Mr M. Phillips
2nd Floor,
Optimum House,
Clippers Quay,
Salford,
M50 3XP

Our ref: EPR/VB3359ME

Date: 20/06/2022

Dear Matt,

Your new environmental permit

Permit reference: EPR/VB3359ME
Operator: Kier Integrated Services Limited
Description of Activity: Salisbury River Park Scheme
Site / Location: Salisbury

Our determination of your application for a permit is complete. We're satisfied that you can carry out your activities in accordance with the enclosed permit, without increasing flood risk, or harming land drainage or the environment. Please keep the permit in a safe place.

This letter contains web links to other documents. If you aren't able to access these please phone me on 07385 937836 or email blandford.frap@environment-agency.gov.uk. Please quote our reference when contacting us.

Please look at the table below and note any of the things that apply to your permit.

If…	then..
you plan to keep your records at a site other than where the activity takes place	you need to let us know within 20 working days of receiving this letter.
your permit includes standard rules	we've enclosed the rules set/s. We may change these in future but will let you know about any changes. You must make sure you're always following the latest rules set.
your permit has a pre-operational condition requiring you to do something before work starts (for example submit a method of work, or have measures in place to reduce sediment mobilisation)	check the deadlines for completing these measures and make sure you carry them out by the times stated.
your permit requires you to notify us before works start	check the deadlines for notifying us and make sure you carry them out by the times stated.
your permit requires you to notify us when any particular work is complete	check the deadlines for notifying us and make sure you carry them out by the times stated.
you need to submit other returns or information	send these to us at the contact details above, unless we advise you otherwise.

Find out more about complying with your permit on our website
https://www.gov.uk/topic/environmental-management/environmental-permits

This includes guidance on your management system and how you will be regulated.

There is a subsistence charge for your permit that applies when we carry out compliance checks. For most permits this will happen once and we will invoice you when the charge is due. If the permit continues over a longer period, deals with a number of activities, or has ongoing conditions, we may do compliance checks more than once and will invoice you at the time the compliance work is done.

Rights of appeal

If you're not happy with any permit condition that has been imposed by the permit you may appeal to the Secretary of State. You must make your appeal no later than six months after the permit issue date. Further information about making an appeal and the forms you will need are available from the Planning Inspectorate website or from the contact details below.

Environment Appeals, Enforcement and Specialist case work division, The Planning Inspectorate, 3/25 Hawk Wing, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6PN. Phone: 0303 444 5584

Email: environment.appeals@planninginspectorate.gov.uk

You must send written notice of the appeal and the documents listed below to the Secretary of State at the Planning Inspectorate address above. At the same time you must send us a copy of the notice and documents to:

Jeanette Stockton, Permitting Technical Specialist, Environment Agency, National Permitting Service, Richard Fairclough House, Knutsford Road, Latchford, Warrington, WA4 1HT.

Phone: 020 302 50662 Email: jeanette.stockton@environment-agency.gov.uk

The documents are:

- a statement of the grounds of appeal
- a copy of any relevant application
- a copy of any relevant environmental permit
- a copy of any relevant correspondence between the appellant and the regulator
- a copy of any decision or notice which is the subject matter of the appeal
- a statement indicating whether you wish the appeal to be in the form of a hearing or dealt with by way of written representations.

You may withdraw an appeal by notifying the Secretary of State in writing and sending a copy of that notification to us.

If you have any questions about this permit please phone me on 07385 937836 or email blandford.frap@environment-agency.gov.uk. Please quote our reference when contacting us.

Yours sincerely

Dan Evans
Flood and Coastal Erosion Risk Management Officer
Partnership & Strategic Overview, Dorset and Wiltshire, Wessex Area

Salisbury River Park

Construction Environmental Management Plan (SHEMS-FOR-INF-245)

Infrastructure
Business Unit

DOCUMENT CONTROL

Contract Title	Salisbury River Park
Report Title	Construction Environmental Management Plan
Revision	2
Status	For Issue to Wiltshire Council
Control Date	23 11 2021

Record of Issue

Issue	Status	Author	Date	Check	Date	Authorised	Date
0	Internal for comment	Mike Barron	23/11/21	Tom Howden	25/11/21		
1	Project team Comment	Mike Barron	2/12/21	Heather Coutts	10/12/21		
2	Issue to Wiltshire Council.	Mike Barron	13/12/21				

Distribution

Organisation	Contact	Copies
Wiltshire Council	Planning Portal	Electronic

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1 Introduction

1.1 Purpose & Scope

The purpose of this Construction Environmental Management Plan (CEMP) is to provide all the information required to enable appropriate management and mitigation of the environmental aspects and impacts associated with development of Salisbury River Park in line with requirements established in the Environmental Statement (ES) and the Environmental Action Plan (EAP).

The Environmental Action Plan is issued as a contract document and listed contractor actions take precedence over listed actions within this CEMP should there be any difference. Kier staff must bring any differences to the attention of the Project Manager immediately.

This CEMP will be updated to reflex any amendments issued within the EAP.

This CEMP will also establish actions to support delivery of good and best practice and improve sustainability outcomes of the project.

This CEMP covers the following phases of works:

- Enabling Works including removal of trees/ vegetation, translocation of water voles and utility service diversions.
- River corridor improvements specific to the Maltings regeneration area
- Wetland creation area in Fisherton Recreation Ground.
- Flood defence embankments adjacent to Ashley Road and in Fisherton Recreation Ground.
- Water level management and fish passage measures
- Local measures to reduce flooding including raising footpaths and temporary defences.

For the post construction phase of works, this CEMP would be refined into a Handover Environmental Management Plan (HEMP) covering the following:

- Post construction – i.e. operational
- Landscaping and ecological maintenance works covering a 5 year maintenance phase.
- The HEMP will comply with requirements of the approved Landscape and Ecological Management Plan.

1.2 Context

This document has been developed in line with requirements of the Kier Environmental Management System which meets the requirements of ISO14001 (2015) and which aligns with Kier's Sustainability Policy (Flood Risk

1.2.1 Introduction and Client Conditions

A Flood Risk Activity Permit will be required for all works.

1. Salisbury River Park will registered on the High-risk site log by the EA PM.
2. Sign up for the GOV.UK flood warnings via the below website:
    a. https://www.gov.uk/sign-up-for-flood-warnings
    b. You can get alerts via phone call and text.
3. Register for the Flood Guidance Statement 10 day flood forecast from the Flood Forecasting Centre:
    a. http://www.ffc-environment-agency.metoffice.gov.uk/services/request.html
4. Complete a Flood contingency plan. Consider the following:
    a. Contingency measures required in the event we need to react to a potential flood event.
    b. Actions points – is this a level or will it be based on a forecast?
    c. Who is responsible for making the decision to implement our flood mitigation procedures
5. Monitor the weather forecast.
6. If significant rain is forecast request the 2 day 24hr rainfall data from the EA Senior User/ FIDO.

1.2.2 Key Risks, Mitigation Measures and Monitoring

As a general control measure, in-channel works will be carried out in summer months between 1July and 31 October.

Additionally, the Kier Project Manager and General Foremen will subscribe to the EA flood and weather warning service to assist with works planning and/or site evacuation as necessary.

Risk	Mitigation Measures and Monitoring
Impact on flood plain capacity	• Stockpiles of material will be planned and managed to limit storage volumes on the floodplain. • Temporary access roads shall be completed at grade to ensure it does not impede flow of water across the flood plain • Use of site security measures or other non-mobile equipment needs to consider rapid deconstruction or mobility in the event of heightened flood risk and flood response measures considered as part of RAMS e.g. disconnect Heras panels so water flows past rather than pushing panels down
Impact on water quality & impact on works	• All plant shall use biodegradable hydraulic oils • Spill kits with suitable materials to be deployed over the watercourse to prevent downstream migration of pollutants shall be kept in close proximity to works. • Use of site security measures or other non-mobile equipment needs to consider rapid deconstruction or mobility in the event of heightened flood risk and flood response measures considered as part of RAMS

	• Plant will be brought back into the site compounds at night time and over weekend periods • All plant should be fuelled in the main site compound within the provided facilities. • Dewatering of less than 50m3 day is permitted providing discharge is pumped directly to surface water. All discharge pipes must have a silt settlement facilities and oil sock fitted and not cause scour or sediment mobilisation from the receiving water body https://www.legislation.gov.uk/uksi/2017/1044/regulation/5/made
Supporting information on Flood Risk Activity Permits is provided in the Kier Environmental Permits and Authorisations Guidance (SHEMS-GUI-GR-300)	
Monitoring	
• The General Foremen and SHE team will provide assurance through regular site visits and inspections that the above measures are being implemented.	

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1.3 Historic Environment

1.3.1 Introduction and Client Conditions

- Archaeological fieldwork has been undertaken at Fisherton Recreation Ground/ Ashley Road.
- An archaeological watching brief will be present during the Central Car Park/ the Maltings works as the River Terrace gravel layers or peat layers are excavated.

1.3.2 Key Risks, Mitigation Measures and Monitoring

Further investigation is planned prior to works but following this, there remains the possibility of finds. The following additional mitigation measures shall therefore be adopted.

Risk	Mitigation Measures and Monitoring
Impact on archaeological remains	• Excavation works within Central Car park/ the Maltings shall be carried out under archaeological watching brief from Wessex Archaeology Ltd in line with excavation guidance provided by them. • RAMS for excavations work in these areas shall be informed by consultation with the supervising archaeologist • Site supervisors & operatives working in these areas shall also be provided a TBT by the supervising archaeologist prior to start of works • In the event of any finds, works shall stop immediately and the Project Manager informed.
Measures outlined above are in line with the Kier Archaeology & heritage Standard (SHEMS-STD-GR-060)	
Monitoring	
• The General Foreman and SHE Advisor will provide assurance through regular site visits and inspections that the above measures are being implemented.	

APPENDICES

Appendix 1).

All environmental documentation, including this CEMP, Risk Assessments and Method Statements (RAMS) are also required to align with the Environment Agency on-site best practice as below

- SHEW CoP Constructing a Better Environment May 2018

1.4 Supporting Documents

This CEMP will support implementation of several key documents including (see also **Table *3***):

- CL:AIRE Materials Management Plan
- Soils Management Plan
- Site Waste Management Plan
- Surface Water Management Plan

1.5 Review and updates

As a minimum, this CEMP will be reviewed and revised on a 6 monthly basis and/or under the following conditions:

- Where the EAP is updated.
- Where EA policy is updated.
- Where revised management controls are required in the event of a significant environmental incident.
- Where unexpected finds e.g. ecology require additional management/ mitigation measures to be put in place.
- Following legal updates of material significance to the project
- Following updates of the Kier Environmental Management System (EMS) of material significance to the project e.g. Minimum Standards
- Following identification of non-conformance through internal or external audits where root cause is associated with the project EMS
- Following updates to industry best practice where there are opportunities for delivery on site
- Following updates to Kier or client environmental sustainability targets/required actions as appropriate

2 The Development

2.1 Works elements

There is a high level of fluvial flood risk in Salisbury, with flooding on the main rivers affecting communities surrounding and most notably in the centre of the city. This project will reduce flood risk within central Salisbury, through the utilisation of multiple flood protection measures.

The flood protection measures will be designed to have a Standard of Protection up to 1% (1 in 100 years). While the Standard of Protection will be the priority aim, the project aims to introduce multiple benefits to Salisbury's communities by integrating methods such as wetland creation and public realm improvements to river corridor amenity.

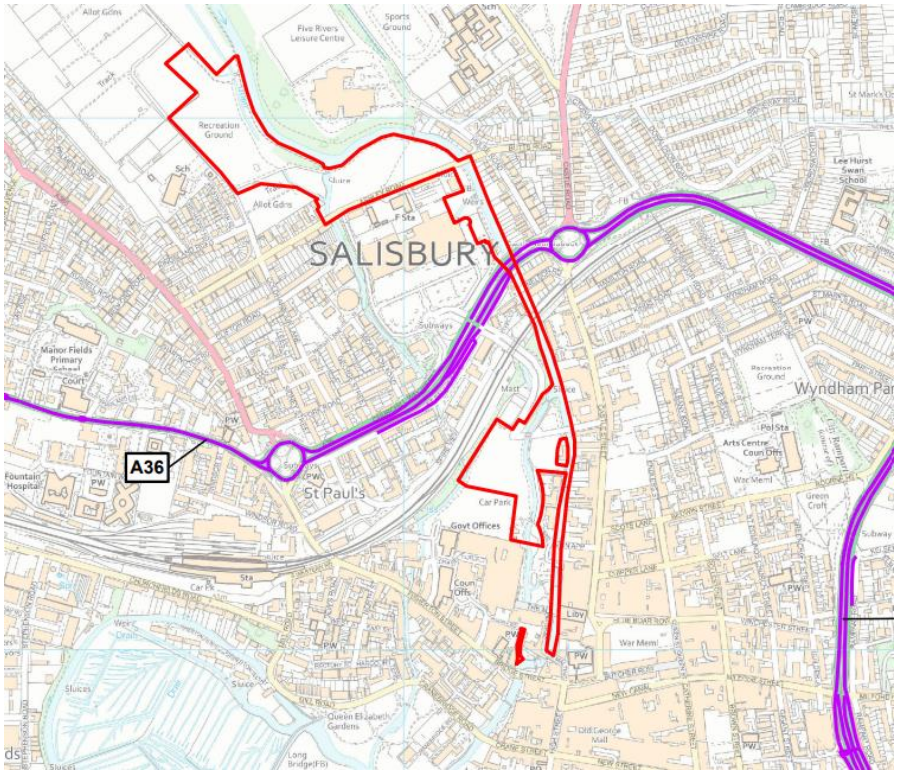
The *proposed works* shall include, but are not limited to, the following elements:

- River corridor improvements specific to the Maltings regeneration area
- Wetland creation area in Fisherton Recreation Ground.
- Flood defence embankments adjacent to Ashley Road and in Fisherton Recreation Ground.
- Water level management and fish passage measures

Local measures to reduce flooding including raising footpaths and temporary defences

2.2 Location

The site will be located within Salisbury between Five Rivers Leisure Centre (SU136311) and The Maltings (SU141300). The two main areas of works are at Fisherton Recreation Ground/ Ashley Road Open Space and the Long Stay Central Car Park/The Maltings.



Salisbury River Park

2.2.1 Sensitive receptors

The table below identifies potentially sensitive receptors near to the works areas. These locations will be mapped onto the Site Constraints Plan (small scale) in Appendix 4

Table 1 - Noise and vibration worst-case receptors' sensitivity identified within study areas. (Source: Environmental Statement Ch6 Noise and Vibration.

Receptor	Sensitivity/value
Construction noise and vibration (human response)	
Residential properties at: Ashley Road East and West. Coldharbour Lane. 1-4 and 53-67, Hulse Road. Millstream Approach. Castle Street. Ivy Place. Summerlock Approach.	High
Educational facilities: Sarum St Paul's C of E Primary School	High
Commercial buildings (i.e. offices, retail, restaurants and pubs) at: Mill Stream Medical Centre. Health Walk Centre. Studio Theatre Ashley Road. Five Rivers Leisure Centre. Riverside Tennis Club. Community Rehabilitation Centre. Offices Castle Street and Millstream Approach. Boat House PH. Offices 69 to 73 Cheviot House. Offices Bridge Street.	High Medium Low
Construction vibration (on buildings)	
Residential properties at: 53 to 67 Hulse Road Commercial buildings (i.e. offices, retail, restaurants and pubs) at: None identified.	High
Operational noise	
Residential properties at: None identified during post construction operations.	
Commercial buildings (i.e. offices) at: None identified during post construction operations	

2.3 Construction Management

2.3.1 Access

Access to the site will be directly to the two main areas of works.

Fisherton Recreation Ground/ Ashley Road Open Space will be accessed off Ashley Road. Construction traffic will approach Ashley Road from the A36, travel north on Castle Street (A345) and turn left into Butts Road.

Long Stay Central Car Park/ the Maltings will be accessed from the A36 travelling south on Castle Street and turn right into Mill Stream Approach.

2.3.2 Site Hours

- Monday – Friday 0700-1800 (0800 to 1800 for enabling works and piling works)
- Saturday – 0800-1300
- No Sunday or Bank Holiday working unless exceptional circumstances prevail.

2.3.3 Construction worksites

The main site compound will be established within the Long Stay Car Park. A secondary compound will be established at Ashley Road Open Space.

Compound areas will be required to accommodate the following

- site offices and limited parking
- welfare facilities
- stores for small plant and tools
- site generators
- materials, stockpiles, laydown and handling facilities
- refuelling facilities
- COSHH management areas

2.4 Sustainability Risks & Opportunities

Small scale environmental constraints plans are available for both work areas. (Appendix 4)

The table below provides a summary of key sustainability risks and opportunities identified within **Error! Reference source not found.** (SHEMS-FOR-INF-070 Environmental Risk Assessment & Action Plan – Medium to large projects) which has been developed from available documentation and site knowledge. Together with the Project Aspects and Impacts Assessment (

POL-GR-002 Sustainability Policy.p

Appendix) and measures outlined in the Environmental Statement (Jacobs March 2021) this has been used to inform management and mitigation measures outlined in this CEMP

Table 2: Summary of sustainability risks and opportunities

Further detail on these is provided in subsequent sections

Aspect	Key Project Risks	Mitigation Measures
Nuisance 	Noise and vibration impacts from construction activities	• Best Practicable Means (BPM) is in use where appropriate e.g. acoustic barriers and the use of the SFA piling method. • A Public Liaison Officer in place. • Regular updates to local residents and businesses
Ecology 	Working within sites protected for nature conservation, damage to habitats, injury or death to water voles. Disturbance to bat roosts. Invasive non native plant species identified.	• Translocation of water voles under licence to a safe area and destruction of habitats to prevent re-occupation prior to construction works. • Works to river channel programmed to avoid fish spawning season. • Ecological check of trees noted to have bat roost potential prior to their removal. • Vegetation clearance timed outside of bird nesting season where possible • Biodiversity Protection Zones will be clearly mapped on all plans and physical signage/ barriers put in place on the ground to prevent ingress by works. • Implement suitable eradication of INNPS or biosecurity measures and controls to prevent spread.
Soils and Materials 	Contaminated soils - includes asbestos. High volume excavations	• Implementation of Soils Remediation & Management plan including further SI as required • Compliance with CIRIA C765 Asbestos in soil and made ground good practice site guide. • Develop & Implement Site Waste Management Plan • Reuse of site won soils through the CL:AIRE DoWCop process. • Targeted training for site ops to reduce cross contamination risk & improve segregation
Pollution Prevention 	Pollution to air, surface waters & ground arising from works and increased leachate mobilisation	• Implementation of Kier Pollution Prevention Minimum Standards e.g. concrete washout • Hazardous soils to be stored on an impermeable base and sheeted to prevent rainfall run off.
Energy/ Carbon 	High carbon intensity & failure to meet Kier carbon reduction targets	• Main compound offices to connect to grid using renewable energy supplier. • Use of 'Eco Plant and Equipment' from Kier preferred suppliers • Design improvements & materials efficiency through implementation of MMP

		• Use of HVO fuel in generators and applicable plant.
Aspect	**Opportunities**	
	Minimising excavated material classed as Hazardous for removal from site. Use of CL:AIRE MMP to enable reuse of suitable excavated soils on site where required. Potential for significant cost and waste reduction	
	The development will enhance biodiversity through targeted planting of trees/ shrubs. Additional habitat creation within existing woodlands. Installation of bat and bird boxes.	
	Design is for the use of low carbon concrete mixes where possible. Use of HVO fuel for any generators and all Kier plant. Subcontractors will also have access to secured Kier prices	

3 Environmental Management System

The Environmental Management System (EMS) is effectively constructed around four main tiers of documentation as follows. It is based on the Kier Group EMS and supporting Kier Infrastructure Forms. These documents set out the principal means by which environmental aspects will be managed on this project. This CEMP and Environmental Sub plans are informed by reports provided by the Client and include the Environmental Statement and Associated Appendices.

Table 3 – EMP Documentation

Tier	Plans		
1	**Construction Environmental Management Plan**		
2	**Environmental Sub-Plans**		
	Land Quality Risk Assessment (Doc Ref TBA)	**CL:AIRE Materials Management Plan (Doc Ref TBA)**	
	Construction Traffic Management Plan (Doc ref TBA)	**Site Waste Management Plan** (online)	
	***Soils Management Plan (Doc ref TBA)**	**Surface Water Management Plan (Doc Ref TBA)**	
	*Note – the SMP establishes requirements for strip, storage and reuse of soils rather than establishing mechanism for use of excavated soils as a material rather than waste under the DoWCoP (CL:AIRE MMP)		
3	**Environmental Registers & Reporting Templates**		
	AIRSWEB Site Safety Inspections (SSI) Used by the SHE team to record SHE Inspections	**AIRSWEB Operational safety Inspections** Used by the site/ ops team to record SHE inspections	
	AIRSWEB Incident Log To record all incidents and near misses on site	Permit to Discharge *(SHEMS-FOR-INF-159)*	
	Permits, Licences & Consents Register (SHEMS-FOR-INF-244)	Environmental Survey Schedule (*SHEMS-FOR-INF – 240)*	
	Environmental Site Set Up Checklist (SHEMS-FOR-INF-249)		
4	**Kier Standards & Guidance**		
	Kier standards – links provided below provide access to all Kier Standards and associated Guidance, Minimum Standards and training resources	**Supporting information & resources** Environmental Compliance ARCI Chart	

Environmental Management System

	Pollution Prevention Responsible Sourcing & Supply Chain Zero Waste Protection of Habitats & Resources	Environmental Permits & Authorisations – England & Wales Kier Spill Products Brochure Kier Spill Training Brochure	

Documents covered by Tiers 1-3 will be stored in the site documents library.

3.1 Planning

3.1.1 Design & Environmental Statement Compliance

The Kier PM must inform the Environment Agency if their construction methodology is materially different to that proposed in the planning application Environmental Statement.

Where the Temporary Works Co-ordinator considers that the TW design or construction methodology is materially different, an environmental significance assessment must be undertaken to determine if level of environmental impacts arising from new proposals are materially different to that previously proposed.

3.1.2 Environmental Aspects & Impacts

The Environmental Aspects & Impacts Assessment is included in 

POL-GR-002 Sustainability Policy.p

Appendix . This will be reviewed in line with CEMP review established in 1.5 and, where necessary, relevant sections of the CEMP will be updated

3.1.3 Objectives, Targets & KPIs

The Sustainability Action Plan (SAP) in Table 4 below, supports delivery of the Kier Sustainability Framework KPIs , Kier Infrastructure Sustainability Plan, *Building Better* and IS014001 requirements. This SAP template will be updated periodically to reflect changes to Kier Group and Infrastructure targets

Targets identified in this plan are mandatory.

Guidance Notes can be found below this table

Table 4 – Sustainability Acton Plan

Objective (Kier Sustainability Framework aspiration)	Targets (Enter client targets as applicable)	Source	Action	Action Owner	By When	Status
Pollution Prevention We will prevent pollution from all operations within our control	100% Environmental KPI reporting compliance	Kier Group	All Incidents near misses and enforcement actions to be reported via AIRSWEB (1)			
			Cost calculation carried out at project level for all enforcement actions, incidents and near misses. Online cost calculator tool to be used (2)			
			Costs and numbers of incidents, near misses and enforcement actions to be reported via the Building for a Sustainable world Sharepoint site on a quarterly basis as minimum			
	All supervisory staff (black hats) on active projects to have undertaken training linked to Airsweb Operational Site Inspections (OSIs)	Kier Inf	Project Managers to provide list of black hats to Infrastructure Environment Manager and establish training requirement within their teams (3)			
	All supervisory staff (black hats) on active projects to have undertaken accredited spill response training	Kier Inf	Project Managers to schedule spill response training with SHE team or arrange delivery through supplier (4)			
Responsible Sourcing We will always take a lifecycle approach to the sourcing of materials, products and services	TBC					

Objective (Kier Sustainability Framework aspiration)	Targets (Enter client targets as applicable)	Source	Action	Action Owner	By When	Status
Carbon Impact We will achieve net zero carbon across our own operations and our supply chain by 2045	Carbon Scope 1 & 2 (Direct cost of fuel and electricity) - 100% Environmental KPI reporting compliance	Kier Group	All direct fuel and electricity (5) use to be purchased via preferred suppliers. Where purchases are not via preferred suppliers data@energise.com to be notified			
	From start of FY21/22 all projects* procure fuel and electricity in line with Kier Standard.	Kier Inf	Project Managers to use Kier preferred fuel and electricity suppliers. In all other instances notify data@energise.com (5) **exceptions include where client provides power or JV partner is responsible. Use of a renewables power tariff should be recommended.*			
	From start of FY21/22 all projects reporting Scope 3 Carbon data	Kier Inf	Projects assign single point of contact for reporting support			
	From start FY21/22,10% of all staff parking spaces (on each NEW project) and 10% site vehicle spaces to have EV charge points.	Kier Inf	For sites connected to grid. Implement roll out of EV charging infrastructure on site either with local installers or using Kier provider. Contact Julie.Madoui@kier.co.uk or Kevin.Wing@kier.co.uk Allow for 5% increase year on year EV points to be fitted on existing projects which have >2 years to run (6)			
	FY21/22 target 10 items of hired handheld equipment is an 'eco' version*		For project with grid connection to use 'eco'/ electric alternatives where practically and commercially viable. (7). E.g. battery powered rammers			

Objective (Kier Sustainability Framework aspiration)	Targets (Enter client targets as applicable)	Source	Action	Action Owner	By When	Status
	** defined as renewable energy or electric powered or hybrid version (not 100% fossil fuel)*					
	Where use of electric or hybrid plant or equipment is not possible use HVO as alternate fuel to diesel		Switch to HVO fuels for non-electric site equipment subject to acceptance by Client (instructed), Project Commercial Manager or Business Unit Commercial Director (8)			
	From Q1 2021/22, all sites adopt the following hierarchy of site power provision: 1) Use grid power/ transition to grid from generators 2) Use/ transition to renewables/ hybrid power and/or 3) Use HVO fuel for site power provision	Kier Inf	Project Managers to adopt hierarchy for site power provision subject to cost review at Business Unit and project level and acceptance (instruction) by client, Project Commercial Manager or Business Unit Commercial Director. (7) (8) CAPEX and OPEX to be considered			
	From start of FY2021/22 all new projects with value > £1m will investigate and *implement low carbon concrete solution(s) **where practicable and commercially viable*	Kier Inf	All projects of value > £1Million to be able to demonstrate investigation of low carbon concrete solutions for temporary or permanent applications. (9) Where practicable or commercially viable, low carbon concrete solutions to be implemented and a case study to share information has been developed			
Zero waste We will produce no avoidable waste by 2035. Kiers operations	Direct cost of waste - 100% Environmental KPI reporting compliance	Kier Group	Direct waste costs and volumes (10) to be reported via the Building for a Sustainable World Sharepoint site on a quarterly basis as minimum			

Objective (Kier Sustainability Framework aspiration)	Targets (Enter client targets as applicable)	Source	Action	Action Owner	By When	Status
will be single use plastic free by 2030	From FY 2022/23, we will achieve 100% diversion of PPE from landfill with all PPE either recycled or reused on or off-site.	Kier Inf	Established a separate means of collecting and segregating PPE waste and work with supply chain to ensure all PPE is diverted from landfill (11)			
	By end of FY 2021/22 all projects of value > £1m to have carried out a single use plastics audit	Kier Inf	Project managers to carry out audit on site (a template will be provided) Target quick wins to remove single use plastics from use where a more sustainable alternative exists.			
Protection of Habitats and Natural Resources Our operations will help to maintain a healthy environment for future generations	Direct cost of water - 100% Environmental KPI reporting compliance	Kier Group	Direct water costs and volumes (12) to be reported via the Building for a Sustainable World Sharepoint site on a quarterly basis as minimum			
Social Sustainability						
Protecting Human Rights Improve support for vulnerable / disadvantages communities in proximity to projects	All contracts/ projects > £5 million to develop a Social Value Plan that includes identified support for vulnerable/disadvantaged communities in proximity to projects.	Kier Inf/ Group	Project/ Contract Team to report progress at monthly and quarterly business reviews and through Thrive on a quarterly basis			
Employee Wellbeing & Retention	All Kier Infrastructure staff to use at least 1 volunteer day per year (all					

Objective (Kier Sustainability Framework aspiration)	Targets (Enter client targets as applicable)	Source	Action	Action Owner	By When	Status
Improve support to our local communities and environment through volunteering	staff are entitled 2 volunteer days per year					

Guidance Notes

(1) AIRSWEB reporting required for all Infrastructure projects including JVs. Guidance on incident classification is available here

(2) Where the online tool is not accessible, an excel based calculator is available on request

(3) Online training consisting of three modules of 50min each will be provided. Project Managers are requested to provide list of supervisors on site to tom.Howden@kier.co.uk

(4) Darcy are able to provide accredited spill response training. The training brochure is available here

(5) Direct fuel and electricity is that paid for by Kier i.e. is not part of subcontractor fuel spend

(6) For EV charge points on site contact Julie.Madoui@kier.co.uk, Group Head of Fleet or kevin.wing@kier.co.uk, Category Manager Fleet to obtain further details regarding Kier site installations. See Fleet pages here

(7) See GAP and Sunbelt 'eco' plant and equipment brochures here. The procurement team are undertaking a review of electric equipment and will soon be able to provide certain items as default where costs and application is commensurate with current fuel based models.

(8) HVO provides a 90% carbon reduction compared to diesel. For enquiries regarding provision of HVO fuel contact Jonathan.Wilmore@kier.co.uk. Use of HVO is viable in all plant and equipment provide by GAP and Sunbelt

(9) Low carbon concrete solutions defined as those where carbon footprint is at least 25% lower than a standard BS8500 CEM1 mix
Benchmark CEM 1 - 320Kg CO2e/m3
Low carbon - 250 Kg CO2e/m3

A list of potential suppliers is available here

(10) Direct waste costs and volumes are to cover Construction, Demolition and Excavation waste disposal paid by Kier directly i.e. not wrapped up within a subcontractor total cost package for drainage works for example. Further guidance is available here

(11) Kier Procurement Team and Kier Waste Focus Group (with Inf support) to establish supplier base/ supply chain support and communicate to projects. Currently, only hard hat recycling is available via the National Hard Hat Recycling Scheme which Kier is signed up to. All sites are encouraged to adopt this scheme

(12) Direct Water costs and volumes cover the following:

- Mains water – metered and paid for by Kier
- Mains water – unmetered and paid for by Kier (where volumes can be derived from bills)
- Bulk water delivered – paid for by Kier
- Abstracted water

(13) The Kier Volunteering Policy which includes guidance on taking volunteer leave is available here

3.1.4 Risk & Method Statements

For each package of works – defined as a task requiring a specific RAMS), the works engineer, in association with the works supervisor (e.g. foreman or ganger – black hat) responsible for delivering works on the ground will take responsibility for ensuring that all personnel including subcontractors are made aware of any environmental risks and control measures necessary, through the following means and using this CEMP as a point of reference for information:

- Within the RAMS
- Point of Work Risk Assessment
- Daily pre-start briefing
- Task Specific Briefing

All staff engaged on a task will sign to clarify that they accept and understand the risks and mitigation measures identified in the RAMS and briefings and they will act in accordance with requirements.

Where works are required to deviate from a RAMS, the works engineer shall first be informed and, where required, the RAMs updated and briefed to the site team before any work commences.

Supporting forms/templates:

Risk Assessment Template (SHEMS-FOR-GR-070)

Point of Work Risk Assessment (SHEMS-FOR-GR-071)

Risk Assessment & Method Statement Review Form (SHEMS-FOR-GR-073)

When submitted documents are reviewed they are given a category A, B, or C as follows:

- Category A: Work can proceed and the method statement and risk assessment are satisfactory
- Category B: There are comments but work can proceed if the comments clearly articulate what must happen and should be resubmitted incorporating the comments unless the activity itself would be complete before submission could be reasonably be processed.
- Category C: The documents do not meet the required standards and work cannot commence until it has been amended and the changes accepted.

It is essential that environmental risks and appropriate mitigation/actions relevant to the task being undertaken are identified in RAMS & Point of Work Risk Assessment.

3.1.5 Planning Requirements

Planning Permission has been granted subject to the discharge of 30 conditions.

3.1.6 Permits, Licences & Consents (PLCs)

It is the responsibility of the Project Manager and Programmer to work with the Environment Manager/ Advisor to identify works potentially requiring either a temporary or permanent Permit, Licence or Consent and the resources required to make application in sufficient time. The Kier PLC Guidance Document SHEMS-GUI-GR-300a provides further information on consent requirements and timelines for application.

Consent applications should be made by the team managing the works with support from the Env Manager/ Advisor as required

The table below provides a summary of permits, licences and consents that are active on the project and managed by Kier. It also includes Exemptions and Local Positions Statements

Table 5 – PLC Summary

Aspect	Licence Type	From	Expires	Key consent conditions
Ecology				
Water	Environmental Permits (Flood Risk Activity) Environmental Permit (Discharge)			
Noise and Vibration				
Waste				

A full list of permits, licences, authorisations and/or consents associated with the Project will be recorded and managed within the **Permits Licences and Consents Register** SHEMS-FOR-INF-244, maintained as a live document by the Project Manager.

Ownership of PLCs and the conditions therein shall be agreed with the Project Manager and identified Works Supervisors to ensure that ownership sits with individuals who have responsibility and authority for delivering the relevant works.

Special note should be made of the following either through consent guidance or upon receipt of the consent, and process put in place to deliver these requirements:

- Consent conditions e.g. monitoring & reporting
- Close out requirements e.g. lines of evidence
- Administrative details i.e. details to be changed if named personnel leave the project

The following consents are owned and managed by other parties

Table 6 – External PLCs relevant to the project

Aspect	Licence Type	From	Expires	Key consent conditions
Ecology	Water vole displacement licence Ownership: Environment Agency	Applied for.		
Water				

Noise and Vibration				
Waste				

3.2 Implementation & Operation

3.2.1 Roles & Responsibilities

It is the responsibility of everyone on-site to ensure the environment is protected for the duration of the Development.

Table 7 details key roles and responsibilities in relation to construction phase delivery. Additional roles and responsibilities relating to specific tasks will also be captured in this CEMP and or RAMS and communicated directly to personnel through site inductions, training sessions & toolbox talks and RAMS briefing sessions.

Table 7 – Key roles and responsibilities

Roles*	**Responsibilities***
Kier Senior Project Manager	Identifying and approving the environmental competence of all contractors and sub-contractors to be employed for the delivery of the Development. Reviewing and approving the final CEMP and identifying the need for any improvements. Reviewing and approving construction method statements with regard to environmental aspects prior to works commencing. Monitoring the implementation of the CEMP throughout the construction of the Development.
Client Environmental Clerk of Works (ECW)	Overview and audit of all site activities for compliance with the EA CoP Constructing A Better Environment and the Environmental Action Plan.
Kier Ecological Clerk of Works (ECoW)	On site for specific activities that have a direct ecological risk to carry out pre works surveys and inspections, present Tool Box Talks and monitor throughout the activity • Throughout any tree removal/ vegetation clearance operations with additional specific responsibility for bat roost inspections to trees identified from Phase 1 surveys prior to tree removal operations, presence of amphibians and otter holts, identification of king fisher perch vegetation and liaison with water vole displacement licence holder. • Works within existing SSSI/SAC woodlands for boardwalk construction. The ECoW will report to the Project Manager and is authorised to suspend works.
Kier Project Manager	Overarching responsibility for the implementation of environmental requirements associated with the construction of the Development. Reporting on environmental performance and compliance to the Environment Agency. Preparing the Construction Environmental Management Plan (CEMP). Ensuring construction method statements, work instructions and other procedures are prepared with the support of the Environmental Advisor. Identifying the competencies of all staff and ensuring delivery of training (including environmental training) to the team. Reviewing and improving sub-contractor method statements for environmental aspects prior to works starting. Monitoring of the programme for the environmental works, and the provision of status reports as necessary. Providing advice and liaising with construction teams to ensure that environmental risks are identified, and appropriate controls developed on-site.
Kier Site General Foremen (Black hats)	Responsible for on-site implementation and supervision of environmental requirements associated with the construction of the Development. Implementation and operation of environmental controls on-site. Ensure all staff are aware of and follow the requirements of the CEMP.

Roles*	Responsibilities*
	Ensure environmental site inspections are undertaken. Respond to environmental incidents. Briefing site personnel and subcontractors on the latest environmental and sustainability issues. Completing daily logs. Maintaining the waste register, ensuring correct waste management procedures are being implemented.
Kier Health, Safety and Environment (HSE) Manager	Responsible for managing the implementation of environmental requirements associated with the construction of the Development. Undertaking monthly environment compliance audits. Reporting on environmental performance and compliance to the Project Director.
Kier Health Safety and Environment Advisor	Responsible for audit of the day-to-day implementation and monitoring of environmental requirements associated with the construction of the Development. Reporting on environmental performance and compliance to the HSE Manager. Developing the CEMP with the Construction Manager, and contributing to construction method statements, work instructions and other specialist procedures. Supporting the Project Manager in identifying environmental competence requirements for all staff and ensuring delivery of environmental training to the team. Monitoring construction activities to ensure that identified and appropriate control measures are effective and ensuring compliance with the final CEMP. Leading incident investigations and reporting. Assisting or leading in the preparation and implementation of environmental permits, licences and consents as required. Assisting or leading in the development of toolbox talks.
Key subcontractors – SHE Manager	Responsible for managing the implementation of environmental requirements associated with the construction of the Development. Undertaking monthly environment compliance audits. Reporting on environmental performance and compliance (e.g. KPI data) to Kier as required Provide necessary training to the subcontracts team Ensure that all staff are fully aware of EMS requirements and relevant standards, guidance etc
Site staff and all other construction personnel	Should be suitably qualified and competent for the tasks required. Receiving general environmental awareness training and undertake work in accordance with Method Statement Briefings and toolbox talks. General duty of care towards the environment and an awareness of their responsibilities in accordance with the CEMP and associated plans and policies.
Principal Designer	To provide information relevant to construction that could assist the Contractor to manage environmental aspects of the Development. Review of opportunities to deliver cost and carbon savings
* Draft roles and responsibilities. These will evolve and be refined throughout the lifecycle of the Development.	

3.2.2 Procurement

Subcontractors and suppliers are assessed, selected and procured in accordance with Kier Supply Chain procedures which include the requirement for each subcontractor to have successfully completed an environmental competence assessment. This includes requests for information on managing environmental risks associated with their package of works and also communication of environmental management requirements.

Additionally, all suppliers and subcontractors will be asked (through our online SHE portal - SHEAPS) to sign agreement that they will adhere to Kier SHE Standards and Minimum Standards. For materials, this includes Minimum Standards and Guidance established in the Kier Responsible Sourcing and Supply Chain pages:

Minimum Standards

- Metal Fixtures and Fittings Purchasing (SHEMS-MST-GR-003)
- Metals & Steelwork Purchasing (SHEMS-MST-GR-004)
- Natural Stone Purchasing (SHEMS-MST-GR-005)
- Workwear Purchasing (SHEMS-MST-GR-006)
- Timber Purchasing (SHEMS-MST-GR-007)

Directory of Sustainable Suppliers

Guidance

- Importing Topsoil (SHEMS-GUI-GR-061c)
- Recycled Aggregate (SHEMS-GUI-GR-065n)

Additionally, all fuel and electricity should be purchased via Kier preferred suppliers. Guidance is available through the Kier Carbon Management pages here. This will support automated provision of quarterly KPI data

The project team is also directed towards the Kier Directory of Sustainable Suppliers here which provides details of suppliers and products supporting improved sustainability outcomes and which have been used successfully on previous Kier projects

3.2.3 Training, Awareness & Competence

In the first instance the Kier project team has been and shall be selected from experienced staff available for transfer from other projects. Where necessary and as soon after commencement on the contract as possible, staff undertake training in order that required levels of competence are met.

Training shall be tracked using the SHE Training Matrix which is managed as a live document/database by the Project Manager and Environmental Advisor. The SHE Matrix shall be used to identify the following for Kier staff and key subcontractors/ labour.

- Existing staff competencies including key subcontractor personnel (named individuals)
- SHE training to meet required Kier Standards
- SHE training to meet required Environment Agency Standards
- SHE training to meet project specific requirements in relation to identified risks

While subcontractors and labour suppliers are expected to carry out their own training, additional training and awareness will be delivered through the following mechanisms:

- Site induction
- Tool Box Talks
- Posters e.g. Visual Standards
- Email bulletins
- Bespoke training sessions from external providers
- On site ad hoc training by Env Manager

Training records are stored within Sharepoint and hard copies within the Environmental training folder

3.2.3.1 Inductions

Everyone intending to work on the contract first attends a site induction. This includes content on key environmental management requirements and relevant environmental risks. At or prior to the induction, attendees are required to provide evidence of appropriate competence; CSCS / CPCS cards etc.

The Environmental slides within the induction will be reviewed on a regular basis and updated in line with changing project phases to reflect any changes in risk or opportunities associated with works. Updates will also include lessons learnt and/or any new approaches to environmental management on site with respect to the works. This might include, for example, updates to Kier Environmental Minimum Standards or information from Kier SHE Bulletins relevant to the works.

3.2.3.2 Tool box talks

Tool box talks will be delivered to relevant staff (Kier and subcontractors) in line with the environmental training plan or as required relevant to existing project risks and opportunities.

Pollution prevention and spill kit training will be covered throughout the year with a requirement for all supervisors (black hats) on site (as a minimum) to have received accredited spill response training within 6 months of project start date in line with the target established in Table 4.

General tool box talks (i.e. non site-specific) are available on My Kier here and will be used as the basis for TBTs on Salisbury River Park.

3.2.3.3 External training provision

All site supervisors must pass either the CITB 5 day site managers safety training project (SMSTS) course or the site supervisor's safety training project (SSSTS). This includes training in risk and COSHH assessments.

3.2.3.4 Posters

Key environmental information will be posted on site briefing boards and on dedicated environmental notice boards located at strategic positions on site e.g canteen area, briefing zones.

Posters will include relevant Kier Group SHE Bulletins, specific Environmental Alerts, SHEQ Solutions case studies and the Kier Infrastructure Monthly Comms update. Standards and Guidance to cover key environmental management requirements on site e.g. concrete washout will also be posted on notice boards

Copies of all posters will be retained digitally and as hard copy within the site Environmental Training folder

3.2.3.5 Email bulletins

To ensure project remain up to date with legal changes and share best practice and lessons learnt, Kier Group provides regular updates via 'SHE Bulletins', 'Environmental Alerts' and via the Monthly Sustainability Comms Update. The Infrastructure Environment Manager will ensure these are forwarded to the Salisbury River Park team along with any relevant Environment Agency communications. Where required these will also be supported through other training and awareness channel as described in this section e.g. incorporated into site induction.

3.2.3.6 On-site training by Kier Environment Manager

To support site teams and individuals, the project SHE Advisor will also provide ad-hoc training/ coaching as required. This will include providing specific training with operatives tasked with carrying out environmental management support roles e.g. water quality sampling.

3.2.4 Communication

Within the project there will be both verbal and written communication pathways between external and internal parties.

3.2.4.1 Internal Project Communications

Internal communications are considered to be those between Kier and the Environment Agency, as well as wholly within the Kier project team. General environmental issues, legislative and regulatory requirements will be communicated internally by issue use of the adopted document management system, internal memo and meetings (where these fall outside of training and awareness as identified in the previous section).

Management meetings are as follows:

- Monthly Project Team Meeting Kier/ Atkins/ EA: date & time TBC
  Daily co-ordination meeting Kier: time TBC
- Weekly Construction team Meeting (Kier): date & time TBC

3.2.4.2 Communications with local businesses and residents

Communications will be managed by the EA Project Manager with support provided by a nominated Kier Public Liaison Officer (main Point Of Contact) and by the Kier Project Manager (support where required e.g. noise issues)

Local residents and businesses will be kept informed of upcoming works and any changes to planned works through emails, phone call, issue of letter drops, site events and community events.

3.2.4.3 Complaints & queries

In the event a construction related complaint is received (e.g. noise, dust) it will be investigated by the Kier Public Liaison Officer alongside the complainant (where requested and practicable), and the Kier Section General foreman where relevant to ensure that complaints are owned by the team that gave rise to complaint in the first instance and who are in the best position to resolve issues.

A complaints log shall be maintained by the Kier Public Liaison Officer and updates provided at the weekly team meetings. A complaints summary shall also be shared with the Environmental Health officer (or other nominated person) as needed, such as per requirements of a Section 61.

3.2.4.4 Communications with other regulatory stakeholders

Key environmental regulating authorities for Salisbury River Park are Natural England, the Environment Agency and Wiltshire Council. Key contacts are provided in *Table 8* below

Table 8: External Stakeholder Contacts

External Stakeholders			
Name	**Position**	**Location**	**Contact Number(s)**
TBC	Wiltshire Council Environment Health Officer		☏: ✉:

External Stakeholders			
Name	**Position**	**Location**	**Contact Number(s)**
TBC	Wiltshire Council Arboriculture Officer		☏: ✉:
Roland Smith	Wiltshire Council Archaeologist		☏: ✉: Roland.Smith@wiltshire.gov.uk
Andy Wallis	EA Area Contact		☏: 07757703594 ✉: Andy.Wallis@environment-agency.gov.uk
Jessica Dunston	EA Environmental Project Manager		☏: 07867 372980 ✉:jessica.dunston@environment-agency.gov.uk
Dianne Matthews	Natural England Area Contact		☏: ✉:

Prior to start of work, key personnel will be invited to a start up meeting and a series of regular project update meetings will be agreed.

3.3 Evaluation of Compliance

3.3.1 Risk and Method Statements

All method statements for activities with environmental risk will be reviewed and approved by the project Environmental Manager as per 3.1.4.

When carrying out site inspections, the General Foremen will assess compliance with the RAMS

3.3.2 Site inspections

Weekly SHE Inspections (which include environmental elements) using the AIRSWEB Operational Site Inspection (OSI) proforma will be undertaken by Kier Supervisors and Engineers.

A monthly environmental inspection using the AIRSWEB Site Safety Inspection (SSI) proforma will be undertaken by the project SHE Advisor in line with guidance here.

All inspection findings will be logged on the Kier AIRSWEB system and actions assigned to relevant individuals. Email reminders will be sent automatically until the action is formally closed on AIRSWEB

Depending on the observations made, findings of inspections may be communicated to site team immediately on site to enable immediate close out

Ad-hoc site visits will also be undertaken and observations recorded on Observation Cards (available from Site Offices) and/or passed on to site supervisors by email, phone or face to face.

3.3.3 Environmental Monitoring

Monitoring relating to specific Environmental Management Aspects (noise, dust etc) is recorded in relevant sections of this document.

3.3.4 Audits

An Environmental Audit will be carried out by Kier on a six monthly basis. Date of the first audit is to be confirmed

Auditors will have ISO14001 Lead Auditor Qualification.

3.3.4.1 Non-conformity and corrective action

Any non-conformance with the Environmental procedures, method statements and consents raised through the audit processes will be recorded by the Auditor on AIRSWEB with closeout dates agreed with the auditee and shall reflect the severity of the finding.

Results of all inspections and audits shall be shared with the Environment Agency Project Manager

3.3.5 Environmental Incidents

Guidance on Classifying and Recording Environmental Incidents (SHEMS-GUI-GR-301) shall be included in the site induction with additional training provided by the project SHE Advisor as required.

Guidance shall also be posted on the Environmental Notice Board.

Incident reporting and Investigation shall be in accordance with the Kier Standard SHEMS-STD-GR-011.

All environmental incidents must be reported to the Environment Agency Incident Hotline 0800 80 70 60

3.3.5.1 Near Misses & Minor incidents

Near Misses and Minor Incidents shall all be recorded on the Kier AIRSWEB system by the responsible supervisor relevant to works where the incident occurred.

Incidents where there is lack of clear ownership shall be raised on AIRSWEB by the investigating member of the SHE Team.

Escalation Procedure

- Works supervisor
- General Foreman
- Project Manager

3.3.5.2 Major Incidents or Regulator Interventions

A Major Incident (MI) is an incident that would impact on Kier employees and / or supply chain, Kier assets, members of the public, the reputation of Kier Group and or has potential to result in significant environmental impact

- All support necessary should be called in from other Kier works areas as required. INCIDENT RESPONSE MUST BE PRIORITISED OVER WORKS. Site teams will receive full management support to this effect.

- The Kier Major Incident Response Plan should be initiated

Escalation Procedure

Notification to	Notification by
Kier Project Director – Phil Ramsay	Senior Project Manager
Kier Senior Project Manager – Mike Barron	Project Manager
Kier Project Manager – Mike Barron (for enabling/tree works)	General Foremen
Kier Infrastructure Environment Manager – Tom Howden	Senior Project Manager
Environmental Regulator (EA/NE)	Senior Project Manager
Client Environmental Manager – Gary Haley	ECW/ Senior Project Manager
Client Project Manager – Mike Porter	Kier Project Director/ Senior Project Manager
Client Project Executive – Mark Goldingay	Kier Project Director/ Senior Project Manager

Where there is a Regulator Intervention the Kier Enforcement Authority Contact Standard (SHEMS-STD-GR-022) shall be followed.

Major Incidents and Regulator Interventions shall be raised on AIRSWEB and Environment Agency system and investigated by the Infrastructure Environment Manager or, in their absence, by the SHE Manager

3.3.5.3 Incident cost KPI

As per Kier KPI requirements, all near misses, incident and regulator intervention shall be valued using the Incident Cost Calculator available here

3.4 Documentation & Records Control

A schedule of the records to be maintained and responsibilities for maintaining them is included in the Environmental Records Schedule below.

The table does not include documents relating to specific environmental management functions (water, noise, air etc) these are included in following sections

Table 9: Documentation and Records Log

Records to be Kept	Responsibility
Kier Environment Policy;	Senior Project Manager
Construction Environmental Management Plan	Senior Project Manager
Site Waste Environmental Management Plan	Project Manager
Environmental Audit Reports;	Project Manager
Environmental Incident Reports;	AIRSWEB
Monitoring and Measurement Records;	General Foremen
Minutes of Meetings with Local Authorities	Project Manager
Minutes of Meetings with Statutory Agencies	Project Manager
Environmental Training Records	General Foremen
Environmental Site Inspection Proformas	AIRSWEB
Environmental data (KPI) Log	Project Manager
Management Review, Board Reports, Objectives and Targets	Senior Project Manager
Environmental Management Review	Senior Project Manager
Innovation/ lessons learnt	Project Manager
Consents and Compliance Proformas	Project Manager

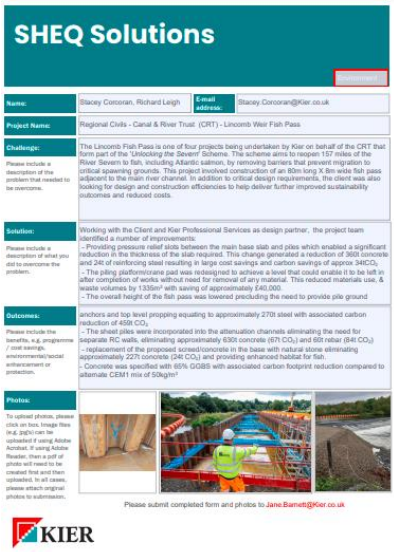
3.5 Continual Improvement

3.5.1 Lessons Learnt

Lessons learnt may initially be captured though the AIRSWB system as part of incident or non-conformance investigations and then developed for further communication across other projects using the Lessons Learnt template.

This may also be used to capture improvements not initially identified as part of an audit or incident

3.5.2 SHEQ Solutions


SHEQ Solutions

Name: Stacey Corcoran, Richard Leigh — E-mail address: Stacey.Corcoran@Kier.co.uk

Project Name: Regional Civils - Canal & River Trust (CRT) - Lincomb Weir Fish Pass

Challenge: Please include a description of the problem that needed to be overcome.

The Lincomb Fish Pass is one of four projects being undertaken by Kier on behalf of the CRT that form part of the 'Unlocking the Severn' Scheme. The scheme aims to reopen 157 miles of the River Severn to fish, including Atlantic salmon, by removing barriers that prevent migration to critical spawning grounds. This project involved construction of an 80m long X 8m wide fish pass adjacent to the main river channel. In addition to critical design requirements, the client was also looking for design and construction efficiencies to help deliver further improved sustainability outcomes and reduced costs.

Solution: Please include a description of what you did to overcome the problem.

Working with the Client and Kier Professional Services as design partner, the project team identified a number of improvements:
- Providing pressure relief slots between the main base slab and piles which enabled a significant reduction in the thickness of the slab required. This change generated a reduction of 368t concrete and 24t of reinforcing steel resulting in large cost savings and carbon savings of approx 340CO_2
- The piling platform/crane pad was redesigned to achieve a level that could enable it to be left in after completion of works without need for removal of any material. This reduced materials use, & waste volumes by 1335m³ with saving of approximately £40,000.
- The overall height of the fish pass was lowered precluding the need to provide pile ground anchors and top level propping equating to approximately 270t steel with associated carbon reduction of 459t CO_2
- The sheet piles were incorporated into the attenuation channels eliminating the need for separate RC walls, eliminating approximately 630t concrete (67t CO_2) and 60t rebar (84t CO_2))
- replacement of the proposed screed/concrete in the base with natural stone eliminating approximately 227t concrete (24t CO_2) and providing enhanced habitat for fish.
- Concrete was specified with 65% GGBS with associated carbon footprint reduction compared to alternate CEM1 mix of 50kg/m³

Outcomes: Please include the benefits, e.g. programme / cost savings, environmental/social enhancement or protection.

Photos: To upload photos, please click on box. Image files (e.g. jpg) can be uploaded if using Adobe Acrobat. If using Adobe Reader, then a pdf of photo will need to be created first and then uploaded. In all cases, please attach original photos to submission.

Please submit completed form and photos to Jane.Barnett@Kier.co.uk

KIER

Previous examples and the SHEQ solutions template can be found here

4 Environmental Risks and Mitigation Measures

Kier will seek to limit any adverse impacts of the works on the environment through identification of project specific aspects and impacts and the use of Design mitigation and/or Best Practicable Means to eliminate or mitigate impacts.

This section is informed by the Project Risk & Opportunity Assessment initiated during ESE stage and developed through to start of works on site (**Error! Reference source not found.** and summarised in

Aspect	Key Project Risks	Mitigation Measures
Nuisance	Noise and vibration impacts from construction activities	• Best Practicable Means (BPM) is in use where appropriate e.g. acoustic barriers and the use of the SFA piling method. • A Public Liaison Officer in place. • Regular updates to local residents and businesses
Ecology	Working within sites protected for nature conservation, damage to habitats, injury or death to water voles. Disturbance to bat roosts. Invasive non native plant species identified.	• Translocation of water voles under licence to a safe area and destruction of habitats to prevent re-occupation prior to construction works. • Works to river channel programmed to avoid fish spawning season. • Ecological check of trees noted to have bat roost potential prior to their removal. • Vegetation clearance timed outside of bird nesting season where possible • Biodiversity Protection Zones will be clearly mapped on all plans and physical signage/ barriers put in place on the ground to prevent ingress by works. • Implement suitable eradication of INNPS or biosecurity measures and controls to prevent spread.
Soils and Materials	Contaminated soils - includes asbestos. High volume excavations	• Implementation of Soils Remediation & Management plan including further SI as required • Compliance with CIRIA C765 Asbestos in soil and made ground good practice site guide. • Develop & Implement Site Waste Management Plan • Reuse of site won soils through the CL:AIRE DoWCop process. • Targeted training for site ops to reduce cross contamination risk & improve segregation
Pollution Prevention	Pollution to air, surface waters & ground arising from works and increased leachate mobilisation	• Implementation of Kier Pollution Prevention Minimum Standards e.g. concrete washout • Hazardous soils to be stored on an impermeable base and sheeted to prevent rainfall run off.

Energy/ Carbon	High carbon intensity & failure to meet Kier carbon reduction targets	• Main compound offices to connect to grid using renewable energy supplier. • Use of 'Eco Plant and Equipment' from Kier preferred suppliers • Design improvements & materials efficiency through implementation of MMP • Use of HVO fuel in generators and applicable plant.
Aspect	**Opportunities**	
	Minimising excavated material classed as Hazardous for removal from site. Use of CL:AIRE MMP to enable reuse of suitable excavated soils on site where required. Potential for significant cost and waste reduction	
	The development will enhance biodiversity through targeted planting of trees/ shrubs. Additional habitat creation within existing woodlands. Installation of bat and bird boxes.	
	Design is for the use of low carbon concrete mixes where possible. Use of HVO fuel for any generators and all Kier plant. Subcontractors will also have access to secured Kier prices	

). This assessment will be updated as works progress with detail on management measures to eliminate or mitigate impacts incorporated into the following sections.

The principles raised here are in line with the Register of Environmental Actions & Commitments in **Error! Reference source not found.**, Kier Group and Kier Infrastructure Standards, Minimum Standards, Guidance and Targets. Principles outlined below should therefore be seen as requirements, rather than suggestions. Where site restrictions e.g. space limit adoption, effort should be made to deliver the intended outcomes as near as possible.

4.1 General Environmental Actions

4.1.1 Housekeeping & site set up

Activities on site would be managed and undertaken in a manner, as far as reasonably practicable, to minimise impact on the surrounding environment and local residents and businesses.

The following principles shall be adopted:

- Environment Agency Code of Practice 'Constructing a Better Environment' must be adhered to at all times
- Establishment of safety and spill stations with clear SHE signage to support site comms
- Provision of sufficient secure storage for site personnel clothing/ PPE etc
- 'Single Use Plastics' Free – recyclable paper cups, issue of multi-use drinks bottles etc
- Considerate behaviour of all site staff, including access routes
- Regular maintenance of suitable staff welfare facilities
- Removal of food waste and other rubbish at frequent intervals or placed in enclosed skips to minimise risk of pest or vermin infestation
- Segregation of office waste and appropriate selection of disposal contractors to maximise recycling rates

- Use of Community Wood Recycling Scheme for all wood waste – provision of segregated cages (not skips)
- Wheel washing facilities in place for vehicles exiting the sites.

