None. Pump system unconstrained by river flows and no spillway flow.	Early warning monitoring and operational protocols.	Provide evidence of adverse effects.	None proposed.	Adjust winter operation of Banklands Bridge Weir to maintain a minimum water level in ditches.	IDB develop and implement operational protocols (2020)	2022	
Aller Moor	**Reduced duration (2 days) and reduced max extent (100-250ha) of surface water.**	Increased conveyance in Sowy and reduced spillway flow after dredge.	Validation monitoring, infrastructure improvements and operational protocols.	Manage water levels to effect 'no change' in winter months. Confirm with monitoring.	Monitoring: telemetry required for Church Drove and Aller Drove.	Adjust winter operations of IDB and EA weirs to maintaining a minimum water level in ditches (IDB: Lucas Rhyne, Black Withies and Leazeway - EA: Beer Wall, Church Drove, Oxleaze Drove and IDB structure Stathe Drove). Adjust winter operation of Langacre Rhyne at Beer Wall, or IDB structures on Lucus, Leazeway and Black Withies Rhyne to mitigate reduced flood conditions.	EA/IDB develop and implement operational protocols (winter 2020/21 – Dec 20 to Feb 21)	2022	Increase floodplain connectivity of Langacre system.
King Sedgemoor SSSI	**Reduced flood duration (2 to 7 days) and reduced extent (25-100ha).**	Increased conveyance in Sowy and reduced spillway flow after dredge.	Validation monitoring, infrastructure improvements and operational protocols.	Manage water levels to effect 'no change' in winter months. Confirm with monitoring.	Rebuild Egypt Clyse (EA 2020). Maintain existing RWLA (IDB). Monitoring: telemetry required for Middlezoy Moor, Othery Rhyne and RWLA Block 3.	Recent operational changes for Langacre and Othery Rhyne system already provide adequate mitigation.	EA construction (2020) No operational changes required IDB provision of telemetry	2022	Further enhance floodplain connectivity of Langacre system.
Butleigh & Walton KSM	**Reduced max extent (100-250ha). No flood duration model output available.**	Interaction between increased volume in KSD and reduced spillway flow from Parrett.	Validation monitoring, infrastructure improvements and operational protocols.	Manage water levels to effect 'no change' in winter months. Confirm with monitoring.	Monitoring: telemetry required for 18ft Rhyne and Butleigh Drove.	Adjust operation of Greylake sluice to mitigate reduced flood conditions or seek suitable alternative. For example, adjust winter operation in adjacent areas, Sutton Moor, Pitney, Somerton Moor, Low Ham Moor to maintain a minimum water level in ditches.	EA/IDB develop and implement operational protocols (2020)	2022	Potential for RWLA type schemes.

Area	Projected indicative change extent and duration for a typical annual winter flood	Potential mechanism off change (typical winter flood)	Mitigation type	Mitigation objective	Short-term infrastructure improvements	Required mitigation operational protocols	Responsible Body	WLMP update (to incorporate mitigation protocols)	Strategic mitigation options
Moorlinch	**No change in flood duration(<12hrs) or extent (<25ha).**	Interaction between increased volume in KSD and reduced spillway flow from Parrett.	Early warning, infrastructure improvements and operational protocols.	Provide evidence of adverse effects.	Rebuild and maintain existing RWLA, including bunds and flap valves. Rebuild Parchey tilting weir.	Restore operation of micro-roost (NE). Adjust winter operation of Shapwick Right Rhyne (IDB) to buffer RWLA and sustain ditch levels and splash conditions across SSSI.	EA construction (2020) IDB develop and implement operational protocols (winter 2020/21 – Dec 20 to Feb 21)	2022	Remove RWLA structures to restore connectivity and operate IDB structures to sustain wetland conditions in winter. Potential to extend winter splash conditions to include Sutton Hams.
Southlake	**No change in flood duration(<12hrs) or extent (<25ha).**	None	Early warning monitoring.	Provide evidence of adverse effects.	None proposed.	None proposed		2022	Permit warping in February
Earlake	**No change in flood duration(<12hrs) or extent (<25ha).**	None	Early warning monitoring.	Provide evidence of adverse effects.	None proposed.	None proposed		2022	None proposed.
Langmead & Weston	**No change in flood duration(<12hrs) or extent (<25ha).**	None	Early warning monitoring.	Provide evidence of adverse effects.	None proposed.	None proposed		2022	None proposed.
Chedzoy	**No change in flood duration(<12hrs) or extent (<25ha).**	Interaction between increased volume in KSD and reduced spillway flow from Parrett.	Early warning monitoring and operational protocols.	Provide evidence of adverse effects.	None proposed.	Adjust winter operation of Chedzoy Sluice to maintain a minimum depth of water in ditches.	EA develop and implement operational protocols (2020)	2022	Potential for RWLA type scheme, Sedgemoor Drove.
Bawdrip & Bradney	**No change in flood duration(<12hrs) or extent (<25ha).**	Interaction between increased volume in KSD and reduced spillway flow from Parrett.	Early warning monitoring.	Provide evidence of adverse effects.	None proposed.	None proposed		2022	None proposed.