4.1.2 Energy Efficiency

The following principles should be adopted to reduce costs and carbon footprint. This is aligned with the Environment Agency SW Hub 5 low carbon Principles

- Use of renewables/hybrid based power where mains provision is unavailable. See the Sunbelt and GAP 'Eco' brochures here
- Provision of multiple EV rapid charging points (mains power connection only) for site plant and staff vehicles with wired capacity to add points
- Use of high energy and water efficient site offices and on-site welfare units in compliance with Kier procurement requirements
- Preferential hire/ procurement of electric plant and equipment where application is practicable and cost effective See the Sunbelt and GAP 'Eco' brochures
- Selection of newer more efficient plant i.e. higher output rating under typical operating conditions
- Selection of plant based on CAPEX and OPEX costs (i.e. that includes consideration of fuel usage) NOTE – red diesel rebate is being lost in Spring 2022 with cost of diesel rising approx £0.40/litre
- Heavy plant (>8t) must be fitted with telematics to monitor idling and usage efficiency
- No idling of plant on site e.g. over breaks
- Consider provision of solar charging stations for small/handheld equipment e.g. drills
- Selection of energy efficient appliances of Grade B or higher e.g. dishwasher, microwave etc
- Use of HVO in plant and generators

4.1.3 Materials Storage & handling

Good materials storage and handling will lead to reduced waste volumes and costs and costs associated with further material purchase to compensate for damage. Requirements outlined in the following Minimum Standards will be adopted.

SHEMS-MST-GR-024 Site organisation: housekeeping

SHEMS-MST-GR-025 Site organisation: materials storage

4.1.4 Lighting

To minimise impact of light intrusion on local residents and disturbance of wildlife, the following principles shall be adopted:

- Minimise use of lighting to lowest practical levels to enable safe working
- Ensure lighting is directional and low spill (use of shields) and directed inwards to work areas rather than outward facing into connecting habitats or towards residents
- The use of sensors and automatic control systems for lighting to minimise the periods when it is on.

- See also ‘Energy Efficiency’ for lighting procurement

4.1.5 Water Management

These principles are concerned with water use efficiency and minimising wastage. Site specific measures relating to water pollution prevention are covered in 4.7. Where practicable, employ the water use hierarchy to reduce usage and eliminate wastage through the following measures/ actions

- Request water efficient utilities/ appliances within site offices e.g. automatic tap shut off, air flush urinals, low flush volume toilets
  Rainwater harvesting from site offices and/or water treatment/ site drainage to provide water source for dust suppression and road sweepers
- Use of directional misting units for dust suppression rather than high volume sprays

4.2 Air Quality Management

4.2.1 Introduction and Client Conditions

The Environmental Statement air quality impact assessments concluded that, across the different stages of the construction of the Scheme, there is a medium risk of dust soiling and impact to ecological sites and a low to medium risk of human health impacts (in the absence of mitigation).

The project will adopt good practice measures as included in the Institute of Air Quality Management (IAQM) dust guidance (and detailed below) to mitigate the effects on local air quality from dust emissions during construction. The mitigation measures as specified in IAQM (2016) are considered suitable to mitigate dust emissions generated by the scheme.

4.2.2 Key Risks, Mitigation Measures and Monitoring

During the construction phase, dust will be managed in the following ways:

Risk	Mitigation
Construction Traffic – Vehicle movements on haul roads; vehicle movements on site during dry periods; spillage and loss of load from vehicles carrying loose material; deliveries of aggregates to the project and adjacent properties	• All construction traffic will follow the site traffic management plan. • A low speed limit is in place on the project e.g. 10mph • All ‘Highly Recommended’ mitigation controls from Table 12 of the IAQM assessment included in Appendix L of the ES and the EAP will be implemented. (see Appendix 6). • All HGVs carrying loose materials should use load covers • A wheel wash/jet wash with rumble grid is in place for all vehicles leaving the site to pass through during earthworks operations before they enter the public highway • Sweepers will be used on hard standing, black topped haul routes and public roads to ensure routes remain clear of dust and mud. • Road edges and pathways will be swept and damped down Vehicle/ plant storage areas to be topped e.g. crushed & rolled tarmac

Stockpiles - Excavated soils and bulk deliveries e.g. sand, aggregates	• Manage earthworks and exposed areas/stockpiles to prevent wind whipping using methods such as covering, re-vegetating, or other alternative methods of dust suppression such as hessian fabric or using water suppression. • Location of stockpiles away from any sensitive receptors. • Dust suppression to be used for dust generating loading and unloading activities
Site Activities - On site earth moving operations, site levelling, cut and fill and deep excavations.	• Plan the site layout so that machinery and dust-generating activities are located as far as practicable from nearby sensitive receptors. • Public Liaison Officer to advise residents/ sensitive receptors prior to the start of specific activities (as for noise) and confirm daily monitoring of dust settlement will be made. • The PLO will be the point of contact for residents/ receptors concerns and advise the project team appropriately. • Mobile bowsers to be deployed on site at regular intervals. Activity to be increased during dry and windy periods. • All cutting and grinding operations to be conducted in ways to reduce risk of dust migration (wet cutting techniques etc.) • The use of dust extraction equipment when drilling and cutting – cutting bays with integrated dust extraction are available from RVT
Actions identified above are in line with the following Standards & Guidance • Pollution and Nuisance Standard (SHEMS-STD-GR-063)	
Monitoring	
• Ongoing visual monitoring (minimum daily) to be undertaken by site personnel during site inspections with findings logged on AIRSWEB OSI reports.	

4.3 Noise and Vibration

4.3.1 Introduction and Client Conditions

This section identifies a noise and vibration monitoring and control strategy which will be agreed with Wiltshire Council before the start of construction.

Working hours: (as per 2.3.2)

All work activities will apply Best Practicable Means (BPM) to minimise noise and vibration impacts. These are also in line with mitigation measures established in the Environmental Statement to ensure works have no significant impact on local residents or businesses

4.3.2 Key Risks, Mitigation Measures and Monitoring

During the construction phase, noise and vibration will be managed in the following ways:

Risk	Mitigation Measures and Monitoring
Significant noise impacts – that will create a disturbance to residences and other local stakeholders This could delay works, impact project programme and affect project reputation	• Key residential receptors and potentially sensitive stakeholders are identified in Section 2.2.1 and on the site Noise Receptors and Estimated Construction Noise Levels document and map in Appendix4. • The following works must be notified to the Kier Public Liaison Officer (PLO) at least 1 week in advance to enable notification to local residents and businesses and where required, Wiltshire Council. • The PLO contact details will be given to residents and business should a complaint be needed. - Night-time works (none are planned) - Weekend works (other than Saturday mornings) - Works with high noise potential e.g. impact piling, vibratory piling, use of heavy vibratory rollers, slab breakout • Emergency night-time works should also be notified to the PLO as soon as reasonably possible • In line with the noise reduction hierarchy, potentially noisy works should first be mitigated through adoption of appropriate design or construction methods and programming e.g. use of pile cropper rather than pecker, day-time vs night time hours, delayed morning start for noisy works • The quietest available plant or machinery should be used. The Sunbelt and GAP brochures provide details of noise levels – electric plant or equipment is the preferred option • All equipment should be maintained in good mechanical order and fitted with appropriate silencers, mufflers or acoustic covers. • Localised use of hoardings and portable barriers as necessary to shield particularly noisy activities • Careful selection of working methods and programme.

	• Shutting down of equipment when not in use. The site has a 'no engine idling' policy • Handling of all materials in a manner which minimises noise, including minimising drop heights into hoppers and lorries. • Switching all audible warning systems to the minimum setting required by the health and safety executive and using banksmen as an alternative to audible alarms wherever practicable. • Ensure that local residents are fully informed with respect to the construction programme, and particularly with regards to any proposed periods of night-time working. • Engaging in community liaison to explore ways of minimising noise impacts and increasing local tolerance to noise. • House static noise emitting equipment operating continuously within suitable acoustic enclosure with enclosure entrance pointing away from or to be screened from receptors • Plant to be fitted with broadband reversing alarms
Vibration impacts	• The following works must be notified to the Public Liaison Officer (PLO) at least 1 week in advance to enable notification to local residents and businesses and, where required, Wiltshire Council/ Salisbury Council. Additionally, these works must NOT be undertaken outside of daytime working hours unless by agreement with Environment Agency Project Manager - Impact piling - Vibratory piling • For impact or vibro-piling works within 50m of a residential or business receptor, a pre-condition survey should first be undertaken • Vibration monitoring by a competent and qualified person shall be undertaken for vibro- or impact piling works within 50m of a residential or business receptor. • Sheet pile installation for temporary are planned by Movax (hydraulically pushed) however should vibratory equipment be required to install through river terrace gravel deposit layers then the above applies. • Permanent piles are planned to be augured and segmental flight auger (SFA) the likely solution. Should an alternative augured solution be proposed then the above may apply to any specified casings installation.
Actions identified above are in line with the following Standards & Guidance • Pollution and Nuisance Standard (SHEMS-STD-GR-063)	
Monitoring	

- Appropriate management of potential noise impacts will be monitored through daily checks by site supervisors and through AIRSWEB OSI and SSSIs

  Monitoring of noise levels and comparison against the estimated construction noise levels at the identified receptor sites (Appendix 4) will be made daily during the specific operations listed.

  An external vibration monitoring company will be appointed to monitor the receptor sites listed should impact or vibro-piling solutions be adopted.

4.4 Waste Management

4.4.1 Introduction and Client Conditions

Kier aim to reduce waste disposal volumes and costs through application of circular economy principles. We will maintain our Duty of Care through appropriate vetting of all waste carriers and disposal sites supported by quality monitoring of all waste documentation

This section of the CEMP details site specific requirements for managing waste on site. It is supported by the Site Waste Management Plan on SMARTWaste which details waste management options for specific material types and provides a log of waste movements since project commencement.

The SWMP located in SMARTWaste will include:

- Names of personnel responsible for the implementation of this plan on site;
- A forecast of expected waste streams;
- Waste minimisation decisions taken throughout the project;
- A record of the production and disposal routes of waste,
- Waste carriers and destinations of the waste (including licence details)
- Waste/material specific implementation of circular economy & waste hierarchy principles
- Details of the training that has been carried out on site;
- A comparison of the forecasted versus actual waste produced; and
- A review record to identify areas of improvement.

4.4.2 Key Risks, Mitigation Measures & Monitoring

During the construction phase, the following waste management principles will be followed:

Risks	Mitigation
Reduce generation of waste	• Just-in-time' procurement to minimise the chance of damage to materials • Storage in appropriately dedicated areas to prevent spoilage, damage and contamination see also 4.1.3 • Dedicated materials storage areas will be established within the site compound. This will include sheltered storage for those materials subject to damage by sun/rain/ frost etc. • Recycled aggregates - use WRAP declaration form to demonstrate QP compliance - all delivery tickets to include statement that material has been produced in accordance with WRAP Protocol - avoid mixing with other materials such as loose soils where practicable • Request suppliers to offer take back of excess/unused materials including excess packaging. • Utilise off-site manufacturing e.g. drain units

	• Consider life cycle costs and end of life of materials and products e.g. cheap hoarding that has associated high waste disposal costs at end of life might have higher lifecycle cost than reusable hoarding • Review options for reuse as part of the Materials Management Plan
Reuse materials within the project	• Use the online SWMP in SMARTWaste to plan for reuse options e.g use of timber cut offs for storage bins • Consider lifecycle costs & end of life when selecting materials and products e.g. allow for easy deconstruction to enable reuse of separate elements
Improve reuse and/or recycling off the project	• Consider recycling rates during waste procurement. Zero waste to landfill as objective • Segregation for excavation waste shall comprise marked stockpile areas for non-hazardous soils and contained areas with barrier membrane on ground for contaminated soils awaiting testing and/or disposal. • All topsoil stripped from the scheme, unless contaminated, will be stored to maintain its quality for re-use. • Depending on type of contamination, contaminated soils could be left in windrows to speed up breakdown of contaminants through natural weathering processes • Segregated and signed skip area to be established within site compound. • Minimum segregation requirements for construction waste as follows: - WEEE e.g. white goods, lighting - Metals including cabling - Wood (Community Wood Recycling Scheme is preferred sub-contractor) - Plastic waste - Hazardous construction waste - Mixed non-hazardous construction waste - Canteen (food) waste - Medical waste - Dry recyclables from office – paper, card - Waste oils - Batteries - PPE (in a useable state for donation)
Mismanagement of Waste - Environmental and financial costs associated with the generation of waste and the lack of segregation and opportunity for re-use or recycling options; Improper disposal with the potential to pollute the environment and unauthorised	• All waste is tracked via SMARTWaste. • All supervisors and those handling to receive training on completion of Waste Transfer and Consignment Notes as well as TBTS targets at specific project waste management requirements

disposal and breach of legislation.	• Storage, treatment, useage and disposal of wastes might require Exemptions, Permits or Local Enforcement Positions to be agreed. Guidance on permits is available in 3.1.6
In addition to the points above, the following standards and guidance will be followed / forms used as part of the Kier Environmental Management System: • Waste Management Standard (SHEMS-STD-GR-065) • Materials & Waste – characterisation, classification and testing standard (SHEMS-STD-INF-200) • Hazardous Waste Storage Standard (SHEMS-MST-GR-0010)	
Monitoring:	
• The SMARTWaste administrator is responsible for ensuring waste data entry is up to date to enable quarterly KPI reporting • Compliance of waste management on site will be checked and recorded through AIRSWEB SSIs and OSIs. • The General Foremen shall be responsible for ensuring the site waste area/ skips are well managed and waste properly segregated	

4.4.3 Waste Carrier Licences and Waste Management Site Permits

Waste carrier licences and FULL waste management licences will be obtained as part of the procurement process (Kier and all subcontractors) and will be checked against the Environment Agency's database by the Procurement Team/ subcontract lead prior to placing an order.

The Procurement Team and subcontractor leads, with the support of the Environment Manager shall check permit/licence details to ensure disposal site can accept waste types and volumes to be disposed of

Copies of carrier licences and site permits and/or exemptions shall be provided to the SMARTWaste co-ordinator for upload to SMARTWaste

NO waste movements may take place prior to required checks being made

4.4.4 Waste Disposal - Non-Hazardous Waste

Skips should be checked prior to leaving site to ensure there is no cross contamination of waste. Where practicable, contaminating materials shall be removed and placed in correct waste provision.

Waste transfer details are completed by the waste carrier and should be checked and signed for by the General Foremen.

All completed WTNs to be handed in at Site Offices / to the SMARTWaste administrator

General Foremen to keep a log of all hazardous waste movements and provide completed CNs and copies of Part E to SMARTWaste administrator>

All WTNs used for the transfer of invasive plant species such as JKW shall be provided to the Env Manager in the first instance to be logged for assurance purposes

All WTNs should be kept for 2 years

4.4.5 Waste Disposal – Hazardous Wastes

The Project Manager, shall provide oversight of hazardous waste storage. Appropriate training will be provided

Waste containers with residual material need to be segregated e.g. aerosols, mastic tubes and any other items should be segregated according to the COSHH segregation charts on display at the COSHH storage/haz waste collection areas

All hazardous waste movements will be recorded on a consignment note provided by the Waste Carrier and should be checked and signed for by the General Foremen.

General Foremen to keep a log of all hazardous waste movements and provide completed CNs and copies of Part E to the SMARTWaste administrator.

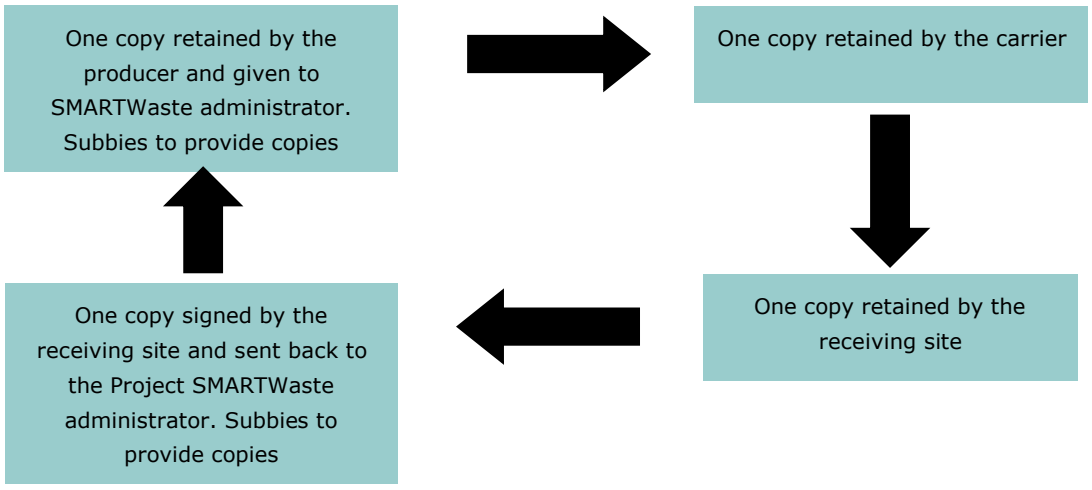
Checks of CNs will be undertaken by the Project SHE Advisor to ensure they contain legally required information. Where necessary, additional training will be provided to personnel signing CNs

Unique Hazardous Waste Premises code for Salisbury River Park shall be KIERIN/SAL (see Guidance here)

All CNs should be kept for 3 years separately from WTNs.

Figure 1 summarises management of quadruplet copies of WTNs and CNs

Figure 1 – Waste Transfer Note and Consignment Note Management



4.4.6 Additional testing

Ground Investigations and associated testing have been used to determine Waste Classification of excavation and demolition arisings. However, additional testing will be required in the following circumstances:

- Localised contamination events e.g. arising from oil spills or landfill leachate. Indicators include:
    - Visual e.g. discolouration of soils, oily sheen from water run off,
    - Smell – e.g. hydrocarbons
- Where materials have been mixed with hazardous materials
    - Mixing hazardous and non-hazardous wastes as a means of treatment is illegal.
    - Mixing will potentially cause a larger volume to be classed as hazardous which will incur increased disposal costs.
- Suspicion of asphalt containing coal tar
    - In the first instance, suspect samples shall be tested using PAK spray.
- Excavated areas are outside boundaries of original GI scope or where key gaps are identified

Tresting Suites should cover the following with testing frequency in line with Kier Materials Characterisation and Classification Guidance (SHEMS-GUI-GR-065b):

- Waste classification – Brownfield suite'
- Asbestos screening with quantification as required
- WAC testing
- Other testing in line with Controlled Waters and Human Health Risk Assessment Screening Values

All contaminated or potentially contaminated materials should be segregated on an impermeable liner and signed appropriately.

The Project SHE Advisor should be informed as soon as possible and additional testing shall be carried out.

Failure to do this may result in mis-classification of waste streams which is a legal offence. The result of sending contaminated materials off site to a location which is not appropriate for storage or treatment may also result in a pollution incident, harm to human health and significantly elevated costs.

4.5 Tree and vegetation management

4.5.1 Introduction and Client Conditions

There are works to carry out to existing trees on site as drawings ENVIMSW002033 -ATK-00-300-DR-L-000001 to 000006. Treatment for Existing Trees.
A significant number of existing trees are to remain and MUST not be damaged. Details of these and associated Root Protection Zones are shown on these drawings.

Protection fencing will be established prior to construction activities. Protection fencing will be erected during the tree works enabling activities where a risk is created to any tree which is to remain or as directed by the arboriculturist.

4.5.2 Key Risks, Mitigation Measures and Monitoring

During the construction phase, the following management measures shall be adopted:

Risk	Mitigation Measures and Monitoring
Damage to retained trees. Ecological impact e.g. to nesting birds and hibernating bats.	• Trees to be retained should be adequately protected by tree protection fencing erected to BS5837:2012 guidelines, at least the calculated distance (from the BS) from the tree to protect the root zones. • Tree Protection fencing is identified on Tree Protection Plans Sheet 1 to 6 ENVIMSW002033-CH2-LL-300-DR-L-1703 to 1708. Tree protection fencing should be clearly marked with signs to ensure all parties are aware of the construction exclusion zone. • All planned tree works and protection of retained trees are to be agreed with the project arboriculturist. • All tree works including tree canopy pruning to facilitate the works are to be undertaken by qualified and competent staff working to BS3998:2010 Tree work – Recommendations. Care is to be taken to avoid damage to retained trees both for the above and below ground parts i.e. branches and roots • ALL vegetation clearance (including ground level clearance) and tree removal shall only be carried out following inspection for nesting birds (if within the nesting season) and for bat potential by an ecologist (ECoW). • Site teams shall be briefed on this requirement during induction
In addition to the points above, the following standards and guidance will be followed / forms used as part of Kier/AECOM Environmental Management System: • Ecology and Biodiversity Standard (SHEMS-STD-GR-063) • Nesting Birds Minimum Standard (SHEMS-MST-GR-0043) • Environmental Guidance Note – Tree and Hedgerow Protection	
Monitoring	

- Monitored through daily checks by site supervisors and through AIRSWEB OSI and SSSIs will cover general good practice principles
- The Project Arboriculturist should be contacted to supervise any tree works
- A nominated supervisor will be made responsible for management of all vegetation clearance and tree works to ensure consistency of approach on site in line with measures identified above and ensuring adequate records are kept. The named supervisor shall liaise with the Project Manager, Arboriculturist and Lead Ecologist to plan and execute works

4.6 Ecology Management

4.6.1 Introduction and Client Conditions

Ecological surveys have identified that there are number of protected species on the site, these include; bats, water voles and the potential for nesting birds. The River Avon System has achieved designation as a Site of Special Scientific Interest (SSSI) and as a Special Area of Conservation (SAC).

The existing wet woodland to the north and north west of Fisherton Recreation area is designated Avon Valley County Wildlife Site (CWR) and Local Nature Reserve (LNR).

Avon Valley Meadows CWR and Local Wildlife Site (LWR) lay to the north of the river.

Working alongside these designated areas and adjacent to/in the River Avon, Summerlock Stream, Mill Stream and several ordinary watercourses require specialist controls.

4.6.2 Key Risks, Mitigation Measures and Monitoring

An Ecological Clerk of Works (ECoW) shall be maintained for all vegetation clearance works and works at Ashley Road that encroach within the River Avon SSSI/SAC for boardwalk/ river viewing platforms and any works within River Avon, Summerlock Stream and Mill Stream channels. These works shall be planned with the Project Manager and ECoW.
Mitigation management measures shall be implemented from the current EAP but shall include:

Risk	Mitigation Measures and Monitoring
Impact on wildlife - general	• Vegetation clearance will be minimised to be of the least extent possible to comply with the drawing requirements. • Trenches and open excavations to be covered, or have a means of escape such as an earth ramp or wooden plank for any wildlife. • If night time work is required, any site illumination will be fully directional to minimise light-spill into adjacent habitat and impacts to disturbance of foraging bats or other animals. Lighting set up to be covered within the RAMS
Water Voles. 	• During tree clearance works an ECoW will be present to ensure methodologies avoid endangering voles and their habitats. • Water voles are to be relocated under licence.

Coarse fish/ salmon 	• In channel works programmed to avoid fish spawning season. • Dewatered sections of River Avon and Summerlock Stream to include a fish rescue operation.
Badgers: disturbance of setts, injury & death 	• No badger setts have been reported within the scheme area The ECoW will carry out a pre-works inspection prior to tree removal/ vegetation clearance to confirm no setts are present. • Should sett(s) be discovered, work shall cease and a programme of licenced works shall be agreed.
Bats: Damage to foraging and commuting routes and damage to potential roost sites. 	• Ecological Assessment by licenced ecologist or accredited agent of bat roost potential in trees to be felled • Trees with low-high bat roost potential to be felled under ecological watching brief in line with Ecological RAMS which shall detail approach to inspection and felling • Adopt lighting management measures as per 4.1.4
Nesting Birds – Disturbance, injury or death to nesting birds (nesting between mid-February and the 31st August.) 	• Tree removal works are programmed to be carried out prior to bird nesting season. • All works to be carried out in line with Kier Nesting Birds Minimum Standard (SHEMS-MST-GR-0043). • Identify all areas to be cleared to programme works from September through to February • Vegetation can still be cleared between the months of mid-February and September under an Ecological watching brief or where an area has been identified as clear of nests within 48 hours • If encountered, nesting birds will be segregated off from works with a 5m exclusion zone around them and a specific briefing given to the workforce regarding the ecological requirements.

Reptiles & amphibians: injury or death  	• Areas for translocation of any finds shall first be identified and enhanced through provision of reptile hibernacula using site won materials such as logs, branches and stone. The hibernacula will then be improved with uncontaminated soil once excavation starts. Locations of hibernacula will be within areas of retained vegetation • Hibernacula shall be marked on the Site Environmental Constraints Plan • Initial clearance works under an Ecological Watch Brief will remove vegetation down to 150mm. Following this, remaining vegetation shall be cut to ground level. • Strimming should be directed from the centre to the edge to encourage any reptiles that may be present to vacate the area, into suitable habitat • Maintain low (<150mm vegetation) cover across works areas prior to construction • In the unlikely event that a Great Crested Newt is discovered during works, work shall stop immediately and the Project Manager or Ecologist shall be informed.
Invasive Species 	• Tree Works are adjacent to areas containing invasive species. Giant Bramble, Wilsons Honeysuckle and Butterfly Bush have been identified. An exclusion zone will be established around these areas. • Should works be required within areas and where finds of further invasive species are noted during the pre-works inspections then eradication or bio-security measures will be adopted to prevent their spread. RAMS for these works will be developed and signed off by the Project Manager / SHE Advisor • All staff shall be briefed on actions and identification of key species during site induction.

In addition to the points above, the following standards and guidance will be followed / forms used as part of Kier Environmental Management System:

- Ecology and Biodiversity Standard (SHEMS-STD-GR-062)
- Risk and Method Statements

Monitoring

- Adherence to control methods shall be monitored through regular site checks including the AIRSWEB OSI and SSI inspection proformas
- A nominated supervisor will be made responsible for management of all vegetation clearance and tree works to ensure consistency of approach on site in line with measures identified above and ensuring adequate records are kept. The named supervisor shall liaise with the Project Manager, ECW and ECoW to plan and execute works

4.7 Pollution Prevention and Management

4.7.1 Introduction and Client Conditions

This section describes the pollution prevention and control measures to be followed by Kier and all subcontractors on this scheme to prevent pollution of the ground, groundwater and surface water features.

Site personnel are briefed to challenge unauthorised personnel and Out of hours security will be in place to prevent pollution due to acts of vandalism.

Requirements set out in this plan are in line with the Kier Pollution Prevention and Nuisance Standard (*SHEMS-STD-GR-064*) and the following Minimum Standards which will be available to site teams.

- SHEMS-MST-CIS-0042 Chemical and Paint Storage
- AppendSHEMS-MST-CIS-0045 Oil and Fuel Storage - above ground
- SHEMS-MST-CIS-0046 Refuelling
- SHEMS-MST-CIS-0041 Concrete washout
- SHEMS-MST-CIS-0010 Hazardous Waste Storage

4.7.2 Conceptual site model

The conceptual model below lists likely Pollution Sources, Pathways and Receptors across Salisbury River Park and will be used to inform pollution prevention and mitigation actions. The model will be updated as construction progresses. Control measures and mitigation are covered in the following section.

The essential requirement of pollution prevention is to break the linkage(s) between pollution sources, pathways and receptors e.g. ban on on-site concrete washout to eliminate a pollution source or blocking drains to prevent washout of contaminants into a stream.

Table 10 – Conceptual Site Model

<Mechanism of discharge>

Source	Pathway	Receptor
Refuelling Hub • spill during re-fuelling of plant • spill during fuelling of diesel tank by fuel supplier • leaking seals/ connections	Direct to ground Groundwater flow Flow of contaminant though or over ground e.g. rainwater run-off and infiltration	Made ground & subsoils Groundwater Summerlock Stream River Avon
Site generators • spill during re-fuelling • damage to fuel lines between cube and generator	Direct to ground Groundwater flow	Made ground & subsoils Groundwater Summerlock Stream

• leaking seals/ connections	Flow of contaminant though or over ground e.g. rainwater run-off and infiltration	River Avon
Private vehicles within Central Car Park – oil & fuels • leaks	Wash across hardstanding to surface water drainage or direct to ground	Made ground & underlying subsoils. River Avon
Hydraulic oils within plant e.g. hoses (biodegradable) • *hose failure* • *vandalism*	Direct to ground Groundwater flow Flow of contaminant though or over ground e.g. rainwater run-off and infiltration	Made ground & subsoils Groundwater Summerlock Stream River Avon
Waste skips • *leaks from liquid disposal*	Direct to ground Groundwater flow Flow of contaminant though or over ground e.g. rainwater run-off and infiltration	Made ground & subsoils Groundwater River Avon
Contaminated spoil stockpiles • *leaching from soils*	Direct to ground Draining to site drainage network	Made ground & underlying subsoils Groundwater
Fuel within equipment - petrol e.g. handheld concrete saw • *leaking fuel tank – condition or impact damage* • *spills during refuelling* • *vandalism*	Direct to ground Groundwater flow Flow of contaminant though or over ground e.g. rainwater run-off and infiltration	Made ground & subsoils Groundwater
Sediment from site *wash-off during rainfall events* *wash-off during flood events* *from mud tracked onto roads*	Wash-off from cleared areas direct to highways drains	Surface water features Highways drains with discharge to River Avon
Landfill leachate • *spill during CFA works* • *direct seepage* • *increased mobilisation associated with works*	Via groundwater seepage Sprayed directly to ground during piling Direct to ground from pipes Direct discharge of poorly treated water from treatment units	Surface water features Made ground & subsoils Groundwater

4.7.3 Drainage plan

- The Site Drainage Plan (
- Appendix 5) forms a key part of pollution/ incident response. The plan shall be used by engineers and site supervisors to plan pollution prevention and controls.

- Within the all compound and works areas, surface water drainage is marked in BLUE

- Where controls are put in place, these shall be notified to the Project Manager and the plans updated

- The plan shall be reviewed by the Project Manager on a regular basis and updated as required. As a minimum the plan shall be updated when drainage arrangements are modified within any works area e.g. temporary or permanent drainage put in

4.7.4 Spill kits

- It is the responsibility of the General Foremen to retain an adequate supply of appropriate spill kits for deployment to site and for restocking of used spill kit materials.

- It is the responsibility of the site supervisors to ensure that appropriate spill kits (i.e. relevant to the risks) will be strategically placed around all work areas with free access maintained at all times.

- Mandatory placement locations include:

    - Adjacent to COSHH stores
    - Within/ adjacent to refuelling area
    - Within/adjacent to plant maintenance area(s)
    - Adjacent to any discharge points to surface water (or nearest secure location) – spill kit shall contain booms sufficient to cover width of ditch/ river

- Mobile spill kits shall also be carried on all main plant

- Spill kit lids shall be secured with a rip tag

- Used materials should be sealed within the bags provided and disposed of in the hazardous waste skip/bin.

- It is the responsibility of the site team to ensure that spill kits are fully restocked after use

- Minimum requirements for spill kit training as established in 3.1.3 also extend to subcontractor supervisors

4.7.5 Oil & Fuel Storage

- For bulk fuel storage, proof of suppliers checks/ inspection shall be request prior to delivery. Thereafter, the General Foreman is responsible for requesting and managing annual service checks. A copy of checks shall be provided to the SHE Advisor

- The Stores Supervisor shall carry out assurance checks on a monthly basis using the Oil Check sheet provided within the Minimum Standard and resolve issues with support from the Works Manager. A copy of the checklist shall be provided to the SHE Advisor

:

4.7.6 Refuelling

- Refuelling that takes place at the site compound will be within the designated and sign-posted refuelling and plant wash-down area. Plant must not be refuelled outside of the bunded area
- Refuelling must be supervised at all times and a plant nappy deployed
- Only static plant shall be refuelled via a mobile fuel bowser
- Refuelling of fuel cubes via tanker shall only be supervised by trained personnel in line with the guidance provided on the fuel cube. IF no instructions are provided, the supplier shall be contacted and instruction requested.

4.7.7 COSHH

- All waste COSHH and packaging (anything with a red hazard symbol) waste should be placed in COSHH bins provided on site. When full, the site supervisor shall arrange for these to be returned to the Stores Supervisor (and swapped out) to be placed in the main haz-waste storage areas.
- Waste liquid COSHH (including part full containers) shall be returned directly to the store-man for storage in the hazardous waste storage areas prior to disposal.
- If a hazardous/COSHH waste bin is found to be full/nearing capacity it shall be reported to the Stores Supervisor who shall arrange for replacement as above
- The Stores Supervisor will act as the nominated CoSHH Coordinator and be responsible for provision of COSHH sheets for COSHH materials issued for use
- COSHH materials should be returned to the stores at the end of the day rather than left out overnight.
- Bunds shall be fitted with an oil filter (see the Kier Spill Products Brochure) for drainage of contaminated water

4.7.8 Equipment and plant

- Subcontractors are responsible for ensuring that all plant and machinery that comes to site is in a state of good repair that that regular checks are undertaken as follows;
    - Pre-deployment checks with certificate/proof of checks from the plant provided to the General Foreman.
    - Daily pre-start checks undertaken by the plant operator

- Prescribed maintenance checks based on hours of operation/mileage

- Biodegradable oil shall be used within all hydraulic systems for all plant.
- Where plant is observed leaking fuel/oil during operation, it shall be shut down and a drip tray/ plant nappy deployed. Where possible, a temporary fix shall be provided until the plant can be removed from site for repair
- All mobile plant shall carry portable spill kits
- Plant shall only be washed down in the designated wash down area (shared with the refuelling area) which have been set up to prevent run off of muddy water and oils in surface water courses

4.7.9 Surface and groundwater (pumping from excavations) management

- Pumping from excavations will be settled prior to discharge to the appropriate water course at Summerlock Stream or the River Avon. Settlement will either be by Siltbuster settlement tank(s), settlement lagoon or sediment sock depending on the relevant excavation.
- For the river channel widening works in Central Car Park a 'dry' channel will be formed by diverting flows to the Mill Stream. A downstream dam will be established at Avon Approach Bridge. Over-pumping of this dam will be necessary to deal with water ingress from ground water and lateral connections that cannot be diverted/sealed. The made ground within the car park has been identified as contaminated in various locations. Over-pumping must not take place whilst or after excavation of these locations until water quality test results are available which will include phosphate levels.
- Any in-channel works which may mobilise silts (eg berm construction in Mill Stream) will require special consideration given to the potential for phosphate release.
- Any discharges of surface water from consolidated foundation works ie concrete lined/ not in direct ground contact or areas of hardstanding may take place direct to ground or surface water drainage network providing there is no sign of contamination e.g. hydrocarbons. Where there is evidence of hydrocarbon contamination e.g. an oil sheen, water shall be discharged via an oil & sediment 'sock' . See Kier Pollution Prevention Brochure

4.7.9.1 Water Quality Monitoring

Water quality monitoring shall be established at the following locations with all samples sent to a UKAS certified lab.

Table 11 - Discharge Quality Monitoring

Sampling location	Frequency	Analytical Determinants	Responsibility	Records Managed by
Baseline upstream of Swimming Pool Gate and downstream of Avon Approach Bridge	Prior to commencement and weekly during and after works	TBC based on EA permit conditions	Named person TBC	Project Manager
Baseline upstream of new Summerlock channel offtake and downstream at Summerlock Bridge and Ashley Road Open Space	Prior to commencement and weekly during and after works	TBC based on EA permit conditions	Named person TBC	

4.7.10 Concrete Washout

- There shall be NO washout of concrete wash waters either to ground or surface waters including site drains
- Concrete washout of chutes only shall use the minimum volume of water possible and use the concrete washout facilities set up on site as shown on the site plan line with Kier Concrete Washout Minimum standard SHEMS-MST-GR-0041

4.7.11 Road Sweeper arisings

- Option 1 – sweepers discharge direct to nearest licenced facility
- Option 2 – establish sweeper arisings facility on site e.g Kelly Sweepers offer a full solution including dewatering of arisings and permitted discharge
- Option 3 – hire local sweeper company and make use of proprietary dewatering units e.g. Siltbuster and operate under Environment Agency RPS 65. Disposal of solid waste to permitted contractor

4.8 Pollution response

4.8.1 Critical Actions

The key elements of pollution response are:

- ELIMINATE any source of ignition
- **STOP** the source of pollution e.g. seal the leak
- **CONTAIN** the spread of any pollutant e.g. use of spill granules, soil bunds to prevent spill reaching drains or watercourse, drain covers, oil booms
- **NOTIFY** the site supervisor will escalate the notification as described below for minor or major incidents
- CLEAN UP after assessing the risk. Any materials used to contain or clean up a fuel /oil spill should be classed as hazardous waste and should be disposed of in hazardous waste bags provided with the spill kits and then disposed of in the hazardous waste skip in the main compound.

While training will be provided it is the responsibility of all site operatives to familiarise themselves with spill kits within their works areas and ensure these are full of required equipment

4.8.2 Emergency Response – large scale spillages

For large scale spillages, contact Adler and Allan who are a UK Spill Association accredited contractor who are working in partnership with Kier. They provide 24 hours a day, 7 days a week spill response services and have nationwide coverage.

A three-step incident response service is available for spills that cannot be contained or cleaned up using site teams and equipment:

Step 1: Report Call 0800 592 827: experienced incident advisors will provide free initial telephone advice to help manage the situation.

Step 2: Respond If the spillage requires further intervention, the response team can mobilise to site to provide specialist assistance. Whilst the team is en-route, telephone support will continue to be available.

Step 3: Restore The call out team will thoroughly remediate and restore the site leaving the impacted area safe and hazard-free.

- For spills where further additional support is required, the General Foreman, HSE Advisor or Project Manager should call Adler & Allan
- In the absence of any of the above, all site supervisors are authorised to call Adler & Allan for support
- Adler & Allan should be provided with the following information:

Adler & Allan

0800 592 827

- Location
- Cause
- Receptor e.g. river, ground, drainage
- Extent of pollution
- Substance involved and quantity
- Support required

4.8.3 Training

Spill response training is available via Darcy as set out in the Darcy/Kier Spill Training Brochure

As per the targets established in 3.1.3, it is a minimum requirement for all site supervisors (black hats), including subcontractors to receive spill training within the first 6 months of project start date.

An accredited Train the Trainer course is also available and it is recommended that a number of supervisors receive this training to then provide further training to site operatives

Boom deployment and equipment for a full river response training will be given.

Training shall be organised by the Environment Manager with support of the Project Manager as the target owner

4.9 Flood Risk

4.9.1 Introduction and Client Conditions

A Flood Risk Activity Permit will be required for all works.

7. Salisbury River Park will registered on the High-risk site log by the EA PM.
8. Sign up for the GOV.UK flood warnings via the below website:
    a. https://www.gov.uk/sign-up-for-flood-warnings
    b. You can get alerts via phone call and text.
9. Register for the Flood Guidance Statement 10 day flood forecast from the Flood Forecasting Centre:
    a. http://www.ffc-environment-agency.metoffice.gov.uk/services/request.html
10. Complete a Flood contingency plan. Consider the following:
    a. Contingency measures required in the event we need to react to a potential flood event.
    b. Actions points – is this a level or will it be based on a forecast?
    c. Who is responsible for making the decision to implement our flood mitigation procedures
11. Monitor the weather forecast.
12. If significant rain is forecast request the 2 day 24hr rainfall data from the EA Senior User/ FIDO.

4.9.2 Key Risks, Mitigation Measures and Monitoring

As a general control measure, in-channel works will be carried out in summer months between 1July and 31 October.

Additionally, the Kier Project Manager and General Foremen will subscribe to the EA flood and weather warning service to assist with works planning and/or site evacuation as necessary.

Risk	Mitigation Measures and Monitoring
Impact on flood plain capacity	• Stockpiles of material will be planned and managed to limit storage volumes on the floodplain. • Temporary access roads shall be completed at grade to ensure it does not impede flow of water across the flood plain • Use of site security measures or other non-mobile equipment needs to consider rapid deconstruction or mobility in the event of heightened flood risk and flood response measures considered as part of RAMS e.g. disconnect Heras panels so water flows past rather than pushing panels down

Impact on water quality & impact on works	• All plant shall use biodegradable hydraulic oils • Spill kits with suitable materials to be deployed over the watercourse to prevent downstream migration of pollutants shall be kept in close proximity to works. • Use of site security measures or other non-mobile equipment needs to consider rapid deconstruction or mobility in the event of heightened flood risk and flood response measures considered as part of RAMS • Plant will be brought back into the site compounds at night time and over weekend periods • All plant should be fuelled in the main site compound within the provided facilities. • Dewatering of less than 50m3 day is permitted providing discharge is pumped directly to surface water. All discharge pipes must have a silt settlement facilities and oil sock fitted and not cause scour or sediment mobilisation from the receiving water body https://www.legislation.gov.uk/uksi/2017/1044/regulation/5/made
Supporting information on Flood Risk Activity Permits is provided in the Kier Environmental Permits and Authorisations Guidance (SHEMS-GUI-GR-300)	
Monitoring	
• The General Foremen and SHE team will provide assurance through regular site visits and inspections that the above measures are being implemented.	

4.10 Historic Environment

4.10.1 Introduction and Client Conditions

- Archaeological fieldwork has been undertaken at Fisherton Recreation Ground/ Ashley Road.
- An archaeological watching brief will be present during the Central Car Park/ the Maltings works as the River Terrace gravel layers or peat layers are excavated.

4.10.2 Key Risks, Mitigation Measures and Monitoring

Further investigation is planned prior to works but following this, there remains the possibility of finds. The following additional mitigation measures shall therefore be adopted.

Risk	Mitigation Measures and Monitoring
Impact on archaeological remains	• Excavation works within Central Car park/ the Maltings shall be carried out under archaeological watching brief from Wessex Archaeology Ltd in line with excavation guidance provided by them. • RAMS for excavations work in these areas shall be informed by consultation with the supervising archaeologist • Site supervisors & operatives working in these areas shall also be provided a TBT by the supervising archaeologist prior to start of works • In the event of any finds, works shall stop immediately and the Project Manager informed.
Measures outlined above are in line with the Kier Archaeology & heritage Standard (SHEMS-STD-GR-060)	
Monitoring	
• The General Foreman and SHE Advisor will provide assurance through regular site visits and inspections that the above measures are being implemented.	

APPENDICES

Appendix 1 – Kier Sustainability Policy

POL-GR-002
Sustainability Policy.p

Appendix 2 – Project Aspects & Impacts Assessment

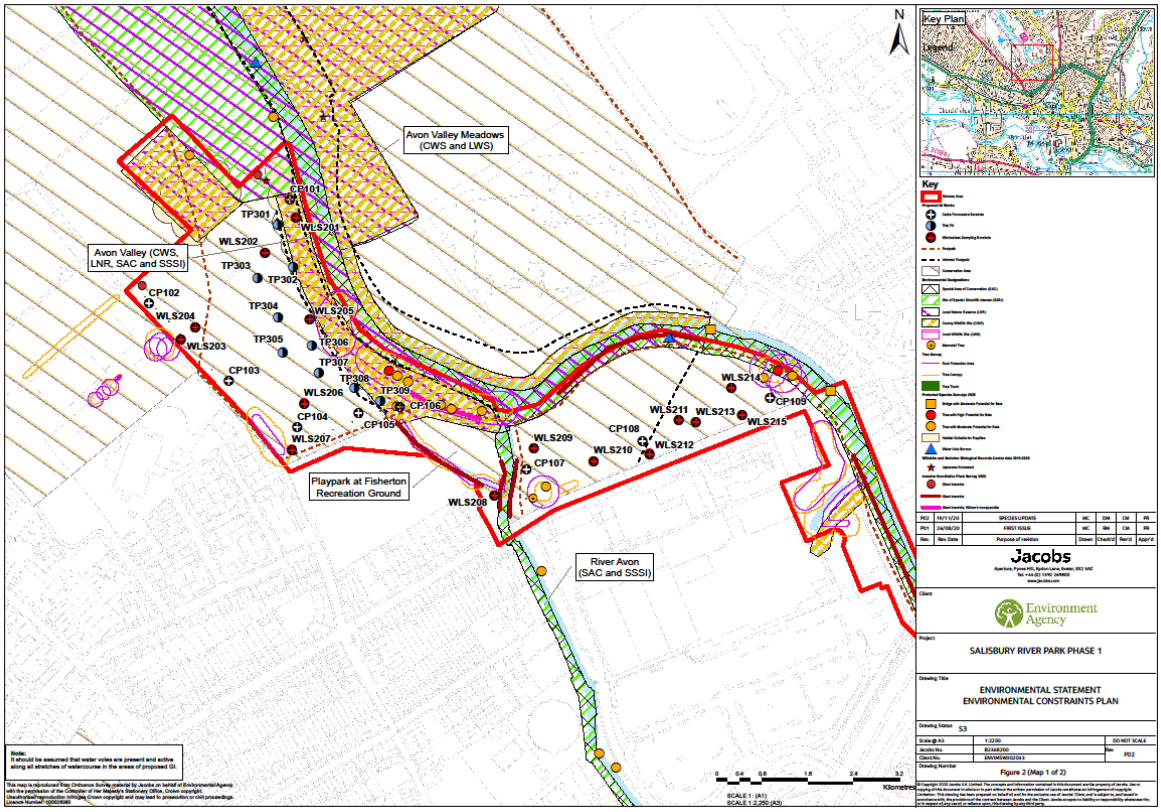
The project aspects and impacts assessment needs to be reviewed every 6 months or when any project changes occur.

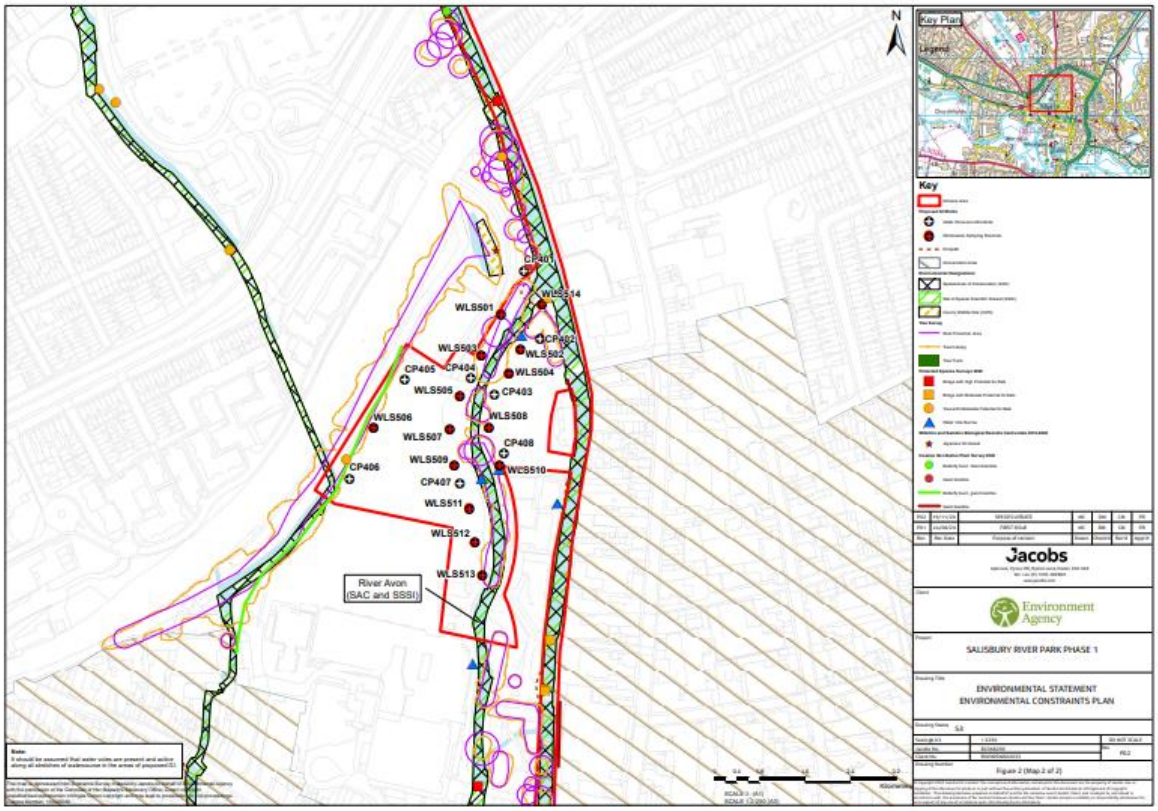
Salisbury River Park Environmental Aspect

Appendix 3 – Risk & Opportunity Assessment

SHEMS-FOR-INF-070
Environmental Risk A

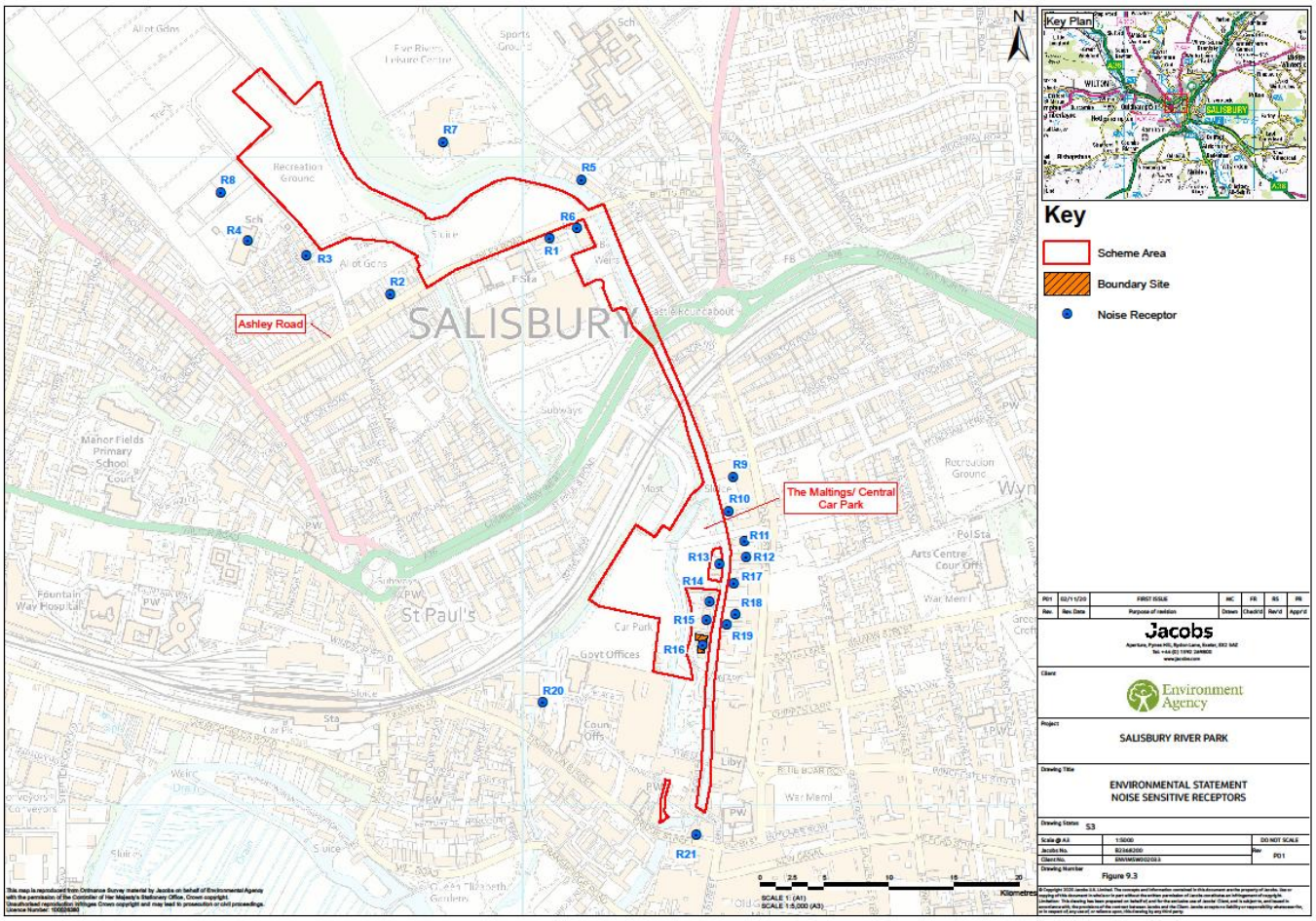
Appendix 4 – Site Constraints Plan (small scale)





ENVIMSW002033-C
H2-ZZ-300-AS-EN-11

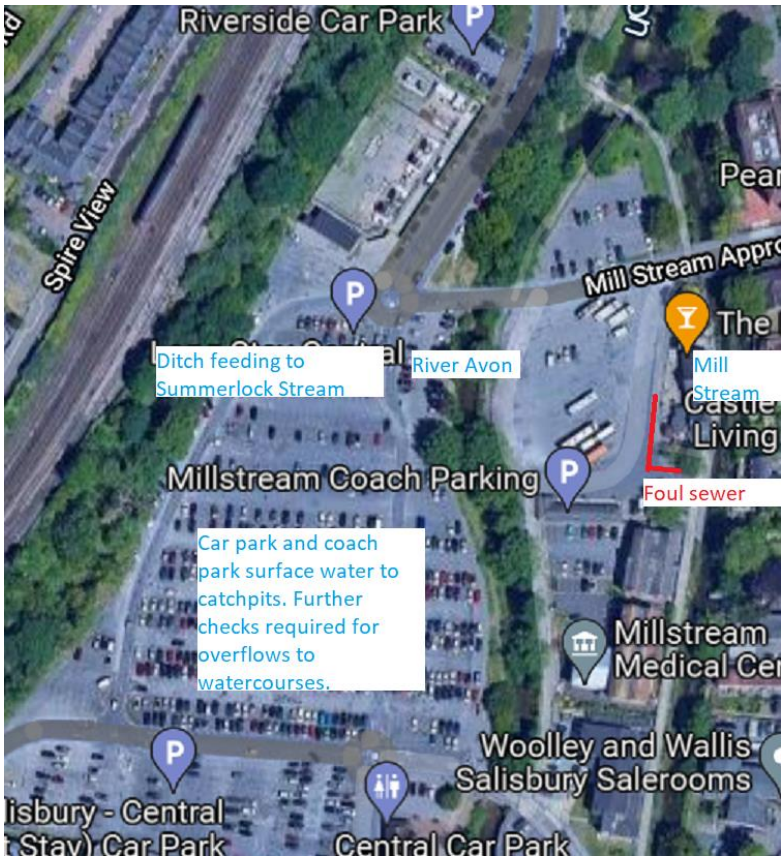
Noise receptors and estimated construction noise levels. Plan to be included in Subcontractor RAMS with agreed times of operation.



Appendix 5 – Site Drainage Plans

Ashley Road Drainage Plan.

Central Car Park Drainage Plan



Appendix 6 – Construction Dust Assessment.

NA-Appendix L Construction Dust Ass

Dust assessment and receptors

NA-CONSTRUCTION DUST ASSESSMENT F

Appendix 7 – Environmental Action Plan.

ENVIMSW002033-AT
K-ZZ-300-RP-EN-000

Permit with introductory note

The Environmental Permitting (England & Wales) Regulations 2016

Kier Integrated Services Limited

Flood risk activities comprising construction of two permanent culvert systems, flood embankment and walls, control weir structure, permanent ground level raising, modifications to the River Avon Main channel, two temporary bridges, retaining wall, wetlands area, control structure, offtake, permanent bridge, footbridge and associated temporary sheet piled cofferdams and walls

National Grid References: SU1368831102 to SU1424030244

River Avon: North of Fisherton Recreation Area to Avon Approach Bridge (SU 14275 30468) and Summerlock Stream: Ashley Road Open Space, Salisbury from Blackwell Hatches to Summerlock Bridge (SU13855 30895)

Permit number

EPR/VB3359ME

Introductory note

This introductory note does not form a part of the permit

The main features of the permit are as follows.

Flood risk activities comprising construction of two permanent culvert systems, flood embankment and walls, control weir structure, permanent ground level raising, modifications to the River Avon Main channel, two temporary bridges, retaining wall, wetlands area, control structure, offtake, permanent bridge, footbridge and associated temporary sheet piled cofferdams and walls.

The status log of the permit does not form part of the permit. It sets out the permitting history, including changes to the permit or permit reference number.

Status log of the permit		
Description	**Date**	**Comments**
Application EPR/VB3359ME	Duly made 08/04/22	Application for construction of two permanent culvert systems, flood embankment and walls, control weir structure, permanent ground level raising, modifications to the River Avon Main channel, two temporary bridges, retaining wall, wetlands area, control structure, offtake, permanent bridge, footbridge and associated temporary sheet piled cofferdams and walls
Permit determined EPR/VB3359ME	20/06/2022	Permit issued to Kier Integrated Services Limited

End of introductory note

Permit

The Environmental Permitting (England and Wales) Regulations 2016

Permit number

EPR/VB3359ME

The Environment Agency hereby authorises, under regulation 13 of the Environmental Permitting (England and Wales) Regulations 2016

Kier Integrated Services Limited ("the operator")

whose registered office is

2nd Floor,
Optimum House,
Clippers Quay,
Salford,
England,
M50 3XP

company registration number 00873179

to operate the following flood risk activities:

- New Summerlock Stream offtake at Ashley Road site,
- Construction of retaining wall at Ashley Road site,
- Creation of wetlands area at Ashley Road site,
- Construction of flood embankment and flood walls at Ashley Road site,
- Installation of Summerlock Stream control structure at Ashley Road site,
- Temporary bridge across Summerlock Stream at Ashley Road site,
- Temporary sheet piled cofferdam at Ashley Road site,
- Replacement of hatches for two culverts at Ashley Road site,
- Temporary bridge across River Avon at Central Car Park site,
- Modifications to the River Avon Main channel at Central Car Park site,
- Temporary sheet piled wall and cofferdam at Central Car Park site,
- Construction of control weir structure at Central Car Park site,
- Construction of new Mill Stream approach bridge at Central Car Park site,
- Coach Park land raising at Central Car Park site,
- Twin floodway culverts at Central Car Park site, and
- Installation of footbridge south of Coach Park at Central Car Park site

at

National Grid References: SU1368831102 to SU1424030244

to the extent authorised by and subject to the conditions of this permit.

Name	**Date**
 **Johnathan Austin** **FCRM Directorate**	**20/06/2022**

Authorised on behalf of the Environment Agency

Conditions

1 Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:

(a) in accordance with a written management system that identifies and minimises risks of flooding, impact on drainage and environmental harm so far as is reasonably practicable, including those risks arising from operations, maintenance, accidents, incidents, non-conformances and those drawn to the attention of the operator as a result of complaints; and

(b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of the permit.

2 Operations

2.1 Permitted activities

2.1.1 The operator is only authorised to carry out the activities specified in schedule 1 table S1.1 (the "activities").

2.2 The site

2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 2 to this permit and showing National Grid References SU1368831102, SU1427530468 and SU1424030244.

2.3 Operating techniques

2.3.1 The operator shall use appropriate measures, including but not limited to those in the approved Method of Work.

(a) to minimise sediment mobilisation

(b) to minimise impact on biodiversity

(c) to ensure there is no increase to flood risk or detrimental impact on drainage;

(d) for the storage and disposal or waste produced; and

(e) to prevent and minimise environmental harm.

2.3.2 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

2.3.3 Measures shall be taken to ensure that the activities do not cause the spread of invasive non-native species or plant or animal diseases.

2.3.4 The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by the Environment Agency.

2.3.5 The Operator shall register with the Environment Agency to receive flood warnings for the duration of the activities and (a) take all necessary steps, including appropriate mitigation measures, to ensure that the activities do not result in an unacceptable increase in flood risk to any third party (b) if requested by the Environment Agency, remove any structure from the watercourse within 2 hours

2.3.6 If materials or equipment are washed downstream, the operator shall use best endeavours to recover lost materials and equipment once any flood water has receded.

2.3.7 The activities shall be undertaken outside of the period 1st November to 30th April to protect fisheries on the river.

3 Information

3.1 Records

3.1.1 All records required to be made by this permit shall:

(a) be legible;

(b) be made as soon as reasonably practicable;

(c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and

(d) be retained, unless otherwise agreed in writing by the Environment Agency, for at least 6 years from the date when the records were made.

3.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by the Environment Agency.

3.2 Reporting

3.2.1 The operator shall send all reports and notifications required by the permit to the Environment Agency using the contact details supplied in writing by the Environment Agency.

3.3 Notifications

3.3.1 The Environment Agency shall be notified no less than 7 days before the commencement of the activities.

3.3.2 The Environment Agency shall be notified no less than 7 days after the activities are completed.

3.3.3 The Environment Agency shall be notified without delay following the detection of any breach of a limit specified in the permit or any significant environmental effects resulting from the activities or of any breach of the permit.

3.3.4 Written confirmation of actual or potential incidents or effects and breaches referred to in 3.3.3 shall be submitted within 24 hours.

3.3.5 The Environment Agency shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

(a) any change in the operator's trading name, registered name or registered office address; and

(b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

Where the operator is a corporate body other than a registered company:

(a) any change in the operator's name or address; and

(b) any steps taken with a view to the dissolution of the operator.

In any other case:

(a) the death of any of the named operators (where the operator consists of more than one named individual);

(b) any change in the operator's name(s) or address(es); and

(c) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

3.3.6 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for flood risk, drainage or the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

(a) the Environment Agency shall be notified at least 14 days before making the change; and

(b) the notification shall contain a description of the proposed change in operation.

3.4 Interpretation

3.4.1 In this permit the expressions listed in schedule 3 shall have the meaning given in that schedule.

3.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "without delay", in which case it may be provided by telephone.

3.4.3 Any reference to a distance of a number of metres from a flood defence structure, drainage work, remote defence or sea defence is a reference to that distance as measured from the foot of the foregoing as the case may be.

3.4.4 Any reference to a distance of a number of metres from a river control work is a reference to that distance as measured from the nearest part of the river control work.

3.4.5 Any reference to a distance of a number of metres from a watercourse is a reference to that distance as measured horizontally from the foot of the bank on the landward side of the watercourse

Schedule 1 – Operations

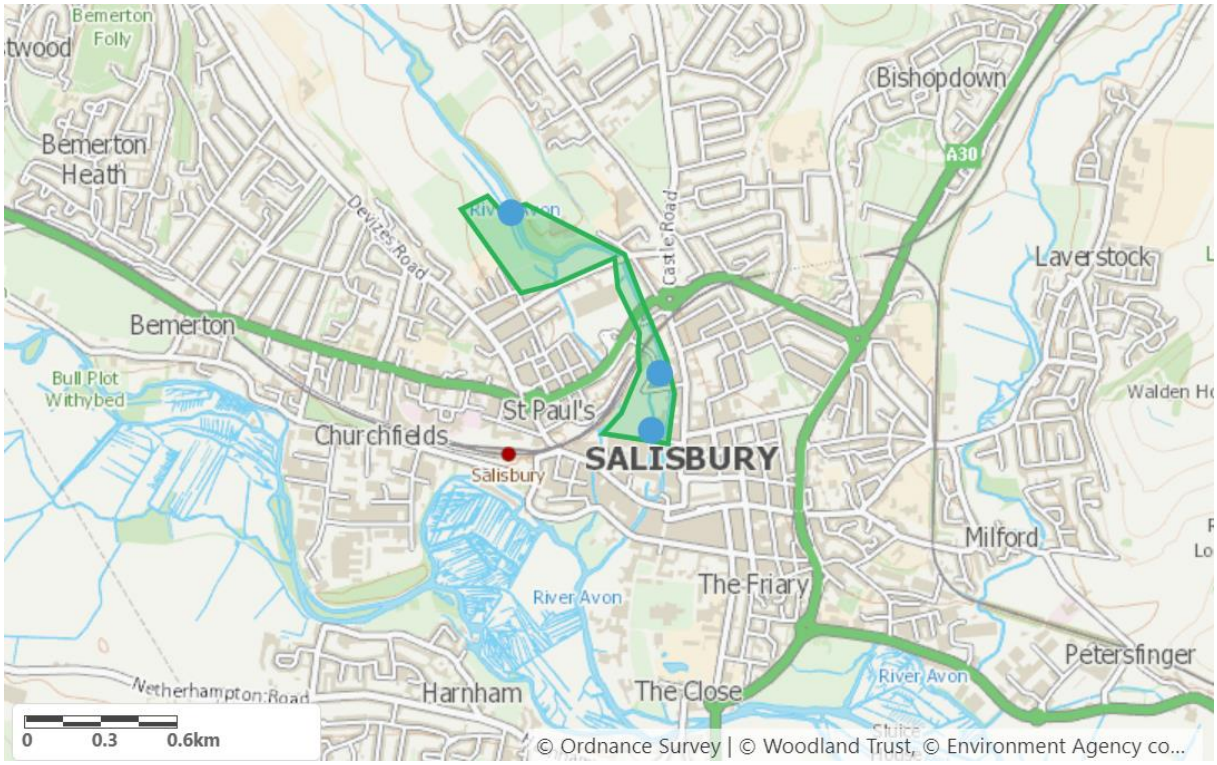
Table S1.1 activities		
Activity reference	**Description of activities**	**Limits of activities**
	Permanent Works	
P1	New Summerlock Stream offtake at Ashley Road site, Construction of retaining wall at Ashley Road site, Creation of wetlands area at Ashley Road site, Construction of flood embankment and flood walls at Ashley Road site, Installation of Summerlock Stream control structure at Ashley Road site, Replacement of hatches for two culverts at Ashley Road site, Modifications to the River Avon Main channel at Central Car Park site, Construction of control weir structure at Central Car Park site, Construction of new Mill Stream approach bridge at Central Car Park site, Coach Park land raising at Central Car Park site, Twin floodway culverts at Central Car Park site, and Installation of footbridge south of Coach Park at Central Car Park site.	The activities shall be commenced within 3 years of the date of the grant of the permit and completed within 3 years of commencement. The activities shall be carried out in accordance with: - The application form dated: 01/04/22. - Drawing No's (dated 01/04/22): - ENVIMSW002033-ATK-00-300-DR-C-000001 - ENVIMSW002033-ATK-00-300-DR-C-000008 - ENVIMSW002033-ATK-00-300-DR-RE-000001 - ENVIMSW002033-ATK-00-3AR-DR-C-000032 - ENVIMSW002033-ATK-00-3AR-DR-C-000033 - ENVIMSW002033-ATK-00-3AR-DR-C-000034 - ENVIMSW002033-ATK-00-3AR-DR-C-000035 - ENVIMSW002033-ATK-00-3AR-DR-C-000036 - ENVIMSW002033-ATK-00-3AR-DR-C-000037 - ENVIMSW002033-ATK-00-3AR-DR-C-000042 - ENVIMSW002033-ATK-00-3AR-DR-C-000043 - ENVIMSW002033-ATK-00-3AR-DR-C-000044 - ENVIMSW002033-ATK-00-3AR-DR-C-000048 - ENVIMSW002033-ATK-00-3AR-DR-C-000049 - ENVIMSW002033-ATK-00-3AR-DR-C-000050 - ENVIMSW002033-ATK-00-3AR-DR-C-000051 - ENVIMSW002033-ATK-00-3AR-DR-C-000052 - ENVIMSW002033-ATK-00-3AR-DR-C-000063 - ENVIMSW002033-ATK-00-3AR-DR-C-000053 - ENVIMSW002033-ATK-00-3AR-DR-C-000040 - ENVIMSW002033-ATK-00-3AR-DR-C-000073 - ENVIMSW002033-ATK-00-3AR-DR-C-000074 - ENVIMSW002033-ATK-00-3AR-DR-C-000038 - ENVIMSW002033-ATK-00-3AR-DR-C-000039 - ENVIMSW002033-ATK-00-3AR-DR-C-000047 - ENVIMSW002033-ATK-00-3AR-DR-C-000010 - ENVIMSW002033-ATK-00-3AR-DR-C-000011 - ENVIMSW002033-ATK-00-3AR-DR-C-000012 - ENVIMSW002033-ATK-00-3AR-DR-C-000013 - ENVIMSW002033-ATK-00-3AR-DR-C-000031 - ENVIMSW002033-ATK-00-3AR-DR-C-000041 - ENVIMSW002033-ATK-00-3AR-DR-C-000046 - ENVIMSW 002033-ATK-00-3AR-DR-C-000007 - ENVIMSW 002033-ATK-00-3AR-DR-C-000008 - ENVIMSW002033-ATK-00-3AR-DR-C-000058 - ENVIMSW002033-ATK-00-3AR-DR-C-000059 - ENVIMSW002033-ATK-00-3AR-DR-C-000060 - ENVIMSW002033-ATK-00-3AR-DR-C-000061

Table S1.1 activities		
Activity reference	**Description of activities**	**Limits of activities**
		- ENVIMSW002033-ATK-00-3AR-DR-C-000067 - ENVIMSW002033-ATK-00-3AR-DR-C-000068 - ENVIMSW002033-ATK-00-3CC-DR-C-000080 - ENVIMSW002033-ATK-00-3CC-DR-C-000081 - ENVIMSW002033-ATK-00-3CC-DR-C-000082 - ENVIMSW002033-ATK-00-3CC-DR-C-000083 - ENVIMSW002033-ATK-00-3CC-DR-C-000084 - ENVIMSW002033-ATK-00-3CC-DR-C-000085 - ENVIMSW002033-ATK-00-3CC-DR-C-000088 - ENVIMSW002033-ATK-00-3CC-DR-C-000089 - ENVIMSW002033-ATK-00-3CC-DR-C-000090 - ENVIMSW002033-ATK-00-3CC-DR-C-000101 - ENVIMSW002033-ATK-00-3CC-DR-C-000086 - ENVIMSW002033-ATK-00-3CC-DR-C-000087 - ENVIMSW002033-ATK-00-3CC-DR-RE-000001 - ENVIMSW002033-ATK-00-3CC-DR-RE-000002 - ENVIMSW002033-ATK-00-3CC-DR-RE-000003 - ENVIMSW002033-ATK-00-3CC-DR-RE-000006 - ENVIMSW002033-ATK-00-3CC-DR-RE-000008 - ENVIMSW002033-ATK-SW-3CC-DR-C-000001 - ENVIMSW 002033-ATK-00-3CC-DR-C-000014 - ENVIMSW 002033-ATK-00-3CC-DR-C-000015 - ENVIMSW 002033-ATK-00-3CC-DR-C-000016 - ENVIMSW 002033-ATK-00-3CC-DR-C-000017 - ENVIMSW 002033-ATK-00-3CC-DR-C-000018 - ENVIMSW 002033-ATK-00-3CC-DR-C-000020 - ENVIMSW 002033-ATK-00-3CC-DR-C-000106 - ENVIMSW002033-ATK-00-3CC-DR-C-000091 - ENVIMSW002033-ATK-00-3CC-DR-C-000092 - ENVIMSW 002033-ATK-00-3CC-DR-C-000104 - ENVIMSW 002033-ATK-RB-3AR-DR-C-000001 - ENVIMSW002033-ATK-RB-3AR-DR-C-000001 - ENVIMSW 002033-ATK-RB-3CC-DR-C-000001 - ENVIMSW 002033-ATK-RB-3CC-DR-C-000010 - Environmental Risk Assessment, dated: 01/04/22 - Flood Risk Assessment, dated: 01/04/22 - Conditions agreed in correspondence, dated 13/05/22: Response to request for further information from applicant - Piling details, dated 20/05/22 - Culvert details, dated 01/06/22 and 10/06/22
	Temporary or enabling works	
T1	Temporary bridge across Summerlock Stream at Ashley Road site, Temporary sheet piled cofferdam at Ashley Road site, Temporary bridge across River Avon at Central Car Park site, and	The activity shall be commenced within 3 years of the date of the grant of the permit and completed within 3 years of commencement. - The application form dated: 01/04/22. - Ashley Road Temporary Works and CCP Temporary Works Drawing's, dated 01/04/22.

Table S1.1 activities		
Activity reference	**Description of activities**	**Limits of activities**
	Temporary sheet piled wall and cofferdam at Central Car Park site.	The top level of the dewatering structures shall be below the level of the top of the bank.

Table S1.2 Operating techniques			
Requirement	**Measures (if measures are specified)**	**Document reference**	**Date Received**
Condition 2.3.1	Approved Method of Work	CDF028-4	01/04/22

Schedule 2 – Site Plan



Schedule 3 – Interpretation

“application” means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations.

“authorised officer” means any person authorised by the Environment Agency under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

“EP Regulations” means The Environmental Permitting (England and Wales) Regulations SI 2016 No.1154 and words and expressions used in this permit which are also used in the Regulations have the same meanings as in those Regulations.

“main river” means a watercourse or part of a watercourse designated as main river on the statutory main river map held by the Environment Agency.

“Method of Work” means a document forming part of the operator’s management system, setting out the working methods for carrying out the activity and what measures will be taken to avoid or minimise the risks of environmental effects.

“approved Method of Work” means the operator’s Method of Work approved by the Environment Agency

“environmental effects” means:

(a) flooding or risk of flooding;

(b) harm to the environment or risk of harm to the environment; and

(c) detrimental impact on drainage or risk of detrimental impact on drainage.

“environmental harm” means a result of human activity which may:

(a) cause harm to the conservation, protection and enhancement of any species and habitats designated under any enactment as having special protection or priority;

(b) prevent the achievement of environmental objectives within the meaning of the Water Framework Directive 2000/60/EC;

(c) cause pollution; or

(d) otherwise adversely affect the protection and enhancement of the environment.

END OF PERMIT

National Environmental Assessment Service (NEAS)

Internal Environmental Assessment

Environmental Action Plan

Project Name	Salisbury River Park Phase 1 Scheme
Project Reference	ENVIMSW002033
Area	South West
Date	28 January 2022
Version Number	5
Author	Heather Coutts (Atkins)

Revision Date	Summary of Changes	Author	Version Number
1 Feb 2021	First Issue	R Shaw/C Morgan	0
26 July 2021	Second issue	H Coutts	2
10 November 2021	Third issue - for enabling works only	H Coutts	3
09 December 2021	Fourth Issue - following regular EAP review	H Coutts	4
28 January 2022	Fifth Issue - following regular EAP review	H Coutts	5

Name	Signature	Title	Date	Version

Stuart Hedgecott	S Hedgecott	Senior Associate Director Environment, Jacobs	3/2/2021 - updated March 21	1
Heather Coutts	H Coutts	Principal Environmental Consultant, Atkins	09/12/2021	4
Heather Coutts	H Coutts	Principal Environmental Consultant, Atkins	28/01/2022	5

Revision History

EAP Approvals

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 *Environmental Statement (ES)* that has been prepared following Environment Agency Operational Instructions. 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 Tables 2 to 4 has one named person (see Table 1) 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.

NEAS 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 EMS. The environmental clerk of works (ECW) 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.

Table 1: Roles and Responsible Parties

Role / Responsible Party	Representative	Contact Details
Environment Agency Area Client	Andy Wallis	Flood Risk Management Technical Advisor Dorset and Wiltshire Partnership & Strategic Overview team Mobile: 07757703594 Email: Andy.Wallis@environment-agency.gov.uk
Environment Agency Project Manager	Mike Porter	Programme & Contract Management and NEAS, Part of Operations Assets & Programme Management Tel: 020302 59360 Mobile: 07776 162281 Email: mike.porter@environment-agency.gov.uk
Environment Agency NEAS Officer	Jessica Dunston	Environmental Project Manager, National Environmental Assessment and Sustainability (NEAS) Mobile: 07867 372980 Email: jessica.dunston@environment-agency.gov.uk
Consultant Project Manager	Sarah Rouse	TBC
Consultant Environmental Clerk of Works (ECW)	TBC	TBC
Consultants Environment Lead	Heather Coutts	TBC
Principal Contractor	Kier	Mike Barron (Project Manager). Tel: 07740394629 Kevin Tregoning (Senior Planner). Tel 07811008167 Sub-contractor to be confirmed

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 ECW 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 ECW 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

This version (version 4) of the EAP relates only to the initial phase of vegetation clearance that is required as part of the construction enabling works. The vegetation is to be undertaken in January 2022 in advance of the main construction works. However to provide context, information about the whole Salisbury River Park Phase 1 Scheme has been retained within this version (version 4) of the EAP.

Background

The 'Salisbury River Park Phase 1 Scheme' (hereafter referred to as the 'Scheme') comprises the construction of flood defence embankments and walls, flood control measures, new bridges and culverts and river channel modifications to provide improved flood defence to people and property in Salisbury. The design also incorporates improved green space for recreational use, provides opportunities for biodiversity that are designed to ensure a net gain in habitat and improved fish passage, and enhanced routes for pedestrians and cyclists that are accessible for all groups of people.

At Ashley Road Open Space and Fisherton Recreation Ground we will:

- build a new embankment and flood wall to reduce flood risk to properties to the south;
- create a new channel and wetland wildlife area through Fisherton Recreation Ground connecting the River Avon and Summerlock Stream. During drier periods and low river flows, water will be restricted to the new channel. When flow in the River Avon is high, water will spill out of the new wetland to cover areas of grassland between the wetland and the proposed flood defences;
- infill a short section of Summerlock Stream that is no longer required;
- build new footpaths and a new cycle track to maintain and improve existing public access, including a new bridge over the new channel and new boardwalks;
- replace the play park at Fisherton Recreation Ground with a new one at Ashley Road Open Space;
- improve landscaping and vegetation along the west/south bank of the River Avon; and
- enhance public access to the river corridor e.g. with new viewing platforms and beaches.

At the Maltings and Central Car Park area we will:

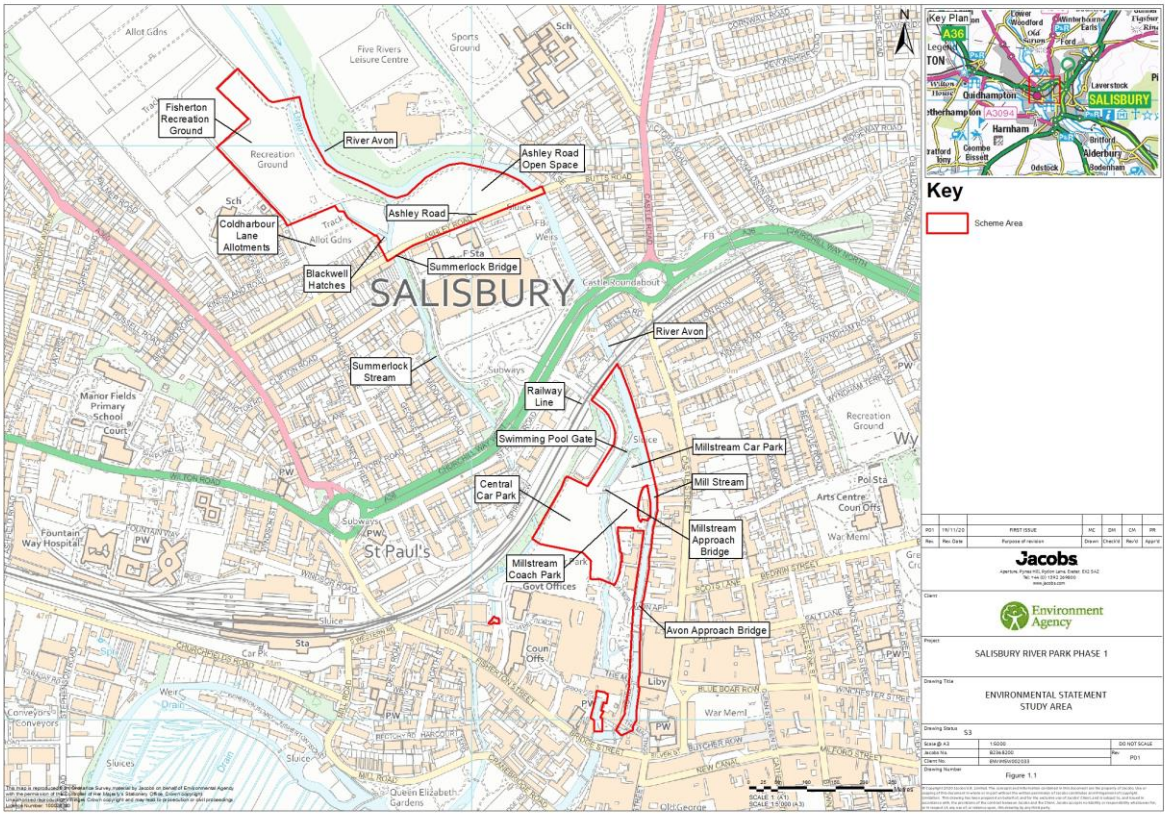
- widen the River Avon to create a 40-50m corridor that can hold more water. This river park corridor will provide new spaces for public enjoyment and benefit wildlife by improving river habitat and including undisturbed wildlife areas;
- create a new mini park for public use on what is currently Millstream car park;
- remove the existing barrier known as Swimming Pool Gate which controls the split of flow between Mill Stream and the River Avon. Instead a series of rock weirs will be built to provide a more gradual drop in water level and allow migrating fish to move upstream more easily;
- reduce the width of Mill Stream channel in a few locations to improve river water flow which is currently low flowing
- improve the existing fish pass at Bishops Mill;

- improve public access to the river in specific areas where it will not disturb wildlife;
- replace Millstream Approach road bridge over the River Avon with a new wider bridge a short distance to the north to span the widened channel;
- replace existing footbridge at Swimming Pool Gate with new wider bridge to accommodate pedestrians and cyclists
- provide a new pedestrian footbridge at the southern end of coach park on the east of the river to provide access to the new river park on the west;
- improve existing footpaths and cycle paths throughout the area, with segregated paths where possible.

Location

The footprint of the Scheme encompasses areas of the River Avon's floodplain in central Salisbury that are susceptible to flooding, and extends from land in the Ashley Road area to The Maltings and Central Car Park area, which is situated approximately 500m further south (see Figure 1).

Figure 1: Study area for the Scheme



Programme

A detailed construction programme will be developed during the detailed design stage of the Scheme, which will minimise disruption to residents, tourists and businesses in Salisbury, particularly those using the river corridor, and to avoid impacting on known protected species and fish. We estimate that the main earthworks associated with the Scheme will take two years (between 2022 and 2023).

Key ecological timings to be considered in advance of construction include: -

- Water vole displacement (Ashley Road area): 15 February to 15 April (using Natural England Conservation licence) or 15 September to 30 November (using Natural England class licence)
- Water vole translocation (Maltings and Central Car Park area): 1 March to 15 April (as last resort 15 September to 30 November)
- Vegetation clearance to avoid impacts on breeding birds: October to February
- In channel works to avoid impacts on fisheries: July to October
- Eradication/removal of invasive species: October to April

The draft construction programme is summarised below: -

Ashley Road area:

- January to March 2022 - there will be several months before the main works start when the contractor will be setting up facilities in the Scheme area including diverting/protecting services, carrying out environmental mitigation works including memorial tree replanting and tree felling and shrub clearance.
- Spring 2022 - the contractor will start to set up the site and install a site compound on Ashley Road Open Space (see Section 3.2.1).
- Spring to Summer 2022 (until the weather deteriorates) - construction of Summerlock offtake structure including footbridge and landscaping, flood embankments and access ramps and flood walls. Earthworks and start of new offtake channel and wetland habitat creation.
- Spring to Summer 2023 - continuation of earthworks, offtake channel and wetland habitat creation.
- Summer to Winter 2023 - completion of the earthworks and landscaping.

Maltings and Central Car Park area

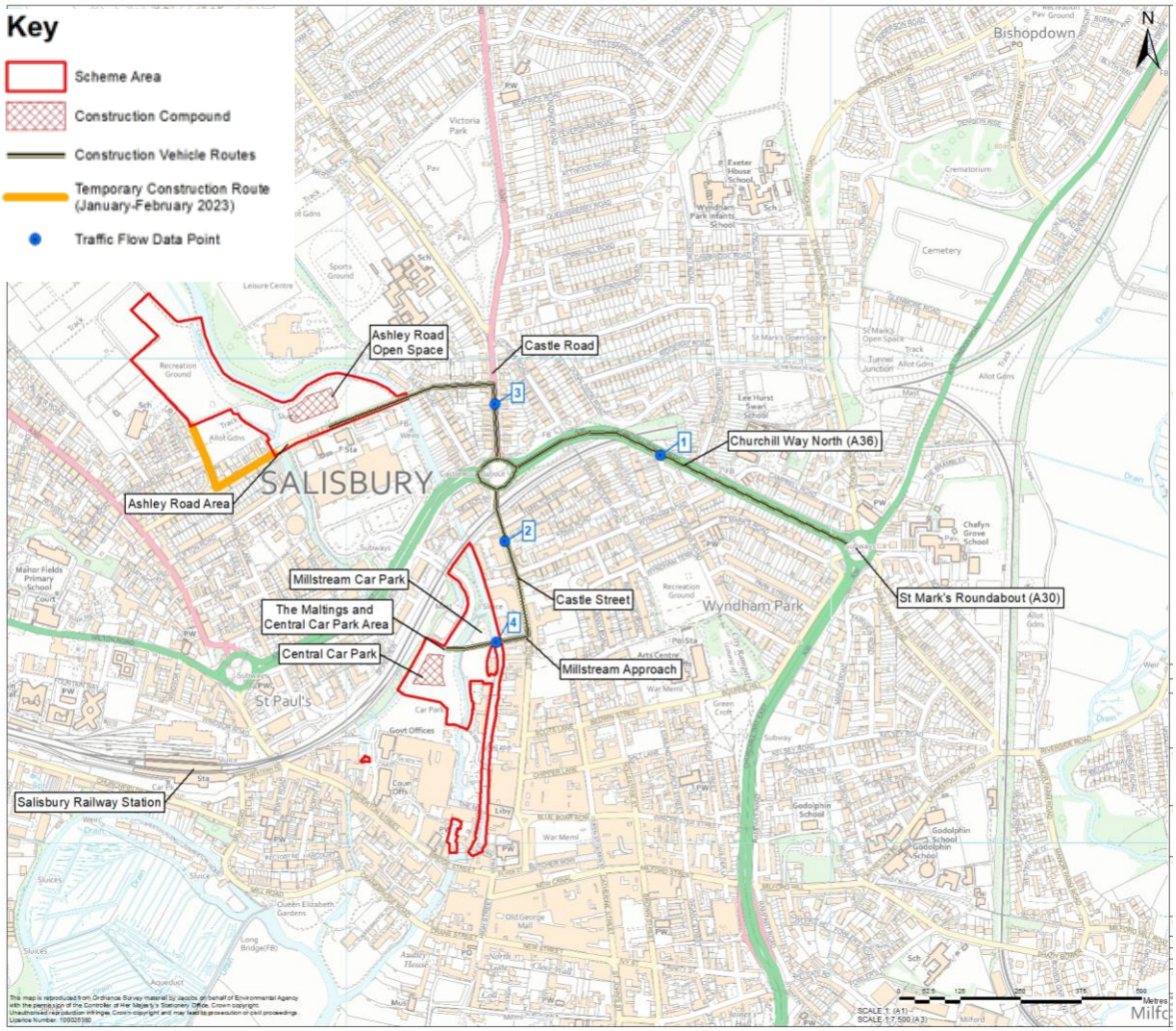
- January to July 2022 - there will be several months before the main works start when the contractor will be setting up facilities in the Scheme area including diverting/protecting services, carrying out environmental mitigation works including tree felling and shrub clearance.
- June to August 2022 - the contractor will set up the site in the Maltings and Central Car Park area including boundary fencing and temporary river crossing.
- July 2022 to June 2023 - river corridor works in the Maltings and Central Car Park area including closure of the River Avon, earthworks, extension of culverts to move the Waitrose outfall and construction of the new Millstream Approach Bridge.
- Winter 2022 to Spring 2023 – high level culverts and road works connecting the new Mill Stream Approach Bridge will be undertaken in the Maltings/Central Car Park area.
- Summer to Winter 2023 - completion of the river channel improvement works in the Mill Stream and Fisherton Street area.

It is planned that all the main works will be within the summer months when there is less risk of high flows and wet ground conditions, which could affect construction activities and increase the risk of soil and sediment mobilisation.

The normal working hours for the construction of the Scheme will be 7.00am to 6.00pm Monday to Friday (with piling works restricted to 8.00am – 6.00pm Monday to Friday). We will avoid construction activities at weekends, Public Holidays and during special events/festivals other than in emergency or other exceptional circumstances.

Detailed site management plans will be prepared by the Contractor in advance of the construction works, and these will include arrangements for traffic management, delivery of materials and equipment to the various working areas and site compounds. The haul routes and provisional locations of the primary site compounds (subject to agreement with stakeholders and landowners) are shown on Figure 2.

Figure 2: Indicative site compound locations and construction access



A draft Construction Traffic Management Plan is provided in Appendix P1, which will be updated during the detailed design stage of the Scheme.

The proposed Scheme will employ up to 35 staff on site at peak time during construction of the Scheme.

Some temporary lighting will be required during construction of the Scheme at the site compounds and around Millstream Approach Bridge.

Full details of the works including plans, method statements and programme can be found in the contract documents prepared by the contractor (when available). These should be reviewed by the ECW prior to works starting on site.

Environmental Action Plan

Tables 2 to 4 summarise the specific actions required to avoid, reduce or minimise environmental impacts that may be experienced during the works.

As this version of the EAP (version 4) only relates to the vegetation clearance element of the enabling works, relevant actions have been highlighted in bold text in Tables 2 to 4 for clarity. All other actions in the tables are retained for information only, and are not relevant to the vegetation clearance works.

The tables are designed to assist in the effective management of environmental risks associated with the works and ensure protection of the environment.

Landscape masterplans showing the proposed Scheme are available as Appendix E2 of the Environmental Statement. A detailed Environmental Constraints Plan to support the EAP tables will be prepared during the detailed design stage of the Scheme.

Table 2: Environmental Action Plan: PRE-CONSTRUCTION

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
A1	**To ensure that the actions within this EAP are fully implemented**	**An Environmental Clerk of Works (ECW) will be appointed in advance of any vegetation clearance or enabling, and in advance of the main phase of construction works to oversee the implementation of the EAP.**	**Environment Agency Project Manager**		**Appointed, expected to be in role by 28/01/22**	
A2	Adhere to any conditions of the Planning Permission	Ensure the Consultant's Environment Lead updates the EAP with any planning conditions that are specific to environmental management.	Environment Agency Project Manager			
A3	Agree post-construction monitoring to ensure that identified mitigation measures achieve their target outcomes	Develop a detailed five-year monitoring plan together with roles, responsibilities and timescales, for discussion and agreement with affected landowners and conservation organisation in advance of the works. The monitoring plan will cover memorial trees, open public space, habitat including trees, invasive and protected species and changes to river flow, river channels and sediment erosion/ingress.	Environment Agency Project Manager	See Table 15.1 in ES for draft post-construction monitoring plan	To be incorporated into the Landscape and Ecological Monitoring Plan (LEMP) required by planning condition. Refer to new action [REF TBC]	
A4	**Ensure the works are appropriately programmed**	**Ensure that the Contractor plans the construction programme in accordance with any seasonal and ecological**	**Environment Agency Project Manager**			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
		restrictions identified in the earlier 'Programme' section of this EAP.				
Local community						
A5	**Minimise disruption to local residents, visitors, users of public open space, and businesses from noise, vibration, access restrictions and dust during construction**	**Appoint a Public Liaison Officer to address local community concerns.**	**Contractor**		**Role to be fulfilled by Mike Barron on site, and Andy Wallis (pre-construction/ enabling works). PLO to be appointed for main works**	
A6	**Minimise disruption to local residents, visitors, users of public open space, and businesses from noise, vibration, access restrictions and dust during construction**	**Throughout the detailed design, continue to liaise with affected residents, the public and businesses of the nature and timing of construction activities through agreed communications channels including newsletters in advance of the works.**	**Environment Agency Project Manager**	**Environment Agency Project Manager will confirm agreed communication channels for the construction stage**		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
A7	Minimise disruption to allotment holders at Coldharbour Lane allotments and users of the allotment shop	During detailed design, inform allotment holders of nature and timing of construction activities in advance of construction, and changes to access and informal parking area (adjacent to Coldharbour Lane) for use by visitors to the allotment shop.	Environment Agency Project Manager	Environment Agency Project Manager will confirm changes to access and parking during the detailed design stage		
A8	Minimise impacts on transport routes, coach users and Millstream Coach Park	Continue to consult public transport providers and Millstream Coach Park in advance of construction about changes to coach parking and transport routes during construction.	Contractor			
A9	**Successfully translocate two memorial trees in the Ashley Road area**	**Agree with arboriculturist during detailed design whether it will be possible to translocate two memorial trees at the start of the construction works or whether the trees will require replacement.**	**Consultant**		**Confirmed that translocation not possible. Trees to be replaced. Communciati-ons with tree owners held**	**27/01/22**
A10	**Successfully translocate two memorial trees in the Ashley Road area**	**If agreed that translocation is possible, translocate the memorial trees as part of the vegetation clearance works.**	**Contractor**		**No longer applicable, sign off**	**27/01/22**
A11	**To ensure that ashes scattered**	**Regardless of decision for replacement or replanting, soil from around the base**	**Contractor**		**Soil collection from**	

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	beneath memorial trees are retained	of the trees is to be collected and stored in a sealed container, and retained to pass on to the owners of the trees.			memorial tree in Ashley Road has been arranged. Not applicable to second memorial tree.	
A12	To protect third memorial tree (retained) in Fisherton Recreation Ground	Ensure that the third memorial tree located at the 'upstream' end of the line of Poplars is protected, and access to it is retained as far as possible during works.	Contractor			
Noise and vibration						
A13	Minimise construction noise levels to the local community	Programme and phase the works over a number of stages to restrict impacts within any one area to the minimum time.	Contractor	See Chapter 6 of ES	In progress	
A14	Minimise construction noise levels to the local community	During any pre-construction works, ensure all activities adhere to agreed working hours as defined in the Summary at the start of this document.	Contractor	This action relates only to initial phase of vegetation clearance and other enabling works taking	Working hours have been included in the CEMP and in all site documentation	

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
				place pre-construction.		
A15	**Ensure action is taken to address any noise concerns raised by the local community**	**During any pre-construction works, maintain a representative on site during working hours to answer queries or address any concerns expressed.**	**Contractor**	**See Chapter 6 of ES** **This action relates only to initial phase of vegetation clearance and other enabling works taking place pre-construction.**	**Paul Gardiner (Kier) to be full time on site during enabling works as main point of contact.**	
A16	Minimise construction noise levels to the local community	Agree requirements for 'noise and vibration monitoring and control strategy' with Wiltshire Council before the start of construction.	Environment Agency Project Manager	Expected to be a planning condition. Details of condition to be negotiated with Wiltshire Council. Refer to Planning Decision Notice received 15/11/21	Action closed. No condition on noise has been received with the grant of planning. Noise management will be managed through the CEMP, and monitoring will not be required.	09/12/21

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
A17	Minimise construction noise levels to the local community	'Noise and vibration monitoring and control strategy' to be prepared and submitted for approval. Draft strategy to be provided to NEAS for review by EA FBG team prior to formal submission.	Contractor	Refer to Planning Decision Notice received 15/11/21	To be managed through the CEMP, which will be sent to NEAS and FBG for review/approval.	
Recreation and access						
A18	Minimise disruption to users of Public Rights of Way (PRoW), informal paths, cycleways and open space.	Inform local communities about the proposed haulage routes and working areas through signage and webpage updates. Information for the signage/webpage updates to be provided by Kier.	Environment Agency Project Manager	See Chapter 7 of ES		
A19	**Minimise disruption to users of Public Rights of Way (PRoW), informal paths, cycleways and open space.**	**Place notices on PRoW immediately adjacent to the proposed haulage routes and working areas prior to the construction period to notify users of these PRoW.**	**Contractor**	**See Chapter 7 of ES** **This action also applies to any initial phase of vegetation clearance and other enabling works taking place pre-construction.**	**Complete - Notices placed on site w/c 10/01/22**	**27/01/22**

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
A20	Minimise disruption to users of PRoW, informal paths, cycleways and open space.	Continue to work with Wiltshire Council PRoW officer to pre-agree appropriate closure/diversion routes for footpaths and cycleways, submit permanent PRoW diversion applications and provide signage prior to closures/diversion.	Environment Agency Project Manager - permanent diversions		COMPLETED Order for permanent diversions submitted 19/04/21, confirmed following grant of planning	
A21	**Minimise disruption to users of PRoW**	**For any required temporary PRoW diversions lasting up to 6 months, submit temporary PRoW diversion applications (Temporary Traffic Regulation Orders) to Wiltshire Council at least 10-12 weeks in advance of requirement.** **Allow two week advance notice period for closure.**	**Contractor - temporary diversions**		**Complete - confirmation of applications received, Orders start from 07/02/22**	**27/01/22**
A22	Minimise disruption to users of PRoW, informal paths, cycleways and open space.	Plan phasing of the works so all access points to the River Avon corridor in the Maltings and Central Car Park area will not be affected simultaneously.	Contractor	See Chapter 7 of ES		
Landscape and visual amenity						
A23	Maintain long-term visual appearance of Scheme area and ensure habitats	Ensure the Consultant's Environment Lead finalises the Landscape (and Habitat) Management Plan, in consultation with	Environment Agency Project Manager	This will now be covered by the		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	are appropriately managed.	Natural England and Wiltshire Council Planning Authority.		LEMP (required by planning condition)		
A24	**Protect retained trees and vegetation**	**Follow BS 3998:2010 for all tree works and BS5837: 2012 guidelines when working close to trees and shrubs and erecting tree protection fencing.** **Demarcate root protection zones and protect retained trees with suitable barriers or other measures in line with the Tree Protection Plans.**	**Contractor**	**See Appendix G of ES for Tree Protection Plans and Arboricultural Method Statement.** **This action relates to initial phase of vegetation clearance and other enabling works taking place pre-construction.**	**Following site meeting with arboricultural consultant (06/12/21), it is confirmed that tree protection for vegetation clearance works is not required.** **Requirements for utility works to be determined once utility design is complete**	
A25	Protect retained trees and vegetation	Following outcomes of site meeting with arboriculturalist (06/12/21), Tree Protection Plans to be updated to reflect changes for detailed design.	Consultant			
Flora and fauna						
A26	**Minimise adverse impacts on flora**	**If this role is not covered by the overarching Environmental Clerk of**	**Contractor**		**Sam Lloyd (ADAS)**	**27/01/22**

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	and fauna during pre-construction/ enabling works	**Works, appoint a suitably qualified ecologist to supervise the vegetation clearance and construction works, and provide specific advice on ecological issues.**			**appointed as ECoW via HiLine Ecology**	
A27	**Minimise adverse impacts on flora and fauna during pre-construction/ enabling works**	**The appointed ecologist will undertake a pre-construction site walkover survey of all working areas (including access and compounds) to verify the relevant ecological constraints associated with the works.**	**Contractor**		**Walkover took place 17/01/22**	**27/01/22**
A28	Enable future monitoring of changes to designated habitats and newly created habitat	Agree monitoring plan with Natural England during detailed design. Include triggers in the plan for actions, should they be needed and include links to the Habitat and Landscape Management Plan, as required.	Environment Agency Project Manager	See Section 15.4 of ES - draft post-construction monitoring plan		
A29	Avoid adverse impacts on designated conservation sites (River Avon SAC/River Avon System SSSI)	Monitor water levels in proposed wet woodland area (to be continued during construction) due to continuity with wetland north of Scheme area.	Environment Agency Project Manager	Understood to be covered by existing groundwater monitoring programme		
A30	Avoid adverse impacts on designated conservation sites (River Avon	Through detailed design, contingency plan for new wet woodland should there be a risk of sustained change. Actions identified to be included in the LEMP for the Scheme.	Atkins landscape / river restoration team			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	SAC/River Avon System SSSI)					
A31	Avoid adverse impacts from recreational disturbance post-completion on new channel, new wetland and widened river	Agree with Natural England during detailed design the locations of designated public access points to the river, and any measures needed to discourage access in wildlife areas. These discussions are to be covered as an item in the final Design Workshops in December 2021.	Atkins Environmental Lead		Depending on agreement with Natural England during detailed design, further measures may be needed to deter/prevent public access at particular points to the river.	
A32	**Minimise adverse impacts on flora and fauna during pre-construction/ enabling works**	**Use existing access tracks and roads as far as possible when undertaking vegetation clearance work.**	**Contractor**	**See Chapter 9 of ES**	**Confirmed - existing tracks are being used where possible for enabling works**	
A33	**Avoid spread of (and eradicate where possible) invasive species during pre-**	**Implement measures to eradicate and control the spread of invasive non-native species within Scheme area when undertaking vegetation clearance work**	**Contractor**	**See Appendix F10 of ES - Invasive Species Survey Report**	**ECoW advising on suitable avoidance for enabling works**	

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	construction/ enabling works					
A34	Avoid killing or injuring any reptiles and amphibians during pre-construction/ enabling works.	As part of vegetation clearance, the appointed ecologist will supervise phased strimming in areas of dense vegetation with an initial cut above ground level. Dismantle all potentially suitable hibernacula by hand and check for amphibians.	Contractor	See Chapter 9 of ES	To be supervised by ECoW during enabling works	
A35	Avoid killing or injuring any reptiles and amphibians during pre-construction/ enabling works.	If amphibians are found during the vegetation clearance works when there is no appointed ecologist on site, move them off-site to a pre-determined safe waterbody or refuge in consultation with the appointed ecologist.	Contractor		In unlikely event that suspected great crested newt is found, stop work immediately and consult ECW.	
A36	Avoid disturbance to breeding birds from vegetation clearance	Remove all vegetation outside of the bird breeding season (March – August). If breeding birds, or nests (including the beginnings of a nest) are found during the vegetation clearance or other enabling works, stop all work in the vicinity and consult the appointed ecologist	Contractor	See Chapter 9 of ES	Works due to commence 31/01/22	

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
A37	**Avoid impacts on waterbirds**	**During vegetation clearance, the appointed ecologist will identify where within the working area there is potentially sensitive/valuable vegetation overhanging the watercourse (which may act as kingfisher perch sites) that should be retained, where possible.**	**Contractor**	**See Chapter 9 in ES and Appendix F4 Kingfisher Report**		
A38	**Avoid impacts on waterbirds**	**Retain vegetation overhanging watercourses where possible as they may act as kingfisher perch sites.**	**Contractor**	**See Chapter 9 in ES and Appendix F4 Kingfisher Report**		
A39	**Avoid harm to badgers**	**Should any potential setts be discovered during the vegetation clearance or other enabling works, cease works and seek advice from the appointed ecologist.**	**Contractor**	**See Chapter 9 of ES**		
A40	Avoid disturbance to badgers that may be present in unsurveyed areas	Ensure a survey is undertaken within 30m of areas where no previous access was granted and update the existing mitigation plan for badgers to provide advice on course of action if any setts are discovered.	Atkins Env lead	Specific to the works and access routes at the railway embankment north of Central Car Park. See Chapter 9 of ES	Survey completed 17/11/21. No evidence of badger setts found.	
A41	**Avoid disturbance to roosting and foraging bats.**	**Prior to the commencement of any vegetation clearance or tree works, ensure a licenced bat worker carries out a pre-works internal check of all trees within the Ashley Road Maltings and**	**Contractor**	**See Appendix F6 of ES - Ground Based Bat Tree Assessment, Secondary Bat**	**Endoscope checks have not been completed in advance of**	

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
		Central Car Park area with moderate or high potential to support bat roosts, to determine if any further bat assessment or mitigation is needed. **It is recommended that this check is undertaken at least 4 weeks in advance of any vegetation clearance starting.**		**Survey and Bat Transect and Passive Bat Detector Survey Reports**	**works (delay risk recognised). Checks to be done immediately in advance of tree removal.**	
A42	Avoid disturbance to roosting and foraging bats.	Prepare and agree a construction site lighting plan with an experienced ecologist to avoid impacts on foraging bats.	Contractor	See Appendix F6 of ES - Bat Transect and Passive Bat Detector Survey Report		
A43	**Avoid disturbance to otters and their resting sites.**	**Ensure that the appointed ecologist carries out a pre-construction survey of all watercourses on site for otter holts and lying-up sites that may have developed since the previous survey, in advance of site clearance works.**	**Contractor**	**See Chapter 9 of ES**	**Depending on the findings of the survey, additional measures to mitigate impacts may need to be included in this EAP.** **Check anticipated to be undertaken 31/01/21**	

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
A44	**Avoid harm to water voles**	**The appointed ecologist will review the locations of trees proposed to be removed within 5m of any watercourse bank and advise of any further actions that are required to protect water voles.** **Any trees to be felled within 5m of any watercourse bank will have stumps left in place above existing ground level, and their roots are not to be disturbed or removed.**	**Contractor**	**This action relates to pre-construction vegetation clearance / enabling works only, which are due to take place in advance of any water vole mitigation undertaken under licence.**		
A45	**Avoid harm to water voles**	**No compounds, plant or machinery is to be situated within 5m of the top of a watercourse bank.** **Any trees to be felled within 5m of the top of any watercourse bank will be felled by workers operating on foot only, unless the location and surrounding bank has been checked for water vole burrows by the appointed ecologist (and confirmed that none are present).**	**Contractor**	**This action relates to pre-construction vegetation clearance / enabling works only, which are due to take place in advance of any water vole mitigation undertaken under licence.**		
A46	Avoid harm to water voles	Ensure that a Water vole license holder develops a water vole method statement in summer 2021 including the identification and securing of a suitable receptor site with	Atkins Environmental Lead	See Appendix F12 of ES - Water Vole	The water vole licence holder	

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
		associated survey of water voles, assessment and survey of mink population and creation/enhancement of habitat suitability.		Method Statement/ Mitigation Strategy	needs to be confirmed.	
A47	Avoid harm to water voles	Ensure that a Water vole license holder relocates water voles in the Maltings and Central Car Park area by trapping and translocation prior to the construction works.	Environment Agency Project Manager	See Appendix F12 of ES - Water Vole Method Statement/ Mitigation Strategy	The water vole licence holder needs to be confirmed.	
A48	Avoid harm to water voles	Ensure that a Water vole license holder surveys for water voles in Spring 2021 in footprint of culverted floodway on Network Rail land where no previous access was granted	Environment Agency Project Manager	To be covered by initial walkover survey by Atkins of NR land.	Survey completed 17/11/21. No evidence of badger setts found.	
A49	Avoid harm to water voles	Ensure that a Water vole license holder displaces water voles in the Ashley Road area in line with the method statement, where construction works including vegetation clearance will be undertaken. This includes around the proposed installation of the viewing platforms and new Summerlock offtake channel, plus an additional 5m buffer.	Environment Agency Project Manager	See Appendix F12 of ES - Water Vole Method Statement/ Mitigation Strategy	The water vole licence holder needs to be confirmed.	
A50	Avoid physical harm and behavioural disturbance to fish	Programme in-channel works to summer months (July to end of October). Should any piling be needed adjacent to the channel outside of these months, a specific risk assessment will be produced to ensure	Contractor			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
		that there is no impact on salmonid reproduction.				
A51	**Minimise impacts on habitats to be retained**	**Return disturbed habitats in temporary working areas to their original condition or better as quickly as possible to minimise loss of key floral species (through colonisation by opportunistic species)**	**Contractor**	**This action relates to pre-construction vegetation clearance / enabling works.**		
Water and hydromorphology						
A52	Assess water quality risks associated with mobilisation and deposition of sediment in watercourses	Carry out a sediment assessment to inform where, when and how sediment needs to be managed and agree proposed sediment management with Natural England.	Environment Agency Project Manager	See Chapter 10 of ES	Establish sediment quantities in different reaches, integrity of each sediment store and levels of priority substances and phosphate.	
A53	**Reduce risk of surface water flooding**	**Register for Flood Warnings and ensure that no equipment or potentially polluting materials are left at risk of flooding. Prepare and review Flood Management Plan.**	**Contractor**	**See Chapter 10 of ES** **This action also relates to pre-construction vegetation**	**Site registered for enabling works.**	

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
				clearance / enabling works as well as main construction phase.		
A54	Manage groundwater flooding and/or seepage associated with flood defences in the Ashley Road area	Analyse findings of ground investigation and high-resolution groundwater monitoring to identify groundwater levels and drainage requirements to manage groundwater levels and optimum design for sub-surface structures.	Atkins Project Manager		Depending on the findings of the investigations, additional measures to manage groundwater drainage (potentially including pumping from sumps) will need to be identified.	
A55	**Protect surface water and groundwater quality**	**Produce a Pollution Response Plan to include communication lines and responses to any silt related incidents.**	**Contractor**	**See Chapter 10 of ES** **This action relates to pre-construction vegetation clearance / enabling works as well as the**	**Incorporated to CEMP and CPP.**	

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
				main construction phase.		
A56	**Minimise the risk of pollution to surface water and groundwater quality during pre-construction and enabling works.**	**Ensure all pre-construction activities adhere to best practice measures, including former pollution prevention guidelines and the Pollution Response Plan.** **Restrict refuelling of vehicles and machinery to designated areas (which do not drain to ground or watercourse), and store all fuels, oils, hydraulic fluids and chemicals within secondary containment (e.g. drip-trays or bunds) at least 10m away from riverbanks.** **Provide toolbox talks about the risks of water pollution and suitable controls.**	**Contractor**	**See Chapter 10 of ES**		
A57	Protect surface water and groundwater quality	Produce a Surface Water Management Plan with measures to control site drainage, to minimise site runoff, treatment of water prior to discharge and considerations to manage silt and leachate generation.	Contractor		Mitigation agreed with Natural England to manage sediment in the River Avon and Mill Stream in line with the findings of the sediment	

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
					assessment will need to be included in the Surface Water Management Plan.	
A58	Protect surface water and groundwater quality	Ensure Consultant finalises the details of the groundwater and surface water monitoring programme for the works in consultation with Natural England, with control/trigger levels for level and quality	Consultant Environmental Lead			
A59	Protect surface water and groundwater quality	Consultant to review current LQRA and determine if any further actions or recommendations are required.	Atkins Project Manager			
A60	Protect surface water and groundwater quality	Subject to review of LQRA, produce a groundwater risk assessment/remediation strategy to address risks to groundwater quality from contamination in soils and groundwater.	TBC			
A61	Protect surface water and groundwater quality	Contractor's groundwater risk assessment/remediation strategy to be approved by EA (with input from EA technical specialists as required).	Environment Agency Project Manager			
A62	Assess the risk of contamination movement during piling.	Carry out a Piling Risk Assessment (necessary to secure an Environmental Permit for the works) prior to piling	Consultant's Project Manager	See Chapter 10 of ES		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
Historic environment						
A63	Minimise impacts on buried archaeology and geoarchaeology	Prepare archaeological impact assessment to present findings from geotechnical investigations in Ashley Road area and the Maltings and Central Car Park area (capturing geoarchaeological information) and geophysical survey and agree appropriate precautionary mitigation measures with Wiltshire Council's archaeologist.	Environment Agency Project Manager	See Chapter 11 and Appendix I of ES (Heritage Desk-Based Assessment and Geophysical Survey)		
A64	Ensure designed Scheme is in keeping and maximises benefits to the architectural and historical interest of the Salisbury Conservation Area.	Liaise with the Conservation and Landscape Officers at Wiltshire Council to agree materials and finishes proposed during the detailed design of the Scheme. These discussions are to be covered as an item in the final Design Workshop planned with the Landscape Officer in December 2021.	Environment Agency Project Manager	See Chapter 11 and Appendix I of ES (Heritage Desk-Based Assessment)		
Traffic and transport						
A65	Minimise construction related traffic impacts on local road users, residents and businesses	Establish a Transport Management Working Group (TMWG) comprising the Environment Agency Project Manager (during construction) and all the heads of the individual contractors employed during the construction of the Scheme.	Contractor	See Chapter 12 of ES		
A66	Ensure sustainable modes of transport	Prepare a robust Travel Plan that promotes use of sustainable transport modes such as	Contractor	See Chapter 12 of ES		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	are used during construction of the Scheme, wherever possible.	walking, cycling and public transport as an effective means of managing the impact of development on the road network.				
A67	Minimise construction related traffic impacts on local road users, residents and businesses	Update and agree full Construction Traffic Management Plan with highway authorities.	Contractor	See Appendix P1 of ES - Outline CTMP		
Sustainable use of land						
A68	Minimise damage to soils and ground conditions and protect water quality	Develop a Soil Management Plan to outline how soils will be stored (stockpiling), measures to manage dust generation and how soils will be protected during construction of the Scheme.	Contractor	See Chapter 13 of ES		
A69	Ensure success of proposed landscaping/habitat creation	Carry out nutrient testing and soil resource survey during detailed design to help understand the fertility of the existing soils (to include assessment of topsoil depths, soil structure, anerobism, plasticity, drainage characteristics, and soil sampling for laboratory testing). Depending on the findings of the survey, develop soil strategy to ensure suitable soil is available to ensure the success of proposed landscaping/habitat creation.	Atkins Project Manager			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
A70	Minimise damage to soils	Programme the majority of earth movements and soil handling for between late May and October when the soils are likely to be drier, as far as is practically possible.	Contractor			
Air quality						
A71	Minimise the impact of dust emissions on human and ecological receptors.	Develop a Dust Management Plan in agreement with Wiltshire Council. Incorporate the 'highly recommended' measures from Appendix 12 in the Dust Management Plan, as appropriate.	Contractor	See Chapter 14 and Table 12 of Appendix L of ES - Air Quality Construction methodology Refer to Planning Decision Notice received 15/11/21	Action closed. No condition on dust management has been received with the grant of planning. Air quality measures referred to will be incorporated to the CEMP.	
Sustainability, carbon and climatic factors						
A72	None identified					

Table 3: Environmental Action Plan: CONSTRUCTION

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
Local community						
B1	Minimise disruption to local residents, visitors, users of public open space, and businesses from noise, vibration, access restrictions and dust during construction	Continue to liaise with affected residents, the public and businesses of the nature and timing of construction activities through agreed communications channels including newsletters in advance of the works.	Contractor	Environment Agency Project Manager will confirm agreed Communication channels during the detailed design stage (Action A6)		
B2	Minimise disruption to allotment holders at Coldharbour Lane allotments and users of the allotment shop	Continue to update allotment holders of nature and timing of construction activities, and changes to access and informal parking area (adjacent to Coldharbour Lane) for use by visitors to the allotment shop.	Contractor			
B3	Minimise disruption to residents	Regularly consult the local residents to provide updates on progression of the construction work.	Contractor	See Chapter 5 of ES		
B4	Minimise disruption to local businesses and community including road users from noise, vibration, dust and access restrictions	Ensure all activities adhere to agreed working hours.	Contractor	See Chapter 5 of ES Limit use of equipment on site to 8.00am - 6.00pm Mon to Fri (with piling works		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
				restricted to 8.00am – 6.00pm Mon to Fri). Avoid construction activities at weekends, Public Holidays and during special events/festivals		
Noise and vibration						
B5	Ensure action is taken to address any noise concerns raised by the local community	Maintain a representative on site during working hours to answer queries or address any concerns expressed.	Contractor	See Chapter 6 of ES		
B6	Minimise construction noise as much as practicable to the local community	Provide advance notification of nature and timing of works to affected receptors, particularly regarding noise or vibration generating activities.	Contractor	See Chapter 6 of ES		
B7	Minimise construction noise as much as practicable to the local community	Implement measures outlined in the 'noise and control mitigation strategy'	Contractor	See Chapter 6 of ES		
Recreation and access						

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
B8	Minimise disruption to users of Public Rights of Way (PRoW), informal paths, cyclesways and open space.	Place notices on PRoW immediately adjacent to the proposed working areas and haulage routes during the construction period to notify users of these PRoW.	Contractor	See Chapter 7 of ES		
B9	Minimise disruption to PRoW, informal paths, cycleways and access across open space.	Follow measures outlined in the Construction Traffic Management Plan	Contractor	See Chapter 7 of ES and See Appendix P1 of ES - Outline CTMP		
Landscape and visual amenity						
B10	Protect retained trees and vegetation	Follow BS 3998:2010 for all tree works and BS5837: 2012 guidelines when working close to trees and shrubs and erecting tree protection fencing. Demarcate root protection zones and protect retained trees with suitable barriers or other measures in line with the Tree Protection Plans during construction.	Contractor	See Appendix G of ES for Tree Protection Plans and Arboricultural Method Statement.		
Flora and Fauna						
B11	Avoid harm to site's ecological sensitivities	Appointed ecologist to provide toolbox talks prior to key activities on site that could have detrimental effects on watercourses to ensure best working practices around water and the site’s ecological sensitives are understood.	Contractor	See Chapter 9 of ES		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
B12	Avoid harm to site's ecological sensitivities	Appointed ecologist to supervise vegetation clearance and the construction works within the watercourses or adjacent to designated conservation areas, and provide advice on specific ecological issues if and when they arise.	Contractor		Areas requiring ecological supervision to be confirmed on a plan during detailed design	
B13	Avoid impacts on designated conservation sites (River Avon SAC/River Avon System SSSI)	Continue monitoring water levels in proposed wetland area during construction due to continuity with wet woodland north of Scheme area.	Environment Agency Project Manager			
B14	Minimise impacts to flora and fauna	Use existing access tracks and roads as far as possible	Contractor	See Chapter 9 of ES		
B15	Avoid spread of (and eradicate where possible) invasive species	Implement measures to eradicate and control the spread of Giant bramble within Scheme area	Contractor	See Appendix F10 of ES - Invasive Species Survey Report		
B16	Avoid spread of (and eradicate where possible) invasive species	Implement biosecurity measures to avoid spread of Butterfly bush and Wilson's honeysuckle.	Contractor	See Appendix F10 of ES - Invasive Species Survey Report		
B17	Protect aquatic flora and fauna from water quality	Carry out works in accordance with the Surface Water Management Plan. The plan includes measures to control site drainage, to minimise site runoff, treatment of water	Contractor	See Chapter 9 of ES		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	changes in watercourses	prior to discharge and considerations to manage silt and leachate generation.				
B18	Avoid killing or injuring any reptiles and amphibians.	If any ongoing vegetation clearance or management is required, the appointed ecologist will supervise phased strimming in areas of dense vegetation with an initial cut above ground level. Dismantle all potentially suitable hibernacula by hand and check for amphibians.	Contractor	See Chapter 9 of ES		
B19	Avoid killing or injuring any reptiles and amphibians.	If amphibians are found during the works when there is no appointed ecologist on site, move them off-site to a pre-determined safe waterbody or refuge in consultation with the appointed ecologist.	Contractor		In unlikely event that suspected great crested newt is found, stop work immediately and consult ECW.	
B20	Avoid impacts on breeding birds	If breeding birds, or nests (including the beginnings of a nest) are found during the works, stop all work in the vicinity and consult the appointed ecologist.	Contractor	See Chapter 9 in ES		
B21	Avoid impacts on waterbirds	The appointed ecologist will reconfirm where within the working area there is potentially sensitive/valuable vegetation overhanging the watercourse (which may	Contractor	See Chapter 9 in ES and Appendix F4 Kingfisher Report		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
		act as kingfisher perch sites) that should be retained, where possible.				
B22	Avoid impacts on waterbirds	Retain vegetation overhanging watercourses where possible as they may act as kingfisher perch sites.	Contractor	See Chapter 9 in ES and Appendix F4 Kingfisher Report		
B23	Avoid impacts on breeding birds	If unforeseen tree/scrub removal is required within the bird breeding season, request that the appointed ecologist carries out a watching brief to identify whether breeding birds are using affected tree/area of vegetation.	Contractor	See Chapter 9 of ES		
B24	Avoid harm to mammals including badger and otter	Cover or fence any excavations to deter mammals from entering or fit with a plank/ mammal ladder to provide an exit route.	Contractor	See Chapter 9 of ES		
B25	Avoid harm to badgers	Should any potential setts be discovered during construction, cease works and seek advice from the appointed ecologist.	Contractor	See Chapter 9 of ES		
B26	Avoid physical harm and behavioural disturbance to fish	Carry out in-channel works during daylight hours to enable a large proportion of any 24-hour period for the movement of Atlantic salmon and other fish species. Avoid in-channel works during the fish migration and spawning season.	Contractor	See Chapter 9 of ES		

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
B27	Avoid physical harm and behavioural disturbance to fish	Ensure Environment Agency Fisheries carry out fish rescue prior to dewatering of River Avon.	Environment Agency Project Manager	See Chapter 9 of ES		
B28	Minimise impacts on habitats to be retained	Return disturbed habitats in temporary working areas to their original condition or better as quickly as possible to minimise loss of key floral species (through colonisation by opportunistic species)	Contractor			
Water and hydromorphology						
B29	Minimise the risk of pollution to surface water and groundwater quality	Adhere to best practice measures (including former pollution prevention guidelines), Pollution Response Plan and Surface Water Management Plan. Restrict refuelling of vehicles and machinery to designated areas (which do not drain to ground or watercourse), and store all fuels, oils, hydraulic fluids and chemicals within secondary containment (e.g. drip-trays or bunds) at least 10m away from riverbanks. Provide toolbox talks about the risks of water pollution and suitable controls.	Contractor	See Chapter 10 of ES		
B30	Minimise the risk of pollution to surface water and groundwater quality	Register for Flood Warnings and ensure that no equipment or potentially polluting materials are left at risk of flooding. Adhere to Flood Management Plan.	Contractor			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
B31	Minimise the risk of pollution to surface water and groundwater quality	Confirm requirement for Environmental Permit for any discharges to surface water.	Contractor			
B32	Minimise risks to water quality	Implement measures in the Surface Water Management Plan.	Contractor			
Historic environment						
B33	Minimise impacts on historic heritage	Identify additional precautionary mitigation measures for inclusion in this EAP if required following pre-construction consultation with the Conservation Officer [TBC] and Wiltshire Council archaeologist.	Consultant Environmental Lead			
Traffic and transport						
B34	Minimise construction related traffic impacts on local road users, residents and businesses	Adhere to agreed Construction Traffic Management Plan.	Contractor	See Appendix P1 of ES - Outline CTMP		
B35	Minimise construction related traffic impacts on local road users, residents and businesses	Maintain Traffic Management Working Group for the duration of the works and report to them on monitoring results of parking and construction traffic.	Contractor			
Sustainable use of land						

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
B36	Minimise damage to soils and ground conditions and protect water quality.	Implement measures outlined in Soil Management Plan	Contractor	See Chapter 13 of ES		
Air quality						
B37	Minimise the impact of dust emissions on human and ecological receptors.	Carry out regular site inspections to monitor compliance with the Dust Management Plan.	Contractor	See Appendix 11 Construction Dust Assessment		
Sustainability, carbon, and climatic factors						
B38	Minimise impact on CO2 emissions during construction	Maintain carbon calculator for the Scheme	Contractor	See Chapter 15 of ES		

Table 4: Environmental Action Plan: POST-CONSTRUCTION

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
C1	Ensure mitigation measures have met their target outcomes	Implement post-construction monitoring in line with the agreed Monitoring Plan. Review Monitoring Plan regularly during years 1 to 5 to ensure it remains relevant and fit for purpose.	Environment Agency Project Manager	See Table 15.1 for outline Post-construction monitoring plan.		
Local community						
	None identified					
Noise						
	None identified					
Recreation and access						
	None identified					
Landscape and visual amenity						
C2	Minimise effects on the landscape and views and ensure target habitat/landscape features are developed and sustained	Ensure a Landscape Supervisor monitors landscaping, habitat development and any required replacement planting in accordance with the Landscape and Habitat Management Plan.	Environment Agency Project Manager			

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
Flora and fauna						
C3	Minimise loss of key floral species and avoid colonisation by invasive species	Ensure an experienced ecologist monitors post-construction habitats for three years after the Scheme's completion, to detect any colonisation by Nuttall's waterweed and trigger eradication measures if necessary.	Environment Agency Project Manager	See Appendix F10 of ES - Invasive Species Survey Report		
C4	Provide new habitat for breeding birds	Install artificial nest boxes suitable for grey wagtail under the new Millstream Approach Bridge.	Contractor	See Chapter 9 of ES		
C5	Provide roosting opportunities for bats	Install ten bat boxes on trees at identified locations (by an experienced ecologist) along the river corridor and on bridges.	Contractor	See Appendix F6 of ES Bat Transect and Passive Bat Detector Survey Reports detailing location of bat boxes		
C6	Monitor changes to qualifying features of River Avon SAC and success of newly created habitat	Ensure an ecologist carries out an annual walkover survey and reports findings to Natural England.	Environment Agency Project Manager	See Appendix J of ES - Habitat Regulations Assessment		
Water and hydromorphology						
	None identified					
Historic environment						

Ref. No.	Objective	Action	Responsibility	Reference to further information	Progress and Further Action	Sign off and date
	None identified					
Traffic and transport						
	None identified					
Sustainable use of land						
	None identified					
Air quality						
	None identified					
Sustainability, carbon, and climatic factors						
	None identified					

Environmental Audit

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

Stage 1 Habitats Regulations Assessment

Environment Agency record of screening for likely significant effects

Jacobs have been commissioned to undertake the Habitats Regulations Assessment (HRA) for the Salisbury River Park Phase 1 Scheme on behalf of the Environment Agency. Jacobs were requested to use the following Environment Agency template for the HRA Screening.

This is a record of the screening for likely significant effects required by Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended), undertaken by the Environment Agency in respect of the permission, plan or project (PPP) detailed in Section 1, for the following relevant site:

- River Avon SAC (UK0013016).

Version 2: 7.12.20 (Author: Alice Shoebridge, Jacobs) - this record has been updated following initial Natural England comment and a meeting with Natural England on 15/06/20. Natural England reviewed and confirmed support to the Scheme design and initial HRA screening document (16/06/20) but provided some additional comments on the HRA Screening to be reflected in an updated HRA Screening document. This record therefore reflects the additional NE comments, and any further information/changes to design since submission of the initial HRA Screening document.

Version 3: 01.03.21 (Author Alice Shoebridge & Corinna Morgan, Jacobs) – this record has been updated following a meeting with Natural England (26.02.21) to discuss the final Scheme proposals and Natural England's further feedback from a review of the updated HRA Screening.

1. Permission, plan or project details

Type of PPP: Urban flood risk management scheme with amenity and habitat benefits (see Section 2)

Environment Agency reference: ENVIMSW002033

National grid reference: SU 13407 31466 – SU 13979 29673.

Site/project name or reference: Salisbury River Park (River Corridor Improvements; RCI) Phase 1.

The study area, which is situated in central Salisbury, extends from land at Ashley Road Open Space/Fisherton Recreation Ground to The Maltings and central car park areas and is shown on Figure 1.

Appendix J

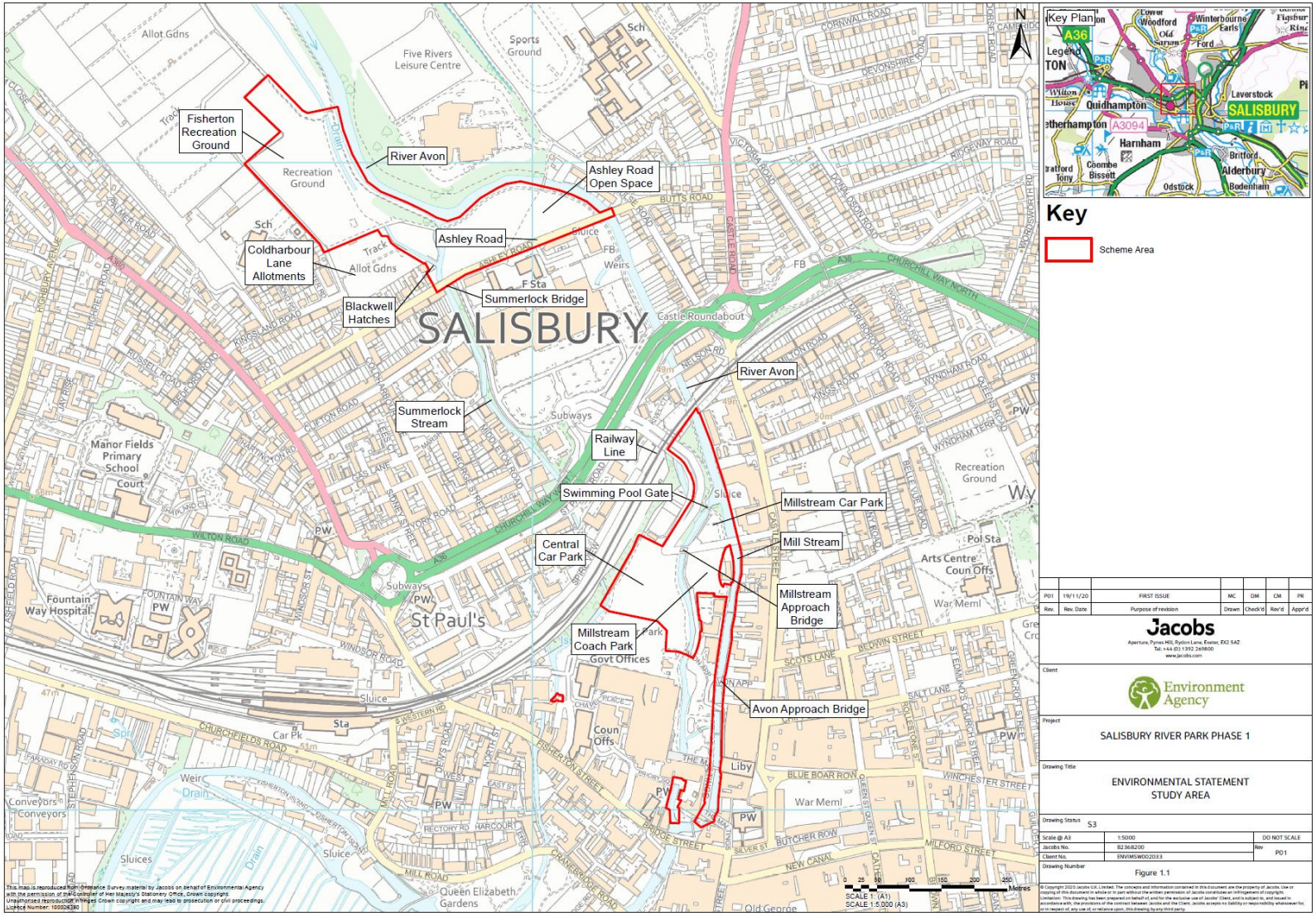


Figure 1: Study Area

2. Description of proposal

The proposed scheme (hereafter referred to as 'river corridor improvements' or 'RCI') comprises construction of flood defence embankments and walls, flow control measures and river channel modifications including river widening and rock weirs, which are shown on the Landscape Masterplans in Appendix A. These works will be undertaken within and adjacent to parts of the River Avon, Summerlock Stream and Mill Stream, which all form part of the River Avon Special Area of Conservation (SAC) – see Sections 3 and 4 for details of the European site.

The design has sought to avoid the use of hard flood defence structures where possible and provide more natural flood management through enlarging the river corridor to increase flood capacity.

Engineering drawings based on the outline design are being developed.

The RCI are components within a Salisbury River Park Master Plan which is being developed by Wiltshire Council.

The RCI will be delivered in phases to allow expeditious delivery of the flood risk management works. These phases are outlined below (note that since the original submission of the HRA Screening Report, the Scheme description has been updated and further details are provided in Section 16).

Phase 1

Phase 1 will involve a combination of landscape, biodiversity and amenity improvements integrated with flood risk management measures to provide flood defence and increase channel capacity, flood flow conveyance and flood storage volume that will comprise the following:

Ashley Road site (see Figure A1 'Ashley Road Landscape Masterplan' in Appendix A)

- New flood defence embankment (see Figure 1 in Appendix A): approximately 500m long and 1m high, along the southern boundary of Fisherton Recreation Ground with approximately 1 in 10 gradient slopes to give a natural appearance but 1 in 4 gradient slopes where space for the embankment footprint is limited. Following further Scheme design, the dimensions of this structure have changed slightly. This embankment will be set back from the River Avon at an approximate distance of 40-50m from the River Avon SAC but ties into natural ground levels on its eastern extremity of Ashley Green at Ashley Road, only 5m to the west of the SAC.
- New flood defence wall: approximately 50m long and 1m high, where it is needed instead of the flood embankment due to space constraints as the width of the recreation area narrows alongside the river and there are adjacent mature trees. Following further Scheme design, the dimensions of this structure have changed slightly.
- Infilling of an approximate 20m length of an artificially modified channel at the junction of the River Avon and Summerlock Stream, which forms part of the River Avon SAC. Creation of a new connection by breaching the bank of the River Avon using an offtake structure further upstream, thus allowing a new proposed offtake channel from the River Avon (upstream of the existing Summerlock Stream) to pass through Fisherton Recreation Ground providing connection to the floodplain. During low flows, water will be constrained to a single channel within this area (or to multiple braided channels if

appropriate), which will be designed to maximise opportunities for fish passage. The new channel will connect to the existing Summerlock Stream between the infill area and the new flow controls (see below).

- New flow control structures (due to their constrained openings) connecting to the River Avon SAC:
    - new channel connection for Summerlock Stream on the right bank of the River Avon at the northern end of Fisherton Recreation Ground - this will be designed with the aim of maintaining the current inflow regime into Summerlock Stream as the existing connection at Blackwell Hatches.
    - new culvert on Summerlock Stream beneath the new embankment on the southern boundary of the recreation ground, adjacent to Ashley Road, to limit the passage of floodwater downstream.

  These new passive flow control structures (which minimise future operational risks), will be designed to enable fish and eel passage.

- New wetland habitat (see Figure 1 in Appendix A)
    - creation of wide, shallow swales narrowing into backwater habitats hydrologically connected to the new Summerlock Stream offtake channel (adjacent to the River Avon SAC), and accommodating water during high flows
    - seasonally wetted ephemeral streams, active at different flow states
    - wildflower meadows and wet woodland

  The excavated material from the new offtake channel and wetland habitat areas is proposed to be re-used in the flood defence embankment.
- Amenity improvements including a relocated play park (from Fisherton Recreation Ground on the western side of the Summerlock Stream to Ashley Green on the eastern side of Summerlock Stream), shingle beach, boardwalks and picnic areas adjacent to the new wetland habitat and improved public access at selective points (e.g. proposed river viewing platforms) to the new wetland habitat and main River Avon channel (part of the SAC).
- Footbridge across the new channel at the north of the new wetland habitat area.
- Localised ground raising or flood wall up to 0.5m high, to act as secondary flood defence measures, in some private gardens adjacent to Ashley Road and Summerlock Bridge, bordering the right bank of the Summerlock Stream (part of the River Avon SAC). These details have changed since HRA Screening.
- Two new pumping areas located on the northern edge of Ashley Road approximately 40m east of the Summerlock Stream and over 50m south of the River Avon. These areas will be used on a temporary basis for pumping standing water from drainage and under-seepage ponding behind the defences during flood events. The areas, large enough for parking vehicles and setting up temporary pumping equipment will comprise grassed geogrid so they are accessible in all conditions.
- New filter drains running at the back of the new flood defence embankment over its entire length as a drainage connection to the two new pumping areas (see above). The drains will require trenching to lay a 0.3m diameter pipe, backfilled with graded gravels. New inspection chambers will be installed at intervals along the filter drains, 1.2m diameter and 1.5m depth.
- New retaining wall along the edge of a new footpath/cycletrack adjacent to Coldharbour Lane allotments

Central Car Park / The Maltings (see Figures 2 'Central Car Park/Maltings' and 3 'Mill Stream' Landscape Masterplans in Appendix A)

- Modifications to the River Avon main channel (part of the River Avon SAC) over a length of approximately 250m adjacent to the Millstream Coach car park to act as a main channel for flood flows. These works will include widening of the channel corridor to a maximum width of 50m, providing a two-staged channel with marginal wetland habitat on both banks.
- Removal of Swimming Pool Gate structure (radial gate) on the western branch of the River Avon channel where it splits (above Millstream Approach) to improve fish passage, reprofiling of the channel bed level to remove the large drop in bed level associated with the removal of the water control structure across Swimming Pool Gate and replace with a series of new rock weirs for fish passage, with lowering of upstream low flow water levels (by up to 0.5m).
- New twin culvert to carry some floodwater under extreme flows (approximately 2.5m wide and 0.75m high) extending over 100m from the River Avon main channel into Summerlock Stream including inlet/outlet structures.
- Extension of twin pipe culverts (each 0.9m in diameter) over a length of approximately 150m to move the outfall from the Waitrose Culvert, which currently joins the channel immediately downstream of Swimming Pool Gate, to a position downstream near the Avon Approach Bridge, providing continued drainage of this watercourse and connected surface water systems.
- Modified layout of existing fish pass weir at The Maltings by lowering the upstream crest level and making any necessary repairs to the structure.
- In-channel works to Mill Stream over an approximate 400m length to improve low flow conveyance – the nature of the works required is to be confirmed following a geomorphology study for the scheme.
- Removal of Hatches from the existing sluice gate structure at The Maltings to reduce upstream water levels within the Mill Stream channel that is potentially silted above its original bed level.
- New low-level flood embankment adjacent to the Waitrose Culvert watercourse (open channel) to the north of the substation.
- Infill of low spots on the existing low-level embankment on the right (west) bank of the River Avon, immediately downstream of the railway.
- Removal of the existing Library Hatches sluice structure and infill of the Library Side Channel, which connects the Mill Stream to the Avon (may be moved to future phases of the RCI). Following further Scheme design, this has been removed from the proposals.
- New flood wall (less than 2m in length) set back from the eastern bank of Summerlock Stream near Fisherton Street with flapped opening to retain drainage outflow into river under normal conditions and measures to improve flood resilience of an adjacent property (approximately 1m from the river).
- Replacement of Millstream Approach road bridge with new structure to cross the widened river corridor.
- New pocket park on the northern edge of Millstream Approach between the widened River Avon corridor on the western side and a road adjacent to the Mill Stream on the eastern side
- Replacement of Swimming Pool Gate footbridge

- New flood wall at Steynings House to be built across an access path to the rear of the building
- New in-channel berm or raised area on the River Avon downstream of the Maltings and just upstream of the confluence where the Mill Stream rejoins at Fisherton Street bridge to encourage fish passage into the River Avon.
- Raising ground levels over a 0.5ha area at Coach Park to act as a flood defence against overland flood flows, using excavated material (alluvium) from modifications to the main river channel corridor, and removal of the Coach Park culvert.
- Amenity improvements including public viewing area, redeveloped coach park, new footpath/cycleway and shingle beach with stepping stones (if considered appropriate following further investigation). With the exception of the coach park, these will be located within the new widened river corridor.

Future Phases

Future phases of the works will comprise additional works in and around The Maltings, which are likely to include (but not be exclusive to) the following: -

- Modifications to the River Avon main channel including widening of the channel between the Avon Approach road bridge and the Maltings Shopping Arcade.
- Replacement of Avon Approach road bridge
- New footbridge crossing the Avon connecting the east and west car park areas
- Amenity improvements including new footpath/cycleway, opportunities for public art installations, available space for events/markets etc
- Additional regeneration proposals being progressed by Wiltshire Council.

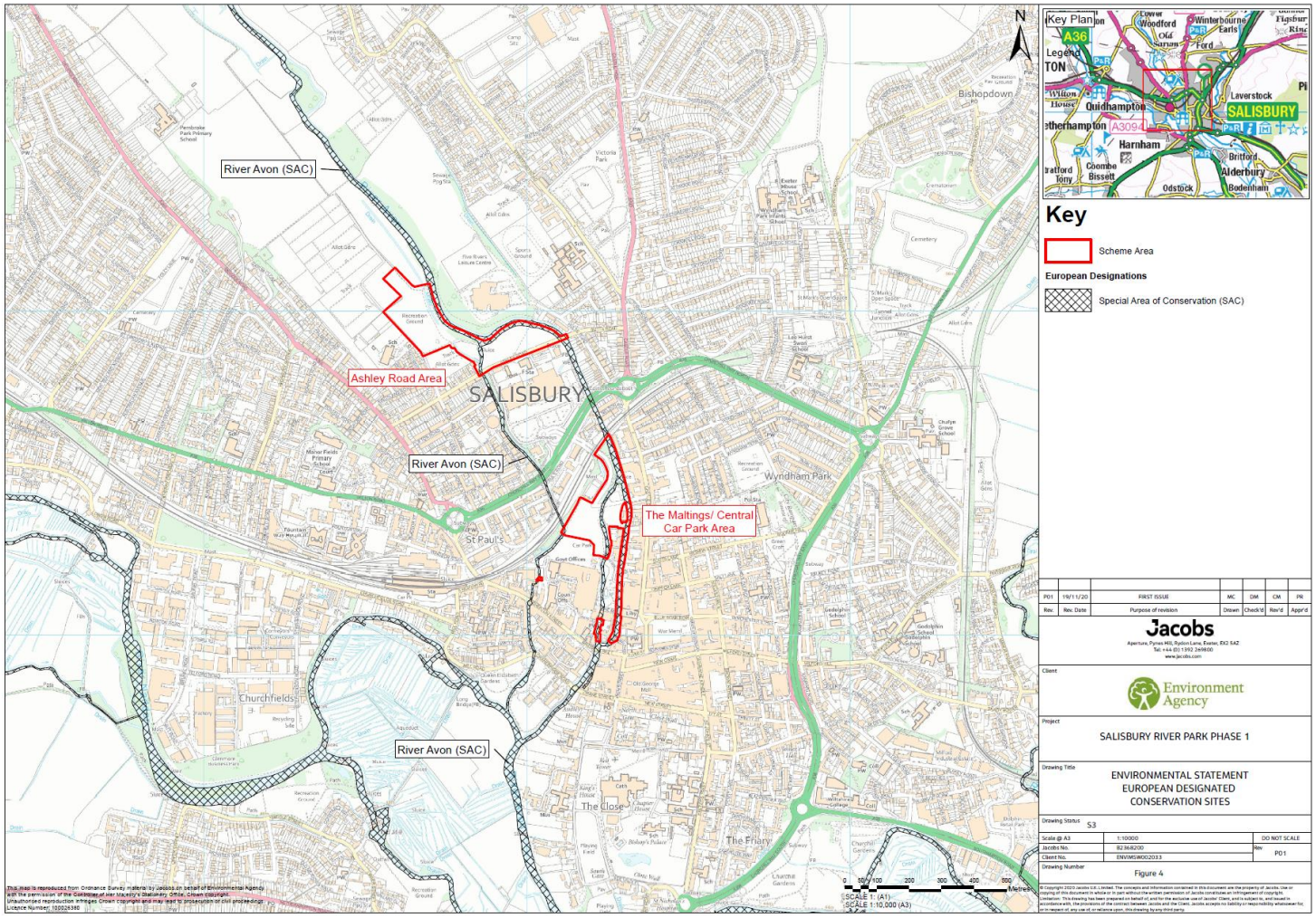
Construction

With the design at an early stage, the construction programme is highly indicative. The HRA Screening assumed that the main earthworks associated with the river corridor widening would take three calendar years (between 2021 and 2023). Works in the Ashley Road area would be constructed initially in 2021/22 and the works in the Maltings and Central Car Park area would be constructed in 2022/23. These timings have since been revised as described in the Appropriate Assessment (see Section 16) and Appendix C of the HRA. There will be several months before the main works start when the contractor will be setting up facilities, diverting/protecting services, carrying out environmental mitigation works and removing vegetation. It is planned that all the main works will be within the summer months when there is less risk of high flows and wet ground conditions, which could affect construction activities and increase the risk of related soil/sediment mobilisation.

This HRA considers the works proposed for Phase 1 of the RCI scheme only but will consider any in-combination impacts with future phases. Although the future phases are essential to the delivery of the overall Salisbury River Park, the works for these phases are not fully defined at this stage and Wiltshire Council has advised (in email communication dated 15/5/20) that they should be treated separately for planning and consenting purposes.

Therefore, a separate HRA will be undertaken for future phases of the RCI. Separate HRAs will also be undertaken, as appropriate, for any other scheme proposals that arise from later phases in the Salisbury River Park Masterplan.

3. Map showing PPP location and European sites



4. European sites requiring assessment[1]

European site	Complete list of qualifying features
River Avon SAC (UK0013016) ^	Atlantic salmon* Annex II species (primary reason for selection)
	Brook lamprey Annex II species (primary reason for selection)
	Bullhead Annex II species (primary reason for selection)
	Desmoulin's whorl snail* Annex II species (primary reason for selection)
	Sea lamprey* Annex II species (primary reason for selection)
	Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation Annex I habitat (primary reason for selection)

^ Protected area under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

* Priority natural habitat/priority species

5. Qualifying species and habitats

Atlantic salmon

The River Avon represents a south coast chalk river supporting Atlantic salmon (*Salmo salar*) populations. Atlantic salmon are migratory species, moving from the marine environment upstream into freshwater environments to spawn, utilising clean gravels. Environment Agency records[2] indicate the presence of Atlantic salmon throughout the main stem of the River Avon and its tributaries, upstream and downstream of the study area – an indicator of the importance of Atlantic salmon habitats and migratory routes in the River Avon.

[1] This is based on screening criteria the Environment Agency consider appropriate to identify possible significant risk.

[2] Environment Agency Ecology and Fish Data Explorer - https://environment.data.gov.uk/ecology-fish/

Brook lamprey

Brook lamprey (*Lampreta planeri*) are a non-migratory fish species that live in freshwater environments. The brook lamprey requires clean gravel beds for spawning at specific times of the year and slow flowing areas with sandy/silt substrate that act as ammocoete nursery areas during juvenile development. Brook lamprey have been recorded by the Environment Agency[3] in the River Avon, including sites within the study area (Summerlock Stream), indicating the presence of suitable habitat to support this species.

Bullhead

Bullhead (*Cottus gobio*) are non-migratory bottom-dwelling freshwater species. They predominantly occur in stony rivers and streams with moderate flows and oxygen rich waters and have a high fidelity to their habitat patches. Observations from the River Avon during a site walkover by Jacob's ecologists in September 2019 indicate a number of areas suitable for bullhead. Environment Agency records[4] indicate bullhead are within the River Avon and its tributaries and this species would be expected to be present within the study area.

Desmoulin's whorl snail

Walkover surveys by Jacob's ecologists in September 2019 through sections of the scheme area identified sub-optimal habitat for Desmoulin's whorl snail (*Vertigo moulinsiana)*, which prefer marginal wetland areas of chalk stream habitat. Natural England has confirmed[5] that Desmoulin's whorl snail is not present in this part of the Avon catchment. For these reasons, Desmoulin's whorl snail has been *screened out of this assessment*. However, as part of the integrated design of the Phase 1 RCI, opportunities will be sought to create suitable habitat for the re-establishment of this species, wherever possible.

Sea lamprey

Sea lamprey (*Petromyzon marinus*) have similar spawning habitat requirements to brook lamprey and salmonids; spawning areas must contain suitable refuges and clean gravels and be within close proximity to sandy/silt substrates for larvae development. Ammocoetes of sea lamprey spend several years in these silt beds before metamorphosing and migrating downstream to the marine environment. Fisheries surveys have been undertaken by the Environment Agency for over 20 years at many sites within the River Avon and its tributaries[6]; only two individuals have been identified from the catchment in 2005 and 2011, near

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[3] Environment Agency Ecology and Fish Data Explorer - https://environment.data.gov.uk/ecology-fish/

[4] Environment Agency Ecology and Fish Data Explorer - https://environment.data.gov.uk/ecology-fish/

[5] through telephone communications between the biodiversity officer at the Environment Agency and Natural England on 16/1/20.

[6] Environment Agency Ecology and Fish Data Explorer - https://environment.data.gov.uk/ecology-fish/

Christchurch, approximately 40km downstream of the study area. As such, sea lamprey has been *screened out of the assessment*.

Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

This qualifying habitat is characterised by the abundance of water crowfoots *(Ranunculus* species*)* and stonewort, which are important aquatic plant communities within the River Avon SAC. They provide shelter and food for macro-invertebrates and fish, promote silt deposition and create flow diversity within the channel. Observations from the site walkover in September 2019 of a number of reaches of the River Avon and Summerlock Stream indicate the presence of *Ranunculus* communities.

Whilst not a named qualifying feature of the River Avon SAC, **water voles** are a distinctive/typical species supported by the River Avon SAC habitat. The design of the Phase 1 RCI and associated statutory Environmental Impact Assessment (EIA) will therefore make full consideration of the potential effects (beneficial and detrimental) on water vole habitat and the population through Salisbury. A water vole mitigation strategy for the Phase 1 RCI will be discussed and agreed with Natural England prior to implementation. Similarly, **otters** also make an important contribution to the structure, function and/or quality of the SAC habitat, and the EIA will fully assess the impacts of the scheme on this species.

6. Conservation objectives

The screening for likely significant effects (and appropriate assessment, if required) will consider the implications of the Phase 1 RCI in view of the site's conservation objectives (Table 1).

Table 1: River Avon SAC Objectives

River Avon SAC (UK0013016)^ **Version: 3** **Date: 27th November 2018**
http://publications.naturalengland.org.uk/publication/6048472272732160?category=6528471664689152 ➢ Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring: ➢ The extent and distribution of qualifying natural habitats and habitats of qualifying species; ➢ The structure and function (including typical species) of qualifying natural habitats; ➢ The structure and function of the habitats of qualifying species; ➢ The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely; ➢ The populations of qualifying species and, ➢ The distribution of qualifying species within the site.

7. Risks (pressures) relevant to the type of PPP being assessed

The following list of risks (pressures) are those relevant to the qualifying features of the River Avon SAC, taken from the Environment Agency database. Where additional risks have been added, this is highlighted in the text provided below and relates to 'habitat fragmentation / modification' and 'invasive species' only.

Acidification – No effect pathway as the Phase 1 RCI will not result in long-term changes to the climate. Therefore, this has been screened out of this assessment.

Change in salinity regime – No effect pathway as the Phase 1 RCI is located outside of any tidal influence and will therefore not introduce saline water into the area. This has been screened out of this assessment.

Changes in thermal regime – No effect pathway as there is no standing water body within the study area and the Phase 1 RCI will maintain flows within the existing channels. Therefore, this has been screened out of this assessment.

Entrapment/impingement – Potential effect pathway during operation only and consequently screened into this assessment.

Habitat fragmentation/modification – This has been added to the list of risk (pressures) that any proposed scheme may have on qualifying features and includes physical modifications including barriers to fish movement. Potential effect pathway and consequently screened into this assessment.

Habitat loss – Potential effect pathway and consequently screened into this assessment.

Increased recreation – This has been added to the list of risk (pressures) that any proposed scheme may have on qualifying features (based on advice received from Natural England) and includes changes that may affect the qualifying features through increased recreational use of the River Avon.

Invasive species – This has been added to the list of risk (pressures) that any proposed scheme may have on qualifying features. Potential effect pathway and consequently screened into this assessment.

Natural function – This has been added to the list of risk (pressures) that any proposed scheme may have on qualifying features (based on advice received from Natural England) and includes changes that may affect the natural functioning of the qualifying features.

Nutrient enrichment – No effect pathway as the Phase 1 RCI will not result in any land use changes that could increase nutrient enrichment and will not affect wastewater or abstractions. Therefore, this has been screened out of this assessment.

Physical damage – Potential effect pathway and consequently screened into this assessment.

Siltation – Potential effect pathway and consequently screened into this assessment.

Smothering – Potential effect pathway and consequently screened into this assessment.

Toxic contamination – Potential effect pathway and consequently screened into this assessment.

Turbidity – Potential effect pathway and consequently screened into this assessment.

8. HRA Stage 1 screening

Of those risks (pressures) screened in to the assessment in Section 7, Table 2 shows which risks are relevant to the different elements of the Phase 1 RCI in the alone assessment.

Table 2: Phase 1 RCI and associated risks screened into the assessment. Green indicates risk. 'C' denotes construction and 'O' denotes operation impacts. Those cells left blank indicate they have been screened out.

RCI Phase 1 Works	Risk (pressure)								
	Entrapment/impingement	Habitat loss	Habitat fragmentation/modification	Increased recreation	Invasive species	Natural function	Physical damage	Siltation/smothering/ turbidity	Toxic contamination
Construction of new flood defence embankment and new flood walls/retaining walls					C	C, O		C	C
Two new pumping areas to be used on a temporary basis									
New filter drains at the back of the new defence embankment									
Infilling of 20m length of the Summerlock Stream.		C, O	C, O		C	C, O	C	C	C
New flow control structures; the new channel connection for Summerlock Stream & culvert on Summerlock Stream beneath embankment		C, O	C, O		C	C, O	C	C	C
New channel and wetland habitat	C,O			O	C	C, O	C	C	C
New footbridges across the new channel and boardwalks.		C, O	C, O	O	C	C, O	C		C
Replacement play park to Ashley Road Open Space									

RCI Phase 1 Works	Risk (pressure)								
	Entrapment/impingement	Habitat loss	Habitat fragmentation/modification	Increased recreation	Invasive species	Natural function	Physical damage	Siltation/smothering/ turbidity	Toxic contamination
Amenity improvements at Ashley Road site e.g. shingle beach, boardwalks and picnic areas, river viewing platforms		C, O	C, O	O	C	C, O	C	C	C
New flood wall in a private garden						C, O		C	C
Modifications to the River Avon main channel[7]		C	C	O	C	C, O	C	C	C
Removal of Swimming Pool Gate structure		C, O	C, O		C	C, O	C	C	C
New floodway culvert from the River Avon main channel into Summerlock Stream			O		C	C, O	C	C	C
Extension of twin pipe culverts to move the outfall of the Waitrose culvert		C	C, O		C	C, O	C	C	C
Modified layout of existing fish pass weirs at The Maltings		C, O	C, O		C	C, O	C	C	C
In-channel works to Mill Stream[8]		C, O	C,O		C	C, O	C	C	C
Removal of hatches from the existing sluice gate structure at The Maltings					C	C, O	C	C	C
New low-level flood embankment adjacent to the Waitrose Culvert watercourse (open channel)					C	C, O	C	C	C
Infill of low spots on the existing low-level embankment on the right (west) bank of the River Avon					C	C, O	C	C	C

[7] including removal of approximately 35 trees along the existing River Avon corridor to facilitate construction of scheme (Scheme design update, see Section 16).

[8] following a Geomorphology Survey, in-channel works include reduction in width (see Section 16).

RCI Phase 1 Works	Risk (pressure)								
	Entrapment/impingement	Habitat loss	Habitat fragmentation/modification	Increased recreation	Invasive species	Natural function	Physical damage	Siltation/smothering/ turbidity	Toxic contamination
New flood wall (less than 2m in length) set back from the eastern bank of Summerlock Stream near Fisherton Street					C	C, O	C	C	C
Replacement of Millstream Approach road bridge & new pedestrian footbridge to the south, and replacement of Swimming Pool Gate footbridge (new scheme component in the updated construction design (16.02.21).		C, O	C, O		C	C , O	C	C	C
Creation of a small pocket park (new scheme element 16.20.21)				O				C	
Raising ground levels over a 0.5ha area at Coach Park						C, O		C, O	
Amenity improvements including public viewing area, redeveloped Coach Park, new footpath/cycleway and shingle beach with stepping stones (if considered appropriate during detailed design and in agreement with Natural England)		C, O	C, O	O	C	C, O	C	C	C
New flood wall at Steynings House					C	C, O		C	C
New in-channel berm on the River Avon downstream of Maltings		C, O	C, O		C	C, O	C	C	C

Other plans, strategies and projects have been identified, which may have potential to affect the European site, in-combination with the Phase 1 RCI; these are listed below:

- Salisbury River Park Master Plan. The Phase 1 RCI are being developed as part of a wider Salisbury River Park Master Plan, which forms part of the Central Area Framework (see below) being developed by Wiltshire Council. The Salisbury River Park Master Plan sets out design principles and specific requirements for development proposals in a total of six phases, which are location specific. Future phases of the RCI are included in the Salisbury River Park Master Plan;
- Wiltshire Council's Central Area Framework (CAF) (Wiltshire Council *et al.* 2020). This is a framework for future projects to regenerate Salisbury city centre. The Phase 1 RCI is an integrated part of the River Park Master Plan, which forms part of the CAF, and therefore the objectives of the Phase 1 RCI align with the wider CAF objectives. Other developments within the CAF additional to the Salisbury River Park include:
    - Fisherton Street gateway – this project proposes to provide a new welcoming entrance to the city with various interventions including implementation of people-friendly streets principles, creation of waterside seating areas to complement the existing café culture and public art in key locations. Although some of these works may fall within the Salisbury River Park Master Plan, this proposal has the potential to interact with the Phase 1 RCI and is considered further;
    - Station Quarter – various interventions are being proposed to improve quality of the public realm around the station, including an enhanced travel interchange, improved Stonehenge visitor experience, improved wayfinding, landscaping and car parking facilities. This project will be the subject of a Master Plan. This Master Plan has the potential to interact with the Phase 1 RCI and is considered further;
    - People friendly streets – this project was being proposed to improve walking and cycling routes in and out of the city centre but has since been suspended;
    - Illuminating Salisbury – this project proposes an outdoor visitor light attraction that will illuminate the stories of Salisbury's rich heritage. This proposal has the potential to interact with the Phase 1 RCI and is considered further;
    - Public arts – proposals for a number of public art and lighting artists to create high quality public realm interventions in Fisherton Street. Lighting as part of public arts has the potential to interact with the Phase 1 RCI and is considered further;
    - Wayfinding – proposals to deliver a Wayfinding Strategy which will inform the delivery of significant improvements to the signage infrastructure in the city, to support visitors' experience of moving through the city. This proposal is not anticipated to have any effects on the River Avon SAC and has therefore not been considered in-combination with the Phase 1 RCI and,
    - Heritage trail app – Wiltshire Council are developing a Salisbury Heritage Trail app for a smart phone. This proposal will not have any effects on the River Avon SAC and has therefore not been considered in-combination with the Phase 1 RCI.
- Hydropower scheme under consideration at Bishop's Mill site at the Maltings by Salisbury Community Energy, with a possible future proposal for a water wheel on the Mill site to generate electricity. As a planning application for this project has not been submitted, no further details are available at the current time. However, it is considered that any hydropower scheme will need guaranteed flow, and there is potential for changes to sediment transport from alterations to flow/velocity brought about by the

nature of hydropower. Therefore, potential in-combination impacts with the Phase 1 RCI are considered and,

- An application for change of use from offices to flats has been submitted at 141 Castle Street. This is the building adjacent to the River Avon (left bank) before the River Avon splits at Swimming Pool Gate and lies within the study area of the Phase 1 RCI. The planning application is for demolition of the existing office building and redevelopment of the site as two residential blocks, with associated parking, landscaping, amenity space and dedicated site access. Although this development has no interaction with the channel or banks, there is potential to interact with the River Avon SAC and its features through surface water drainage.

HRA Screening for River Avon SAC (UK0013016) is provided in Table 3.

Table 3: HRA screening for the risks to qualifying features of the River Avon SAC from the RCI in alone assessment. Indication of in-combination impacts is also presented.

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Habitat loss from infilling of channel at the junction of the River Avon and Summerlock Stream, channel widening, and restructuring, rock weirs, removal of Swimming Pool Gate, addition of in-channel berm/raised area on the Avon downstream of the Maltings and extension of Waitrose culverts (cofferdams) and reduction in	The in-channel works within the River Avon have the potential to result in temporary and permanent habitat changes (disturbance and loss, as well as beneficial impacts). Changes to habitat may result from changes to channel morphology (planform), water levels, flows, substrate and vegetation/tree changes (tree loss and replanting). Any loss or damage to the structure, function and quality of river habitat from these changes may affect the ability of the site's distinctive species (e.g. fish, invertebrate assemblages, otter and water vole) and plant communities (including *Ranunculus* communities) to establish and thrive. Recent macrophyte surveys carried out by Jacobs indicate sub-optimum habitat for *Ranunculus* spp. communities within the area subject to infilling in the Summmerlock Stream, within the River Avon reach in the Maltings/central car park area (widening, restructuring, rock weirs) and within the channel which connects the Mill Stream to the River Avon (infilling). However, *Ranunculus* spp. communities were prevalent within the Mill Stream, and potential habitat loss as a result of changes to flow regime and sediment transport from the removal of Swimming Pool Gate may impact water crowfoot communities. It is considered the reduction in channel width of the Mill Stream by introducing shallow berms to improve low flow conveyance and promote a more sinuous low flow channel may result in habitat loss for *Ranunculus* spp. communities (reduction in channel bed area for establishment). The Mill Stream is	Yes	Potential for some proposals in the Salisbury River Park Master Plan to have in-combination effects. Potential for hydropower scheme to have in-combination effects.	Yes

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
	width of Mill Stream.	approximately 0.1% of the total area of the River Avon SAC and the reduced width of the Mill Stream will still allow some water crowfoot to re-establish. Therefore it is considered loss of habitat within the reach to have negligible impact on the integrity of this SAC feature in the River Avon. A new short section of in-channel berm/raised area on the River Avon downstream of the Maltings and upstream Fisherton Street Bridge will encourage fish passage into the River Avon away from the Mill Stream. Water crowfoot habitat is present in this reach, and installation of such element has the potential to result in loss of some habitat during construction and operation, which may impact other distinctive species of the SAC. The Scheme will result in the permanent loss of existing river habitat suitable for foraging water voles and otters. The loss of the existing steep habitat banks along the River Avon in the Maltings and Central Car Park area may also reduce the availability of suitable burrowing habitat. However, upon completion of the Scheme, the new channel and wetland area and the widened River Avon corridor will provide a net gain in river habitat, resulting in additional foraging habitat for these distinctive species and providing an important food resource for water vole and otter (though the gentler bank profile may increase predation by cats and foxes). **Potential for likely significant effect resulting from permanent habitat loss in Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation.**			

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
		The channel re-naturalisation and the new offtake channel will also provide opportunities for establishment of new habitat that may support the site's distinctive and structural plant and animal species, as well as restoring and improving in-channel and riparian habitats. Any amenity improvements proposed at Ashley Road (e.g. proposed shingle beach, boardwalks, picnic area and river viewing platforms will be discussed and agreed with Natural England at detailed design. These features will not be 'designed in' if they are likely to result in habitat loss and therefore will have no likely significant effect. The removal of Swimming Pool Gate and replacement with a set of rock ramps/weirs will improve flow velocity through the upstream and downstream reaches. This effect will be localised and it is considered to be beneficial for fish and macro-invertebrate species by improving habitat diversity within the reach.			
Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Habitat loss from increased shading from replacement bridge, replacement pedestrian footbridge at Swimming Pool Gate and/or new pedestrian bridge	The replacement of Millstream Approach Bridge will result in a slight increase in level of shading to the channel, increasing the impact of the existing feature; the replacement bridge is 60cm wider than the existing bridge. Abutments are located outside of the river channel. The footbridge for pedestrian access over the Mill Stream is a clear span, timber decked structure. The new culvert on the Summerlock Stream may also cause shading of the channel. A Bailey bridge is required temporarily during construction of these works.	Yes	No known in-combination impacts.	No

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
	and new culvert on the Summerlock Stream	These structures have the potential to cause increased shading of the River Avon SAC and impact water crowfoot, marginal and bankside communities. **Potential for likely significant effect to habitat from shading of Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation.**			
Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Habitat fragmentation from construction plant, in-channel works, new flow control structures and culverts, extension of culverts, removal of Swimming Pool Gate, reduction in width of Mill Stream, addition of in-channel berm/raised area on the River Avon downstream of the Maltings and	The continuity of habitat in the Phase 1 RCI footprint may be affected by changes in channel form, water levels, flows and substrate during construction. Any habitat fragmentation may affect the structure, function and quality of the habitat and its ability to support the site's distinctive species (e.g. fish, invertebrate assemblages, otter and water vole). Recent macrophyte surveys carried out by Jacobs indicate sub-optimum habitat for *Ranunculus* spp. communities within the area subject to infilling in the Summmerlock Stream, within the River Avon reach in the Maltings/central car park area (widening, restructuring, rock weirs) and within the channel which connects the Mill Stream to the River Avon (infilling). However, *Ranunculus* spp. communities were prevalent within the Mill Stream, and potential habitat loss as a result of changes to flow regime and sediment transport from the removal of Swimming Pool Gate may impact water crowfoot communities. It is considered the reduction in channel width of the Mill Stream by introducing shallow berms to improve low flow conveyance and promote a more sinuous low	Yes	Potential for some proposals in the Salisbury River Park Master Plan to have in-combination effects. Potential for hydropower scheme to have in-combination effects.	Uncertain

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
	new bridges and channel infilling	flow channel may result in temporary longitudinal fragmentation for water crowfoot communities. A new short section of in-channel berm/raised area on the River Avon downstream of the Maltings and upstream Fisherton Street Bridge is considered unlikely to fragment the existing water crowfoot habitat during construction and operation. Longitudinal connectivity will remain to enable downstream drift and establishment of seed propagules The road bridge and new flow control structure culvert on the Summerlock Stream may also reduce movement of macro-invertebrates and cause fragmentation of aquatic, marginal and bankside plant communities. **Potential for habitat fragmentation to impact on Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation, including characteristic vegetation and species during construction or operation.** Any amenity improvements proposed at Ashley Road (e.g. proposed shingle beach, boardwalks, picnic area and river viewing platforms will be discussed and agreed with Natural England at detailed design. These features will not be 'designed in' if they are likely to result in habitat fragmentation and therefore will have no likely significant effect.			
Water courses of plain to montane levels with *Ranunculion*	Changes to natural function from construction, and	The Phase 1 RCI will help to restore more natural functioning of this qualifying feature by creating new wetland habitat in the Ashley Road area, by improving the natural functioning of the watercourse and replicating a more natural form. The new flood defences in the Ashley Road area will reduce the risk of flooding to the	Yes	Potential for some proposals in the Salisbury River Park Master Plan to have	Yes

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
fluitantis and *Callitricho-Batrachion* vegetation	modifications to channels, control structures, extension of Waitrose culvert (temporary cofferdam), replacement of Millstream Approach Bridge, construction of the flood bank and wall, new flood wall at Steynings House, new in-channel berm/raised area downstream of the Maltings on the River Avon and removal of Swimming Pool Gate	surrounding urban environment, and the creation of ephemeral channels will allow controlled flooding onto the floodplain maximising habitat creation and facilitating natural functioning and fluvial processes as far as possible within the constraints of the urban setting. Sediment variability is likely to increase with additional floodplain connection, resulting in heterogeneous flow. This is further benefited by increased morphological diversity of the widened and restructured channel and replacing Swimming Pool Gate with a series of rock weirs, which will improve the existing channel morphology. The reduction in width of the Mill Stream by introduction of shallow berms or raised areas to improve low flow conveyance by minimising the deposition of silt during reduced flow conditions, will promote in-stream and marginal habitat diversity and create a more sinuous channel. However, the Phase 1 RCI may result in temporary changes to the natural functioning of the watercourses and their hydromorphology during construction, including the use of cofferdams for works to the Waitrose culvert and Swimming Pool Gate. Additionally, long-term modifications (including the infilling of the channel, bridge replacements and amenity improvements) to the watercourses, their riparian zone and their geomorphology will affect hydrological continuity, flow, channel width and depth, in-channel, side-channel sedimentation features and some of the site's distinctive species. These changes may have significant impacts on the natural function of the watercourses. Longitudinal connectivity of the River Avon will be improved (long-term) by the replacement of Swimming Pool Gate with a series of rock weirs which will restore sediment transport and natural functioning of the river by reduction of the impoundment. The removal of the structure will lower water levels by		in-combination effects. Potential for hydropower scheme to have in-combination effects.	

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
		approximately 20cm based on modelling, which has the potential to significantly affect the qualifying features. The new flood defences, including the embankment along the southern boundary of Fisherton Recreation Ground adjacent to Ashley Road, the creation of a two stage channel and ground raising at the Coach Park, will restrict uncontrolled overland flood flows leading to urban flooding. These defences, which will be located at a distance of over 50m from the River Avon (except at the eastern extremity) will not reduce nor constrain the extent of the existing qualifying feature or the structure and function of riparian habitat, nor the extent that could be restored in this location. The overall effects should be beneficial to designated features. Additionally, it should be noted that the RCI does not constrain opportunities to meet the SAC objectives relating to river restoration beyond the existing situation of an already urbanised river corridor. The replacement Millstream Approach Bridge has a clear-span design with abutments not within the wetted channel. The bridge has been designed to house the abutments as far from the river channel as will allow, to enable the river to function as naturally as possible. During construction, a Bailey bridge is required which may temporarily impact lateral and longitudinal connectivity, e.g. if it requires temporary abutments at the river margins. This risk is considered to also affect fish communities and has been included here only to avoid double counting. The new flood wall at Steynings House will infill a localised low spot on the bank of the Summerlock Stream, approximately 1.5m long and 0.6m high (above ground). The banks at this location are heavily modified, channelling the Summerlock Stream under buildings and through the urban area. It is considered lateral			

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
		connectivity of the channel to the banks does not currently exist, therefore there is no pathway to impact. A new short section of in-channel berm/raised area on the River Avon downstream of the Maltings and upstream Fisherton Street Bridge is considered to not result in likely significant effect on water crowfoot habitat during construction and operation. Longitudinal and lateral connectivity will remain during construction and operation, allowing the downstream drift of seed propagules to establish. Habitat lost as a result of the berm may result in impacts on other distinctive features of the SAC, and is considered under 'habitat loss'. **Potential for significant impacts on natural functioning of Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation.**			
Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Increased recreational use by the public from new channel and wetland habitat, new footbridge, amenity improvements and modifications	The design increases accessibility for the public to the River Avon through addition of viewing platforms, and other amenity benefits including boardwalks and picnic areas adjacent to the new wetland areas. The increase in recreational use has the potential to increase disturbance of the River Avon SAC riparian areas, banks and in-channel (potential for dogs and public to enter the watercourse). Disturbance of the habitat has the potential to affect water crowfoot communities by direct physical impact and in-directly though mobilisation of silts from substrate and bank disturbance. Increasing public amenity may result in an increase of rubbish, which if not properly disposed of may pollute both riparian areas and if left to enter	Yes	Potential for some proposals in the Salisbury River Park Master Plan that are located within close proximity to the SAC and the CAF to have in-combination effects.	Yes

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
	to the River Avon main channel	watercourses. Rubbish has the potential to become trapped within the river system, within crowfoot communities with resulting impacts affecting habitat and foraging potential for fish and macro-invertebrates. Impacts of recreational use on the SAC will be during the operational phase only. **Potential for significant impacts of increase in recreational use by the public to Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation.**		Potential for hydropower scheme to have in-combination effects.	
Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Physical damage from construction plant	Construction plant, although temporary, may have the potential to cause physical damage to this qualifying habitat including *Ranunculus* species macro-invertebrate and fish habitat and the species themselves. Any working in-channel has the potential to affect the structure of the watercourses and associated riparian habitat mosaics and physically remove *Ranunculus* communities. **There is the potential for likely significant effect of in-channel works causing physical damage to Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation during construction.**	Yes	Potential for some proposals in the Salisbury River Park Master Plan to have in-combination effects. Potential for hydropower scheme to have in-combination effects.	Uncertain
Water courses of plain to montane levels with *Ranunculion fluitantis* and	Turbidity and siltation from in-channel works to banks and bed, new channel	Increased suspended sediment and siltation in the River Avon has the potential to alter bed substrate in the watercourses and to smother all macrophyte communities, including *Ranunculus* communities and other distinctive SAC species such as starwort (*Callitriche* spp.) during construction. Sources of increased	Yes	Potential for some proposals in the Salisbury River Park Master Plan to have	Uncertain

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
Callitricho-Batrachion vegetation	creation and construction of new flood defences	turbidity and siltation include any riparian works (run-off) and changes to channel beds, banks and flows. High levels of turbidity have the potential to limit macrophyte communities, including *Ranunculus* species through limitation of light penetration into the water column although these changes are likely to be temporary. Additionally, a substantial increase in suspended load which is deposited onto the river bed has the potential to smother water crowfoot and other macrophyte species and affect establishment. This also has the potential to temporarily impact on the typical wildlife associated with the habitat; fish and freshwater macro-invertebrates. The replacement of Swimming Pool Gate with a series of rock weirs will enable improved longitudinal connectivity within the River Avon SAC, enabling improved sediment transport and reducing siltation upstream. There will be no changes to turbidity and siltation during operation of the RCI. **Potential for likely significant effect on Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation from turbidity and siltation during construction.**		in-combination effects. Potential for hydropower scheme to have in-combination effects. Potential for Castle Street development to have in-combination effects (run-off).	
Water courses of plain to montane levels with *Ranunculion*	Toxic contamination	The distinctive plant communities (including *Ranunculus* species) are susceptible to poor water quality and pollution.	Yes	Potential for the construction of any schemes arising from the Salisbury River	Yes

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
fluitantis and *Callitricho-Batrachion* vegetation	from pollution incident	Toxic pollutants such as oil, fuel and hydraulic fluid could accidentally be released into the watercourse during construction when working in riparian and in-channel areas. There is no new pathway to effect from toxic contamination during operation and the new flood defences will help to prevent flood water entering urban areas and returning to the river in a contaminated condition. **Potential for likely significant effect of toxic contamination on plant communities characteristic of Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation during construction.**		Park Master Plan that are located within close proximity to the SAC to have in-combination effects. Potential for hydropower scheme to have in-combination effects. Potential for Castle Street development to have in-combination effects (run-off).	
Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Invasive species from plant and machinery	Invasive species have the potential to alter the hydromorphological condition of watercourses and thus impact on their distinctive flora communities (including *Ranunculus* spp.) through competition for light, space and habitat resource. **Potential for likely significant effect of invasive species to alter Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation during construction.**	Yes	Potential for the construction of any schemes arising from the Salisbury River Park Master Plan that are located within close proximity to the SAC to have in-combination effects.	Yes

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
				Potential for hydropower scheme to have in-combination effects.	
Atlantic salmon Brook lamprey Bullhead	Physical damage from plant and machinery	Atlantic salmon and bullhead are highly mobile species and sensitive to disturbance, therefore are able to move away from areas of vibration. However, bullhead have a high fidelity to their habitat and in-channel constructional works, although temporary, have the potential to cause harm to individuals unwilling to leave preferential habitats. Brook lamprey have specific habitat requirements during their life-cycle. The specificity for silt beds during their larval developmental stages inhibits their movement within the aquatic environment to areas of other habitat, such as fast flowing, clean gravels. There is the potential for physical damage to juvenile brook lamprey during construction. In-stream works such as dewatering, over-pumping and machinery in the watercourses will cause vibrations within the aquatic environment, which can harm and, in extreme cases, cause mortality in fish. These impacts would be localised and temporary, during construction only. There would be no pathway to effect for physical damage to the qualifying fish species during operation.	Yes	Potential for some proposals in the Salisbury River Park Master Plan to have in-combination effects. Potential for hydropower scheme to have in-combination effects on the qualifying fish species.	Uncertain

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
		Potential for likely significant effect of physical damage to Atlantic salmon, brook lamprey and bullhead during construction.			
Atlantic salmon Brook lamprey Bullhead	Habitat loss from infilling of channel at the junction of the River Avon and Summerlock Stream, channel widening and restructuring and rock weirs and addition of in-channel/berm or raised area on the Avon downstream of the Maltings	There is potential for construction of the RCI to alter habitat utilised by the qualifying fish species in the River Avon including *Ranunculus* communities (that create flow diversity, provide cover and promote sediment grading, utilised by the qualifying fish communities). This includes changes to channel morphology (planform), flows, water levels, substrate diversity, riparian inputs and shading, and in-stream macrophyte cover. There will be temporary loss of in-stream habitat including silt beds, gravel substrate and riparian/bank habitat (vegetation/shading, inputs such as woody debris) during construction. This has the potential to affect qualifying fish species within the SAC. Areas of clean gravels are utilised by adult brook lamprey and bullhead for spawning. Disturbance and loss of clean gravels as a result of temporary construction also has the potential to affect brook lamprey populations. The replacement of Swimming Pool Gate with a series of rock weirs will improve flow and sediment transport through the system. Reduction of the impounded flow habitat which allows formation of silt beds has the potential to impact juvenile lamprey habitat long-term. Increased velocities may reduce habitat for juvenile salmon. On completion of in-channel and riparian works, the RCI will improve aquatic and riparian habitats to the River Avon SAC. However there is the potential for operational impacts on the qualifying fish populations from habitat	Yes	Potential for some proposals in the Salisbury River Park Master Plan to have in-combination effects. Potential for hydropower scheme to have in-combination effects on the qualifying fish species.	Uncertain

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
		loss/damage resulting from long-term changes to the flow regime and silt beds, which will require further assessment. The reach in which the addition of the in-channel berm/raised area to modify flows to encourage fish up the River Avon is considered to result in no loss of habitat for fish species; spawning habitat in this reach is sub-optimal, comprising glide habitat. **Potential for likely significant effect on qualifying fish from habitat loss during construction and operation.**			
Atlantic salmon Brook lamprey Bullhead	Habitat fragmentation/ modification from construction plant, channel infilling, new channel creation, addition of low-level lighting along some parts of the river corridor (Maltings/Central Car Park area), increase in channel shading	Although temporary, construction plant and works may cause a barrier to fish movement through light or vibration in the watercourse. The presence of any physical barriers to movement during the construction process would also limit Atlantic salmon and brook lamprey and result in temporary habitat fragmentation, for example the use of temporary cofferdams during removal of Swimming Pool Gate and re-location of the Waitrose culvert. Bullhead are a non-migratory fish species, residing in freshwater habitats for their entire life-cycle. Any barriers to movement resulting in habitat fragmentation during construction is not considered to result in any likely significant impact on bullhead, and as a mobile species they are considered to seek alternative habitat away from the disturbance. Channel connectivity will be maintained during operation although at the Ashley Road site, the existing connection to the River Avon will be infilled (which may close a potential migratory route for fish) and replaced by a new control gate further upstream. During low flows, at the Ashley Road site, water will be	Yes	Potential for some proposals in the Salisbury River Park Master Plan to have in-combination effects. Potential for hydropower scheme to have in-combination effects on the qualifying fish species.	Uncertain

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
	from the replacement Millstream Approach Bridge and flow control structure, use of cofferdams in relocation of the Waitrose culvert outfall, addition of in-channel/berm or raised area on the Avon downstream of the Maltings and removal of Swimming Pool Gates.	constrained to a single channel; both of which have the potential to result in fragmentation of fish habitat. The removal of Swimming Pool Gate structure (radial gate) on the western branch of the River Avon channel where it splits (above Millstream Approach) and replacement with a series of new rock weirs will help to improve fish passage. Additionally, the new channel should facilitate fish passage with the development of a low flow channel. This will therefore promote increased diversity in fish fauna in both the Avon and the Summerlock Stream. The creation of a new channel will provide additional heterogeneous habitat which will benefit all fish species including salmonids. It is considered during construction, the use of a Bailey bridge to facilitate works to the Millstream Approach road bridge, may cause temporary habitat fragmentation for fish species (e.g. from shading). The reach in which the addition of the in-channel berm/raised area to modify flows to encourage fish up the River Avon is considered to result no fragmentation of habitat for fish species; the berm/raised area will not create a barrier to migration. **Habitat fragmentation has the potential to result in a likely significant effect on Atlantic salmon and brook lamprey during construction and on all species during operation.** Addition of low-level lighting by seating along the river corridor at the Maltings/Central Car Park area is part of the scheme for security and to reduce vandalism. The lighting is considered low-level and below the current baseline of			

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
		artificial light already present (from the coach park/car park). This is therefore not considered to have a significant impact on fish behaviour, specifically migratory species (Atlantic salmon) or result in habitat fragmentation. During operation, the replacement Millstream Approach Bridge will be 60cm wider than the existing structure, thereby increasing channel shading of the River Avon. During operation, the new culvert on the Summerlock Stream will also increase shading of the watercourse. However it is considered resident fish species which perform localised migrations within the reach (bullhead, lamprey) and those migratory species (Atlantic salmon) are able to move through the reach to locate preferred habitat through maintenance of longitudinal connectivity. During operation, the new culvert on the Summerlock Stream has the potential to cause habitat fragmentation for fish populations, for migratory species and those which perform localised migrations.			
Atlantic salmon Brook lamprey Bullhead	Increased recreational use by the public from new channel and wetland habitat, new footbridge, amenity improvements and modifications	The increase in recreational use has the potential to increase disturbance of the River Avon SAC banks and in-channel (potential for dogs and public to enter the watercourse). Disturbance of the habitat has the potential to effect fish communities in-directly though mobilisation of silts from substrate and bank disturbance. The impact of an increase in silt has been provided within this HRA. There is potential for physical damage to bullhead and lamprey nests from any in-channel disturbance resulting from increased recreational use in focussed areas along the river corridor (though it should be noted that there will be reduced	Yes	Potential for some proposals in the Salisbury River Park Master Plan that are located within close proximity to the SAC and CAF to have in-combination effects.	Yes

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
	to the River Avon main channel	recreational disturbance in other more restricted areas which may benefit these species) Increasing public amenity may result in an increase of rubbish, which if not properly disposed of may pollute both riparian areas and if left to enter watercourses. Rubbish has the potential to become trapped within the river system, resulting in impacts affecting habitat, food and foraging potential for fish through disturbance to macro-invertebrate communities. Impacts of recreational use on the SAC will be during the operational phase only. **Potential for significant impacts of increase in recreational use by the public on the River Avon SAC qualifying fish species.**		Potential for hydropower scheme to have in-combination effects.	
Atlantic salmon Brook lamprey Bullhead	Entrapment/ impingement from new wetland habitat creation	Potential for new wetland habitat area at Ashley Road (created by breaching the river-bank) to trap fish during low flows. However, the area has been designed to ensure that the new swales are hydrologically connected to the main river and therefore no significant effects are anticipated during operation. **No significant effects of fish entrapment during operation.** The new wetland habitat area is likely to benefit fish by creating new areas for spawning and juvenile development.	No	Potential for some proposals in the Salisbury River Park Master Plan to have in-combination effects. Potential for hydropower scheme to have in-combination effects	No

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
				on the qualifying fish species.	
Atlantic salmon Brook lamprey Bullhead	Changes to natural function of watercourses from engineered scheme	The physical changes associated with the new widened channel, new structures (e.g. twin culvert floodway) and new wetland habitat area has the potential to locally affect the characteristic habitat mosaics of the river, coarse sediment supply and the flow regime of the watercourses, which could significantly impact on the life cycle requirements of the fish including spawning and migratory passage during construction and operation. **Potential for likely significant effect on all qualifying species from changes in natural function of the watercourses during construction and operation.** The reach in which the addition of the in-channel berm/raised area to modify flows to encourage fish up the River Avon is considered to result in a positive effect on natural functioning of the SAC, by promoting lateral connectivity.	Yes	Potential for some proposals in the Salisbury River Park Master Plan to have in-combination effects. Potential for hydropower scheme to have in-combination effects on the qualifying fish species.	Uncertain
Atlantic salmon Brook lamprey Bullhead	Turbidity, siltation and smothering from in-channel works to banks and bed	A temporary increase in suspended sediments and high turbidity in the SAC during construction of the RCI (from changes to channel planform and flow and breach of bank upstream of new wetland habitat area) have the potential to negatively affect Atlantic salmon and bullhead by reducing their ability to feed. Brook lamprey do not feed as adults so turbidity will not impact their feeding ability. Brook lamprey utilise silt dominated habitats until spawning where clean stones and gravels are sought.	Yes	Potential for some proposals in the Salisbury River Park Master Plan to have in-combination effects. Potential for hydropower scheme	Uncertain

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
		Increased sediment deposition in the watercourses, generated from in-channel works or riparian run off, has the potential to smother clean gravels required for spawning habitat and egg/larval survival, block gills and disrupt respiratory function, and reduce the availability of prey species for all qualifying fish species. Any deposition of sediments from construction may form discrete units that could be utilised by juvenile lamprey in the future. The RCI will promote habitat diversity through modifying flow types and sediment transport. There is no pathway to effect from turbidity and siltation during operation for the qualifying fish species. **Potential for likely significant effect on Atlantic Salmon and bullhead from turbidity and on all qualifying species from siltation during construction.**		to have in-combination effects on the qualifying fish species. Potential for Castle Street development to have in-combination effects (run-off).	
Atlantic salmon Brook lamprey Bullhead	Toxic contamination from pollution incident	Sources of toxic pollutants include substances such as oil, fuel and hydraulic fluid from construction plant. The accidental release of pollutants during construction could impact fish populations directly or indirectly. There is no pathway to effect from toxic contamination during operation. **Potential for likely significant effect on Atlantic salmon, brook lamprey and bullhead from toxic contamination during construction.**	Yes	Potential for the construction of any schemes arising from the Salisbury River Park Master Plan that are located within close proximity to the SAC to have in-combination effects. Potential for hydropower scheme	Yes

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
				to have in-combination effects on the qualifying fish species. Potential for Castle Street development to have in-combination effects (run-off).	
Atlantic salmon Brook lamprey Bullhead	Invasive species through in-channel plant and equipment	Invasive species may be introduced to the River Avon SAC through construction plant and works equipment in-channel. Invasive species such as signal crayfish have the potential to impact the qualifying fish populations through predation on eggs and juveniles, displacement of juveniles from shelter, modification of habitats and competition for food. **Potential for likely significant effect of invasive species on Atlantic Salmon, brook lamprey and bullhead during construction.**	Yes	Potential for the construction of any schemes arising from the Salisbury River Park Master Plan that are located within close proximity to the SAC to have in-combination effects. Potential for hydropower scheme to have in-combination effects	Yes

Qualifying feature	Risk (Pressure)	Likely significant effect alone	Yes or No	Likely significant effect in combination	Yes or No
				on the qualifying fish species.	

9. Alone assessment (further details)

A summary of the Stage 1 screening for Likely Significant Effects of the RCI on the qualifying features of the River Avon SAC is provided in Table 4. This table has omitted those qualifying features and risks (pressures) which were assessed as not relevant to the RCI study area and design, respectively (see Sections 5 and 7, respectively).

The Stage 1 screening assessment for the RCI has concluded there is potential for Likely Significant Effect associated with habitat loss and fragmentation, physical damage, natural function, siltation, smothering and turbidity, toxic contamination, increased recreation and invasive species.

It is therefore concluded that a Stage 2 Appropriate Assessment is required. The Appropriate Assessment will consider any compensatory work which may be required due to the development.

Table 4: A summary of the Stage 1 screening for Likely Significant Effects of the RCI on the qualifying features of the River Avon SAC.

Qualifying feature		Risk (pressure)							
	Habitat Loss	Habitat fragmentation	Physical damage	Entrapment / impingement	Natural function	Turbidity, siltation and smothering	Increased recreation	Toxic contamination	Invasive species
Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Yes	Yes	Yes	N/A	Yes	Yes (turbidity & siltation only)	Yes	Yes	Yes
Atlantic salmon	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Brook lamprey	Yes	Yes	Yes	No	Yes	Yes (siltation & smothering only)	Yes	Yes	Yes
Bullhead	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Desmoulin's whorl snail	Screened out.								
Sea lamprey	Screened out.								

10. In combination assessment (further details)

Table 3 in Section 8 identifies the potential for significant in-combination and cumulative impacts. These can be summarised as follows:

- Potential in-combination effects of the RCI on Atlantic salmon, brook lamprey and bullhead populations and Water courses of plain to montane levels with Ranunculion fluitantis and Callitricho-Batrachion vegetation with future proposals taken forward in the Salisbury River Park Master Plan;
- Potential for uncertain or significant in-combination effects of the RCI on Atlantic salmon, brook lamprey and bullhead populations and Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation with the potential hydropower scheme, which will require further consideration if details of that scheme become available;
- Potential in-combination effects of the RCI on Atlantic salmon, brook lamprey and bullhead populations and Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation with Wiltshire Council's Central Area Framework and,
- Potential in-combination effects of the RCI on Atlantic salmon, brook lamprey and bullhead populations and Water courses of plain to montane levels with Ranunculion fluitantis and Callitricho-Batrachion vegetation with land development at Castle Street, specifically its surface water drainage.

11. Information / Advice

Natural England information / advice

Various meetings have been held with Natural England, Wiltshire Council's Ecologist and Environment Agency specialists (ecology, fisheries) during the development of the RCI as follows:

- Concept design workshop -16 October 2019: to work through the design concepts for the RCI, and to identify any issues that will need to be addressed at more detailed design stages. The workshop included a site visit;
- Outline design workshop - 22 November 2019: this second workshop focussed on inviting ecology/landscape consultees was to work through the outline designs/options for the RCI;
- Preferred option workshop – 24 January 2020: to discuss the preferred option proposals;
- Telephone meetings and email correspondence to discuss the scope of ecology surveys and,
- Ecological focus group workshop – 13 October 2020: to discuss any concerns relating to the proposed scheme.

Natural England has provided ongoing feedback during the development of options and on the proposed RCI, as well as input to the scope of ecology surveys to be undertaken to inform impact assessment and mitigation (including the requirement for European Protected Species licences).

12. References

Natural England (2019): *European Site Conservation Objectives: Supplementary advice on conserving and restoring site features*

Natural England: *Site Improvement Plan Avon River and Valley*

Wiltshire Council, Civic Engineers, SQW and Tibbalds (2020): *Salisbury Central Area Framework*, Report produced in collaboration by Tibbalds Planning and Urban Design, and Wiltshire Council, London.

Wiltshire Council (2018): *Salisbury Transport Strategy: Draft Strategy Refresh 2018*

13. Decision

Jacobs carried out the HRA Stage 1 screening on behalf of the Environment Agency and conclude that there is potential for likely significant effects alone and in-combination on Atlantic salmon, brook lamprey, bullhead and Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation within the River Avon SAC.

An Appropriate Assessment will be required for Phase 1 of the Salisbury River Park Improvements (RCI) scheme.

14. Record of Appropriate Assessment

Jacobs have been commissioned to undertake the Habitats Regulations Assessment (HRA) for the Salisbury River Park Phase 1 Scheme on behalf of the Environment Agency. Jacobs were requested to use the following Environment Agency template for the HRA 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 permission, plan or project (PPP) detailed in Section 14 for the following relevant sites:

- River Avon SAC (UK0013016) ^.

Version: Draft 1: 06.01.20 (Author: Alice Shoebridge & Corinna Morgan, Jacobs)

Version: Draft 2: 01.03.21 (Author: Alice Shoebridge & Corinna Morgan, Jacobs)

15. Summary of Stage 1 (likely significant effect) conclusion

At stage 1, significant effects could not be screened out; those effects screened into Stage 2 are summarised below (Table 5).

Table 5: Potential LSE of the RCI on qualifying features of the River Avon SAC alone and in-combination.

Qualifying feature	**Risk (Pressure)**	**Likely significant effect alone** **Yes or No**	**Likely significant effect in combination** **Yes or No**
River Avon SAC (UK0013016) ^			
Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Habitat loss from infilling of channel at the junction of the River Avon and Summerlock Stream, channel widening and restructuring, rock weirs, removal of Swimming Pool Gate, new in-channel berm on the River Avon downstream of the Maltings and extension of Waitrose culvert.	Yes	Yes
	Habitat loss and/or fragmentation from shading from replacement Millstream Approach Bridge, pedestrian clear span footbridge and replacement of the pedestrian footpath at Swimming Pool Gate. Habitat loss and/or fragmentation from shading from installing a culvert on the Summerlock Stream.	Yes	No (See Section 16)
	Habitat fragmentation from construction plant (including use of cofferdams during removal of Swimming Pool Gate and extension of the Waitrose culvert outfall) and channel infilling	Yes	Uncertain

Qualifying feature	Risk (Pressure)	Likely significant effect alone Yes or No	Likely significant effect in combination Yes or No
	Changes to natural function from the construction and modifications to channels, control structures, extension of the Waitrose culvert, replacement Millstream Approach Bridge. The new flood defences have the potential to constrain natural function to a limited extent but natural functioning is already restricted by existing urban development in the Ashley Road area.	Yes	Yes
	Increased recreational use by the public from operation of the new channel and wetland habitat, new footbridge, amenity improvements and modifications to the River Avon main channel	Yes	Yes
	Physical damage from construction plant (construction only)	Yes	Uncertain
	Turbidity and siltation from in-channel works to banks and bed (construction only)	Yes	Uncertain
	Toxic contamination from pollution incident (construction only)	Yes	Yes
	Invasive species from plant and machinery (construction only)	Yes	Yes
Atlantic salmon Brook lamprey	Habitat loss from infilling of channel at the junction of the River Avon and Summerlock Stream, channel widening and restructuring and rock weirs	Yes	Uncertain
	Habitat loss/fragmentation from installing a culvert on the Summerlock Stream.	Yes	Yes

Qualifying feature	Risk (Pressure)	Likely significant effect alone Yes or No	Likely significant effect in combination Yes or No
Bullhead	Habitat fragmentation/modification from construction plant (including use of cofferdams during removal of Swimming Pool gate and extension of the Waitrose culvert) and channel infilling and new channel creation	Yes	Uncertain
	Increased recreational use by the public from operation of the new channel and wetland habitat, new footbridge, amenity improvements and modifications to the River Avon main channel.	Yes	Yes
	Physical damage from plant and machinery (construction only)	Yes	Uncertain
	Changes to natural function of watercourses from engineered scheme	Yes	Uncertain
	Turbidity, siltation and smothering from in-channel works to banks and bed (construction only)	Yes	Uncertain
	Toxic contamination from pollution incident (construction only)	Yes	Yes
	Invasive species through in-channel plant and equipment (construction only)	Yes	Yes

^ Protected area under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

16. Further information about the proposal

Modifications to Scheme design and construction programme

Since writing the HRA Screening document, Scheme design specifics have been finalised and a full description is provided below of the 'screened in' elements. Table 6 provides details of the design which have changed since the writing of the HRA Screening.

The construction programme has also been revised since the HRA Screening and is shown in Appendix C. This is provided as an indicative programme and may be subject to further change during detailed design of the Scheme. The revised programme shows the Scheme being constructed over two years with the works in the Maltings and Central Car Park area starting in 2022 rather than 2023 as previously indicated. The works at Fisherton Recreation Ground will now also extend over two years.

Ashley Road site (see Figure A1 'Ashley Road Landscape Masterplan' in Appendix A)

Ashley Road area
New flood defence embankment: The embankment will run along the southern boundary of Fisherton Recreation Ground and Ashley Road Open Space and be approximately 550m long and up to 1.4m high. The embankment will have varying side slopes; on the river side these will be up to 1 in 10 gradient slopes to give a natural appearance and respect the local landscape character and up to 1 in 4 gradient slopes where space for the embankment footprint is limited and on the Ashley Road side. The embankment will be topsoiled with site-won topsoil and seeded with either an amenity grass seed mix, or, if fertility levels in the topsoil are sufficiently low (to be determined during detailed design), it may be seeded with a species-rich meadow seed mix. Topsoil stripping will be required to facilitate construction. There may also be some form of below ground cut-off to limit seepage. This would require trenching along the whole length of the embankment and filling with clay material or installing plastic sheet piling. The requirements will be confirmed at detailed design stage. This embankment will be located at an approximate distance of 40-50m from the River Avon SAC but ties into natural ground levels on its eastern extremity of Ashley Green at Ashley Road, only 5m to the west of the SAC.
New flood defence walls: (1) New wall, approximately 95m long and 1.4m high (above ground), clad in red brick on river side adjacent to footpath / cycle track, will run close to the Coldharbour Lane Allotments and link Summerlock Bridge to the flood defence embankment to the north. The wall is needed instead of a flood embankment due to space constraints as the width of the recreation area narrows alongside the river and there are adjacent mature Black Poplar trees which we will retain. Improvements will also be made to ditches alongside the allotments to improve drainage. Topsoil stripping and excavation by up to approximately 1.0m to the foundation level of the wall will be required to facilitate construction. There may also be some form of below ground cut-off to limit under-seepage below foundation level. This would require additional trenching below foundation level along the whole length of the wall and filling with clay material or alternatively installing plastic sheet piling or similar. The requirements will be confirmed at detailed design stage.

(2) New wall, approximately 45m long and just over 2.0m high on the river side and 0.6m high on the garden side (above ground), clad in red brick, will extend into one private garden adjacent to Ashley Road and Summerlock Bridge, bordering the right bank of Summerlock Stream. The wall will act as a secondary flood defence. The existing 20m long river-bank wall (mainly built in blockwork) on the Summerlock Stream will be removed and new marginal wetland planting introduced along the edge of the channel to enhance biodiversity.

(3) Raising the existing parapet upstand on the north side of Ashley Road bridge over Summerlock Stream by approximately 0.3m, with the new reinforced concrete section of upstand dowelled into the existing wall, and fitting new parapet railings. A connecting new flood defence wall will continue to the east, approximately 0.4m high (above ground), clad in red brick with railings, alongside the pavement on Ashley Road. A short length of flood defence embankment then runs to the north along the west bank of Summerlock Stream up to the main flood defence embankment.

Removal of trees: removal of 18 trees including 10 Lombardy poplar trees and two memorial trees and 30m of hedgerow along the southern boundary of the existing play area adjacent to Coldharbour Lane Allotments to facilitate the construction of the new embankment.

Removed trees will be replaced with new tree planting as shown on the Landscape Masterplan, including 33 new specimen trees in the Ashley Road area (to include the replacement of six Lombardy poplars in Fisherton Recreation Ground and the replacement or replanting of two memorial trees).

Infilling a short section of Summerlock Stream: Infilling an approximate 20m length of channel at the Summerlock Stream offtake from the River Avon at Blackwell Hatches. As part of the new Summerlock channel, just downstream a backwater amenity and biodiversity feature and shingle beach will be created.

New Summerlock Stream offtake structure and offtake channel: The offtake structure will require breaching the bank of the River Avon at the northern end of Fisherton Recreation Ground. Below this structure, the new offtake channel will pass through Fisherton Recreation Ground and connect with the existing Summerlock Stream just downstream of the Blackwell Hatches.

During low flows, water will be constrained to a single channel within this area (which may include multiple braided sub-channels if appropriate) and will be designed to maximise opportunities for fish passage. During higher flows, the channel will provide a connection to the surrounding new wetland habitat area (see below).

The approximate size of the new offtake channel will be 320m long with a low flow channel about 3-4m wide and up to 1.4m depth below existing ground level. The offtake structure will have reinforced concrete walls and base, and will be clad with natural stone. Due to the height of the opening of the offtake structure and the relatively small width of opening, the installation of two separate concrete side walls was not considered further as it would need substantially more concrete for the foundation bases, and would probably end up meeting in the middle of the channel anyway. A pre-cast U channel will result in the least amount of concrete being used and will also avoid the need to pour concrete on site with the associated environmental risks associated with this. The invert will be buried and allow to naturally accrete. Berms either side of this low flow channel will vary in width to form a two stage channel for higher flows. The requirements will be confirmed at detailed design stage, with the aim of maintaining the existing low flow regime.

New flow control structures: The structures comprise the new Summerlock Stream offtake described above and a new culvert on the Summerlock Stream, which will pass beneath the new flood defence embankment on the southern boundary of the Fisherton Recreation Ground, near Ashley Road, to limit the peak flood flows passing downstream. These are both

passive structures to minimise future operational risks and maintenance costs and have been designed to enable fish and eel passage.
New wetland habitat (see landscape plans in Appendix E1): The wetland will include the main low flow channel with marginal berms and adjacent wet grassland and wet woodland located within a ground lowered area, hydrologically connected to the new Summerlock Stream offtake channel, and accommodating water during high flows. It will also incorporate seasonally wetted ephemeral secondary streams, active at different flow states.
Two new footbridges and boardwalks: The footbridges (2m wide) will cross the new Summerlock Stream offtake channel (one will also accommodate a new cycle track) at the north and south end of the new wetland habitat area. The bridge at the southern end of the wetland habitat area (near the allotments) will be clear span over the channel to minimise the constraint on the channel with consideration of the root zones of the adjacent black poplar trees. Further details of the bridges will be provided during detailed design. The exposed elements of the proposed steel beam pedestrian/cycle bridges such as soffits will be clad in timber. The bridges will be fitted with vertical timber railings. Two sections of boardwalk access will be provided around the wetland area. The boardwalks will be constructed from recycled plastic.
New retaining wall along the edge of the new footpath / cycle track where it runs past Coldharbour Lane Allotments, approximately 70m long and up to 1m high (retained height), required due to space constraints to avoid impacting the native Black poplar trees.
New amenity facilities: These will include a shingle beach and picnic area adjacent to the new wetland habitat, improved public access at selected points (e.g. proposed river viewing platforms) to the new wetland habitat and installation of benches and information boards.

The Maltings/central car park (see Figure A2 'Central Car Park/Maltings' Landscape Masterplan' in Appendix A)

Central Car Park/The Maltings area
Modifications to the River Avon main channel: The river channel corridor near the Millstream Coach Park will be reshaped and widened (50m maximum) and reshaped over a length of approximately 250m, providing a multi-staged channel with marginal wetland habitat on both banks. A geosynthetic clay liner or cohesive alluvium backfill will be used to line the widened channel (which is currently not lined) where required, due to the risk of contamination in the made ground in the area. Bed materials to be imported will be sized appropriately, consistent with the geology of naturally occurring substrates at detailed design stage.
Removal of Swimming Pool Gate structure (radial gate): The flow control structure on the western branch of the River Avon channel, where it splits (above Millstream Approach), will be removed to improve fish passage and allow reprofiling of the channel bed to remove the large drop in bed level across the existing structure. It will be replaced with a series of new rock weirs for fish passage, with appropriately sized flints/gravels imported to form the substrate of each step. There will be a change in low flow water levels upstream due to the reconfigured layout, by up to about +/-0.2m based on modelling.
New floodway culvert: The culvert (shown on Figure A2 in Appendix A) extending over approximately 140m will connect the River Avon main channel with the Summerlock Stream, with inlet and outlet structures, designed to carry floodwater only in extreme flood events (it will not impact on low flows) to reduce the flood risk to residential properties (notably in the

area on the Avon downstream of the Maltings between Fisherton Street and the confluence with the Nadder). The approximate size will be 4m wide and 1m high (internal dimensions). Flow into the culvert is controlled by a high level side spill weir on the main Avon channel and therefore flow will only pass into the culvert during large flood events (1 in 20 annual probability or rarer). Construction will require the removal of approximately 19 trees. [Alternative option of a shorter culvert under the main road with an open channel downstream was assessed but discounted due to landowner issues].

Extension of twin pipe culverts (each 0.9m in diameter): The culverts will extend over a length of about 150m to move the outfall of the Waitrose culvert, which currently joins the channel immediately downstream of Swimming Pool Gate, to a position further downstream near the Avon Approach Bridge, providing continued drainage of this watercourse and connected surface water systems.

Tree removal and replanting: Removal of 67 trees along the existing River Avon corridor to facilitate the construction of the widened channel and river park corridor. A total of 281 replacement trees are to be planted in and adjacent to the reprofiled River Avon corridor, comprising 47 standard trees and 234 transplants within tree and shrub planting plots.

Reduction in width of the Mill Stream: Narrowing to 6-8m (based on an assessment of low flows in this channel and analysis of channel in other areas where it is the correct width to allow velocities to prevent siltation) over an approximate 550m length to improve low flow conveyance and create a more sinuous low flow channel by introducing shallow berms or raised areas (potentially using locally sourced flint gravel). Requirements will be confirmed at the detailed design stage**.** The berms will be placed in the existing channel to minimise deposition of silt on the flint bed under reduced flow conditions and to encourage diversity in local instream and marginal habitats.

Modified layout of existing fish pass weirs at The Maltings: This will involve lowering the upstream crest level, strengthening a central wall, and making any necessary repairs to the structure. Detailed design will confirm the changes that can be made without structural impacts to neighbouring buildings; it will not be possible to make it more naturalistic than its current condition. Changing the flow regime will result in a longer period of time usable by fish.

Removal of hatches from the existing sluice gate structure at The Maltings: This will reduce upstream water levels within the Mill Stream channel that is potentially silted above its original bed level and restore fish passage.

Local ground raising: Infilling low spots to a maximum depth of 0.3m over small areas near the River Avon near the railway embankment and adjacent to the Waitrose Culvert watercourse (open channel) to the north of the substation. The aim will be to reduce flood risk to the adjacent access road.

New flood wall (about 1.5m in length): The wall will be set back from the eastern bank of Summerlock Stream near Fisherton Street with flapped opening to retain drainage outflow into river under normal conditions. Associated measures to improve flood resilience of an adjacent property (approximately 1m from the river).

Creation of a small Pocket Park: new park on approximately 500m² of land on the northern edge of Millstream Approach between the widened River Avon corridor and the road adjacent to the Mill Stream.

Replacement of vehicular and footbridges

Removal of the existing Millstream Approach road bridge and replacement of Millstream Approach road bridge: The new single lane bridge (with capability to be used as a two lane

highway bridge in the future) will cross the widened river channel in a more northerly alignment. The new bridge deck with approximate open span of 20m and width of 10m will be supported on new bridge abutments and piled foundations positioned within the widened river corridor.

Modified road approaches to the replacement road bridge, requiring ground raising to accommodate the higher level of the bridge. On the western side the existing road adjacent to the electricity substation will be raised over a total length of about 100m, with low height retaining walls to accommodate this. On the eastern side the existing ground will need raising to form a new approach road over a total length of about 50m.

New pedestrian steel trussed footbridge further downstream (south of existing Millstream Approach bridge). Footbridge width approximately 2m, length approximately 35m.

Replacement of existing footbridge at Swimming Pool Gate with new wider bridge to accommodate pedestrians and cyclists. The exposed elements of the proposed steel beam pedestrian and cycle bridge such as soffits will be painted in an appropriate colour. Bridge width approximately 6m, length approximately 30m.

For the new bridges the form of construction and finishes will be determined at detailed design. The decks of all bridges will be surfaced with finishes that continue or at least complement the existing surfaces on the adjacent sections of footpath or cycle track.

New retaining wall: The wall will run along the edge of a footpath/cycle track on the right bank of the River Avon, just upstream of the replacement road bridge on the western side of the widened river corridor. The approximate size will be 40m long and 1m high (retained height), required due to space constraints to accommodate the modified channel corridor profile given the minimum gradients of the river banks. The exposed face of this wall will be clad with natural stone and public safety fencing will be fixed to the top of it.

Coach Park raising: Raising ground levels by up to about 0.5m over approximately 0.2ha area to act as a flood defence against overland flood flows, using excavated material from modifications to the main River Avon channel corridor, and removal of the Coach Park culvert. The area will be re-surfaced and the drainage improved.

New flood alleviation measures at Steynings House: Short section of new flood wall to infill a localised low spot in the bank on Summerlock Stream which is vulnerable to flooding overland into Fisherton Street downstream. The wall, less than 2m long and approximately 1m high, to be built across an access path to the rear of the main building, clad in red brick to match the existing brickwork.

The new flood wall at Steynings House will incorporate an appropriately sized drainage slot with flap valve to allow any surface water runoff collecting behind it to drain into Summerlock Stream. A flap valve will be fitted to the large rectangular box culvert outfall within the Summerlock Stream channel at this location - WaStop non return valve or similar. There will be no change to the existing water quality of runoff discharging directly to the river nor to the gullies. However, during the detailed design stage of the Scheme, opportunities will be sought to provide improvement (where possible) in consultation and agreement with the landowners.

Associated measures to improve flood resilience of the main building, on the river side (undefended), will be considered at detailed design stage.

River Avon fish passage measures: New short section of in-channel berm or raised area on the River Avon downstream of Maltings and just upstream of the confluence where the Mill Stream rejoins at Fisherton Street bridge. This berm will be formed potentially using locally sourced flint, placed in the existing channel (east side) to locally create more turbulent flow

conditions characteristic of chalk streams, to encourage fish passage into the River Avon away from Mill Stream. The in-channel berm is needed to create the attractant flow to maximise the chances of fish choosing this route rather than the Mill Stream. Whilst improvements to the Mill Stream fish pass are proposed, it will still only be passable for certain fish, whereas the Avon channel should be passable to all.	
Amenity improvements: including public viewing area, new footpath/cycle track and shingle beach with stepping stones (if considered appropriate following further investigation).	
Improvements to the layout of roads and footpaths within the Central Car Park area: to accommodate the Scheme proposals and provision of new segregated cycleway route for National Cycle Network Route 45 from Swimming Pool Gate to the southern boundary of the coach park.	
New low-level lighting: installed along some of the new Public Rights of Way for safety, security and vandalism purposes, and the locations for this lighting will be agreed in consultation with Natural England during detailed design of the Scheme.	
Throughout Scheme area	
Diversion of services	Diversion of cables and pipes including gas mains (diversion location approximately 15m from SAC passing under new defences adjacent to Summerlock Stream at Ashley Road) to facilitate widened river corridor and new wetland habitat area and new alignment of some services
Diversion of and new Public Rights of Way	Temporary and permanent diversions of Public Rights of Way (notably public footpaths and cycleways) including signage of all temporary and permanent diversions. The riverside path at Fisherton Recreation Ground will be partially changed to boardwalk with the surface of the remaining length improved.
	Ashley Road site - newly surfaced paths with ideally resin-bound gravel where possible or asphalt in areas of heavy use (e.g. the new cycleway/footpath that ramps over the new flood defence embankment to Coldharbour Lane) - to be determined during detailed design.
	The Maltings and Central Car Park area – new paths will be tarmac to provide durability in this heavily used area
Trees and vegetation	Planting of standard trees (80 nr.), native species wet woodland (c. 1,450m^2), native species tree and shrub planting (c. 2,070 m^2), native species hedgerow (c.470m) amenity shrub planting (c.900m^2) and marginal wetland habitat creation (c. 3,830m^2).

Table 6: Design changes since writing the HRA Screening (draft 1)

Design element Original HRA Screening (Draft 1)	Updated design element to be carried forward in Appropriate Assessment	Comment
N/A	Removal of approximately 18 trees and 20m of hedgerow along the southern boundary of the recreation ground	New Scheme component. It is considered to have no impact to SAC features.

Design element Original HRA Screening (Draft 1)	Updated design element to be carried forward in Appropriate Assessment	Comment
	adjacent to Coldharbour Lane Allotments to facilitate the construction of the new embankment. Replanting of 360 trees in the Ashley Road area (to be thinned).	No change to Stage 1 Screening.
N/A	Two new pumping areas to be used on a temporary basis for pumping standing water from drainage and under-seepage ponding behind the defences during flood events.	New scheme component screened out. The pumping areas will be removed from the SAC, at a distance of at least 40m, located behind the new flood embankment. There is no pathway to impact.
N/A	New filter drains will run at the back of the new flood defence embankment over its entire length as a drainage connection to the two new pumping areas. The drains will discharge to the pump sumps.	New scheme component screened out. The filter drains will be removed from the SAC, at a distance of over 50m, located behind the new flood embankment (except at the eastern extremity). These will only be used during flood events when there is extensive flooding on the wet side of the embankment and the discharged water will be pumped back over the flood defence embankment. There will be no known pollution associated with the use of these filter drains and there is no pathway to impact.
N/A	New retaining wall along the edge of the new footpath / cycle track where it runs past Coldharbour Lane Allotments.	New scheme component. The new wall is removed from the SAC, at a distance of over 40m. There is no pathway to impact.
New footbridge across the new channel in the Fisherton	Construction of two new footbridges across the new channel (one to also accommodate a new	Number of footbridges has increased in new channel area.

Design element Original HRA Screening (Draft 1)	Updated design element to be carried forward in Appropriate Assessment	Comment
Recreation Ground/Ashley Road area.	cycleway) at the north and south end of the new wetland habitat area and two sections of boardwalk access around the wetland area.	No new impacts on SAC as the footbridge is not being constructed over existing SAC habitat, but may add to the existing impacts [as the SSSI boundary and potentially the SAC boundary will follow the new channel banks].. No change to Stage 1 Screening.
New twin culvert from the River Avon main channel into the Summerlock Stream	New single culvert from the River Avon main channel to the Summerlock Stream	Reduction from twin to single culvert. No new impacts. No change to Stage 1 Screening.
Extension of twin pipe culverts (each 0.9m in diameter) over a length of approximately 150m to move the outfall from the Waitrose culvert, which currently joins the channel immediately downstream of Swimming Pool Gate, to a position downstream near the Avon Approach Bridge providing continued drainage of this watercourse and connected surface water systems	This will require use of a cofferdam during construction.	New scheme component. Stage 1 Screening has been updated (Section 8).
N/A	Removal of approximately 67 trees along the existing River Avon corridor to facilitate the construction of the widened channel and river park corridor and 19 trees along railway embankment. Replanting of 281 trees in the Maltings and Central Car Park area (to be thinned).	Additional detail in Scheme design. Stage 1 Screening has been updated (Section 8).
In-channel works to Mill Stream over an approximate 400m length to improve low flow conveyance - the nature of the works required is to be confirmed following a	Reduction in width of the Mill Stream to a target width of 8m over an approximate 550m length to improve low flow conveyance and create a more sinuous low flow	Additional Scheme design detail. Stage 1 Screening has been updated (Section 8).

Design element Original HRA Screening (Draft 1)	Updated design element to be carried forward in Appropriate Assessment	Comment
geomorphology study for the scheme.	channel by introducing shallow berms or raised areas	
Removal of the existing Library Hatches sluice structure and infill of the Library Side Channel, which connects the Mill Stream to the Avon	Removed from Scheme proposal Pending further details on plans for the area around the Library Hatches sluice, opportunities to improve and/or remove this channel will be considered in later phases of the wider Salisbury River Park Masterplan and assessed as part of any future consenting (including a separate HRA].	Removed from HRA Screening assessment in Section 8. No change to Stage 1 Screening
Removal and replacement of Millstream Approach road bridge. Replacement bridge (increased width from 9.5m to 10.1m) with new single lane bridge crossing the widened channel in a more northerly alignment. New pedestrian footbridge further downstream (south of existing Millstream Approach bridge)	A Bailey bridge will be required during the works associated with the Millstream Approach road bridge. During construction the road bridge will be used as a two-way road.	Additional Scheme design detail. Stage 1 Screening has been updated (Section 8). New Scheme component. It is considered no impact to SAC features. No change to Stage 1 Screening.
N/A	Replacement of existing footbridge at Swimming Pool Gate with wider bridge to accommodate pedestrians and cyclists, approximately 6m in width and 30m in length.	New Scheme component No changes to Stage 1 Screening, however, this adds to the impacts of shading/fragmentation of the river.
N/A	New retaining wall which will run along the edge of a footpath/cycle track upstream of the replacement road bridge on the western side of the widened corridor. The approximate size will be 40m long and 1m high (above ground).	New Scheme component. No changes to Stage 1 Screening. The retaining wall will mark/line the edge of the footpath/cycleway, which is removed from the river corridor. It is located

Design element Original HRA Screening (Draft 1)	Updated design element to be carried forward in Appropriate Assessment	Comment
		within the existing heavily modified area of Salisbury.
N/A	Creation of a small pocket park on 500m^2 of land on the eastern side of the widened River Avon corridor on the northern edge of Millstream Approach.	New Scheme component. No change to Stage 1 Screening, however this adds to the potential impacts of increased recreational use.
N/A	Improvements to the layout of roads and footpaths within the Central Car park area to accommodate Scheme proposals and provision of new segregated cycleway for National Cycle Network Route 45 from Swimming pool Gate to the southern boundary of the coach park. The footpaths within the Maltings and Central Car Park area will be asphalt to ensure they are durable and can be easily maintained, as requested by Wiltshire Council.	New Scheme component. No changes to Stage 1 Screening.
N/A	New flood alleviation measures at Steynings House: Short section of new flood wall to infill a localised low spot in the bank on Summerlock Stream which is vulnerable to flooding overland into Fisherton Street downstream.	New scheme component. Potential pathway to impact on qualifying features through changes to bank structure and lateral connectivity within the SAC. Stage 1 Screening updated.
N/A	New short section of in-channel berm or raised area on the River Avon downstream of Maltings and just upstream of the confluence where the Mill Stream re-joins at Fisherton Street bridge.	New scheme component. Potential pathway to impact through changes to in-stream habitat and flow Stage 1 Screening updated.
N/A	New low-level lighting will be installed along some of the new Public Rights of Way	After a meeting with NE (See Section 19), impacts of low-level lighting were included in the Stage 1 Screening HRA (Section 8;

Design element Original HRA Screening (Draft 1)	Updated design element to be carried forward in Appropriate Assessment	Comment
		Habitat Fragmentation). As such, this has been carried through to the Appropriate Assessment.

Additional Habitat and Species Data

Since writing the HRA Stage 1 Screening assessment, water crowfoot communities have been surveyed to gain an understanding of their presence and extent within the study area.

Water crowfoot communities have been identified within the study area (Jacobs, 2020[9]), indicating suitable habitat within the River Avon, Summerlock Stream and Mill Stream. The site surveyed at Fisherton Recreation Ground is considered sub-optimal habitat for water crowfoot communities; in the 100m stretch surveyed no water crowfoot was noted. The HRA Screening has been updated accordingly with this information.

Environment Agency data indicates fish populations are diverse within the River Avon, with a number of fish species migrating through Salisbury to find suitable spawning habitat in the upper reaches of the catchment. Fish data from the Ecology and Fish Data Explorer[10] indicates the presence in the study area, amongst others of Atlantic salmon, bullhead, brook lamprey, brown trout, European eel, grayling, dace, perch, minnow, pike, gudgeon and stone loach.

Electric fishing surveys were scheduled to be carried out by the Environment Agency in 2020 to provide a current and more detailed understanding of the fish communities within the study area. These surveys did not go ahead due to COVID-19 and restrictions imposed by the Government. However, baseline information and local knowledge of the river provided by the Environment Agency Fisheries Officer has been used to help assess the risks in this assessment, which assumes worse case (i.e. that all screened in qualifying fish species could be present and spawn within all reaches of watercourse within the Scheme area). The Environment Agency are proposing to carry out electro fishing surveys in 2021, which will be used to inform the detailed design of the Scheme and construction method statements prepared by the Contractor.

Additional Considerations of Sediment Mobilisation

From a geomorphological viewpoint, all channels within the footprint of the scheme are relatively stable: there has been very little evidence of changes to planform and dynamic natural adjustment of local channels in recent history. Contemporary (i.e. existing post-glacial) sediment input to the river system is predominantly fine material (derived from diffuse catchment sources and bank erosion) with little, if any, replenishment of gravels. As a result, the main channel adjustment processes within the area covered by the scheme are associated with the movement and accumulation of silts.

[9] Jacobs (2020) Salisbury River Corridor Scheme: Macrophyte Survey Report.

[10] Environment Agency Ecology and Fish Data Explorer: https://environment.data.gov.uk/ecology-fish/

Within and local to the proposed scheme boundary, fine sediment deposits are currently located in: marginal areas among woody mattresses (i.e. artificial structures constructed from woody material and brash designed to trap sediment along channel margins) designed to encourage berm formation upstream from Blackwell Hatches; marginal deposition between Blackwell Hatches and Ashley Road; and further settlement of fines upstream of Swimming Pool Gate in the impounded reach of c.500 metre length directly upstream from this structure. Fine sediment also builds up within the Mill Stream, particularly directly downstream of the bifurcation from the River Avon at Swimming Pool Gate where seasonal smothering of the bed may occur. Silts are evident along the Mill Stream channel margins and within dense stands of water crowfoot in the upper to mid reaches. Though deposition of fine sediment occurs elsewhere in the River Avon and Summerlock Stream, it is not as extensive or as prominent as in the above areas and characteristic chalk stream features of a clean bed with instream and marginal vegetation communities are largely present in these reaches.

17. Appropriate assessment: assessing the effects alone

The Stage 1 Screening identified that the Phase 1 works have the potential for Likely Significant Effect (LSE) on the qualifying feature 'Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation' and qualifying fish species (Atlantic salmon, bullhead, brook lamprey) during the construction and operational phases.

These effects are assessed further below.

Habitat loss

The Phase 1 RCI works have been assessed to have the potential for LSE on qualifying features of the River Avon SAC (the river habitat characterised by water crowfoot communities and fish species). The work elements associated with the potential for habitat loss are:

- Infilling of up to 20m length of the Summerlock Stream, new culvert;
- Modifications to the River Avon main channel and Mill Stream;
- Amenity improvements at Ashley Road site (e.g. shingle beach, boardwalks and picnic areas, river viewing platform) and amenity improvements within the Maltings/central car park area including public viewing area, new footpath/cycleway and shingle beach with stepping stones (if considered appropriate during detailed design and in agreement with Natural England);
- Replacement of Millstream Approach road bridge and new pedestrian footbridge to the south and replacement of footbridge at Swimming Pool Gate;
- Removal of Swimming Pool Gate structure and modified layout of existing fish pass weirs at The Maltings;
- New in-channel berm on the River Avon downstream of the Maltings and,
- Extension of twin pipe culverts to move the outfall of the Waitrose culvert.

These are considered in more detail below, alongside mitigation measures and a resulting assessment on impact on site integrity.

The anticipated losses (200m^2/0.02ha) of in-channel SAC habitat resulting from the Phase 1 works will be mitigated by an overall net habitat gain (estimated 14% increase) within the footprint of the scheme. The new offtake channel for the Summerlock Stream at Fisherton Recreation Ground has been designed to re-create a typical chalk stream habitat totalling an estimated 320m of new channel habitat and 0.36ha of new riverine and riparian habitat features. This will directly contribute to restoring the extent of the qualifying habitat within the SAC, as well as restoring the extent and pattern of in-channel and riparian habitats to that

characteristic of natural fluvial processes. Measures specifically designed to introduce desirable characteristics include:

- Addition of varying sizes of gravels and variable channel width will promote flow diversity and retention of a clean substrate for fish spawning. Addition of small proportions of smaller substrates, predominantly sand, will also benefit the establishment of macrophytes including water crowfoot communities;
- Creation of riffle-pool-run sequences through a channel design that includes varying depths and widths within a sinuous planform will promote habitat diversity and flow diversity which will promote species richness;
- Low banks will be created at suitable locations in the new channel to provide connection between the river and floodplain in varying flow conditions but also provide lateral connectivity of the river channel to those marginal and riparian areas, providing additional benefits for macro-invertebrate communities and fish communities;
- As in a natural chalk stream environment, some deposition of fine material is expected at low flows. Maintenance of sediment continuity will be enhanced by the addition of instream features, potentially including woody debris, alternate berms, marginal planting, bed reprofiling and large woody material that acts as flow deflectors. These additions would also introduce morphological diversity in the channel and create varied instream habitats and,
- A riparian buffer zone may be created including backwaters designed to prevent fish stranding, provide nursery habitats for a number of fish species including lamprey and promote habitat for specialist macro-invertebrates.

Infilling of 20m length of the Summerlock Stream, new Summerlock offtake structure

Infilling of the channel at the junction of the River Avon and Summerlock Stream and the new Summerlock offtake structure will result in the direct loss of approximately 200m^2/0.02ha of in-channel habitat. This represents only 0.006% of the overall area of the River Avon SAC (416.6ha).

The section of channel being infilled on the Summerlock Stream is heavily modified and considered to be poor quality sub-optimal river habitat, dominated by slower flows and overlying silt on coarse substrates. It therefore provides sub-optimal habitat for fish, the and characteristic plant communities of the SAC (e.g. water crowfoot communities) and macro-invertebrates.

The connection between Mill Stream and the River Avon is also considered to be sub-optimal river habitat due to the heavily modified nature of the channel.

The restoration potential of the short section of Summerlock Stream channel to be infilled is limited and the loss of this area will be mitigated by the creation of the new Summerlock channel which will provide 320m of new chalk stream and 0.36ha of chalk stream and riparian habitat. Therefore there will be an overall gain in chalk stream habitat. The infilling of this channel is therefore not anticipated to have an adverse impact on the extent and distribution of the SAC habitat.

Modifications to the River Avon main channel and Mill Stream

The loss of in-channel, marginal and bank habitat resulting from modifications to the River Avon main channel and Mill Stream during construction will be temporary. This habitat will re-

establish on completion of the Phase 1 works and will be offset by a net gain in restored in-channel river habitat for both characteristic chalk stream plant and fish communities. Restoration of a more natural morphology will encourage characteristic features of the chalk stream habitat to establish which will benefit SAC features, distinctive species and biodiversity. The loss of riparian trees during construction, which also provides supporting habitat for the qualifying fish species (in terms of combatting increasing temperatures by climate change) will be offset through the replanting of native species along the widened River Avon corridor.

Whilst the design of the two-stage channel of the River Avon and Mill Stream in the Maltings/car park area will increase flood capacity and enable more natural flood management it also enables re-naturalisation of the watercourses and widening of the River Avon corridor to restore as much of the river habitat as possible within the constraint of an urban river system. The two-stage channel is designed with a variable berm width with marginal wetland habitat. Improving lateral connectivity and diversity in bank structure will benefit qualifying SAC species through habitat diversity. Tree planting in riparian areas will enhance riparian inputs for physical habitat for biological receptors for example by combatting increase in temperatures (climate change) and by providing a source of woody debris.

The modifications to the River Avon main channel and Mill Stream, whilst not entirely directly connected with, or necessary to the management of the River Avon SAC, will none-the-less contribute to the site's conservation objective to restore the SAC river habitat feature.

Amenity improvements at Ashley Road site and within the Maltings/central car park area

The impacts associated with increased recreational use of the River Avon SAC, including the new river platform are considered separately within this assessment. See 'Increased recreational use'.

Replacement of Millstream Approach road bridge & new/replacement footbridges

The replacement of Millstream Approach bridge (60cm increase in width,), the new pedestrian footbridges in the Maltings/car park area and across the new wetland channel, the replacement footbridge at Swimming Pool Gate and the culvert structure on the Summerlock Stream have the potential to increase the shading of the watercourse with associated impacts on aquatic plant communities, fish and invertebrates.

It is considered that the cumulative effect of the replacement bridges, footbridges and new culvert on the Summerlock Stream may exacerbate the existing pressures on the SAC features from the existing modified nature of the river corridor.

However, it is considered that any adverse effects can be avoided through the design of the new bridges and removal of the existing Millstream Approach Bridge to reduce the level of shading from existing and the creation of significant new areas of unshaded river habitat (as part of the new Summerlock channel) at Fisherton Recreation Ground and within the widened river corridor. The design of the replacement Millstream Approach Bridge includes a clear span with no instream span supports to avoid any operational in-stream disturbance of habitat. The bridge abutments and foundations will be positioned within the widened corridor but as far removed from the river as possible. The width of the replacement bridge has also been reduced as far as possible to cater for single lane traffic (with capability to be used as two-way in future) and marginal vegetation planting within the widened corridor.

It is noted that dappled shading can provide benefits to the aquatic habitat through creation of micro-habitats (and provide temporary refuge for fish during localised migrations in hot weather), and aiding combat of increased temperatures caused by climate change.

Removal of Swimming Pool Gate structure and modified layout of existing fish pass weirs at The Maltings

The channel upstream and downstream of Swimming Pool Gate is considered sub-optimal for chalk stream habitat. Upstream, the structure causes a loss of coarser clean sediments and fluctuating water levels which means that the plants, fish and other creatures characteristic of chalk stream habitat will have been replaced by those that prefer deeper, slower flowing water with a silty substrate. Downstream the River Avon (including the Mill Stream) is heavily modified with some localised natural areas, including tree-lined banks. Riffle-run-glide complexes are evident through to The Maltings, dominated with clean coarse substrates.

During construction, the works have the potential to cause impacts on fish communities through habitat fragmentation since flows will be altered to facilitate dry working conditions; this is considered further in 'Habitat Fragmentation' section.

The replacement of Swimming Pool Gate with a passive weir structure to improve fish passage will alter the division of flow between the river and the mill channel – i.e. more water will be diverted down the main channel. Mitigation of the risk of additional deposition of sediment within the Mill Stream will be provided by the introduction of marginal berms designed to create a low flow channel with velocities to transport silts. These new features will be designed to allow natural adjustment through seasonal accretion and movement of sediment according to the local hydromorphological conditions and will restore chalk stream features to, what is effectively, an artificial channel. It is also likely that additional fine sediment may be deposited in the Avon upstream of the passive weir structure in low flow conditions. However, model simulations suggest that velocities in the channel upstream of the new weir will increase in medium to high flows which may lead to remobilisation of deposited material. The replacement of Swimming Pool Gate with rock weirs will reduce the impounded nature of the reach at this location, promoting longitudinal connectivity, sediment transport and fish passage.

The removal of Swimming Pool Gate and modified layout of existing fish pass weirs at the Maltings, combined with the enhancement/creation of the chalk stream habitat features in the Mill Stream will contribute to the site's conservation objective to restore the SAC river habitat feature.

New in-channel berm on the River Avon downstream of the Maltings

Water crowfoot habitat is present in the reach where the berm is proposed, but not prevalent, and addition of this structure may still result in loss of habitat. Resulting impacts on distinctive species which utilise this habitat may be affected, including fish, macro-invertebrates and water vole (although the berm is required to create the attractant flow to maximise the chances of fish selecting this route rather than the Mill Stream). However, the changes to flow dynamics within the localised area created by the berm may promote crowfoot establishment by production of more favourable conditions in which crowfoot habitat can proliferate in the reach. In addition, any habitat lost by the footprint of the berm will be offset by the addition of the wetland channel at Fisherton Recreation Ground, providing an additional 0.36ha of channel.

Extension of twin pipe culverts to move the outfall of the Waitrose culvert

A temporary cofferdam is required for the relocation of the Waitrose culvert outfall. The habitat along this reach of the River Avon at the Maltings is considered sub-optimal for fish and water crowfoot communities Therefore the effect of any temporary habitat loss during construction is considered negligible.

Relocating the culvert outfall itself will result in localised changes to habitat, flow, channel morphology, channel substrate composition and bank structure at the new point of discharge, resulting in a localised reduction in quality of the aquatic environment. This is considered to have negligible impact on the SAC features of the River Avon SAC and the habitat it supports. The main flow into the Waitrose culvert is from the River Avon upstream, but it is believed there are several surface water connections into it as well. Some surface water drains to the Waitrose culvert, which discharges initially into a pond by the sub-station, before entering the culverts proposed to be extended. The pond currently provides some degree of water quality treatment but no further improvements are proposed as part of this Scheme. Initial discussions with stakeholders such as Greenspace Partnership indicate a desire to provide improvements at this location, particularly due to the nature of the County Wildlife Site, which may be considered further during detailed design.

The original outfall will no longer be operational, removing impacts on the aquatic environment at this location. Detailed design of the outfall will consider all options to reduce any localised impacts, including location of the outfall flush with the banks at an appropriate height.

Changes to water voles and otters

Water vole and otter are distinctive species of the River Avon SAC and the Stage 1 Screening identified potentially significant effects on these species. Construction activities (noise, vibration and artificial lighting) will impact upon the watercourses in the Scheme area, and therefore potentially disturb foraging and breeding habitat for water voles and foraging and resting sites for otters. These impacts are discussed further in the ecological impact assessment of the Environmental Statement and a Water Vole Mitigation Strategy.

The Scheme will result in the permanent loss of existing river habitat used by foraging and breeding water voles (and will directly impact on water voles through the loss of active burrows). Where construction works including vegetation clearance will be undertaken within 10m of a known water vole burrow within the Ashley Road area, water vole displacement will be undertaken to ensure no water voles are present during the proposed works. Due to the length of bank on the River Avon to be widened within the Maltings and Central Car Park area and burrows directly impacted, mitigation for these effects are the trapping and translocation of water vole to a suitable receptor site. Various receptor sites are being considered for the translocation of water voles and are subject to further survey in Spring 2021. This receptor site will provide suitable habitat for the establishment and growth of the water vole population.

The loss of the existing steep habitat banks along the River Avon in the Maltings and Central Car Park area may also reduce the availability of suitable burrowing habitat. Similarly, the Scheme may result in the loss of foraging or resting sites for otters. However, upon completion of the Scheme, the new channel and wetland area and the widened River Avon corridor will provide a net gain in river habitat, resulting in additional and high quality foraging habitat for these distinctive species and providing an important food resource for water vole and otter (though the gentler bank profile may increase predation by cats and foxes and may be influenced by an increase in recreational activity).

A pre-construction survey for otters in suitable aquatic habitat will identify any new otter holts or laying up sites within and adjacent to works areas. Please refer to the Environmental Statement for the Scheme for further detail of the mitigation measures. It is considered water vole and otter populations are unlikely to be impacted by the Scheme assuming implementation of the mitigation measures.

Considering the works associated with the Phase 1 RCI and mitigation measures outlined in this section, the RCI directly contributes to achieving a number of the Conservation Objectives of the River Avon SAC;

- Restore extent of the river habitat feature within the site- ;
    - Restore extent of in-channel and riparian habitat mosaic;
    - Riparian zone structure;
    - Restore presence of woody debris in-channel;
    - Restore natural flow regime;
    - Restore natural sediment regime;
    - Restore biological connectivity;
- Restore and/or maintain presence of key structural, influential and/or distinctive species (such as diverse fish community, water crowfoot communities, macro-invertebrate assemblages, otter and water vole;
- Fisheries – restore habitat that is likely to support fish densities to a level at or below the natural carrying capacity of the River Avon and,
- Cover of submerged macrophytes – maintain sufficient proportion of aquatic macrophytes to allow reproduction in suitable habitat.

In summary, it is estimated that the Phase 1 RCI will deliver an overall net function chalk river habitat gain of approximately 0.34ha which will positively contribute to restoring the qualifying habitat of the SAC and benefit the qualifying species (include losses not restricted to recreation ground).

Additionally, a five-year monitoring plan will be developed with Natural England prior to construction of the Phase 1 works to monitor changes to the qualifying features of the SAC within the scheme area and the success of the newly created wetland habitat adjacent to the SAC. To inform the plan, an annual walkover survey will be undertaken. The monitoring plan will include triggers for action, should they be needed.

It is therefore considered there is no adverse effect on site integrity from habitat loss.

Habitat fragmentation

The Phase 1 RCI works have been assessed to have the potential for LSE on qualifying features of the River Avon SAC (river habitat and fish). The work elements associated with the potential for habitat fragmentation are:

- Infilling of 20m length of the Summerlock Stream;
- New flow control structures; the new channel connection for Summerlock Stream & culvert on Summerlock Stream beneath embankment;
- Modifications to the River Avon main channel and Mill Stream;
- Amenity improvements at Ashley Road site (e.g. shingle beach, boardwalks and picnic areas, river viewing platforms) and amenity improvements within the Maltings/central car park area including public viewing area, redeveloped Coach Park, new

footpath/cycleway and shingle beach with stepping stones (if considered appropriate during detailed design and in agreement with Natural England);
- Replacement of Millstream Approach road bridge & new pedestrian footbridge to the south, and replacement of Swimming Pool Gate footbridge;
- Removal of Swimming Pool Gate structure and modified layout of existing fish pass weirs at The Maltings and,
- New culvert from the River Avon main channel into Summerlock Stream and extension of twin pipe culverts to move the outfall of the Waitrose culvert.

These are considered in more detail below, alongside mitigation measures and a resulting assessment on impact on site integrity.

Infilling of 20m length of the Summerlock Stream
New flow control structures; the new Summerlock offtake structure & culvert on Summerlock Stream beneath embankment;
Removal of Swimming Pool Gate structure and modified layout of existing fish pass weirs at The Maltings;
New floodway culvert from the River Avon main channel into Summerlock Stream including viewing platform over floodway offtake structure;
Extension of twin pipe culverts to move the outfall of the Waitrose culvert

Infilling of the 20m length of the Summerlock Stream will cause direct loss of habitat (as described previously) and temporary habitat fragmentation. Fish passage will be hindered and dispersal of water crowfoot and other plant seed propagules and invertebrates through downstream drift will be impacted.

Creation of new channel to extend the existing Summerlock Stream will directly replace the loss of a potential migratory route for fish caused when the reach downstream of Blackwell Hatches is disconnected. Habitat fragmentation will potentially also be increased in the Summerlock Stream by culverting of a 6m length of the stream under the new embankment. However, this new structure has been re-designed as far as possible to minimise its length whilst still being capable of limiting peak flood flows to reduce flood risk and protect against future changes to flood risk. . The length of the culvert design is minimised as far as possible and will maintain the gravel bed and as much continuity of marginal and bankside habitat of the river as possible to avoid additional impact on the biological community from further fragmentation caused by existing structures.

Fish passage through the Avon in central Salisbury will be greatly improved via the removal of Swimming Pool Gate, a noted obstruction to fish migration, with a series of rock weirs that will improve connectivity for both designated and non-designated species. Sediment transport will also be restored.

The extension of the twin pipe culverts, each 0.9m diameter, (which is not part of the SAC) to move the outfall of the Waitrose culvert (which currently joins downstream of Swimming Pool Gate) is considered to present no new risk of habitat fragmentation during operation except localised changes at the outfall in its new position further downstream near the Avon Approach Bridge. During relocation of the outfall a cofferdam is required which will result in temporary habitat fragmentation for fish and water crowfoot communities. The habitat along this reach of the River Avon at the Maltings is considered sub-optimal for fish and water crowfoot communities. During the temporary installation of the cofferdam, the fish are able to transit the

River Avon system through the Mill Stream. Therefore the effect of any temporary habitat fragmentation during construction is considered negligible.

Within the new wetland area at Fisherton Recreation Ground, channels will be designed to facilitate fish passage during low flows and maintain sediment continuity. A range of instream, marginal and riparian enhancements will be introduced to generate new heterogenous habitat to benefit a range of species, including salmonids and water crowfoot communities as described in the section previously.

Modifications to the River Avon main channel and Mill Stream

During construction of the two-stage channel in the River Avon adjacent to the Maltings central car park and the Mill Stream, in-channel works have the potential to temporarily fragment habitat for water crowfoot species (physical removal) and fish (barriers to migration from construction vibration and temporary changes in flow). Additionally a range of habitat modifications during construction have the potential to affect the structure and function of the riparian habitat mosaic and riparian zone causing a simplification of biotope mosaics and declines in characteristic biota dependent upon biotopes that have been lost or reduced in extent.

The physical removal of water crowfoot communities as a result of in-channel works will result in direct loss of the species associated with this community. However, the works are designed to provide the conditions for both these, and other chalk stream plant communities to thrive and they should recolonise through seed dispersal following the works. In addition, the transplantation of water crowfoot plants has been shown to be effective in speeding up establishment on other restoration projects. During operation, it is considered the design of the Phase 1 RCI (creation of new wetland channel, removal of Swimming Pool Gate to improve flow and sediment transport) will reduce fragmentation of habitats, improving lateral and longitudinal connectivity with improved marginal and in-channel environments.

Barriers to migration from vibrations of construction plant have the potential to cause temporary habitat fragmentation. This may originate from construction plant in-channel and piling in riparian/bank areas. Fish are mobile species and are able to navigate away from areas of disturbance; maintaining channel connectivity during construction will help reduce any risks of habitat fragmentation for fish. Construction activities will be temporary and conducted during daylight hours during the summer months (May to October) to reduce any impact on migrating fish species. Further exploration of piling options will be undertaken during detailed design and the preferred will be determined and confirmed with Natural England, to ensure that non-percussive and non-vibrating push pile techniques are used wherever the geological conditions allow.

Fish movement up-river could also be temporarily impeded by the additional flow that will temporarily pass down the Mill Stream during construction in the parallel River Avon (i.e. changes to the Swimming Pool Gate sluice and construction of new rock ramps). This would be during the summer months and could therefore impinge migratory movements through this reach but can be mitigated by manipulating flow splits to ensure that the acceptable flow over the fish pass is not exceeded. Flow could be diverted through the operation of the Library and Maltings Hatches or by diverting more flow down Summerlock Stream further up-river.

Amenity improvements at Ashley Road site within the Maltings/central car park area

The impacts associated with increased recreational use of the River Avon SAC are considered separately within this assessment. See 'Increased recreational use'.

It is considered the provision of a new segregated cycleway from Swimming Pool Gate to the southern boundary of the coach park will not result in lateral habitat fragmentation of marginal and bank habitat. The cycleway is located in the riparian zone, which is already heavily modified.

Replacement of Millstream Approach road bridge & new pedestrian footbridge to the south, and replacement footbridge at Swimming Pool Gate

During construction of the replacement of Millstream Approach bridge, a Bailey bridge will be required which will create temporary shading of the channel. It is considered to have no adverse effects on qualifying features of the SAC.

During operation, new bridges or modifications to bridges which result in an increase in shading of the channel have the potential to limit water crowfoot communities, bankside vegetation, and macro-invertebrate communities. It is considered fish communities will not be impacted by the new footbridge across Millstream Approach or within the new channel as fish habitat and connectivity will be maintained.

The replacement Millstream Approach bridge will be slightly wider than the existing (by 60cm) with a slight increase in shading to the channel (in comparison to the existing structure). The replacement bridge will be constructed within an urban river corridor where the continuity of habitat extending 500m north and south of the replacement bridge is already interrupted through the presence of other bridges and other urban structures impacting on the channel and riparian habitat (and the biota the river supports including invertebrates and fish). The replacement of the footbridge at Swimming Pool Gate will be widened to accommodate pedestrians and cyclists; approximately 6m wide compared to an existing width of approximately 3m with associated increase in shading over the existing channel.
As described previously, it is considered that any potentially adverse effects can be avoided through the design of the new bridges and the removal of the existing Millstream Approach Bridge which will reduce shading and the creation of significant new areas of unshaded river habitat (as part of the new Summerlock channel) at Fisherton Recreation Ground and also within the widened river corridor. The 'greening up' and of and enlarging the River Avon corridor will also help to improve habitat quality, connectivity and continuity for aquatic species. The design of the replacement Millstream Approach Bridge includes a clear span with no instream span supports to avoid any operational in-stream disturbance of habitat. The bridge abutments and foundations will be positioned within the widened corridor but as far removed from the river as possible. The width of the replacement bridge has also been reduced as far as possible to cater for single lane traffic (with capability to be used as two-way in future) and marginal vegetation planting within the widened corridor.

The Phase 1 RCI and mitigation measures outlined in this section directly relate to fulfilling the River Avon SAC Conservation Objectives:

- Restore extent and features (fish, water crowfoot) within the site;
- Restore natural flow regime;
- Restore natural sediment regime;
- Restore biological connectivity;

- Restore and/or maintain presence of key structural, influential and/or distinctive species (such as diverse fish community, water crowfoot communities, macro-invertebrate assemblages, otter and water vole;
- Fisheries – restore fish densities to a level at or below the natural carrying capacity of the River Avon and,
- Cover of submerged macrophytes – maintain sufficient proportion of aquatic macrophytes to allow reproduction in suitable habitat.

It is considered there is no adverse effect on site integrity from habitat fragmentation.

Changes to natural function

The Phase 1 RCI works have been assessed to have the potential for LSE on qualifying features of the River Avon SAC (fish and water crowfoot communities). The work elements associated with the potential for impacts on natural function are:

- Flood defence:
    - construction of new flood defence embankment and new flood wall at Ashley Road;
    - new flood wall (less than 2m in length) set back from the eastern bank of Summerlock Stream near Fisherton Street;
    - new flood wall in a private garden and,
    - New low-level flood embankment adjacent to the Waitrose Culvert watercourse (open channel) and infill of low spots on the existing low-level embankment on the right (west) bank of the River Avon.
- Infilling of 20m length of the Summerlock Stream,;
- New flow control structures; the new channel connection for Summerlock Stream & culvert on Summerlock Stream beneath embankment;
- New channel and wetland habitat;
- Modifications to the River Avon main channel and Mill Stream;
- Amenity improvements at Ashley Road site (e.g. shingle beach, boardwalks and picnic areas, river viewing platforms) and amenity improvements within the Maltings/central car park area including public viewing area, redeveloped Coach Park, new footpath/cycleway and shingle beach with stepping stones (if considered appropriate during detailed design and in agreement with Natural England);
- Replacement of Millstream Approach road bridge & new pedestrian footbridge to the south, replacement footbridge at Swimming Pool Gate;
- Removal of Swimming Pool Gate structure and modified layout of existing fish pass weirs at The Maltings and,
- New culvert from the River Avon main channel into Summerlock Stream and extension of twin pipe culverts to move the outfall of the Waitrose culvert.

These are considered in more detail below, alongside mitigation measures and a resulting assessment on impact on site integrity.

All work elements have the potential to cause temporary effects on the natural hydromorphological processes of the river habitat and to effect the SAC fish species during construction. In-channel, marginal and riparian works may affect the lateral and longitudinal connectivity of the River Avon SAC; temporary changes to hydromorphology and the natural functioning of the watercourses. Maintaining lateral and longitudinal connectivity during

construction will reduce this impact. Constructional impacts will be temporary and localised. Further mitigation for each of the work elements is detailed below.

Flood defence improvements

The new flood defences (the embankment along the southern boundary of Fisherton Recreation Ground adjacent to Ashley Road and the embankment adjacent to the Waitrose car park) and the new flood walls will restrict overland flood flows that lead to urban flooding (which would likely be undesirable for the SAC given the presence of areas of made ground and potential contaminants). These defences will be located back from the river as far as possible (given existing urban development and land use constraints) and they will therefore not reduce nor constrain the extent of the qualifying feature or the structure and function of riparian habitat that could otherwise be restored in this urban setting. The need to control the extent of the river flooding will, to some degree, be mitigated by the creation of a new length of channel and associated earthworks to lower the ground levels at the Fisherton site, and lowering sections of existing bank along the river will also reconnect this area of floodplain to the river under a greater range of flow conditions restoring 0.34 hectares of more naturally functioning wet floodplain habitat. Additionally, it should be noted that the RCI does not constrain opportunities to meet the SAC objectives relating to river restoration beyond the existing situation of an already urbanised river corridor.

Infilling of 20m length of the Summerlock Stream;
New flow control structures; the new channel connection for Summerlock Stream & culvert on Summerlock Stream beneath embankment;
New floodway culvert from the River Avon main channel into Summerlock Stream;
Extension of twin pipe culverts to move the outfall of the Waitrose culvert.

Infilling of reaches of the watercourse and addition/modification of culverts have potential long-term, permanent impacts on natural functioning of the SAC.

Although a 20m section of the Summerlock Stream will be lost at Ashley Road, the section lost is controlled by hatches/sluice, which already limit the connectivity of the SAC. As part of the RCI, the Summerlock Stream will link to the 20m of new wetland channel, creating improved longitudinal connectivity. The wetland channel is designed to have features of a chalk watercourse, and addition/planting of marginal vegetation will improve lateral connectivity.

The addition of the culvert at Ashley Road is required to maintain longitudinal connectivity downstream of the new embankment.

The purpose of the new floodway culvert in the central car park area, which will predominantly be a dry channel located outside of the SAC, is to reduce flood risk and increase capacity during extreme flood events. This is therefore unlikely to provide continuous, long-term connectivity, may attract windblown litter and urban deposition, and any addition or extension of culverts has the potential to locally affect habitat mosaics, flow and sediment transport of the watercourse. As flow will only pass into the culvert during large flood events (i.e. 1 in 20 annual probability or rarer) and no low flows will pass into the culvert, it is not anticipated to adversely affect the SAC.

The new wetland channel and removal of Swimming Pool Gate is considered to have positive significant effects which benefit restoration of natural function of the river by restoring velocities, sediment transport and longitudinal connectivity.

New channel and wetland habitat

The new wetland habitat will have a positive impact on the qualifying features of the SAC through local changes to sediment transport, flow regime and habitat diversity (mosaics).

The purpose of the Phase 1 RCI is to help restore a more natural functioning river habitat by creating new wetland habitat in the Ashley Road area, by replicating a more natural channel form. The creation of ephemeral channels will allow controlled flooding onto the floodplain, increasing the amount of floodplain restored to its natural function and facilitating natural fluvial processes. Sediment variability is likely to increase with additional floodplain connection, resulting in heterogeneous flow. Restoring the continuity of bank-side and marginal vegetation throughout the river provides habitat benefits for qualifying features, but also improves lateral connectivity of the river and benefits fish and macro-invertebrate communities by providing cover and detrital inputs.

Modifications to the River Avon main channel and Mill Stream

Whilst there will be temporary impacts during construction the physical changes associated with the new widened channel in the reach of the River Avon adjacent to the car park and the re-naturalisation of the Mill Stream will have a positive impact on the characteristic habitat mosaics of the river, coarse sediment supply and the flow regime of the watercourses in the long-term.

During the construction phase, works will be conducted during daylight hours during the summer months (May to October) to reduce any impact on migrating and/or spawning fish species. Longitudinal connectivity will be maintained during construction, to allow movement of species and dispersal of seeds/macrophyte propagules. There will be no operational impacts as a result of these proposed works; they aim to enhance and restore the natural functioning of the SAC.

The removal of Swimming Pool Gate in the reach of the River Avon adjacent to the car park will improve natural functioning of the River Avon SAC, please see 'Removal of Swimming Pool Gate Structure' for further detail.

The improvements to the Mill Stream include creation of a low flow channel by introduction of suitable marginal material designed to work with local natural geomorphological processes. The new channels at Fisherton Recreation Ground will also be designed to provide sediment transport continuity throughout the new reaches of the Summerlock Stream.

Lateral connectivity will also be enhanced between the banks, marginal areas and in-channel habitats by the introduction of bankside and marginal vegetation within the widened corridor of the River Avon adjacent to the central car park/Maltings area.

Removal of Swimming Pool Gate structure and modified layout of existing fish pass weirs at The Maltings

Replacement of Swimming Pool Gate with a passive weir will improve longitudinal continuity of river habitat. This will benefit all biological receptors within the ecosystem by reducing the effects of the impoundment, as well as improving downstream (drift) movement of macro-invertebrates and removing a known barrier to fish movement.

The River Avon upstream of the impoundment is heavily modified with concrete banks along the majority of the left bank and sections of the right bank. During survey the river was wide (10m), deep (>1m), slow flowing with overlying silt prevalent throughout the channel. It is considered habitat is sub-optimal for qualifying SAC features and reduction of water levels by 20cm as a result of the removal of Swimming Pool Gate will have no detrimental impact on qualifying features but will restore natural functioning and silt transport more typical of a chalk river system.

Flow and sediment regime and biological connectivity are attributes of the Conservation Objectives targeted to re-naturalise the River Avon, and this will result once a new dynamic equilibrium has established under the modified flow regime post-construction. This is further benefited by increased morphological diversity of the widened and restructured channel and replacing Swimming Pool Gate with a series of rock weirs, which will improve the existing channel morphology.

Amenity improvements at Ashley Road site and within the Maltings/central car park area

The impacts associated with increased recreational use of the River Avon SAC are considered separately within this assessment. See 'Increased recreational use'.

Replacement of Millstream Approach road bridge & new pedestrian footbridge to the south, replacement of the footbridge at Swimming Pool Gate

The replacement of the bridge at Millstream Approach (including the use of a temporary Bailey bridge during construction) and new pedestrian footbridge are designed as clear-span structures, with abutments located as far from the river banks/wetted channel as possible with the constraints of the built environment. This is to allow the river to function as naturally as possible whilst maintaining lateral and longitudinal connectivity. The course of the river through Salisbury has been stable for decades and it is unlikely that erosion of the banks along this relatively straight reach of the river would occur naturally. The bridges will therefore not prevent natural geomorphological processes occurring, or being restored at this location, within its urban constraints.

In addition, the new wetland area will be restoring part of the River Avon to a more natural form.

The Phase 1 RCI and mitigation measures outlined in this section directly relate to fulfilling the River Avon SAC Conservation Objectives:

- Restore extent and features (fish, water crowfoot) within the site;
- Restore extent of riparian and in-channel habitat mosaic;
- Riparian zone structure;
- Restore presence of woody debris in-channel;
- Restore natural flow regime;
- Restore natural sediment regime;
- Restore biological connectivity;
- Restore and/or maintain presence of key structural, influential and/or distinctive species (such as diverse fish community, water crowfoot communities, macro-invertebrate assemblages, otter and water vole;
- Fisheries – restore fish densities to a level at or below the natural carrying capacity of the River Avon and,

- Cover of submerged macrophytes – maintain sufficient proportion of aquatic macrophytes to allow reproduction in suitable habitat.

It is considered there is no adverse effect on site integrity from changes to natural functioning.

Increased recreational use

The Phase 1 RCI works have been assessed to have the potential for LSE on qualifying features of the River Avon SAC (fish and water crowfoot communities). The work elements associated with the potential for impacts from increased recreational use are:

- New channel and wetland habitat;
- Modifications to the River Avon main channel and Mill Stream;
- Amenity improvements at Ashley Road site (e.g. shingle beach, boardwalks and picnic areas, river viewing platforms);
- Replacement of Millstream Approach road bridge & new pedestrian footbridge to the south, and replacement of Swimming Pool Gate footbridge and,
- Creation of a small pocket park.

The potential risks of increased recreational use on the qualifying features of the SAC caused by the work elements are considered together. This is because the impact to pathway and associated risk is considered the same (disturbance, littering).

The Phase 1 works have the potential to adversely affect the structure and function of the river habitat indirectly through recreational use of the area, with associated disturbance to the associated biota and qualifying fish species. Increase public use of the improved open spaces from the proposed new wetland, new footbridge across the new channel and modifications to the River Avon have the potential to introduce increased litter in and around the River Avon SAC. Additionally, disturbance to the structure and function of the riparian zone may increase through recreational activities on the banks and riparian areas and within the channel through dogs and/or children entering the new channel and existing watercourses.

These impacts will be mitigated during the detailed design of the scheme at Fisherton Recreation Ground and along the widened river corridor within the Maltings and central car park area through the provision of specific 'focussed' areas for access to the new channel, new wetland area and to the widened river corridor. Areas which will be maintained as a wildlife corridor and the locations of any focussed access points will be discussed and agreed with Natural England during the detailed design of the scheme to ensure that there are no adverse impacts from disturbance to the newly improved river corridor.

The design of the new offtake channel and wetland habitat creation at Fisherton Recreation Ground includes a designated dipping platform on the River Avon and a shingle beach in the new wetland area to draw public access away from the other natural margins along the River Avon, which will be developed further during detailed design in discussion with Natural England.

The east side (left bank) of the River Avon along the widened river corridor in the Maltings and central car park area will be maintained as a wildlife corridor for the most part managed with planting and any access points to the river along this stretch incorporated into the scheme during detailed design will be discussed and agreed with Natural England to ensure that there are no adverse impacts from disturbance to the newly improved river corridor.

Information board(s) will be installed at the Ashley Road site to explain the new wetland habitat area while also improving knowledge and raising awareness of the importance of the River Avon SAC and its ecological community. These will help to educate members of the public and help ensure the River Avon SAC is conserved. Other facilities to improve awareness and provide

educational opportunities, will be considered and developed where appropriate, in discussion with Natural England during the detailed design stage of the Scheme, as well as other stakeholders including local schools.

Considering the works associated with the Phase 1 RCI and mitigation measures outlined in this section, the RCI directly contributes to achieving a number of the Conservation Objectives of the River Avon SAC;

- Restore extent and features (fish, water crowfoot) within the site;
- Restore extent of riparian and in-channel habitat mosaic;
- Riparian zone structure;
- Restore and/or maintain presence of key structural, influential and/or distinctive species (such as diverse fish community, water crowfoot communities, macro-invertebrate assemblages, otter and water vole;
- Cover of submerged macrophytes – maintain sufficient proportion of aquatic macrophytes to allow reproduction in suitable habitat.

It is considered there is no adverse effect on site integrity from changes to recreational use of the SAC.

Toxic contamination via pollution incidents

The Phase 1 RCI works have been assessed to have the potential for LSE on qualifying features of the River Avon SAC (fish and water crowfoot communities). The work elements associated with the potential for toxic contamination of the SAC are:

- Flood defence:
    - construction of new flood defence embankment and new flood wall at Ashley Road;
    - new flood wall (less than 2m in length) set back from the eastern bank of Summerlock Stream near Fisherton Street
    - new flood wall in a private garden and,
    - New low-level flood embankment adjacent to the Waitrose Culvert watercourse (open channel) and infill of low spots on the existing low-level embankment on the right (west) bank of the River Avon.
- Infilling of 20m length of the Summerlock Stream;
- New flow control structures; the new channel connection for Summerlock Stream & culvert on Summerlock Stream beneath embankment;
- New channel and wetland habitat;
- Modifications to the River Avon main channel and Mill Stream;
- Amenity improvements at Ashley Road site (e.g. shingle beach, boardwalks and picnic areas, river viewing platforms) and amenity improvements within the Maltings/central car park area including public viewing area, redeveloped Coach Park, new footpath/cycleway and shingle beach with stepping stones (if considered appropriate during detailed design and in agreement with Natural England);
- Replacement of Millstream Approach road bridge & new pedestrian footbridge to the south, and replacement of Swimming Pool Gate footbridge;
- Removal of Swimming Pool Gate structure and modified layout of existing fish pass weirs at The Maltings and,
- New culvert from the River Avon main channel into Summerlock Stream and extension of twin pipe culverts to move the outfall of the Waitrose culvert.

The potential risks of pollution incident on the qualifying features of the SAC caused by the work elements are considered together. This is because the impact to pathway and associated risk is considered the same.

The construction of most elements of the Phase 1 works have the potential to adversely affect the water quality of the qualifying watercourses and its characteristic plant communities including water crowfoot populations, as well as qualifying fish species (which are susceptible to poor water quality) through a pollution incident, should it occur.

There is also a risk of creating a pathway to effect from any riparian/bank excavations/groundworks (run-off) and removal of Swimming Pool Gate (silt mobilisation). Soils and/or silts may contain contaminants that have the potential to be released during construction.

An Environmental Action Plan (EAP) and Construction Environmental Management Plan (CEMP) will be prepared and will include all measures agreed with Natural England to mitigate the identified effects of the Phase 1 works on the SAC and to ensure overall environmental protection and management during the works. The CEMP will be discussed and agreed with Natural England prior to construction of the scheme. Individual method statements will be prepared by the Contractor that will outline working practices that target specific elements of construction work. These will include measures to ensure that any pollution risk is minimised and incident response details consistent with the Best Practice prevention Guidelines.

In addition, the works will be undertaken in accordance with best practice (such as the Environment Agency's former Pollution Prevention Guidelines (PPG 5: *Works and maintenance in or near water*)) to reduce the risk of contamination of the watercourse arising through pollution incidents from plant and machinery.

All works will be restricted to defined working areas and works compounds and material storage areas will be sited on hard-standing and/or avoid areas of known ecological interest. The contractor's construction site compound and vehicle access route plans are provided in Appendix B.

Fuels and lubricants for vehicles will be held at designated 'Compound areas.' Biodegradable fuels will be used during the works.

An Ecological Clerk of Works (ECW) who is a suitably qualified ecologist will be present during the construction works. Toolbox talks will be given by the ECW prior to and during the construction works as necessary to ensure that the risk of pollution incidents is minimised. The talks will ensure that construction staff are aware of the site's ecological sensitives, the aims of environmental management practices and relevant working methods.

The Phase 1 RCI and mitigation measures outlined in this section directly relate to fulfilling the River Avon SAC Conservation Objectives:

- Water quality – other pollutants: a wide range of pollutants may impact habitat integrity. Target to ensure waterbody in which the SAC lies achieves at least 'Good' status; no decline from the baseline.

It is considered there is no adverse effect on site integrity from pollution incidents.

Invasive species

The Phase 1 RCI works have been assessed to have the potential for LSE on qualifying features of the River Avon SAC (fish and water crowfoot communities). The work elements associated with the potential for invasive species introduction or spread are:

- Flood defence:
    - construction of new flood defence embankment and new flood wall at Ashley Road;
    - new flood wall (less than 2m in length) set back from the eastern bank of Summerlock Stream near Fisherton Street and,
    - New low-level flood embankment adjacent to the Waitrose Culvert watercourse (open channel) and infill of low spots on the existing low-level embankment on the right (west) bank of the River Avon.
- Infilling of 20m length of the Summerlock Stream;
- New flow control structures; the new channel connection for Summerlock Stream & culvert on Summerlock Stream beneath embankment;
- New channel and wetland habitat;
- Modifications to the River Avon main channel and Mill Stream;
- Amenity improvements at Ashley Road site (e.g. shingle beach, boardwalks and picnic areas, river viewing platforms) and amenity improvements within the Maltings/central car park area including public viewing area, redeveloped Coach Park, new footpath/cycleway and shingle beach with stepping stones (if considered appropriate during detailed design and in agreement with Natural England);
- Replacement of Millstream Approach road bridge & new pedestrian footbridge to the south, and replacement of Swimming Pool Gate footbridge;
- Removal of Swimming Pool Gate structure and modified layout of existing fish pass weirs at The Maltings and,
- New culvert from the River Avon main channel into Summerlock Stream and extension of twin pipe culverts to move the outfall of the Waitrose culvert.

Populations of four invasive or potentially invasive non-native plant species were recorded during an invasive species survey; all within or immediately adjacent to the SAC:

- The legally controlled Nuttall's waterweed *Elodea nuttallii*. Nuttall's waterweed was recorded from the right bank of the River Avon to the north of the A36 flyover. This species is likely limited by flow rate and channel bed substrate, which indicates its presence in the dredged/canalised part of the Avon. Any habitat creation which encourages slow-flowing or standing water and soft sediments, may support Nuttall's waterweed. If it were to occur, it is considered to be a moderate negative impact (based on a medium ecological importance and moderate negative magnitude), should the species be encouraged to spread downstream;
- Giant bramble *Rubus armeniacus* was recorded along watercourses throughout the Scheme area, with extensive dense stands along the River Avon;
- Butterfly-bush *Buddleja davidii*, was recorded from along the embankment of the railway and retaining walls of the River Avon within the Scheme area and,
- Wilson's honeysuckle *Lonicera nitida* was recorded as planted shrubs in the Fisherton Recreation Ground.

The latter three species comprised small populations and pose less of a risk to native biodiversity in the SAC.

No works are proposed along the River Avon upstream of the Ashley Road area where Nuttall's waterweed was recorded and there will therefore be no adverse impacts on the SAC from the

spread of this species during construction. However, monitoring of post-construction habitats will continue for three years (to be confirmed) after the scheme's completion, to detect any colonisation by Nuttall's waterweed and trigger eradication measures should they be needed.

Standard biosecurity measures will be undertaken during construction of the scheme for butterfly bush and Wilson's honeysuckle, which are located within the construction footprint to ensure that they do not spread within the SAC. Additionally, as there are only small populations of these species, we will remove them in the course of works, uprooting plants and disposing of them appropriately. These species are not considered to have potential to alter the hydromorphological condition of the qualifying watercourses and thus impact on their distinctive plant communities (including *Ranunculus* spp.) through competition for light, space and habitat resource.

Giant bramble is more invasive locally and we will eradicate and control the spread of this species during construction and as part of on-going delivery of a Habitat Management Plan for the scheme. This species is not considered to pose any threat to the SAC.

The Contractor will adopt standard best practice methods to prevent the spread of the invasive species identified in accordance with best practice (such as the Environment Agency's former Pollution Prevention Guidelines (PPG 5: *Works and maintenance in or near water*)) and adopt standard biosecurity protocols.

All measures to avoid the spread of or eradicate invasive species will be outlined in an Environmental Action Plan.

The Phase 1 RCI and mitigation measures outlined in this section directly relate to fulfilling the River Avon SAC Conservation Objectives:

- Invasive, non-native and/or introduced species – ensure non-native species categorised as 'high-impact' in the UK under the Water Framework Directive are either rare or absent, but if present having minimal impact on the integrity of habitat.

It is considered there is no adverse effect on site integrity from invasive species.

Physical damage

The Phase 1 RCI works have been assessed to have the potential for LSE on qualifying features of the River Avon SAC (river habitat and fish species). The work elements associated with the potential for physical damage of qualifying SAC species are:

- Flood defence:
    - new flood wall (less than 2m in length) set back from the eastern bank of Summerlock Stream near Fisherton Street and,
    - new low-level flood embankment adjacent to the Waitrose Culvert watercourse (open channel) and infill of low spots on the existing low-level embankment on the right (west) bank of the River Avon.
- Infilling of 20m length of the Summerlock Stream;
- New flow control structures; the new channel connection for Summerlock Stream & culvert on Summerlock Stream beneath embankment;
- New channel and wetland habitat;
- Modifications to the River Avon main channel and Mill Stream;
- Amenity improvements at Ashley Road site (e.g. shingle beach, boardwalks and picnic areas, river viewing platforms) and amenity improvements within the Maltings/central car park area including public viewing area, redeveloped Coach Park, new

footpath/cycleway and shingle beach with stepping stones (if considered appropriate during detailed design and in agreement with Natural England);
- Replacement of Millstream Approach road bridge & new pedestrian footbridge to the south and replacement of Swimming Pool Gate footbridge;
- Removal of Swimming Pool Gate structure and modified layout of existing fish pass weirs at The Maltings and,
- New culvert from the River Avon main channel into Summerlock Stream and extension of twin pipe culverts to move the outfall of the Waitrose culvert.

There is potential for direct physical damage to the qualifying species of the River Avon SAC during the construction of in-channel works. Physical removal of water crowfoot communities and harm to fish through vibration and silt loading (impacting respiratory function) were all identified as risks during the HRA screening Stage 1. The risk of physical damage to the qualifying SAC species for all work elements is considered together and provided below.

Percussive piling, which has the potential to kill or harm fish, will not be used. Auguring for reinforced concrete piles will take place at Millstream Approach Bridge and immediately to the south at the location of the proposed new footbridge, potentially at Swimming Pool Gate and Fisherton Recreation Ground at the site of the new footbridge across the new channel. Piling methods will be specified during detailed design (in discussion and agreement with Natural England and Environment Agency fisheries) to avoid any adverse effects on qualifying fish species, including physical harm and behavioural disturbance. This includes: dewatering with fish rescue in advance of in-channel works; restricting riverside activities to daylight hours, which will provide a large proportion of any 24-hour period available to Atlantic salmon and other fish species to move in the absence of acoustic deterrents; and scheduling in-channel works (except for works in dewatered reaches which can be worked within at any time of the year) for June to September outside of the migration, spawning and egg incubation seasons for salmon (October to April) and bullhead (March to May). Avoidance of key sensitive seasons will therefore ensure no adverse effect on the qualifying fish populations and no significant risk of physical harm to individuals. Further exploration of piling options will be undertaken during detailed design, to ensure that non-percussive and non-vibrating push pile techniques are used wherever the geological conditions allow.

The working period during the summer months coincides with the period in which water crowfoot communities show significant growth and reproduction (flowering) and is consequently at risk of physical damage (and loss). Reducing disturbance to the accumulated seed bank in sediments and maintaining connectivity to populations upstream which will repopulate through natural drift. Any effect from physical damage will be temporary and will affect less than 0.006% of the SAC habitat, which will re-establish upon completion of the scheme. This will be offset by additional wetland habitat creation resulting in an overall and long-term habitat gain once the new habitat has established.

The creation of the new wetland area in the recreation ground will provide habitat to benefit all qualifying species of the SAC. The substrate structure (predominantly flints and gravels – to be determined through assessment of suitable particle size assessment during the detailed design phase of the Scheme) with flow diversity (riffle-run-pool) sequences established by the varying widths and depths of the proposed sinuous watercourse will provide habitat for water crowfoot communities to establish. Completion of works in the autumn provides opportunity for the water crowfoot to establish through dispersal of seeds from upstream communities during the following spring/summer months.

Additionally, a five-year monitoring plan will be developed with Natural England prior to construction of the Phase 1 works to monitor changes to the qualifying features of the SAC within the scheme area and the success of the newly created wetland habitat adjacent to the SAC. To inform the plan, an annual walkover survey will be undertaken. The monitoring plan will include triggers for action, should they be needed.

Considering the works associated with the Phase 1 RCI and mitigation measures outlined in this section, the RCI directly contributes to achieving a number of the Conservation Objectives of the River Avon SAC;

- Restore extent and features (fish, water crowfoot) within the site;
- Restore extent of riparian and in-channel habitat mosaic;
- Riparian zone structure;
- Restore presence of woody debris in-channel;
- Restore natural flow regime;
- Restore natural sediment regime;
- Restore biological connectivity;
- Restore and/or maintain presence of key structural, influential and/or distinctive species (such as diverse fish community, water crowfoot communities, macro-invertebrate assemblages, otter and water vole;
- Fisheries – restore fish densities to a level at or below the natural carrying capacity of the River Avon and,
- Cover of submerged macrophytes – maintain sufficient proportion of aquatic macrophytes to allow reproduction in suitable habitat.

It is considered there is no adverse effect on site integrity from physical damage.

Siltation, smothering, turbidity

The Phase 1 RCI works have been assessed to have the potential for LSE on qualifying features of the River Avon SAC (fish and water crowfoot communities). The work elements associated with the potential for silt mobilisation, smothering of habitats and changes to turbidity are:

- Flood defence:
    - construction of new flood defence embankment and new flood wall at Ashley Road;
    - new flood wall (less than 2m in length) set back from the eastern bank of Summerlock Stream near Fisherton Street
    - new flood wall in a private garden and,
    - new low-level flood embankment adjacent to the Waitrose Culvert watercourse (open channel) and infill of low spots on the existing low-level embankment on the right (west) bank of the River Avon.
- Infilling of 20m length of the Summerlock Stream;
- New flow control structures; the new channel connection for Summerlock Stream & culvert on Summerlock Stream beneath embankment;
- New channel and wetland habitat;
- Modifications to the River Avon main channel and Mill Stream;
- Amenity improvements at Ashley Road site (e.g. shingle beach, boardwalks and picnic areas, river viewing platforms) and amenity improvements within the Maltings/central car park area including public viewing area, redeveloped Coach Park, new footpath/cycleway and shingle beach with stepping stones (if considered appropriate during detailed design and in agreement with Natural England);

- Replacement of Millstream Approach road bridge & new pedestrian footbridge to the south, and replacement of Swimming Pool Gate footbridge;
- Removal of Swimming Pool Gate structure and modified layout of existing fish pass weirs at The Maltings and,
- New culvert from the River Avon main channel into Summerlock Stream and extension of twin pipe culverts to move the outfall of the Waitrose culvert.

The Phase 1 works have the potential to mobilise sediment and cause increased silt deposition and a change in turbidity in the River Avon. Sources of silt include any riparian works (run-off) and changes to channel beds, banks and flows. Adverse impacts on habitat include smothering of clean gravels utilised by Atlantic salmon, bullhead and brook lamprey for spawning and changes to turbidity which may impact behaviour in Atlantic salmon and bullhead. Adverse alteration of bed substrate in the watercourses may smother *Ranunculus* communities. These impacts would be during the construction phase only, including the period after demobilisation when new flow regimes are first in place.

During detailed design, a sediment assessment will be used to inform where, when and how sediment needs to be managed during the construction phase to inform mitigation measures to be used as the scheme is built. The assessment will aim to establish the quantities in different reaches, the physical integrity of each sediment 'store' (and thus vulnerability to being washed out during construction) and the levels of priority substances (if any) and phosphate. This information will be used to assess the risks associated with any contaminants: monitoring of downstream water quality during the works may be implemented to avoid potential deterioration. Appropriate mitigation measures to manage the movement of sediment if needed to avoid adverse effects on the integrity of the SAC will be identified during detailed design and will be agreed with Natural England. Such measures could be conditioned through the planning process.

The removal of Swimming Pool Gate and replacement with a set of rock weirs will reduce the impoundment upstream. The principal change to fine sediment movement caused by construction activity will be linked to the construction of a coffer dam to create a dry channel to allow removal of Swimming Pool Gate and further engineering works in the main River Avon channel. This will divert the entire Avon flow into the Mill Stream and is likely to result in mobilisation of silt deposits in this watercourse. The quantity of material that could be mobilised, and the relationship between this and baseline silt movement, is to be investigated during the detailed design, as described above. During the works, it is considered unlikely that sediment will be significantly disturbed in the impounded reaches of the River Avon above the coffer dam as flow in this reach will not be altered.

The principal change to fine sediment movement caused by the implementation of the scheme, i.e. removal of all construction phase works and instatement of the new flow regime, will be linked to the new passive weir structure to replace the actively managed undershot sluice at Swimming Pool Gate and narrowing of the Mill Stream. There is likely to be an increase in the potential for sediment to be deposited on and within the gravel bed within the reach impounded by the new passive weir. However, during higher flows it is likely that there will be some remobilisation and transport of fine sediment that has been deposited during periods of lower flows. The additional contribution of this remobilised stored sediment to the total suspended sediment load of the river is likely to be within the range of natural variability. However, the quantity of material that could be mobilised and the relationship between this and baseline silt movement is yet to be determined.

Once the scheme is 'fully' operational, the marginal berms installed in the Mill Stream will improve the competence of this channel to convey silt under the reduced flow conditions down this watercourse. Flows down the main River Avon channel will be increased: it is anticipated that the majority of fine sediment passing the new passive weir structure will be conveyed within the Avon as in the existing situation, though some marginal deposition in the proposed fish pass steps may occur seasonally which may consolidate over time and add to the diverse habitat created by this new feature.

An Environmental Action Plan (EAP) and Construction Environmental Management Plan (CEMP) will be prepared and will include all measures agreed with Natural England to mitigate the identified effects of the Phase 1 works on the SAC and to ensure overall environmental protection and management during the works. The CEMP will be discussed and agreed with Natural England prior to construction of the scheme. Individual method statements will be prepared by the Contractor that will outline working practices that target specific elements of construction work. These will include measures to ensure that any risk of silt mobilisation is minimised and incident response details consistent with the Best Practice prevention Guidelines.

The Contractor will follow best practice (such as the Environment Agency's former Pollution Prevention Guidelines (PPG 5: *Works and maintenance in or near water*)) to reduce the risk of silt mobilisation during the construction phase.

An Ecological Clerk of Works (ECW) who is a suitably qualified ecologist will be present during the construction works. Toolbox talks will be given by the ECW prior to and during the construction works as necessary to ensure that the risk of pollution incidents is minimised. The talks will ensure that construction staff are aware of the site's ecological sensitives, the aims of environmental management practices and relevant working methods.

The new wetland area to the north of Ashley Road will ensure suitable flow conveyance providing sediment transport through the system, whilst maintaining suitable habitat for juvenile lamprey species which require silt beds for development. The channel is designed with specific widths and depths and meanders to promote flow diversity and sediment transport (riffles, runs) and deposition (pools, marginal areas) to enhance habitat diversity without negative impacts (substantial increased sediment deposition) during low flow periods. Maintenance of sediment continuity at Q95 levels is also considered through additional design aspects, including (alternate) berms, marginal planting, bed reprofiling and flow deflectors.

During construction and excavation of the scheme, the Phase 1 works will be undertaken in accordance with a Soil Management Plan, which will follow Defra's *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites* and require haul routes and working areas to be stripped of both topsoil and subsoil down to a firm base and the soils stored appropriately for re-use, with method statements in place to protect the watercourses from water quality issues.

Considering the works associated with the Phase 1 RCI and mitigation measures outlined in this section, the RCI directly contributes to restoring natural sediment regime, a Conservation Objective of the River Avon SAC.

It is considered there is no adverse effect on site integrity from siltation, smothering and turbidity.

Opinion on adverse effects alone

The alone assessment of the qualifying features of the River Avon SAC, the qualifying river habitat characterised by the water crowfoot (*Ranunculus* spp.) and starwort (*Callitriche* spp.) communities, Atlantic salmon, bullhead and brook lamprey were considered during the construction and operation phases of the RCI and the associated risks which may impact the integrity of the River Avon SAC.

It is considered, alongside mitigation measures/conditions outlined (See Section 21), there is no adverse impact on site integrity from alone assessment of the RCI. The creation of the wetland area, removal of control structures, reduction of impoundments and naturalisation of the channel through the study area will improve the functioning of the River Avon and its ecological community. It is also considered the scheme will provide biodiversity net gain.

18. Appropriate assessment: assessing the effects in combination

Both the uncertain and potentially significant effects 'alone' were considered in Section 17 to determine whether they could an adverse effect on the integrity of the SAC. It was concluded that there was no effect alone subject to the implementation of defined mitigation measures, but effects were not completely avoided when considered in-combination with other plans or developments. An assessment of 'in-combination effects' is therefore presented in Table 6.

It is considered there are no significant 'in-combination' effects on the Conservation Objectives of the River Avon SAC.

Table 6: In-combination effects of the RCI and other plans/projects within the study area which may contribute to impacts on qualifying features of the River Avon SAC.

Other Plan, project or proposal	Identified potential effects on SAC from other plans/projects	Will scale of impact of Phase 1 works lead to adverse effect on integrity of the site in-combination?	Can in-combination effects be avoided?	Can adverse effects be avoided?
Salisbury River Park Master Plan (Phases 2-6)	Habitat loss & fragmentation, natural function, increased recreational use, physical damage, turbidity/siltation/smothering, toxic contamination, invasive species	No	Yes. Mitigation measures outlined in this HRA reduce risk of these effects to qualifying species of the SAC. Since the production of the HRA Screening, Wiltshire Council has committed to removing Phase 2A from the Master Plan;	Yes

			the seating platform across the Summerlock Stream. The Master Plan has undergone a separate HRA. Avoidance of risk and mitigation measures are detailed. Timing of works different.	
Wiltshire Council's Central Area Framework	Increased recreational use	No	Yes. Mitigation measures outlined in this HRA help to reduce the risk of adverse recreational effects on qualifying features of the SAC.	Yes
Hydropower scheme under consideration at Bishop's Mill	Habitat loss & fragmentation, natural function, increased recreational use, physical damage, turbidity/siltation/smothering, toxic contamination, invasive species	No	As a planning application for this project has not been submitted, no further details are available at the current time.	N/A
Castle Street change of use from offices to flats	Turbidity/siltation/smothering and toxic contamination (run-off)	No	Yes. Mitigation measures outlined in this HRA will mean that risk of these effects to qualifying species of the SAC are avoided.	Yes

19. Information / Advice

Environment Agency (internal) consultation

This HRA AA was undertaken by Jacobs on behalf of the Environment Agency. Consultation between Jacobs and the Environment Agency has been carried out throughout this process, which is detailed in Section 11, and below.

Natural England comments

In addition to the various meetings which have been held with Natural England, Wiltshire Council's Ecologist and Environment Agency specialists (ecology, fisheries) as detailed in Section 11, further meetings have included:

- Urban design/landscape update with Natural England, Jacobs and the Environment Agency (2.12.20) and,

- Follow-up meeting after receipt of NE HRA Screening and AA comments with Jacobs and the Environment Agency (26.02.21).

Natural England has provided ongoing feedback during the development of options and on the proposed RCI, as well as input to the scope of ecology surveys to be undertaken to inform impact assessment and mitigation (including the requirement for European Protected Species licences).

Third party comments

None

20. References

Natural England (2019): *European Site Conservation Objectives: Supplementary advice on conserving and restoring site features*

21. Draft conclusion

Jacobs carried out the HRA Appropriate Assessment on behalf of the Environment Agency and conclude that the Phase 1 RCI can be ascertained to have no adverse effect on the integrity of the River Avon SAC, either alone or in-combination with other plans and projects. This conclusion is dependent on the following mitigation measures and/or conditions:

Features of the designed Phase 1 RCI

- Restoring longitudinal continuity of habitat by removal of barriers to fish (Swimming Pool Gate) and improving silt transport and low flow conveyance through the River Avon SAC;
- Creation of a new wetland area;
- Restoring lateral connectivity by improved bankside and marginal vegetation and,
- Improving public awareness of the importance of the River Avon SAC and its role within the ecosystem will help minimise future impacts on the SAC during operation. As well as providing appropriate signage and information boards, creating strong links with local schools will help raise awareness. Ensuring adequate litter bins around site should encourage recreational uses to leave the site as they found it.

Construction delivery

- Seasonal constraints - timings of works;
    - restricting in-channel works to summer months will protect the salmon migration season (October to December) and the salmon (November to April) and bullhead (March to May) spawning season. Flows will be lower during the summer months which provide additional benefit to contractors.
    - Mitigation against the loss of water crowfoot communities in the summer include ensuring longitudinal connectivity is maintained post in-channel works, with suitable habitat available for establishment. Downstream drift of seed

propagules from water crowfoot communities upstream have the potential to re-establish in those area where in-channel works have disturbed the habitat.
    - Ensuring works are undertaken during daylight hours will enable a large proportion of any 24-hour period for the movement of Atlantic salmon and other fish species.
- Construction controls which apply best practice:
    - Pollution Prevention Guidelines and,
    - Best practice to prevent the spread of invasive species.

The Environment Agency is minded to proceed with the project.

Environment Agency Officer: Adele Wratten.

Date: 7th January 2021.

22. Formal consultation

Natural England consultation

Date sent to Natural England for formal consultation: ***5th March 2021***

Date response received from Natural England: ***11th and 12th March 2021***

Natural England advises: **the plan or project can go ahead**

Natural England notes that the Habitats Regulations Assessment (HRA) has not been produced by the Environment Agency, but by the consultant Jacobs. As competent authority, it is your responsibility to produce the HRA and be accountable for its conclusions. We provide the advice enclosed on the assumption that the Environment Agency intends to adopt this HRA to fulfil your duty as competent authority.

Natural England notes that your authority, as competent authority, has undertaken an appropriate assessment of the proposal in accordance with regulation 63 of the Conservation of Species and Habitats Regulations 2017 (as amended). Natural England is a statutory consultee on the appropriate assessment stage of the Habitats Regulations Assessment process.

Your appropriate assessment concludes that your authority is able to ascertain that the proposal will not result in adverse effects on the integrity of any of the sites in question. Having considered the assessment, and the measures proposed to mitigate for all identified adverse effects that could potentially occur as a result of the proposal, Natural England advises that we concur with the assessment conclusions, providing that all mitigation measures are appropriately secured in any planning permission given.

Name of Natural England officer: James Hughes

Job title: Planning and Conservation Lead

Date: 11.03.2021

23. 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 (as amended), undertaken by Jacobs for the Environment Agency.

The screening (Stage 1) concluded that the PPP would be likely to have a significant effect on the following site(s):

River Avon SAC (UK0013016) ^

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

It can be ascertained that the PPP would not have an adverse effect on the integrity of the River Avon SAC, either alone or in combination with other plans and projects:

This conclusion is dependent on implementing the mitigation as outlined in this HRA.

Natural England formal consultation

Natural England was consulted on the appropriate assessment, and the Environment Agency's conclusions, on *5 March 2021* and its representations, to which the Environment Agency has had regard, are inserted in Section 22. The conclusions of this appropriate assessment are in accordance with the advice and recommendations of Natural England.

Public consultation

The opinion of the public was taken under Regulation 63(4) by way of public advertisement of the Scheme and its Environmental Impact Assessment and the views expressed have been taken into account as part of a Statement of Community Involvement. No public consultation has been carried out specifically on the HRA.

Appendix A: Landscape Masterplans

Figure A1: Ashley Road Landscape Masterplan

Figure A2: Maltings and Central Car Park Area Landscape Masterplan

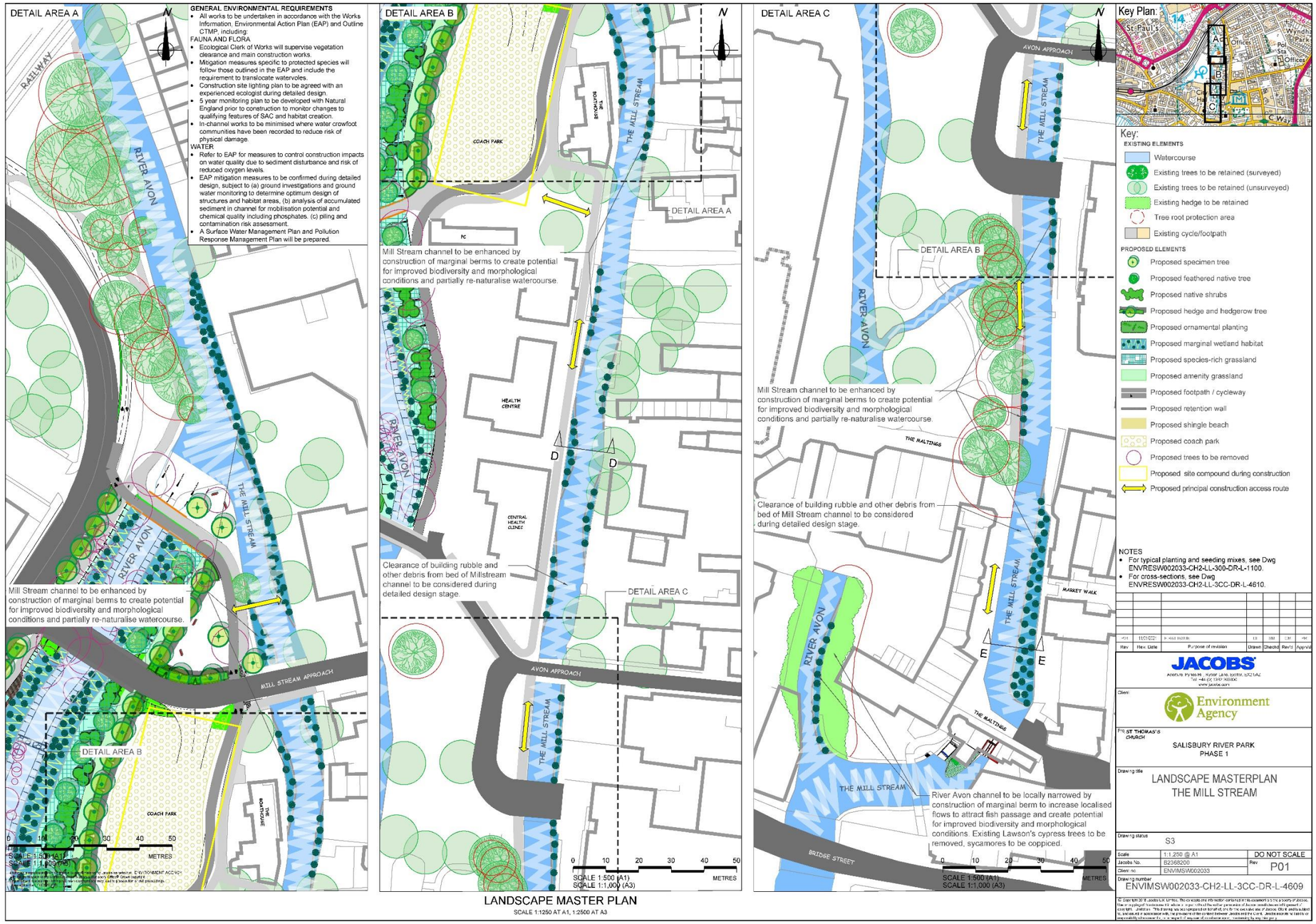


Figure A3: Millstream Landscape Masterplan

Appendix B: Contractor's construction site plan.

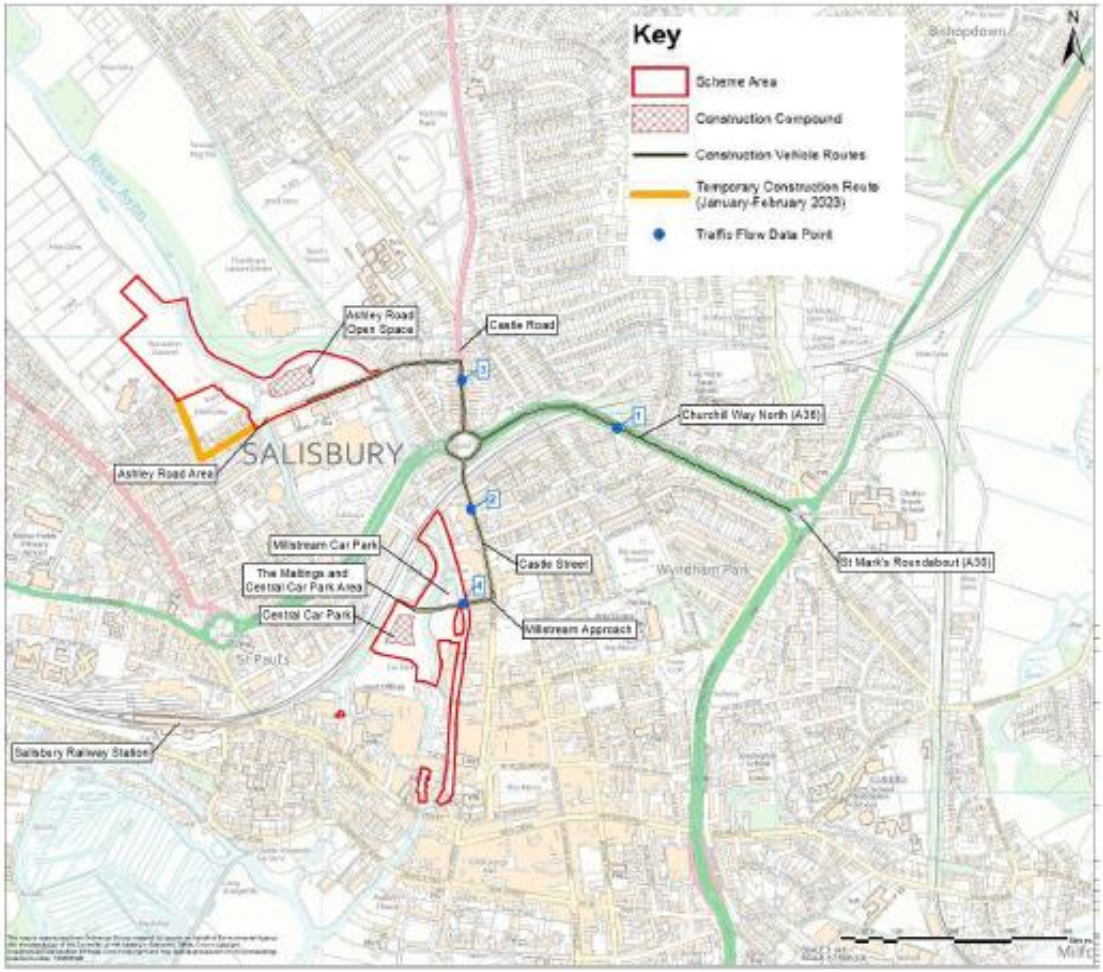


Figure B1: Indicative construction access and site compounds

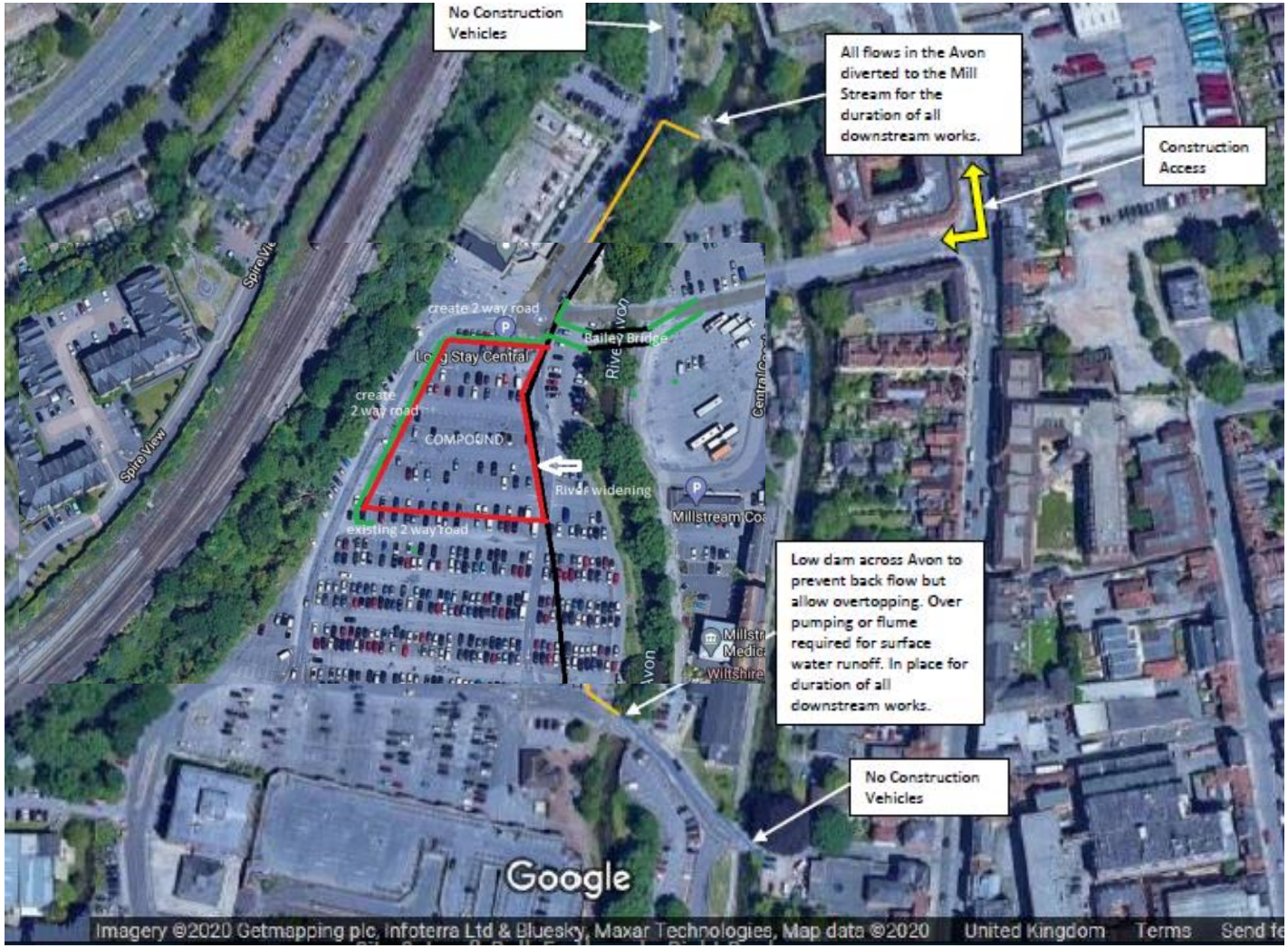


Figure B2: Maltings/central car park construction site plan

Appendix C: Contractor’s indicative construction programme

Technical Note

Project:	Salisbury River Park Phase 1		
Subject:	Low Flows		
Author:	Mike Vaughan		
Date:	06/07/2022	Project No.:	5206632
		Icepac No.:	
Distribution:	Mike Porter Andy Wallis	Representing:	Environment Agency

Document history

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
P0.04	For comment	MJV	SR	KS	SR	07/12/2021
P01.01	For comment	MJV	SR			21/12/2021
P01	For Comment	DH	MJV	SR	SR	24/02/2022
P02	For Comment		MJV	SR	SR	14/03/2022
P03	Issued for Information	EA	MJV	SR	SR	06/07/2022

Client signoff

Client	Environment Agency
Project	Salisbury River Park Phase 1
Project No.	5206632
Client signature / date	

1. Introduction

This note updates the February 2021 Jacobs note on the same (ref ENVIMSW002033-CH2-ZZ-300-TN-HY-1083). It details work undertaken to analyse the estimates of low flows as applied to hydraulic modelling that supports the design of the Salisbury River Park scheme. As with the February note, it compares the model results and gauged data to evaluate the split of low flows at the various watercourse confluences within both the baseline and Salisbury scheme**. This document should be read in conjunction with the February 2021 note, and viewed as an addendum to it**.

The low flows model was adapted from the Environment Agency's 1D-2D flood model of the area.

This note adds the 2021 low flow gauging results to the previous data, and compares that with results from the baseline hydraulic model. It then proceeds to investigate how the proposed Scheme modifies how those flows are proportioned through the main flow splits at Blackwell Hatches and Swimming pool Gate.

This report summarises the technical output from a hydraulic modelling study of low flows. As recognised within this report, there is considerable uncertainty in any low flows modelling study. This comes principally from the difficulties in representing low flows within hydraulic modelling software intended for simulation of floods, in particular the very low flows (<Q70). With these flows local conditions, such as weed growth, sedimentation and assumed hydraulic parameters, have a major impact on any outputs. This is shown in the scatter of the actual gaugings at low flows, as well as the difficulties in getting the model to accurately represent these gaugings. When understanding what will happen in any watercourse during low flows, it is important that local knowledge and understanding is used alongside any modelling outputs, and this is especially true for a complicated system with multiple channels such as these in Salisbury. The model is but a tool to guide and aid our understanding.

The modelling for the baseline scenario is based on the current agreed operating procedures for the structures within this system. In reality, during very low flows, it is necessary for the field team to use local knowledge and judgement in operating the structures to ensure the desired flows and levels are maintained for as long as possible. It is not feasible to represent this human intervention within the model as this operation would vary depending on the time of year and hydraulic conditions. Due to this, the results from the model become less accurate/relevant at very low flows, and the results should be used with caution.

For example, the model assumes that Swimming Pool radial gate will remain open at its minimum setting during very low flows: as this is an undershot gate this results in a drop in water level upstream, which leads directly to minimal flow being passed into the Millstream due to the rise in bed level at the entrance to this channel. The predicted reduction in upstream water level also results in a much reduced flow down the Summerlock Channel. The modelling outputs suggest changes between the baseline and with-Scheme outputs for the very low flows (i.e. Q95) that are potentially unrepresentative for these reasons, and should therefore be treated with caution. In reality, if these very low flows were to occur today, Swimming Pool radial gate would have to be closed further to ensure water levels remained higher in the Millstream and Summerlock, but this would be at the expense of flows in the Avon channel downstream of Swimming Pool Gate. This problem will not occur in the same way with the Scheme in place as the undershot gate is being replaced with an overshot weir which will always retain a depth of water upstream. However, there will remain uncertainty in how the scheme will actually function during low flows, and this is recognised within this report.

To cater for this two key elements have been included in the scheme proposals to ensure an adaptive management approach can be taken. The first one is flexibility in the design, which will allow adjustments to be made to the key structures in the future if the expected flow splits are not achieved. This includes the penstock to change the flow at Blackwell Hatches, and the ability to change the size of the channel on the Summerlock where it is a control on flows, and also the size of low flow notch in the control weir replaces Swimming Pool radial gate. The second element is that whilst a key driver of the scheme is to minimise the amount structures need operating in low (or high) flow events, there is still the ability for local actions to be undertaken in the event of a very low flow event causing a reduction in [the quality of] desired habitats. This includes the ability to close the penstock at Blackwell Hatches and also install stop logs within the Summerlock Channel. This would ensure flow is maintained within the River Avon channel, which will become the preferential route for fish passage following the scheme completion.

To inform any future changes regular flow and stage gauging will be undertaken for at least the first five years after completion of the Scheme to allow a greater understanding of the low flow splits between the different channels, and how these vary with season and vegetation growth. This will also help inform how the system is managed during drought conditions (which will become more likely with future climate change) when decisions may be required on how to best distribute the flow: it may not be possible to sustain flow on all three channels. This is no different to how the system is currently operated and will be detailed further in the Scheme Operation

and Maintenance Manual. However, this will need to remain flexible as the final decisions will need to be made based on the time of year, channel conditions and what stage in their lifecycle any fish species are at.

2. Low flow gauging

Low flow gauging has been undertaken over the period 2020 and 2021, to support records dating from 1959. As described in the February technical note:

"*There are no permanent flow gauges within the study area (only level gauges are present) so observed flows have been obtained from spot gaugings. Information on spot gaugings undertaken in Salisbury has been obtained from the Environment Agency's WISKI database. There are records dating back as far as 1959 but there has been no regular programme of flow monitoring and flow gaugings have not always been undertaken at consistent locations or using the same method. The locations of spot gaugings undertaken are shown in Figure 3 2*."

Figure 2-1: Spot gauging locations in Salisbury

The gaugings provided do not provide a constant set of record points but are instead a mix of actual probe readings and calculated data. In this sense, the data is inherently uncertain. The actual gaugings are tabulated below, reflecting those used in the previous technical note and those taken in 2021.

Table 2-1 – Gauged data

Data reflects only the actual gaugings. No computed data in listed here.
§ flow percentile based on Amesbury gauged flow for that day using the published Amesbury flow duration data. Record ends at 30 September 2020.
¥ flow percentile approximation based gauged value at site 1 or 6+2 transposed to Amesbury.

Location	Friday 10th July 2020	Friday 24th July 2020	Friday 7th August 2020	Monday 19th October 2020	Tuesday 25th May 2021	Tuesday 23rd June 2021	Tuesday 28th July 2021	Tuesday 14th September 2021
~ Flow percentile	24% Q76 §	17% Q83 §	14% Q86 §	*42% Q57*	*73% Q27¥*	*55% Q45¥*	*38% Q62¥*	*29% Q71¥*
1 = Avon u/s Fisherton	-	-	-	2.828	-	-	-	-
2 = Summerlock (nr Ashley Rd)	0.432	0.350	0.298	0.322	1.242	1.002	0.63	0.516
3 = Mill Stream (at MS Approach bridge)	0.647	0.468	0.427	1.066	-	-	-	-
DS of Waitrose offtake, u/s of Swimming Pool hatch	2.021	1.817	-	-	4.357	2.377	1.904	1.594
4 = Avon at Mill Stream Approach	-	-	1.381	1.342	3.695	1.721	1.516	0.73
5 = Avon d/s Fisherton Street	2.070	1.903	1.798	2.455	4.242	2.431	1.888	1.562
6 = u/s of Waitrose offtake, d/s of Ashley road offtake	2.050	1.829	1.704	-	4.041	2.608	1.978	1.718

The data is described below for the River Avon at Blackwell Hatches (Fisherton recreation ground) and Swimming pool Gate, which includes, where required, computed gaugings, based on the actual gaugings. The calculation of computed gaugings was undertaken by others. No checks have been made on the computation of those data. The table above does not include computed gaugings.

2.1. Flow Percentiles

Low flow percentiles are computed using gauged daily flow data only for those years with five days, or less, missing on the National River Flow Archive. For this project the only complete gauge is at Amesbury.

Q10 (the 90 percentile flow): The flow in cubic metres per second which was equalled or exceeded for 10% of the specified term – a high flow parameter which, when compared with the Q95 flow provides a measure of the variability, or 'flashiness', of the flow regime.

Q50 (the 50 percentile flow): The flow in cubic metres per second which was equalled or exceeded for 50% of the flow record.

Q70 (the 30 percentile flow): The flow in cubic metres per second which was equalled or exceeded for 70% of the flow record.

Q95 (the 5 percentile flow): The flow in cubic metres per second which was equalled or exceeded for 95% of the flow record. The Q95 flow is a significant low flow parameter particularly relevant in the assessment of river water quality consent conditions. Q95 values should be used with caution in view of the problems associated with both the measurement of very low discharges and the increasing proportional variability between the natural flow and the net impact of artificial influences, such as abstractions, discharges, and storage changes as the river flow diminishes.

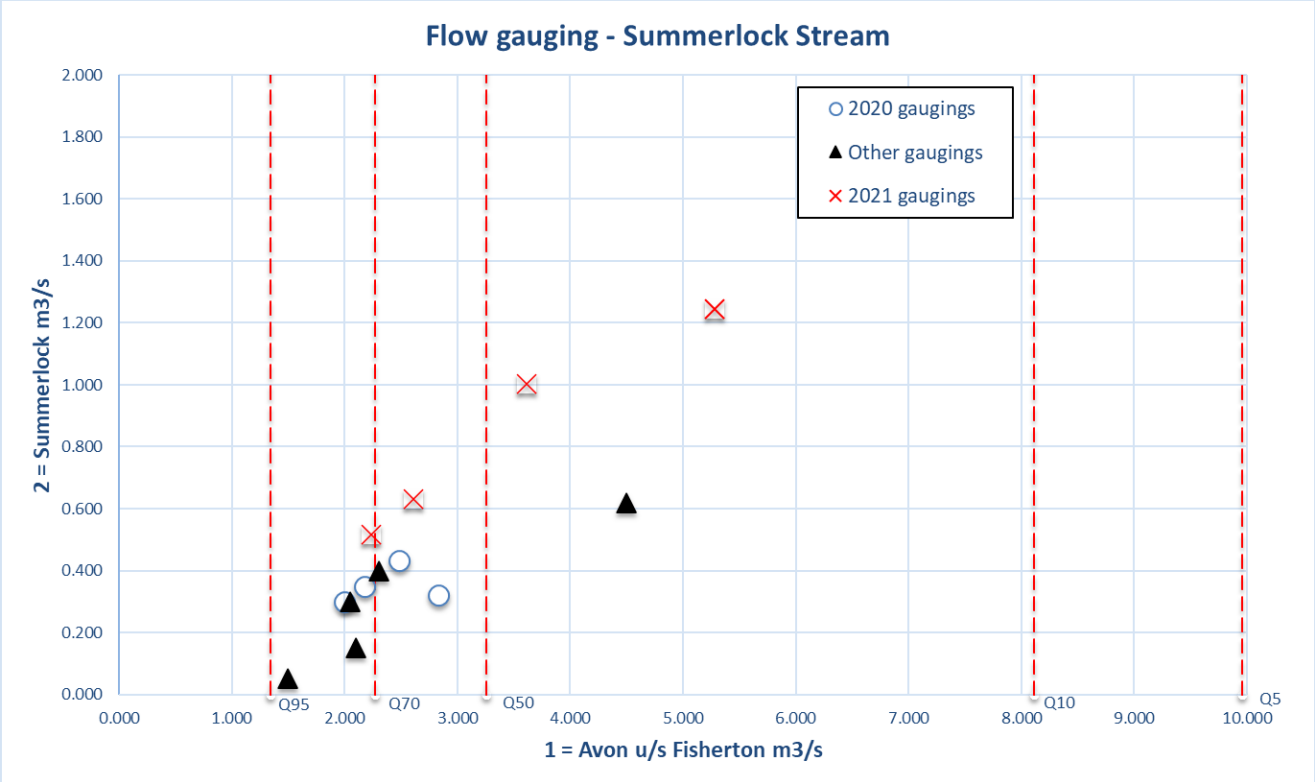
3. Blackwell Hatches

The Blackwell Hatches provide an offtake from the River Avon into the Summerlock Stream. This vertical sluice structure is being removed as part of the River Park Scheme and replaced with a new offtake provided some distance upstream which feeds the Summerlock via a new wetland and associated channel.

The flow gauging (including computed flows) demonstrates a moderate scatter in the relationship between the flow in the Avon and flows passing through the hatches into the Summerlock. It should be noted that not all the data here is gauged, some being derived from gauging at other sites. The scatter is reflected both annually and in the same-season records, and reportedly a direct result of weed growth in the Avon channel. The correlation of River Avon inflow (just upstream of Salisbury) to discharge into the Summerlock is shown below.

Figure 3-1 - Correlation of flows - Summerlock to Upstream Avon

The dashed vertical lines represent the flow percentiles on the River Avon at this location. For example, a Q70 flow on the Avon, of about ~2.3m³/s was gauged in 2021, with a corresponding flow in the Summerlock Stream of ~0.5m³/s Note data includes computed flows as well as actual gaugings from Table 2-1.



3.1. Baseline model

The upstream Avon low flow data (as derived from Amesbury and adapted by catchment area to a point 1.3 km upstream of Salisbury where the hydraulic model extends to) were applied to the hydraulic model to generate predictions of low flows and depths through the Salisbury river system. Note that the actual or computed flows were not simulated with the model. The 2020 model tended to overestimate flows passing into the Summerlock for a given flow in the upstream Avon.

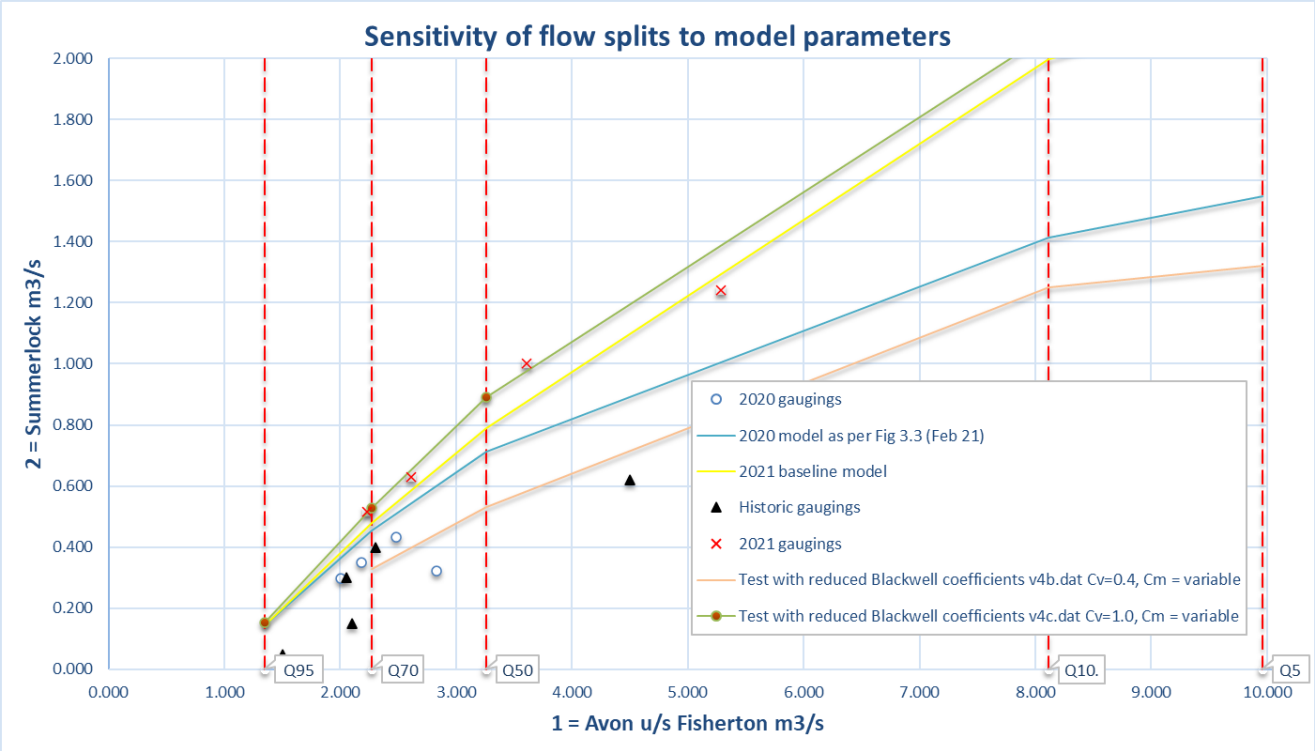
Modifications were made to the model both in the representation of the hatches (improved to reflect two separate gates and using the fixed gate openings), and to the hydraulic parameters (notably the modular coefficient). The updated results further increased the predicted flows passing into the Summerlock but reflected well the 2021 gaugings. Correlation with the 2020 gauged data was not as good.

Numerous tests were undertaken to evaluate the sensitivity of the modelled flow split, including tests on:

- Avon channel roughness
- Summerlock channel roughness,
- Sluice dimensions
- Sluice modular coefficient
- Sluice approach velocity coefficient
- Model application of the sluice
- Combinations of the above

The model matches the 2021 gauge results well. The only other gauged flow above Q50 was less recent, and it is not known how the hatches were operated at this point. The gaugings below Q50 do show a much larger scatter, which is indicative of the greater impacts that vegetation will have. The results indicate that only by lowering the sluice's approach coefficient below the recommended range, and applying a variable (hydraulic defined) modular coefficient, could the predicted flows be low enough to be suitably comparable to the 2020 and historic gauged data. Given the apparent fit of the enhanced model (with default parameters[1]) with the 2021 gauged data, the new baseline model was adopted.

Figure 3-2 - Sensitivity of flow splits to model parameters



3.2. Scheme model

The Salisbury River Park was applied to the baseline model as per the 2020 work, to include the new offtake on the Avon feeding the new wetland channel and the Summerlock Stream.

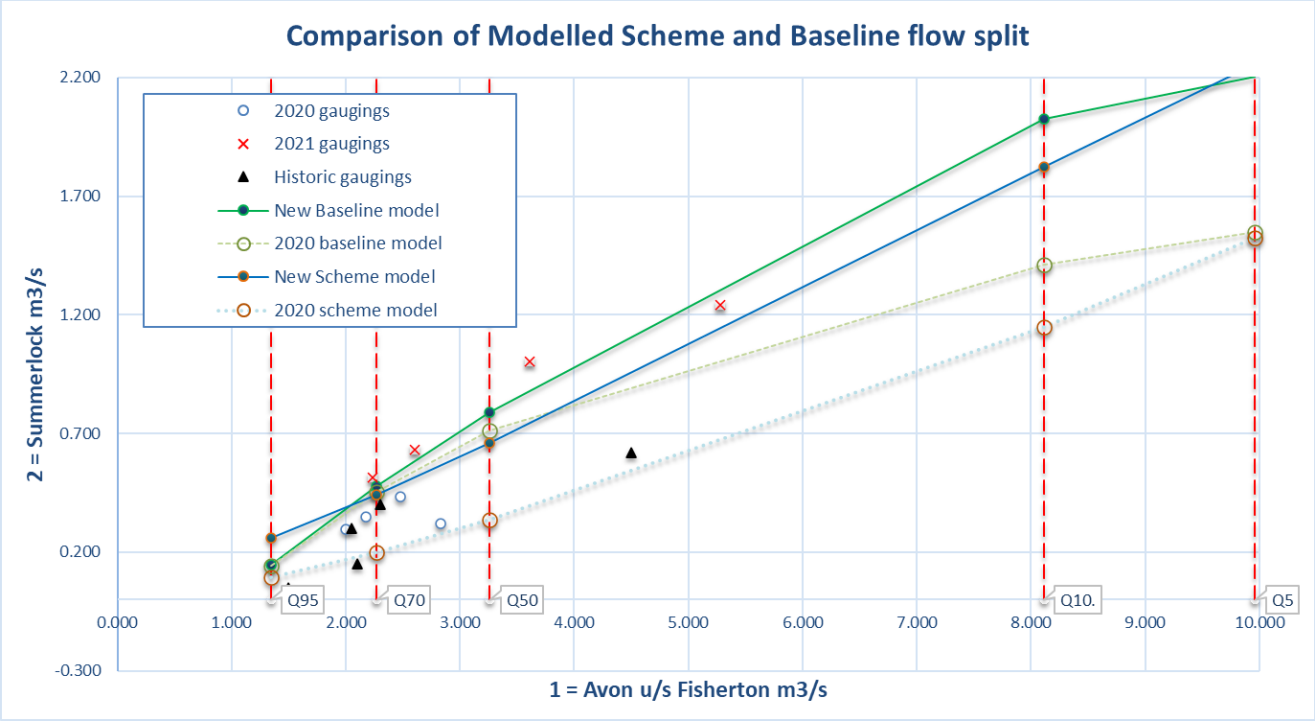
The initial results demonstrated that the size of wetland channel was controlling flows passing into the Summerlock and regardless of the size of offtake structure was unable to pass suitable similar flows into the Summerlock. Several tests were undertaken to demonstrate the mechanism of flow control, which was proven to relate to the new channel, and the constrains of very shallow gradients (1 in 2881) being forced by the invert level at the existing Ashley Road bridge and level at the offtake as directed by low flow levels in the Avon at that location.

[1] 0.70 modular coefficient and 1.0 coefficient of approach velocity

The wetland channel was subsequently widened to 4m, except at a reach near the existing play park, constrained by mature trees to the north and proposed footpath/cycleway to the south. The Avon offtake was replaced with a natural channel, being some 4m wide at its base to match the main wetland channel. This is now part of the design.

The results are plotted in the chart below. This shows that, as above, the new (updated) baseline reasonably matches the 2021 data but predicts higher flows into the Summerlock than gauged in 2020. The 2020 (previous) model results are also plotted as dotted lines, following the same colour scheme (green Baseline, blue Scheme). This shows that the updated Scheme similarly passes less flow into the Summerlock than predicted for the Baseline, although the updated (new) Scheme model does pass more flow into the Summerlock than the accepted 2020 Scheme model. Weed growth in the channel was tested with the Baseline (see previous section) and 2020 was reported to be a high growth year. It should be noted that the model uses flood modelling software and does not cope well at the very low flows and thus caution should be applied when reading these numbers as absolute values.

Figure 3-3 - Comparison of Scheme and Baseline flow split at Blackwell Hatches
The "New Scheme model" is the updated with-Scheme design including the passive feed pipe at Blackwell Hatches.



Both the 2020 and updated 2021 modelling demonstrates that the new wetland channel and offtake is unable to pass the same amount of flow into the Summerlock Stream. This is not least a result of the shallow gradient of that channel and the additional length of watercourse with its respective hydraulic controls.

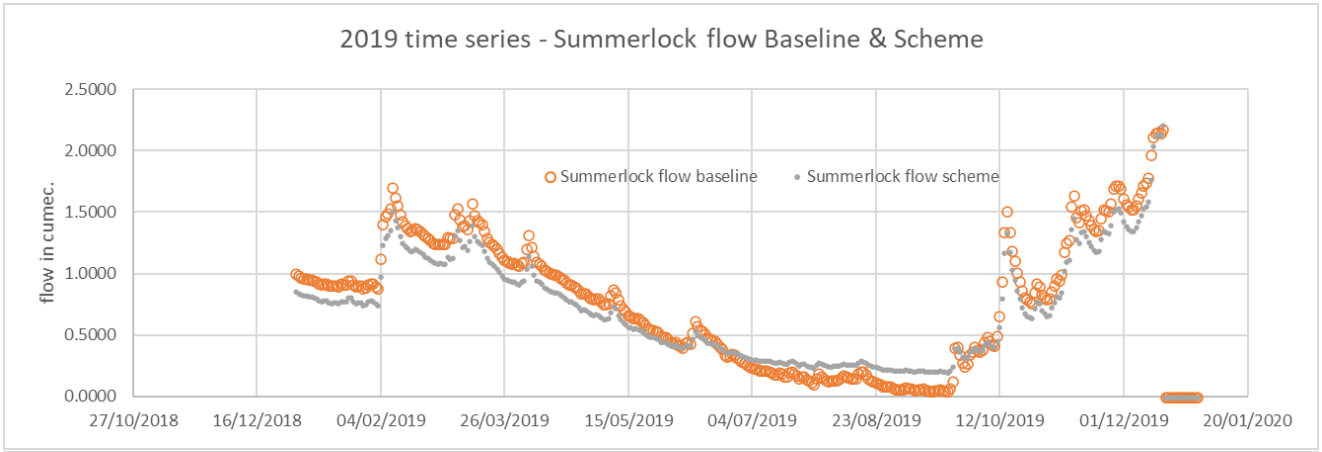
The design implication of this is the need to provide additional flows into the Summerlock Stream, which will be accommodated via a feed pipe being laid through the abandoned/removed Blackwell Hatches. For example, at a 70-percentile flow in the Avon, the modelling predicts a deficit of 130 l/s passing into the Summerlock Stream (480l/s baseline - ~350l/s scheme, taken from the model at Ashley Road). This can be provided using a passive pipe arrangement taking water from the Avon into the Summerlock in the vicinity of the existing Blackwell Hatches. Note that the predicted deficits are smaller than predicted in 2020. Including this piped connection also has additional advantages in allowing for future adjustments to be made to this flow split following future monitoring, and would also allow additional flow to be passed into the Summerlock if required during a low flow incident. The passive pipe is included as a single 600dia culvert in the updated with-Scheme hydraulic model. The Scheme design drawings present this as twin 600dia culverts, controlled by a penstocks to permit flow flexibility should it be required. There is no intention of this penstock being operated during any high flow event.

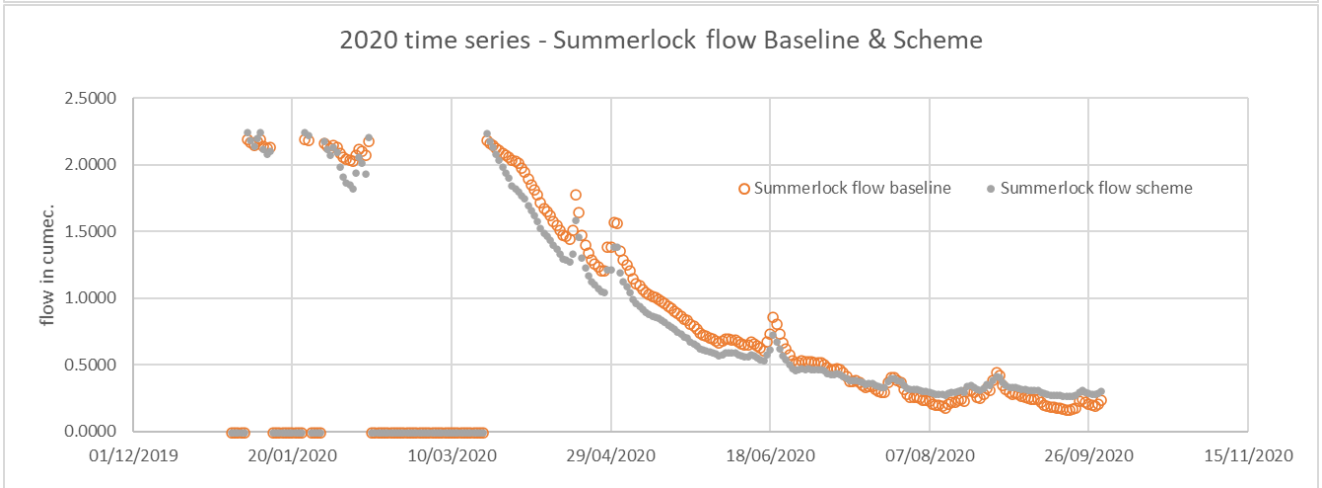
Table 3-1 – Flow predictions at Blackwell Hatches from the hydraulic model
Flow in m³/s quoted to 2dp.

Flow event	Q95	Q70	Q50	Q10	Q5
Flow in Avon u/s Fisherton	1.34	2.27	3.26	8.11	9.96
Flow in the Summerlock					
Baseline (v5)	0.15	0.48	0.79	2.03	2.20
Scheme without feed (v25.2)	0.19	0.35	0.56	1.75	2.20
Scheme with feed (v25.1)	0.26	0.44	0.66	1.82	2.26
Flow deficit with feed	-115l/s	36l/s	128l/s	205l/s	-52l/s

The predicted impact of the scheme on daily flows was developed by taking the adjusted Amesbury record (by catchment area) to represent the River Avon on its approach to Salisbury at Fisherton recreation ground and interpolating it into the above model data. For example, the gauged daily mean flow of 1.35m³/s, recorded in Amesbury on 9 September 2020 (Q88 or 12%ile), converts to 1.62m³/s in Salisbury. Interpolation of the hydraulic model results (Table 3-1) indicate a baseline flow in the Summerlock Stream of 249l/s increasing post-Scheme to 314l/s.

Figure 3-4 – Time series plots – effect of Scheme on Summerlock Stream
Flow in m³/s derived at Ashley Road



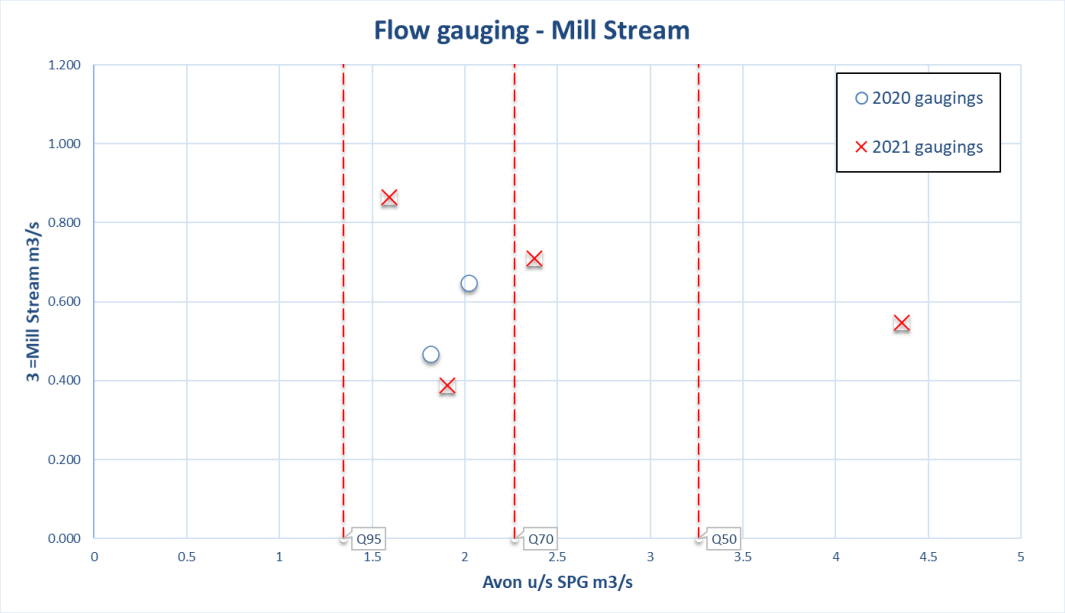


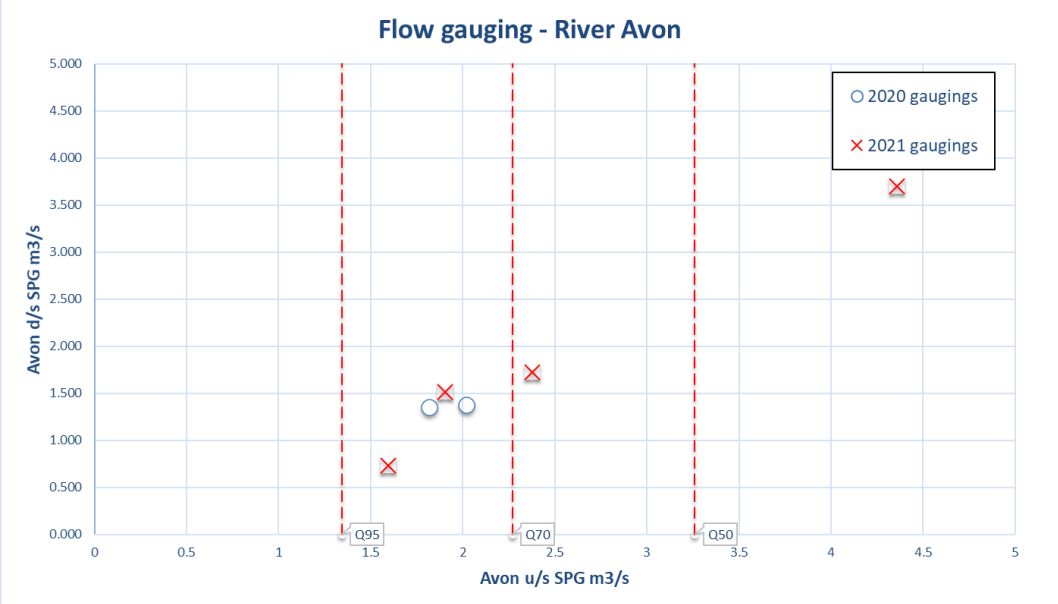
4. Swimming pool Gate

The Swimming pool Gate radial sluice provides an in-channel control on flows passing along the River Avon, regulating water levels upstream and ensuring a flow into the Mill Stream. This radial (undershot) sluice structure is being removed as part of the River Park Scheme and replaced with a new fixed crest weir. One of the key aims of the project is to make the River Avon the dominant flow route during low flows for fish passage (currently it is the Mill Stream). This requires an increase in the low flows passing down the River Avon.

The flow gauging (and subsequent computed data) demonstrates a high scatter in the relationship between the flow in the Avon and flows passing into the Mill Stream. Recall that not all the data is gauged, some being derived from gauging at other sites. This scatter is reflected both annually and in the same-season records. The correlation of River Avon inflow (just upstream of Salisbury) to discharge into the Mill Stream is shown below.

Figure 4-1 - Correlation of flows – Mill Stream to Upstream Avon





The dashed vertical lines represent the flow percentiles on the River Avon **at Blackwell Hatches** (not at Swimming pool Gate) as there is insufficient data to estimate similar at Swimming pool Gate.

A Q70 flow on the Avon, of about ~2.3m³/s was gauged at Swimming pool Gate on 23 June 2021, with a corresponding flow in the Mill Stream of ~0.7m³/s. On the same day, the flow at Fisherton recreation ground was recorded as 3.61m³/s, which is estimated to be just over a Q50 flow. Low flows at Swimming pool Gate will be marginally lower than the flows at Fisherton recreation ground values. Not all the data here is gauged, some being computed from gauging at other sites.

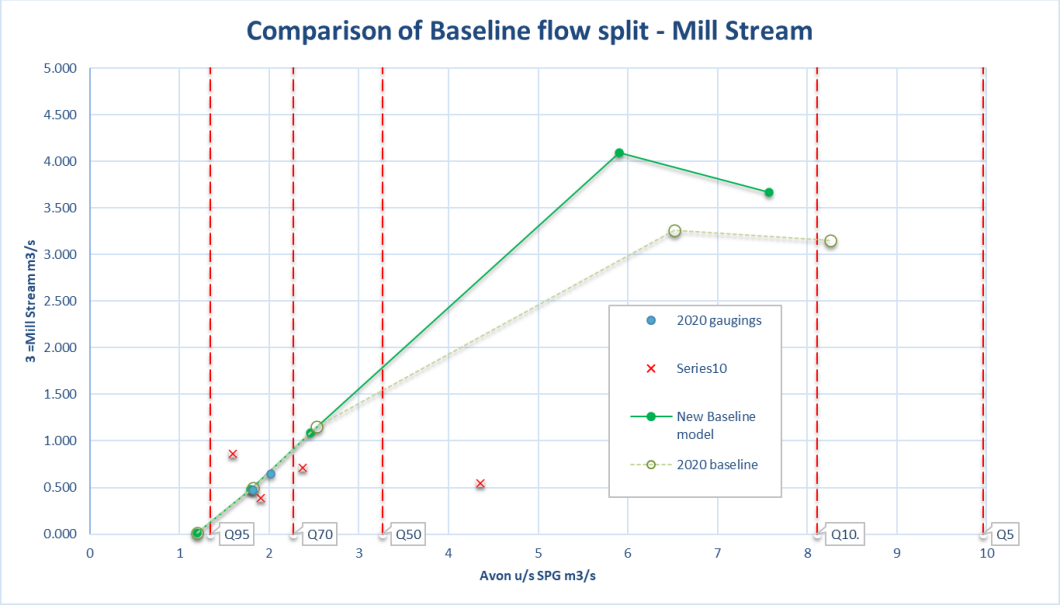
4.1. Baseline model

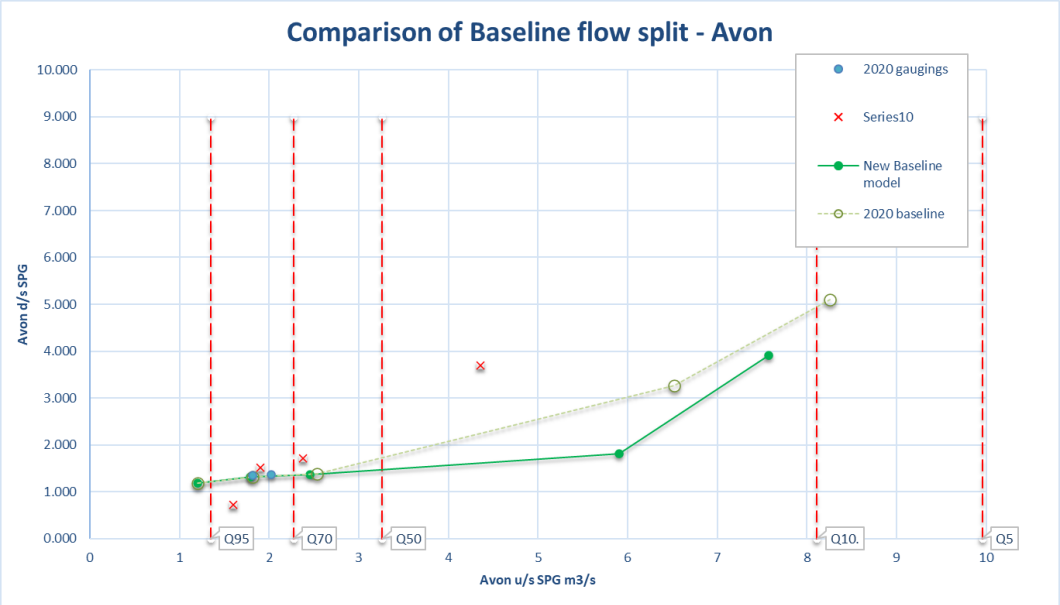
As with Blackwell Hatches, the upstream Avon low flow data were applied to the hydraulic model to generate predictions of low flows and depths through the Salisbury river system. The hydraulic model passes through the scattered gauge data reasonably matching the 2020 record. In contrast to the Blackwell Hatches, the 2021 data at Swimming pool Gate indicates little corelation, which may reflect minor changes to the radial sluice as part of automatic control, ongoing maintenance operations and vegetation growth: the hydraulic model was unable to recreate the recorded flow split. As a result, no changes were made to baseline model.

The chart below provides the model predictions of flow into the Mill Stream given various inflows into the Avon upstream of Salisbury. The minor variation between the 2020 and 2021 model results reflects those changes made upstream to the baseline model at Blackwell Hatches.

Figure 4-2 - Comparison of Baseline flow split at Swimming pool Gate

The dashed vertical lines represent the flow percentiles on the River Avon **at Blackwell Hatches** (not at Swimming pool Gate) as there is insufficient data to estimate similar at Swimming pool Gate A Q70 flow on the Avon, of about ~2.3m³/s was gauged at Swimming pool Gate on 23 June 2021, with a corresponding flow in the Mill Stream of ~0.7m³/s. On the same day, the flow at Fisherton recreation ground was recorded as 3.61m³/s, which is estimated to be just over a Q50 flow. Low flows at Swimming pool Gate will be marginally lower than the flows at Fisherton recreation ground values.





4.2. Scheme model

The Salisbury River Park scheme was applied to the new baseline model as per the 2020 design work, to include a new fixed crest weir replacing Swimming pool radial gate.

The above work demonstrates that the new baseline model allocates flows at Blackwell Hatches correctly and hence flows in the River at Swimming pool Gate. Hence this baseline, and with-scheme model provides valid comparison of before and after effects. It should be noted that at Swimming pool Gate the scheme seeks to change the flow split by passing more water into the River Avon (away from the Mill Stream), and not replicate the baseline bifurcation.

The 2020 work demonstrated a reduction in flow passing into the Mill Stream as promoted by the Scheme. Modifications were made to the New Scheme model (2021) to better represent the rock weir cascade along the River Avon downstream of Swimming pool Gate. This modified the invert level of the weir pools, adding in each individual weir.

The results for the flow split at Swimming pool Gate are plotted in the chart below. This shows that, as above, the baseline has some correlation with the 2020 data. The 2020 model results are also plotted as dashed lines, following the same colour scheme (green baseline, blue scheme). This shows that the updated scheme similarly passes less flow into the Mill Stream than predicted for the baseline with little change in the relationship with the updated model.

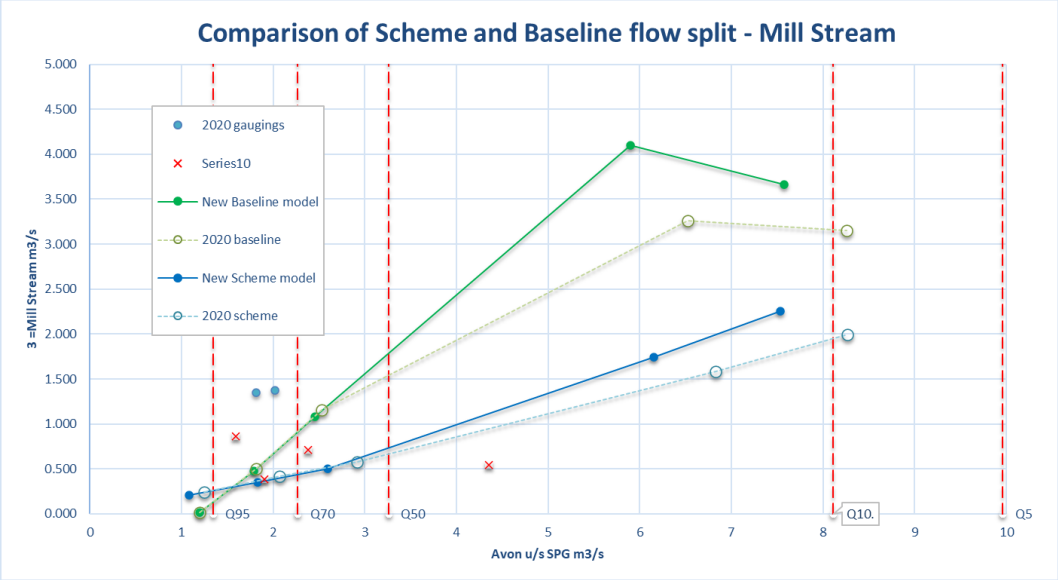
It should be noted again that the model uses flood modelling software and does not cope well at the very low flows and thus caution should be applied when reading these numbers as absolute values. It is likely that the gate/hatches would be operated to avoid extremely low flows in the Mill Stream under existing low flow conditions.

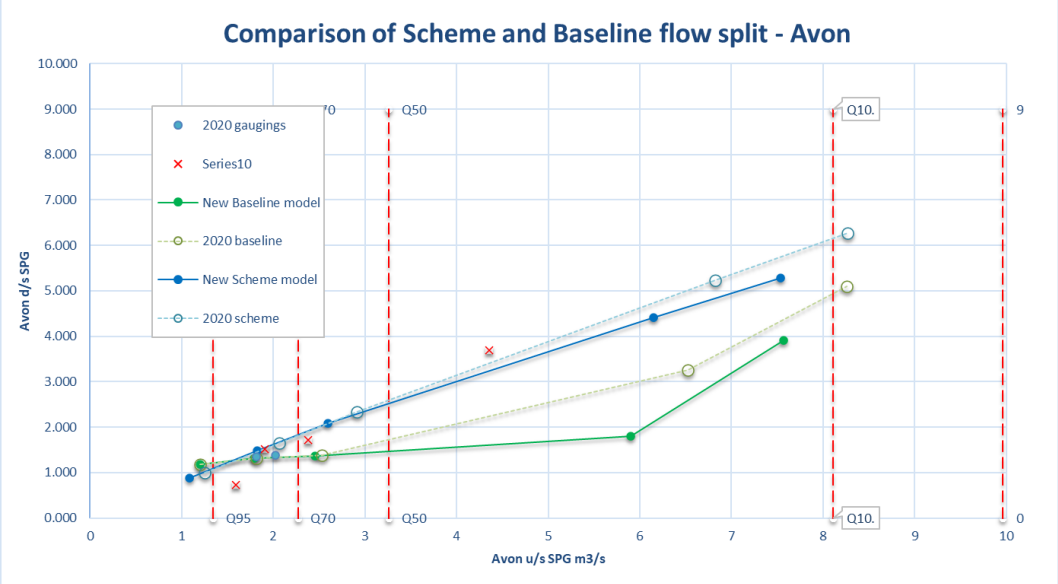
Table 4-1 – Flow predictions at Swimming pool Gate from the hydraulic model
Flow in m^3/s quoted to 2dp. Note flows change between baseline and scheme with the impact of the Fisherton recreation ground and Summerlock Stream works.

Flow event	Q95	Q70	Q50	Q10.	Q5
Flow in Avon u/s Fisherton	1.34	2.27	3.26	8.11	9.96
Flow in the Avon u/s SPG					
Baseline v5	1.20	1.79	2.46	5.90	7.57
Scheme v25.1	1.09	1.83	2.59	6.15	7.53
Flow in the Mill Stream					
Baseline v5	0.01	0.48	1.08	4.10	3.67
Scheme v25.1	0.21	0.35	0.50	1.74	2.25
Flow in the Avon d/s SPG					
Baseline v5	1.19	1.31	1.37	1.81	3.91
Scheme v25.1	0.88	1.48	2.09	4.41	5.28

Figure 4-3 - Comparison of Scheme and Baseline flow split at Swimming pool Gate

The dashed vertical lines represent the flow percentiles on the River Avon **at Blackwell Hatches** (not at Swimming pool Gate) as there is insufficient data to estimate similar at Swimming pool Gate A Q70 flow on the Avon, of about ~2.3m^3/s was gauged at Swimming pool Gate on 23 June 2021, with a corresponding flow in the Mill Stream of ~0.7m^3/s. On the same day, the flow at Fisherton recreation ground was recorded as 3.61m^3/s, which is estimated to be just over a Q50 flow. Low flows at Swimming pool Gate will be marginally lower than the flows at Fisherton recreation ground values.

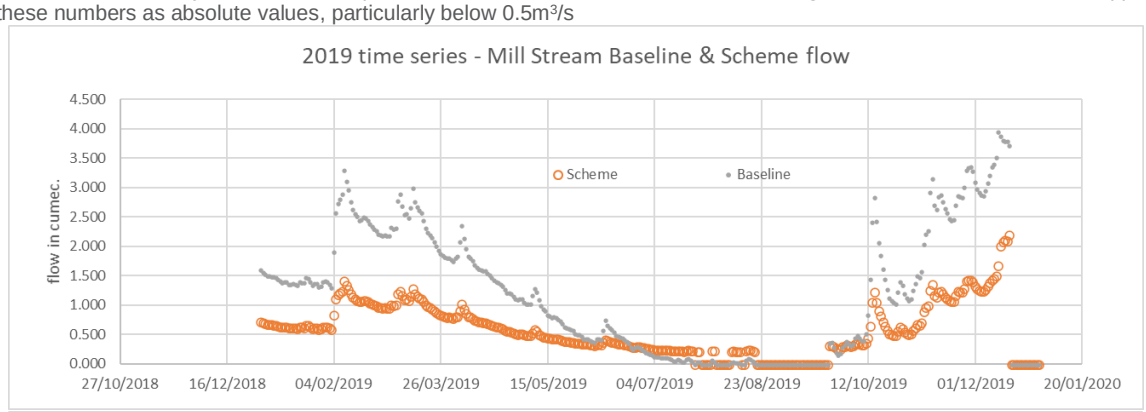




The predicted impact of the scheme on daily flows was developed by taking the adjusted Amesbury record (by catchment area) to represent the River Avon on its approach to Salisbury at Fisherton recreation ground and interpolating it into the above model data. For example, the gauged daily mean flow of 1.35 m^3/s, recorded in Amesbury on 9 September 2020 (Q88 or 12%ile), converts to 1.62 m^3/s in Salisbury. Interpolation of the hydraulic model results (Table 4-1) indicates a baseline flow in the Mill Stream of 152 l/s increasing post-Scheme to 252 l/s.

Figure 4-4 – Time series plots – effect of Scheme on Mill Stream

Flow in m^3/s derived at Ashley Road. The interpolation is based on results from flood modelling software - caution should be applied when reading these numbers as absolute values, particularly below $0.5m^3/s$



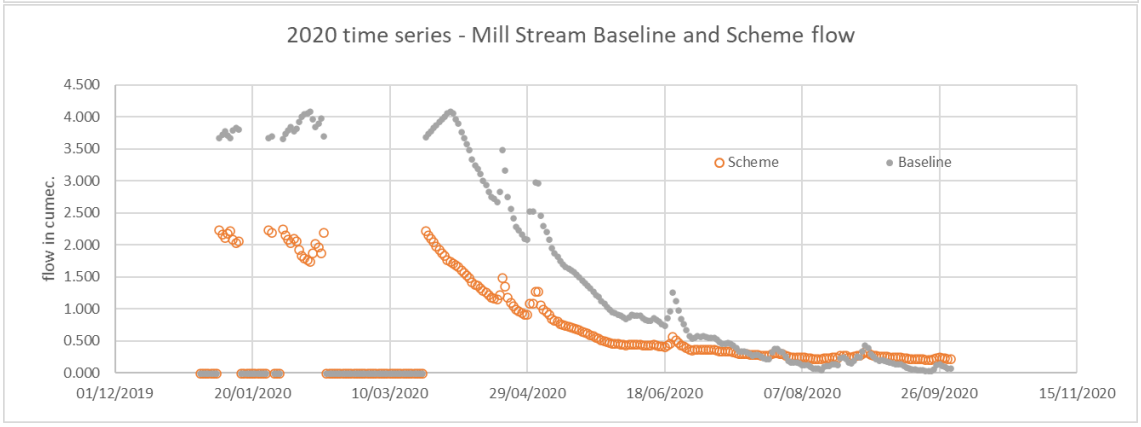
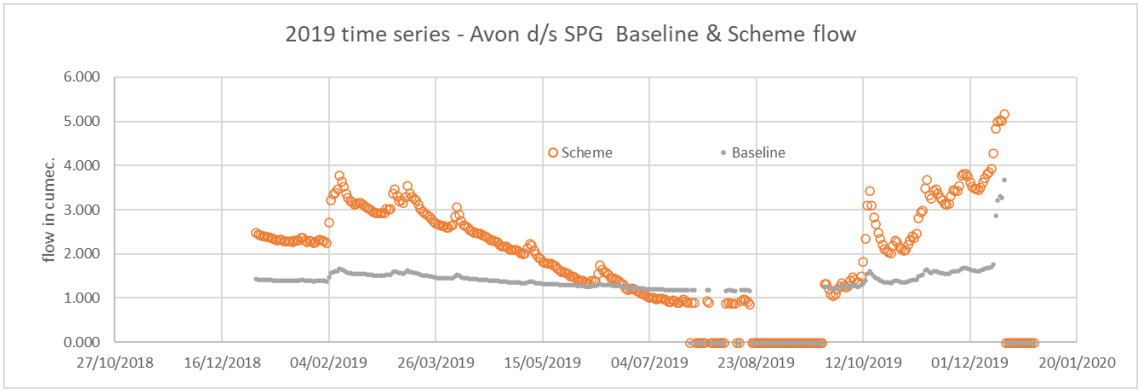
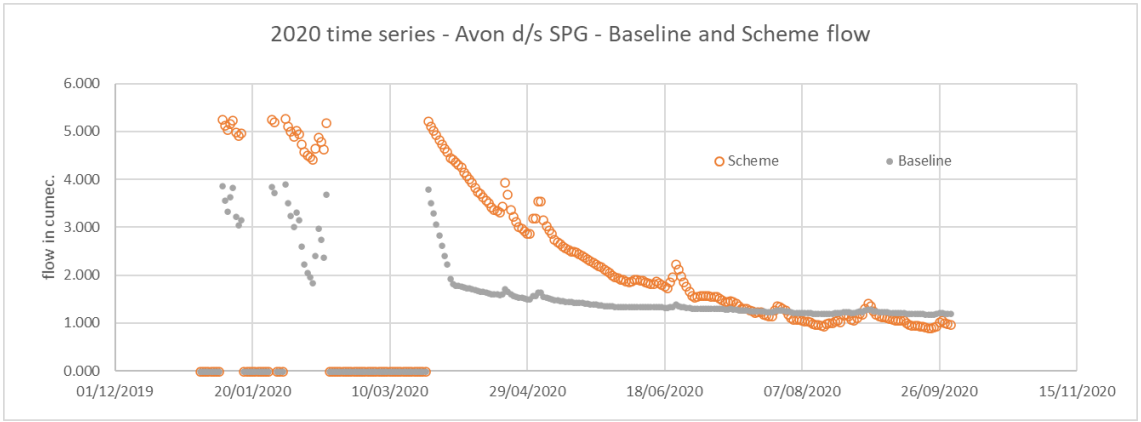


Figure 4-5 – Time series plots – effect of Scheme on Avon downstream of Swimming pool Gate

Flow in m^3/s derived at Ashley Road. The interpolation is based on results from flood modelling software - caution should be applied when reading these numbers as absolute values, particularly below $1m^3/s$





5. Blackwell Hatches to Swimming pool Gate

The results of the model have been compared to evaluate the impact of the Scheme on flow depths and velocities in the River Avon, between Blackwell Hatches and Swimming pool Gate. The results are presented below, showing the existing conditions as predicted by the baseline model, and the proposed conditions from the Scheme model (with the feed pipe at Blackwell Hatches). This data was specifically requested/of interest to the local fishing group.

The results for depth of flow show a general increase in depth of 7mm in daily flows and reduction of 30mm in flood flows. The greatest impact was predicted at the Q10 with an average 101mm reduction along the reach (on an average depth of 1.6m) and the largest change being a 150mm reduction at Swimming pool Gate. Note the results here are quoted in metres, to the nearest 10 mm.

Table 5-1 – Impact of Scheme on depth of flow

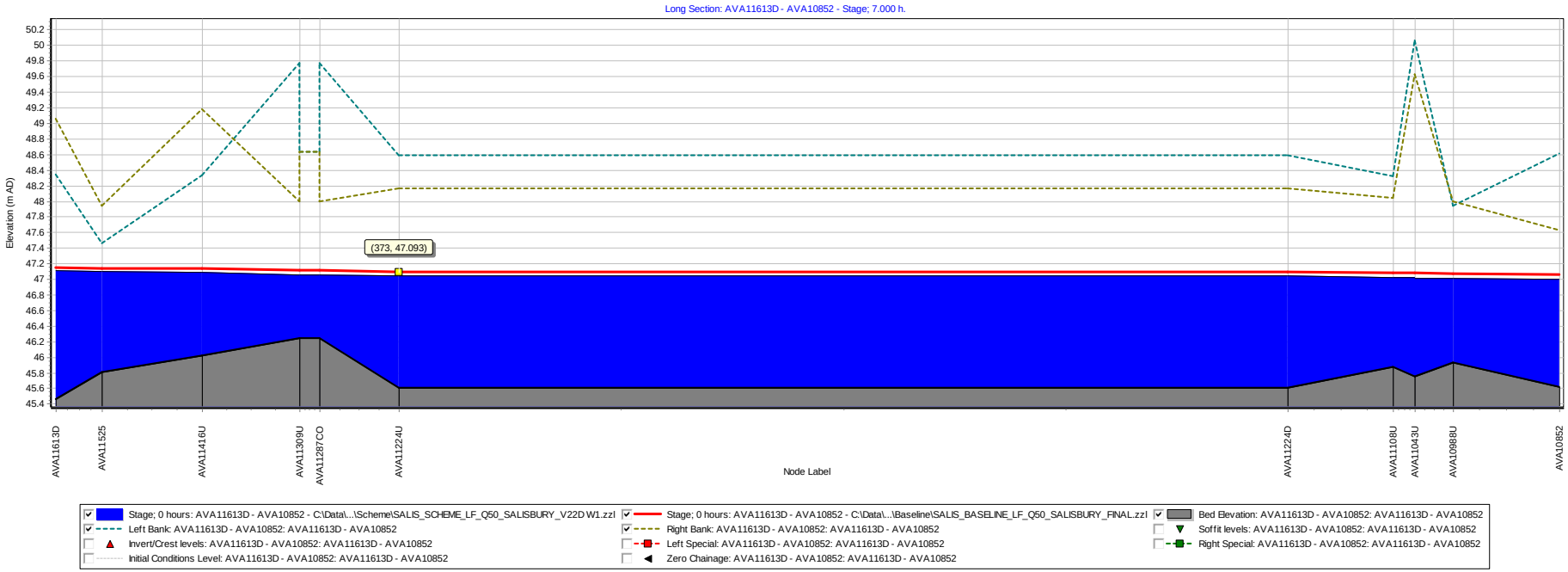
Values reflect changes in depth of flow in m. + change is an increase in depth, - change a reduction in depth.

Location	Model node	Q95 depth[§]	Q95	Q70	Q50	Q10	Q5	2 year	5 year	100 year
	AVA11683	0.725	0.11	0.02	-0.02	-0.07	-0.02	+0.02	-0.04	+0.10
Blackwell Hatches	AVA11613U	1.372	0.11	0.02	-0.01	-0.06	-0.01	+0.03	-0.04	+0.10
Blackwell Hatches	AVA11613D	1.365	0.12	0.03	0.00	-0.04	0.02	+0.03	-0.04	+0.10
	AVA11525	1.015	0.11	0.02	-0.01	-0.06	0.00	+0.02	-0.04	+0.10
	AVA11416U	0.749	0.17	0.04	0.00	-0.05	0.02	+0.02	-0.07	+0.10
	AVA11416D	0.749	0.17	0.04	0.00	-0.05	0.02	+0.02	-0.06	+0.09
Ashley Road	AVA11309U	0.529	0.15	0.02	-0.03	-0.10	-0.03	+0.00	-0.08	+0.06
Ashley Road	AVA11287D	0.529	0.15	0.02	-0.03	-0.10	-0.03	+0.00	-0.09	+0.05
	AVA11224U	1.131	0.18	0.02	-0.03	-0.11	-0.04	0.00	-0.11	+0.04
	AVA11224D	1.131	0.18	0.02	-0.03	-0.11	-0.04	0.00	-0.11	+0.04
Churchill Way W	AVA11108U	0.847	0.19	0.02	-0.04	-0.13	-0.04	-0.02	-0.16	+0.01
Churchill Way W	AVA11067D	0.847	0.19	0.02	-0.04	-0.13	-0.04	-0.02	-0.16	+0.01
	AVA11043U	0.964	0.19	0.02	-0.04	-0.13	-0.04	-0.03	-0.18	-0.01
	AVA11029D	0.964	0.19	0.02	-0.04	-0.13	-0.04	-0.03	-0.18	-0.02
	AVA10988U	0.778	0.20	0.02	-0.04	-0.14	-0.04	-0.04	-0.22	-0.04
	AVA10968D	0.778	0.20	0.02	-0.04	-0.14	-0.04	-0.04	-0.22	-0.04
nr SwimmingPGt	AVA10852	1.079	0.20	0.02	-0.05	-0.15	-0.05	-0.07	-0.31	-0.16

[§]Q95 depth is the depth of flow (m) in the baseline model with the Q95 flow and can be used to consider the relative impact of the tabulated changes in depth. All other events provide greater depths of water and hence the impact is a smaller proportion.

Figure 5-1 – Avon long section: Blackwell Hatches to Swimming pool Gate

Blue hatch = with-Scheme Q50 water levels between Blackwell Hatches on the left, and Swimming pool Gate on the right.
Red line is the baseline water level for the same event.



The result for flow velocity typically show a nominal increase in flow speed, with an average increase of 0.0m/s in low flow conditions and 0.1m/s in flood flow.

Table 5-2 – Impact of Scheme on flow velocity

Values reflect changes in depth of velocity in m/s. + change is an increase in velocity, - change a reduction in velocity.

Location	Model node	Q95 velocity[§]	Q95	Q70	Q50	Q10	Q5	2 year	5 year	100 year
	AVA11683	0.101	0.1	0.1	0.1	0.2	0.1	-0.1	-0.1	-0.1
Blackwell Hatches	AVA11613U	0.183	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1
Blackwell Hatches	AVA11613D	0.156	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0
	AVA11525	0.156	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0
	AVA11416U	0.36	-0.2	-0.1	-0.1	-0.1	-0.1	0.1	0.1	0.1
	AVA11416D	0.154	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1
Ashley Road	AVA11309U	0.154	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1
Ashley Road	AVA11287D	0.366	-0.2	0.0	0.0	0.1	0.0	0.1	0.2	0.1
	AVA11224U	0.183	-0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.1
	AVA11224D	0.181	-0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.1
Churchill Way W	AVA11108U	0.235	-0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.2
Churchill Way W	AVA11067D	0.237	-0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.2
	AVA11043U	0.234	-0.1	0.0	0.0	0.1	0.0	0.1	0.3	0.2
	AVA11029D	0.231	-0.1	0.0	0.0	0.1	0.0	0.1	0.3	0.2
	AVA10988U	0.215	-0.1	0.0	0.0	0.1	0.0	0.1	0.3	0.3
	AVA10968D	0.218	-0.1	0.0	0.0	0.1	0.0	0.1	0.3	0.3
nr SwimmingP Gt	AVA10852	0.16	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.4

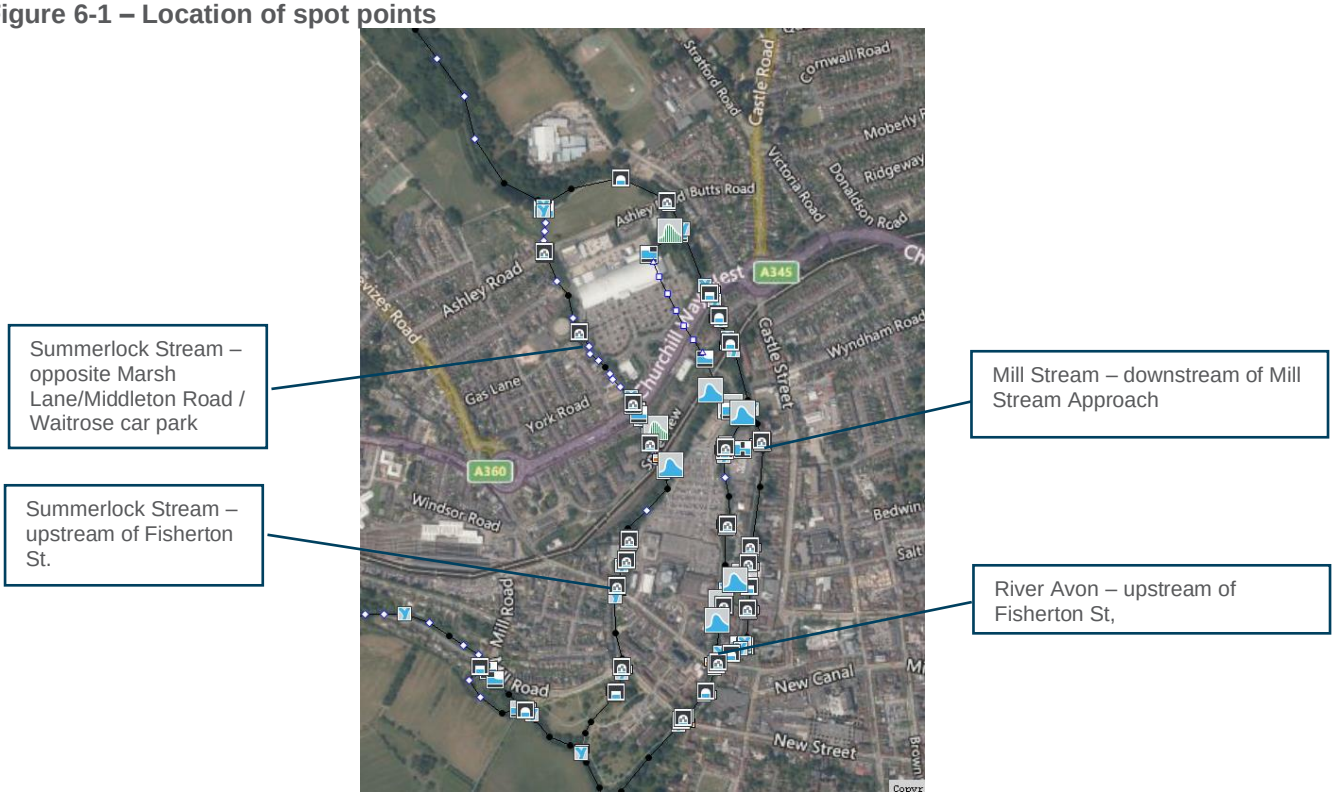
[§]Q95 velocity is the speed of flow (m/s) in the baseline model with the Q95 flow and can be used to consider the relative impact of the tabulated changes in velocity. All other events provide greater flow velocities and hence the impact is a smaller proportion.

6. Results at other locations

The results of the model have been compared to evaluate the impact of the Scheme on flow depths and velocities at four spot locations:

1. Summerlock Stream – opposite Marsh Lane/Middleton Road / Waitrose car park
2. Summerlock Stream – upstream of Fisherton St,
3. River Avon – upstream of Fisherton St,
4. Mill Stream – downstream of Mill Stream Approach

Figure 6-1 – Location of spot points



The results are presented below as changes in water level and velocity. The numbers indicate a mixed response, with some increases and some reductions in both water level and velocity. However, in general terms velocities are impacted by less than ±0.1m/s. Water levels are predicted to be a little more variable, with the greatest change of 186mm reduction predicted at Mill Stream Approach bridge in the Q10 event.

Table 6-1 – Impact of Scheme on water level (change in water level) mm

Depth changes quoted to nearest 10mm. Note A + value represents an increase in water level / flow depth.

Location	Model node	Baseline Q95 depth	Q95	Q70	Q50	Q10	Q5
1 Summerlock at Waitrose	AVD01105D	*186mm*	+50	-10	-40	-40	+10
2 Summerlock at Fisherton St	AVD00474U	*102mm*	+70	-10	-30	-30	+10
3 River Avon at Fisherton St	AVA10289U	*431mm*	-70	0	+100	+10	-0
4 Mill Stream at Avon Approach	AVF00275U	*162mm*	+120	-10	-70	-190*	-80

* Baseline depth of flow for this 190mm reduction in water level during Q10 is 611mm.

Table 6-2 – Impact of Scheme on flow velocity (change in velocity) m/s

Velocity changes quoted to 2dp. A + value represents an increase in flow velocity.

Location	Model node	Baseline Q95 velocity	Q95	Q70	Q50	Q10	Q5
1 Summerlock Waitrose	AVD01105D	*0.35m/s*	0.08	0.01	-0.01	-0.00	0.02
2 Summerlock Fisherton	AVD00474U	*0.27m/s*	0.05	0.01	-0.01	-0.01	0.03
3 River Avon Fisherton	AVA10289U	*0.21m/s*	0.05	0.01	0.01	0.01	0.00
4 Mill Stream MS Approach	AVF00275U	*0.13m/s*	0.21	-0.01	-0.07	-0.12	-0.05

7. Summary

The hydraulic modelling undertaken for the Salisbury River Park scheme provides a reasonable match with the recent gauged record. Whilst this somewhat validates the hydraulic model, the site gaugings demonstrate a significant seasonal and annual variation in how water moves through the Avon system, through Salisbury. It is understood that channel vegetation is a dominant factor in the bifurcation of flows, which indeed varies both throughout the year, but also from year to year.

The current baseline model (v5) correlates well with the gauge record for 2021 around Blackwell Hatches, but not so well at Swimming pool Gate, where it provides a better fit with the 2020 record than the 2021 data. However, there is significant scatter in the gauge records at Swimming Pool gate and the modelling is still considered an acceptable fit.

The proposed wetland channel is demonstrated to pass somewhat less flow into the Summerlock Stream than the baseline, with this result being optimised by widening the new wetland channel to encourage more throughflow from the Avon. However, to address the predicted reduction in flows entering the Summerlock, a new feed supply pipe will be added to the design, taking flows from the Avon at the location of the Blackwell Hatches. This will be accompanied by a small penstock to limit those flows as may be required.

The undershot radial sluice at Swimming pool Gate is being replaced with a fixed crest weir. The hydraulic modelling, as updated in line with the developing design, demonstrates that a subsequent reduction in flow in the Mill Stream is achieved, with more water being passed along the Avon channel.

The impact on flow depths and velocities in the River Avon between Blackwell Hatches and Swimming pool Gate is predicted to be minimal.

Salisbury River Park Phase 1 Scheme




Volume 1: Non-technical Summary

March 2021

Prepared by Jacobs on behalf of the Environment Agency

Environment Agency

We are the Environment Agency. We protect and improve the environment and make it a better place for people and wildlife.

We operate at the place where environmental change has its greatest impact on people's lives. We reduce the risks to people and properties from flooding; make sure there is enough water for people and wildlife; protect and improve air, land and water quality and apply the environmental standards within which industry can operate.

Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do.

We cannot do this alone. We work closely with a wide range of partners including government, business, local authorities, other agencies, civil society groups and the communities we serve.

Published by:

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Quality Assurance

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Author	Rachel Shaw/Corinna Morgan

Approvals

Name	Signature	Title	Date	Version
Stuart Hedgecott	S Hedgecott	Senior Associate Director Environment	16/12/20	1
Stuart Hedgecott	S Hedgecott	Senior Associate Director Environment	March 2021	2

EIA Quality Mark

This Environmental Statement, and the Environmental Impact Assessment (EIA) carried out to identify the significant environmental effects of the proposed development, was undertaken in line with the EIA Quality Mark Commitments.

The EIA Quality Mark is a voluntary scheme, operated by the Institute of Environmental Management and Assessment (IEMA), through which EIA activity is independently reviewed, on an annual basis, to ensure it delivers excellence in the following areas:

EIA Management
EIA Team Capabilities
EIA Regulatory Compliance
EIA Context & Influence
EIA Content
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Non-Technical Summary

1.1 Introduction

Background

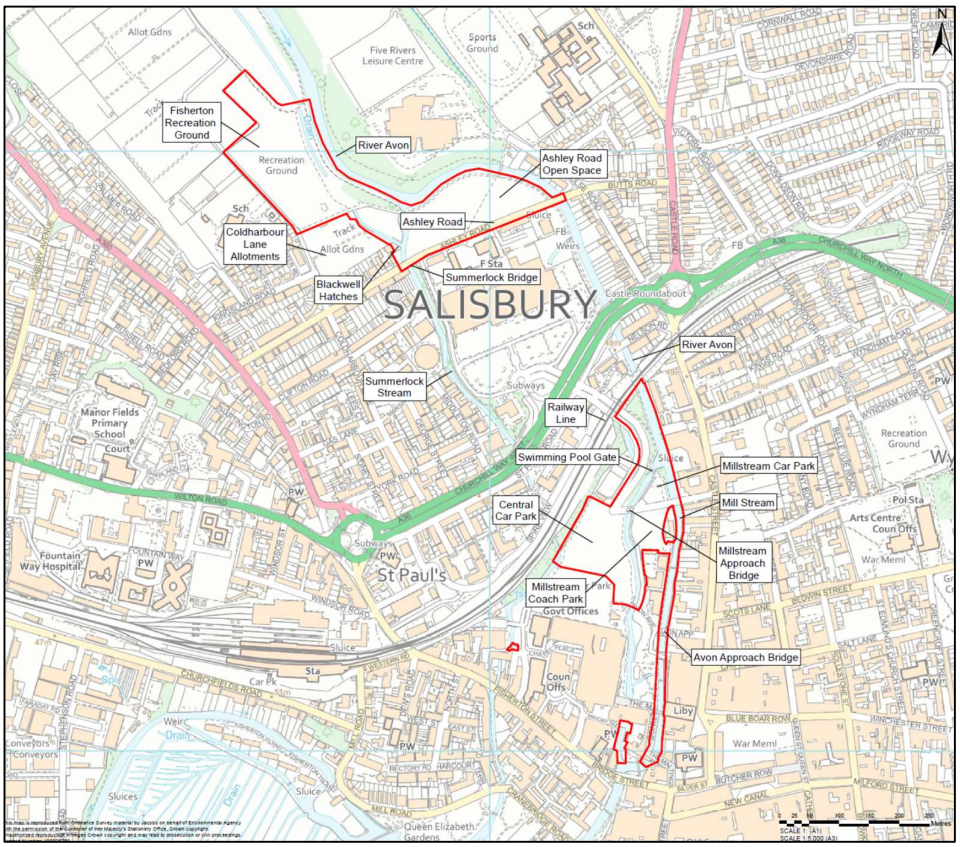
We, the Environment Agency, in partnership with Wiltshire Council, are proposing a Scheme to reduce flood risk and provide environmental and amenity improvements in the centre of Salisbury. This is the 'Salisbury River Park Phase 1 Scheme' and is part of a wider Salisbury River Park Master Plan, which itself is part of the Central Area Framework being developed by Wiltshire Council to regenerate the city centre.

The city centre is vulnerable to flooding from the River Avon, Mill Stream and Summerlock Stream. The Scheme will combine new flood defences with enlarged channels and open spaces that can carry or store additional water, improvements to amenity space, and improvements for wildlife along the river.

We have designed a Scheme that provides more natural flood management by removing existing structures and creating more natural channels. Along with other changes such as some new flood defences, this will reduce the risk of flooding to existing homes and businesses, and also future regeneration sites.

The Scheme area extends from Ashley Road Open Space and Fisherton Recreation Ground in the north of Salisbury to the Maltings and Central Car Park area further south as shown on Figure 1.

Figure 1: Scheme area



Within this area, the Scheme will provide new recreation activities and improved routes for pedestrians and cyclists. The improvements to the River Avon will result in more vegetation at the margins, will reduce barriers to fish migration and will result in better habitat conditions along the River Avon and its associated channels; internationally important chalk river.

Planning and Environmental Impact Assessment

The Scheme will require planning permission from Wiltshire Council's planning authority. An Environmental Impact Assessment (EIA) has been undertaken for the Scheme in accordance with the requirements of the Town and Country Planning (EIA) (England and Wales) Regulations 2011 (SI 2011 No.1824).

EIA is a process to assess the likely significant environmental effects of a proposed scheme together with ways to avoid or reduce any negative environmental effects. The findings of the EIA are presented in an Environmental Statement (Volume 2).

1.2 Alternative options considered

After the flooding in 2014, we assessed various options to reduce flood risk in Salisbury, considering whether they would be practical to build, their effects on the environment and people, their costs, benefits and risks.

Following assessment and feedback from public and government organisations, we then developed a shorter list of options. These comprised combinations of:

- replacement or removal of structures to improve fish passage;
- measures to restrict flood water along the Summerlock Stream;
- flood defences along the River Avon and Summerlock Stream; and
- widening rivers and modifying the floodplain to reduce flood risks.

We considered how each of these options would reduce flood risk, along with the possible effects on the environment and people. After further consultation we are now proposing improvements in two areas as part of this planning application, (i) Ashley Road and (ii) the Maltings and Central Car Park. This is to provide the maximum flood risk benefit from the proposed works and to fit in with Wiltshire Council's wider ambitions for this area.

We then considered various design options for the Scheme including

- different layouts of a relocated Summerlock Stream and new wetland habitat;
- alternative types and locations for new flood defences;
- alternative options for in-river structures which control flow along the channels;
- different options for replacement bridges; and
- alternative methods of construction.

These are all described in the Environmental Statement (Volume 2).

1.3 Consultation

We presented the various options and then the proposed Scheme to stakeholders including the public through meetings, public events and focussed stakeholder workshops between 2019 and 2021. Public consultation specifically on the proposed Scheme and its EIA took place between 19 November 2020 and 7 January 2021.

We were not able to meet face to face with stakeholders and run public exhibitions and events during the COVID-19 pandemic. Instead, we created an online website for the consultation, presented two live web based events to discuss the Scheme and made available paper copies of all information on the website to people without internet access.

Key issues raised during the consultation events are summarised below: -

- need for safe public access to river while protecting and improving wildlife including fish habitat;
- ensure the Scheme has community buy-in;
- consider operational and maintenance liabilities of future use;
- consider impacts on heritage including the historic value of the Mill Stream, as well as opportunities to raise cultural heritage awareness;
- maintain Fisherton Recreation Ground and Ashley Road Open Space as multi-functional open spaces (including a beach and tree planting area), maximising the amount of space available for large scale flood events;
- take opportunities to connect pedestrians and cyclists within Salisbury, to renovate the area, to meet aspirations for the Avon Valley Nature Reserve and to open up views of cathedral e.g. from coach park/ entry point;
- protect recently planted trees in Ashley Road area;
- explain reasons for selecting options e.g. for removing structures along the Avon;
- maintain key points of access from A36 and Castle Street;
- align Scheme with climate change e.g. opportunity to accommodate flooding within the developed space;
- understand future use of The Maltings area, which will influence changes along the river corridor; and
- consider impact of Scheme on parking.

These and other comments raised by the public and other consultees from all the consultation activities have been fed into the Scheme design and taken account in the EIA.

1.4 The Scheme

The Scheme is presented on Figures 2 and 3 and will involve the following:

At Ashley Road Open Space and Fisherton Recreation Ground we will:

- build a new embankment and flood walls to reduce flood risk to properties to the south and create two areas next to these defences for the temporary pumping of drainage water during flooding;
- create a new channel and wetland wildlife area through Fisherton Recreation Ground connecting the River Avon and Summerlock Stream. During drier periods and low river flows, water will be restricted to the new channel. When flow in the River Avon is high, water will spill out of the new wetland to cover areas of grassland between the wetland and the proposed flood defences;
- infill a short section of Summerlock Stream that is no longer required;

- build new footpaths and a new cycle track to maintain and improve existing public access, including new footbridges over the new channel and new boardwalks;
- replace the play park at Fisherton Recreation Ground with a new, improved, one at Ashley Road Open Space;
- improve landscaping and vegetation along the bank of the River Avon; and
- improve access to the river e.g. new viewing platforms and beaches, and picnic area next to the new wildlife area and install benches and information boards.

At the Maltings and Central Car Park area we will:

- widen the River Avon to create a 40-50m corridor that can carry more water during floods. This river park corridor will provide new spaces for public enjoyment and benefit wildlife by improving river habitat and including undisturbed wildlife areas;
- create a new mini park for public use on what is currently Millstream car park;
- remove the existing barrier known as Swimming Pool Gate which controls the split of flow between Mill Stream and the River Avon. Instead a series of rock weirs will be built to provide a more gradual drop in water level and allow migrating fish to move upstream more easily;
- build a new culvert (underground channel) to carry floodwater from the River Avon to the Summerlock Stream;
- modify culverts (underground channels) to improve drainage;
- raise local ground levels in some areas to restrict the passage of floodwater;
- build two short sections of flood wall to reduce flood risk to properties;
- reduce the width of Mill Stream channel in a few locations to improve river habitat during low flows;
- improve the existing fish pass at Bishops Mill;
- improve public access to the river in areas where it will not disturb wildlife;
- replace Millstream Approach road bridge over the River Avon with a new wider span bridge a short distance to the north to span the widened channel;
- replace existing footbridge at Swimming Pool Gate with new wider bridge for pedestrians and cyclists
- provide a new pedestrian footbridge at the southern end of coach park on the east of the river to provide access to the new river park on the west;
- improve existing footpaths and cycle paths throughout the area, with segregated paths where possible; and
- install low level lighting along some of the newly created footpaths and cycleways.

Figure 2: Proposed Scheme at Ashley Road area

Figure 3: Proposed Scheme at The Maltings and Central Car Park area

1.5 Construction, operation and maintenance of the Scheme

Managing our impact on the environment

We are committed to protecting the environment and people during the construction of the Scheme. Some disruption is unavoidable, but we will do all we can to minimise and manage this. All of the measures we have identified to avoid or reduce negative impacts are included in the Environmental Statement and will be incorporated into an Environmental Action Plan. The Environmental Action Plan will be used to ensure that the environmental management and improvement measures are fully implemented as the Scheme is built.

Once construction is complete, the affected areas of land will be reinstated and replanted with a mix of native and ornamental trees We have produced a Landscape Habitat Management Plan which sets out how we will create areas of new meadow grassland, woodland and wetland habitats, and how these should be maintained.

Our construction programme

We have programmed construction to minimise disruption to residents, the public, road users and businesses in Salisbury, and to avoid impacts on protected species and fish.

We expect that the Scheme will be built during 2022 and 2023, with a winter break each year when the ground is too wet to build without significant risk of environmental damage. However, tree felling and shrub clearance will be carried out in winter to make sure we do not disturb nesting birds.

Our indicative programme is shown below: -

Ashley Road area:

- 2022 - January - start enabling works to divert services and clear vegetation;
- 2022 - Spring and Summer - build the new channel, wetland, flood defences and footbridges;
- 2023 - Spring to Autumn - final works to channel works and wetland then landscaping.

Maltings and Central Car Park area:

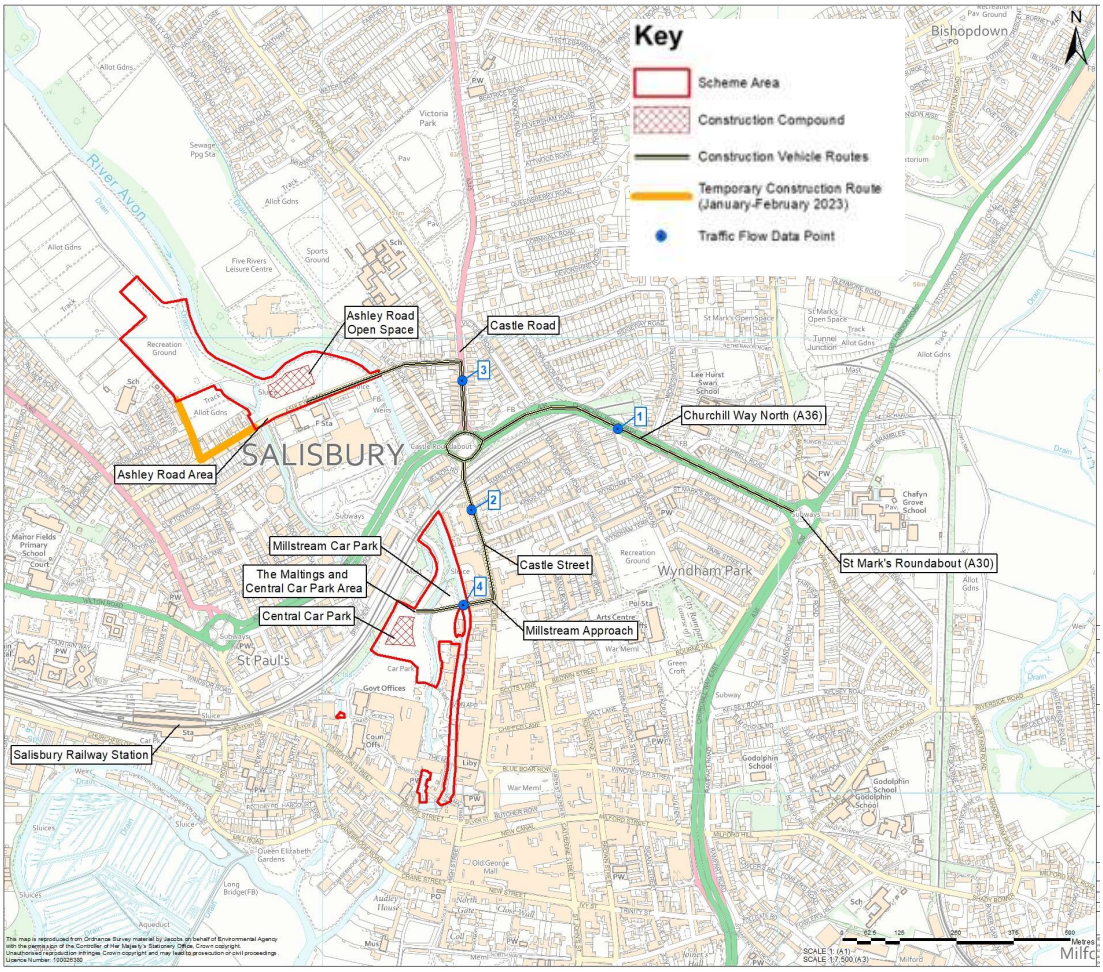
- 2022 - January - start enabling works to divert services and clear vegetation;
- 2022 to 2023 - Summer to Summer - undertake river works, earthworks, modification of culverts and build the new Millstream Approach Bridge;
- 2022 to 2023 - Winter to Spring – road works to connect the new Millstream Approach Bridge;
- 2023 - Summer to Winter - complete Mill Stream improvement works.

The Scheme will be completed by December 2023.

Our working hours are likely to be 7.00am to 6.00pm Mondays to Fridays. The noisiest works (piling) will be further restricted to 8.00am to 6.00pm Monday to Friday. We will avoid construction activities on Sundays, Public Holidays and during special events/festivals. Deliveries and certain other activities will be further restricted to avoid peak commuting times as described in Chapter 3 of the Environmental Statement.

The proposed construction access and compounds are shown on Figure 4 (to be confirmed with stakeholders).

Figure 4: Indicative construction access and compounds



1.6 Environmental effects and the actions we will take

We collected environmental information from the following sources plus through consultation (described in Section 1.3) to identify environment features that may be affected by the Scheme:

- maps, aerial photography and satellite imagery;
- ecology survey data plus examination of county records;
- ecology surveys including habitat surveys and surveys for great crested newts, water birds, badgers, bats, otters, water voles, reptiles, water crowfoot and invasive plants;
- other surveys including a tree survey and river survey;
- ground condition surveys at the Ashley Road area;
- archaeological scanning at the Ashley Road area plus examination of national and county heritage and archaeological data;
- review of landscape characterisation and urban land use studies for Salisbury;
- survey data on ground levels;
- local traffic flow data; and
- other sources such as government agency datasets available from the internet.

We used this information to help design the Scheme and to assess environmental effects.

Local community

The Scheme will benefit the local community by reducing flood risk to approximately 378 houses and commercial properties, as well as infrastructure and recreational assets. There will also be benefits from the improved river corridor and parkland. These changes will have beneficial impacts on the health of those living, working in and visiting the area.

There will be some unavoidable but temporary disruption during construction, notably reduced access to recreational parks and car parks, disrupted access, service diversions, increased traffic, localised noise and temporary loss of one allotment**.**

The completed Scheme will result in a permanent change to part of a garden and two memorial trees, which will be translocated or replaced, and in changes in use of public space.

Measures to minimise any nuisance and reduce anxiety for nearby residents, recreational users and businesses have been identified and we will keep the local community fully informed of the nature and timing of the works.

Local community

The construction works will increase noise and vibration levels locally, particularly in areas around Ashley Road, Coldharbour Lane, Hulse Road, Millstream Approach, Castle Street, Castle Street South, Ivy House and Summerlock Approach. This temporary noise disturbance will affect residents, recreational users, office workers, a school and health centres during some construction works, most notably during embankment construction in the Ashley Road area and works in the river channels within the two year construction period.

We have identified measures to minimise noise nuisance and reduce anxiety. We will ensure these are carried out in accordance with a Noise and Vibration Monitoring and Control Strategy, which we will agree with Wiltshire Council prior to construction. We will keep the local community fully informed of the nature and timing of the works. We will programme construction to minimise disruption.

No changes to noise are expected once construction is complete.

Recreation and access

The Scheme will provide a long-term reduction in the risk of flooding to many amenity assets in Salisbury including public rights of way, public access land and recreation grounds. We have designed a Scheme in consultation with stakeholders interested in greenspace and recreation to ensure that our new and improved footpaths and cycle routes link with the existing network and accommodate future proposals (e.g. the Radial Greenway 1).

The amenity value of the River Avon and its local environment within the city centre will be improved with high quality green space and a much-improved landscape along the river corridor.

We will create controlled access points at the river's edge to allow people to be near the water in a safe and enjoyable way and install information boards and benches along the river corridor.

The Scheme is designed to minimise impacts on landscape features of high value such as mature trees. Wherever possible, we will retain existing plants and trees to ensure the Scheme blends into the surrounding environment and we will plant many more trees than we need to fell.

However, there will be some negative impacts on pedestrians and cyclists during construction including restricted access to parts of the river corridor, and temporary closure of parts of Fisherton Recreation Ground and Ashley Road Open Space. Some temporary and permanent diversions of footpaths and cycleways (including part of the National Cycle Network) will be needed, and some of these will cross new bridges and the new flood defence embankment.

We have identified measures to minimise disruption to recreational users and we will continue to consult those affected through to the end of construction of the Scheme.

Landscape and visual amenity

While the Scheme is being built, there will be temporary changes to the landscape as some vegetation and trees will need to be cut down and there will be construction machinery and plant present, as well as earthworks being carried out in the Scheme area.

Once the Scheme has been built, the landscape in the Scheme area will look noticeably better than at present, particularly in the Ashley Road area where there will be a new river channel and new wetland wildlife area surrounded by new boardwalks, footbridges and other amenities such as picnic areas. Views for those using the existing or diverted footpaths and cycleways will also be improved in the long-term. There will however be a long-term change in view for those living in one private house as a result of a new flood wall.

Visualisations (i.e. images) of what the Scheme will look like when built from three viewpoints are presented in Figures 5, 6 and 7 at the end of this Non-technical Summary.

Wildlife

We have designed a Scheme that will create new and improved areas for wildlife (including fish), as follows:

- at Fisherton Recreation ground we will create a new channel for the Summerlock Stream that will be longer than that filled in at Fisherton Recreation Ground, and we will create new wetland habitat including wet woodland;
- we will remove barriers (e.g. Swimming Pool Gate) in the River Avon and Summerlock Stream to improve passage for eels and other fish, including those species that migrate along the river to breeding grounds;
- we will widen the River Avon corridor through The Maltings and Central car park area and establish a multi-stage channel which incorporates a variety of depths and gradients, to maximise the diversity of wetland habitat for wildlife.

These new and improved habitats will be in keeping with the surroundings, and have been carefully designed to improve habitat connectivity and biodiversity. Although we have designed the Scheme to avoid affecting wildlife wherever possible, the Scheme is likely to result in the permanent loss of up to 110 mature trees although these will be replaced with over 600 new trees. The Scheme will replace some of the amenity grassland at Fisherton Recreation Ground with better wildlife habitats in the longer term. Overall, we have estimated that the Scheme will provide a 14% gain in 'nationally important' river habitat and a 1.4% gain in other habitats (i.e. woodland and grassland). We will also create 445m of new native hedgerow with trees within the Maltings and Central Car Park area.

There are legally protected species which are known to use the Scheme area including nesting birds, bats that use the trees along the river corridor for foraging and potentially roosting, water voles that have burrows in the banks of the River Avon and otters. We have therefore included measures to avoid or minimise risks to these species. We will use good practice procedures for working near water to prevent pollution that could affect

wildlife or their habitats. Prior to construction of the widened river corridor in the Maltings and Central Car Park area, we will harmlessly trap water voles in this area and relocate them to another suitable wetland habitat site.

Following completion of construction of the Scheme, the new and improved wetland and woodland will mature and will provide improved foraging areas for water voles, otters, bats and birds, as well as benefitting many other species.

We have produced a Habitat Regulations Assessment to specifically assess the impacts of the Scheme on the River Avon Special Area of Conservation, an internationally designated site for nature conservation. This concluded that any significant negative effects on the conservation site, notably the watercourses and their characteristic vegetation and fish (Atlantic salmon, Brook lamprey and Bullhead) can be avoided through management measures. These include restricting works in the river and streams to summer months to protect fish spawning and applying best practice to minimise pollution. A five year monitoring plan will be developed with Natural England to monitor changes to the qualifying features of the SAC and the success of the newly created wetland habitat adjacent to it, with triggers for remedial actions should they be needed.

Invasive non-native weed species are present within the Scheme area. A management plan for Nuttall's waterweed and giant bramble will be agreed prior to construction to avoid the spread of these and, where appropriate, to remove them from areas affected by the Scheme.

Water

The Scheme is expected to benefit the River Avon by improving its water quality and allowing the river to function more naturally, especially as a result of removing some river structures to improve fish passage and in-channel habitat.

During construction there will be temporary increases in erosion resulting in sediment input to the River Avon, Summerlock Stream and Mill Stream. There is also potential for accidental pollution of these rivers and of underlying groundwater during construction. Our contractors will therefore follow strict guidance to avoid causing pollution, especially when working in or near the river channels. Landscaping and re-planting to stabilise soils will be undertaken as soon as possible following earthworks, to minimise the risk of increased sediment in the river.

Historic environment

The Scheme will reduce flood risk to various sites of historical interest including Listed Buildings. It will also benefit the historical environment through improved views and landscaping.

During construction, there will be negative effects and/or changes to the setting and historical context of the Grade II 'Salisbury Generating Station' Listed Building and two Conservation Areas (Salisbury and Stratford-sub-Castle Conservation Areas). These changes will result from tree removal and from in-channel modifications including reduced water flow within the historically valued Mill Stream and River Avon. We will manage these impacts through sensitive design of the Scheme in consultation with the Wiltshire Council Conservation Officer and ensure all finishes, materials and landscaping are sympathetic to the historical and architectural interest of the Scheme and surrounding area.

Traffic and transport

As with most projects of this nature, there will be some temporary traffic disruption resulting from construction related traffic and site access, with associated delays for other road users.

We will manage this transport disruption and increased traffic flows through measures described in the Environmental Action Plan, which will be finalised in consultation with the highway authorities and monitored during the works. We will plan deliveries in advance, keeping the roads clean and providing temporary signage to minimise disruption and maintain access as far as possible during construction.

There will also be a temporary loss of 317 car parking spaces (mainly in the Long Stay Central Car Park).

Following construction most parking will be reinstated but 115 spaces on the eastern edge of the Long Stay Central Car Park and all 39 spaces in the Millstream Car Park will be lost permanently. These account for 17% of the available car parking across the long-stay component of these car parks. As the average occupancy rate of these combined car parks is 29% a permanent reduction of 17% is not expected to be significant.

The layout of the Millstream Coach Park area will be altered by the Scheme and agreed in discussion with Wiltshire Council and interested parties. There will be a small reduction in area compared with the existing coach park but this will not affect the number of coaches that currently use the coach park. Once construction is complete, the modified coach park will be at a reduced risk of flooding.

The completed Scheme will help protect the highway network through reduced incidents of flooding and reduced disruption for those living and working in Salisbury.

Sustainable use of land

The Scheme will benefit geology and soils by reducing the risk of flooding of potentially polluted land.

During construction of the Scheme, there will be localised compaction of soil and changes in ground conditions as a result of temporary land use requirements. These impacts will be minimised by constructing the Scheme during drier summer months.

It is planned that some of the soil from digging the widened river channel will be re-used to raise the Millstream Coach Park to minimise the need for export and import, but this is subject to further assessment to ensure the soil is suitable and will not present a risk to human health or the environment.

There is some potential for excavation works to disturb contaminants in previously developed or disturbed areas, which could lead to pollution. Further investigation is planned to identify, assess and manage any such risks. This might include lining the new Summerlock Stream channel and wetland area to minimise any movement of contaminants if these are confirmed.

All of these soil control measures will be detailed in our Environmental Action Plan, which will be agreed before the start of construction.

Air quality

Construction activities are not anticipated to significantly affect local air quality although there will be some temporary dust deposition and locally elevated vehicle exhausts.

Where elevated dust levels arise, these will be managed to ensure that there are no significant impacts on people or wildlife.

Our Contractor will be required to operate vehicles with low emissions of nitrogen oxides. Our Environmental Action Plan will include a section specifically on dust management.

Following construction there will be very few traffic movements resulting from the Scheme, related only to periodic inspection and maintenance, which will not affect local air quality.

Sustainability, carbon and climatic factors

The construction of a new channel and wetland wildlife area in the Ashley Road area will produce approximately 3,600m^3 of excavated materials. In order to minimise the need for export and import, with associated emissions from vehicles, we plan to re-use some of this excavated material when building the new flood defence embankment. Similarly we estimate that approximately 12,000m^3 will be dug out from the Maltings and Central Car Park area when widening the River Avon corridor and again we will re-use some of this material (approximately 12%) to raise the adjacent coach park. Where we excavate gravel we will re-use the majority for channel improvements within the Scheme (with the remainder transported off site for re-use elsewhere).

We have incorporated environmentally sustainable techniques and materials into the design of the Scheme, for example sustainable timber and recycled steel for use in new bridges. Our design has sought ways to be as sustainable as possible, improving access to the river corridor, re-naturalising the rivers and streams, as well as mitigating any potentially negative effects that could result from the Scheme. Throughout construction our Contractor will plan the works to ensure the sustainable and minimal use of new resources and the minimisation and appropriate disposal of wastes.

Over 600 new trees will be planted as part of our landscaping proposals. All the landscaping has been carefully selected to ensure that it is resilient to future climate change. For example, we will plant grass mixes that can cope with more frequent flooding, and trees that are typically found in flooded areas (as well as being local to Salisbury).

Cumulative Impacts

We have assessed the cumulative impacts of the Scheme (i.e. those effects that may result from a combination of several projects or plans or may result from the combination of various activities associated with the Scheme).

Some future phases of the Salisbury River Park Masterplan, activities in Wiltshire Council's Central Area Framework and a re-development project at 141 Castle Street could have effects that both negatively and positively interact with the Scheme, especially if the timing of construction overlaps. We will consider any potential effects further, during the detailed design of the Scheme, as details of the other projects become available. If needed, we will take measures to avoid or reduce any negative effects. This could include continuing to talk to the developers to ensure sensitive phasing and planning of works, using good practice measures such as maintaining tidy construction sites and the use of screening to limit visual intrusion. The Scheme and all other projects will have their own Construction Codes of Practice and management plans that will need to be followed.

Conclusions

The completed Scheme will result in significant beneficial impacts to the local community by reducing flood risk to properties, businesses, roads and recreational areas. It will also provide an improved river corridor for both people and nature within a built up city centre. Our design not only reduces flood risk to people and property but helps to restore the naturalness of the River Avon, provides new and improved wildlife habitat and enhances the local landscape and views.

Figure 5: View 1: Fisherton Recreation Ground

Figure 6: View 2: River Avon from Swimming Pool Gate

VIEWPOINT 2: VIEW SOUTH-WEST DOWN RIVER AVON FROM SWIMMING POOL GATE BRIDGE
PHOTOGRAPH OF EXISTING VIEW

VIEWPOINT 2: VIEW SOUTH-WEST DOWN RIVER AVON FROM SWIMMING POOL GATE BRIDGE
ILLUSTRATIVE VISUALISATION OF PROPOSED VIEW (YEAR 15, SUMMER)

NOTES
- For Central Car Park / Moltings Landscape Masterplan, see Dwg: ENVRESW002033-CH2-LL-3CC-DR-L-4608.

JACOBS

Environment Agency

SALISBURY RIVER PARK
PHASE 1

FIGURE 8.8
ILLUSTRATIVE VISUALISATION
VIEWPOINT 2
R. AVON FROM SWIMMING POOL GATE

S4

DO NOT SCALE

P01

ENVIMSW002033-CH2-LL-3CC-DR-L-4613

Figure 7: View 3: River Avon from Mill Stream Approach Bridge

ATKINS

Member of the SNC-Lavalin Group

Salisbury River Park Phase 1 Scheme

Water Environmental Regulations Assessment update in Detailed Design

Environment Agency

23 February 2022

ENVIMSW002033-ATK-00-300-RP-EN-000001

Notice

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This document has 55 pages including the cover.

Document history

Document title: Water Environmental Regulations Assessment update in Detailed Design

Document reference: ENVIMSW002033-ATK-00-300-RP-EN-000001

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
1.0	Draft for client review	CK	KS	SM	SR	23/02/2022

Client signoff

Client	Environment Agency
Project	Salisbury River Park Phase 1 Scheme
Job number	5206632
Client signature/date	

Contents

Tables

Figures

1. Introduction

1.1. Background

The Environment Agency (EA) are working in partnership with Wiltshire Council, to implement river corridor improvements in the centre of Salisbury as part of the wider Salisbury River Park masterplan. This forms part of the Central Area Framework developed by Wiltshire Council. Proposed works that comprise Phase 1 of the River Corridor Improvements of the Salisbury River Park, are hereafter referred to as 'the Scheme'.

Jacobs (2021) completed a version of the Water Environment Regulations compliance assessment report (formerly known as a Water Framework Directive (WFD) compliance assessment) for earlier stages of Phase 1 of the Scheme as part of the EIA process. The Water Environmental Regulations (WER) compliance assessment outlined here includes an updated assessment section (Section 5 from the original WER assessment) of the Scheme only. This provides an update on the main assessment part of the previous WER assessment to reflect the details developed in the detailed design phase of the project recognising that the main scheme elements have been taken forward into the detailed design. This approach has been agreed with the Environment Agency. Details of the detailed design drawings are provided in the table below (Table 1-1).

Table 1-1 - Description of detailed design drawings used in the WER update

Drawing reference	Description
Ashley Road Summerlock Stream Channel Plan **Drawing number: ENVIMSW002033-ATK-00-3AR-DR-C-000048**	The plan includes a new 315m reach of the Summerlock Stream. The plan includes the new stream and additional channel connections to the existing wetland ditch habitat that will be retained. Additionally, it also includes a backwater feature off the new stream as well as a beach area with gravel bed and banks. Further downstream, there is a new feed supply pipe integrated to abandoned Blackwell hatches, with a headwall and vertical sluice control. The new 600 diameter pipe will be installed at the existing sluice. A primary and secondary defence wall has been detailed in addition to a flood defence embankment the Ashley Road – allotment garden side.
Central Car Park Millstream Berm Typical Detail **Drawing number: ENVRIMSW002033-ATK-00-3CC-DR-C-000004**	Drawing details sectional elevation of new berms on the Mill Stream. Section A presents the existing river-bank or wall, with infill of coarse gravels, cobles and maintained open channel width. Section B presents the typical plan, showing variation in level and infill height. It also presents the direction of river flow (to the right). Section C showcases the direction of flow and the secondary berm length, and the location of the locally sourced material.
Central Car Park Control Weir Structure **Drawing number: ENVIMSW002033-ATK-00-3CC-DR-C-000014**	Drawing details the control structure and associated infrastructure.
Central Car Parking General Arrangement plan Sheet 01 of 06 **Drawing number: ENVIMSW002033-ATK-00-3CC-DR-C-000080**	Drawings detail the River Avon near the Millstream approach road, with the location of the Waitrose culvert. Proposed local ground raising with a slope of 1 in 5.
Central Car Parking General Arrangement plan Sheet 02 of 06 **Drawing number: ENVIMSW002033-ATK-00-3CC-DR-C-000081**	Continued from 01 drawing. Presents the river Avon diverging to Mill Stream and the River Avon through the weir structure. Around the weir structure demonstrates the reprofiled river channel, existing off take structure to be demolished and the replacement and relocations of the footbridge. The 900 diameter twin drainage pipes from open ditch outfall into the

	River Avon are presented. Mill stream shows the proposed berm structure.
Central Car Parking General Arrangement plan Sheet 03 of 06 **Drawing number: ENVIMSW002033-ATK-00-3CC-DR-C-000082**	Continuation of 02, presenting the River Avon and the five weir structures. To the left the drawing showcases the proposed floodway inlet structure and proposed ground raising, and the proposed realignment of the Waitrose culver twin pipe.
Central Car Parking General Arrangement plan Sheet 04 of 06 **Drawing number: ENVIMSW002033-ATK-00-3CC-DR-C-000083**	Continuation of 03, showing the proposed reprofiled river channel; on the River Avon. Mill stream is shown with the existing riverbanks and the assessment locations for infill of low spots and basic repairs.
Central Car Park Avon River General Arrangement Sheet 02 of 03 **Drawing number: ENVIMSW002033-ATK-00-3CC-DR-RE-000002**	Further plan view of the River Avon and the weir structures. Details include new stone rock weir with a low flow notch for fish passage, and the potential for two additional weirs to be included that are not shown on the drawing. Proposed floodway inlet structures are shown, with the 900-diameter twin Waitrose outfall pipes. The Avon also showcases a proposed river corridor incorporating a widened two-stage river channel and vegetated berms.
Central Car Park Millstream Berms General Arrangement Plan Sheet 01 of 02 **Drawing number: ENVIMSW002033-ATK-00-3CC-DR-RE-000004**	Drawing details berm locations on Millstream.
Overview plan **Drawing number: ENVIMSW002033-ATK-00-300-DR-C-000001**	Drawing showcases overall scheme, with a zoomed-out perspective. It presents the Ashley Road general arrangement, with reinforced concrete flood defence wall locations, cycle and footpaths, and proposed Summerlock offtake. It also shows the central car parking general arrangement, with proposed weir structures, Waitrose culverts and proposed floodway inlet and culvert.

This updated Water Environment Regulations compliance assessment report will be presented by developing a set of tables which demonstrate the results of the previous WER assessment and comparing this directly to the updated detailed design assessment. Any changes that have been noted have been assessed accordingly. The updated assessment finally offers a view on compliance of the Scheme to the WER regulations. The overall Scheme location plan and map is presented below in Figure 1-1.

Figure 1-1 - Map location of the Scheme. Detailed design drawing: Salisbury River Park ENVIMSW002033-ATK-00-300-DR-C-000001

N

Millimetres 0 10 100

ASHLEY ROAD GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3AR-DR-C-000032

PROPOSED SUMMERLOCK OFFTAKE CHANNEL

WATER WAY APPROX 800mm ABOVE PROPOSED SUMMERLOCK OFFTAKE CHANNEL

ASHLEY ROAD GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3AR-DR-C-000034

PROPOSED VEHICLE ACCESS RAMP

ASHLEY ROAD GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3AR-DR-C-000033

RIVER AVON

RETAINING WALL

FOOTBRIDGE

PROPOSED EMBANKMENT

PROPOSED VEHICLE ACCESS RAMP

REINFORCED CONCRETE FLOOD DEFENCE WALL

PROPOSED PEDESTRIAN ACCESS RAMPS

ASHLEY ROAD GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3AR-DR-C-000037

ACCESS RAMPS FOR CYCLE PATH AND FOOTPATH

SECONDARY FLOOD DEFENCE WALL

ASHLEY ROAD CONTROL STRUCTURE

ASHLEY ROAD GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3AR-DR-C-000035

ASHLEY ROAD

ASHLEY ROAD GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3AR-DR-C-000036

CHURCHILL WAY WEST

CENTRAL CAR PARKING GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000080

PROPOSED LOCAL GROUND RAISING TO INFILL LOW SPOT IDENTIFIED ALONG RIVER BANK,

CENTRAL CAR PARKING GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000081

PROPOSED FLOODWAY INLET

PROPOSED FLOODWAY CULVERT

PROPOSED HEADWALL

PROPOSED CONTROL WEIR STRUCTURE

WILTON ROAD

COACHPARK

CENTRAL CAR PARKING GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000084

PROPOSED ROCK WEIR ON A CONCRETE FOUNDATION SLAB, WITH LOW FLOW NOTCH FOR FISH PASSAGE

CENTRAL CAR PARKING GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000082

PROPOSED WAITROSE CULVERT HEADWALL

CENTRAL CAR PARKING GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000085

CENTRAL CAR PARKING GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000083

STEYNINGS HOUSE GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000085

CONTINUED IN LEFT ABOVE

CONTINUED FROM RIGHT BELOW

MALTINGS FISH PASS GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000093

-- 000001 PLAN

SCALE 1:2000

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

MAINTENANCE/CLEANING

DECOMMISSIONING/DEMOLITION

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN m AOD UNLESS OTHERWISE SPECIFIED.

KEYS:

- RIVER CENTRE LINE
- PROPOSED WAITROSE CULVERT
- PROPOSED CHANNEL
- PROPOSED EMBANKMENT
- ACCESS RAMP
- EXISTING WATERCOURSE
- PROPOSED WATERCOURSE
- RIVER BERM

50m 0m 50m 100m

Scale 1:2000

DRAFT

Rev.	Date	Description	By	Chk'd	App'd
P01	13.01.2022	FOR REVIEW	MN	DK	SR

Drawing Status: FOR REVIEW

Suitability: S3

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Client: Environment Agency

Project Title: SALISBURY RIVER PARK

Drawing Title: OVERVIEW PLAN

Scale	Drawn	Checked	Reviewed	Authorised
AS SHOWN	MN	DK	SSK	SR
Original Size: A1	Date: 13/01/2022	Date: 13/01/2022	Date: 13/01/2022	Date: 13/01/2022

Drawing Number: ENVIMSW002033-ATK-00-300-DR-C-000001

Revision: P01

USER: magr7853
Date: 13/1/22 23:19:02
Filename: C:\powerbi\drawings_cds_uk\401208716\ENVIMSW002033-ATK-00-300-DR-C-000001.dwg

1.2. Baseline assessment

The Scheme is located within the Avon Hampshire operational catchment, located within the South-West River Basin District. The EA's Catchment Data Explorer (2022) was used to assess surface and groundwater bodies present within the Scheme's red-line boundary area (see Figure 1-1), and nearby upstream and downstream water bodies which have the potential to be associated with the scheme.

1.2.1. Surface water bodies

A summary of the identified surface water bodies and classifications within the red-line boundary and those upstream and downstream are presented in Table 1-2. The Hampshire Avon (Upper) d/s Nine Mile River confluence (GB108043022352) and Hampshire Avon (Lower) (GB108043022351) are assessed water bodies.

The Hampshire Avon (Upper) u/s Nine Mile (GB108043022351) and Nine Mile River (GB108043022360) are upstream water bodies of the Hampshire Avon Upper. These converge to become the Hampshire Avon (upper) near Bulford, more than 20 km upstream of the Scheme, and thus will not be impacted by it. Therefore, these water bodies are scoped out of any further assessment.

Table 1-2 - Summary of WFD surface water body classifications

Name	Type	Water body ID	Catchment Area (km^2)	Overall Status Cycle 2	Hydromorphological Designation
Hampshire Avon (Upper) d/s Nine Mile River confluence	River	GB108043022352	82.901	Moderate	Not designated artificial or heavily modified
Hampshire Avon (Lower)	River	GB108043015840	124.239	Moderate	Not designated artificial or heavily modified
Hampshire Avon (Upper) u/s Nine Mile River confl Water Body	River	GB108043022351	109.754	Moderate	Not designated artificial or heavily modified
Nine Mile River	River	GB108043022360	39.32	Moderate	Not designated artificial or heavily modified

1.2.2. Groundwater bodies

The groundwater body underlying the Scheme is the Upper Hampshire Avon Water Body (GB40801G806900). A summary of the groundwater body is provided in Table 1-3. The overall status of the groundwater body is poor, due to 'Agricultural and rural land management'. The Scheme sits on a principal bedrock aquifer.

Table 1-3 - Summary of WFD groundwater body classifications

Name	Type	Water body ID	Catchment Area (km^2)	Overall Status Cycle 2	Hydromorphological Designation
Upper Hampshire Avon Water Body	Groundwater body	GB40801G806900	1569.156	Poor	Not applicable

1.3. Baseline Screening

1.3.1. Surface Water screening

The two water bodies carried forward for screening include the Hampshire Avon (Upper) d/s Nine Mile (GB108043022352) and Hampshire Avon (Lower) (GB108043022351) due to the proposed works on the channel and surrounding areas. The WFD status for the surface water bodies are summarised in Table 1-4.

Table 1-4 - WFD Summary for the Hampshire Avon (Upper) d/s Nine Mile and Hampshire Avon (Lower) water bodies

Water Body Name	Hampshire Avon (Upper) d/s Nine Mile		Hampshire Avon (Lower)	
Water Body ID	GB108043022352		GB108043022351	
Hydromorphological Designation	Not designated artificial or heavily modified		Not designated artificial or heavily modified	
Classification (2019 Cycle 2)	Moderate		Moderate	
Overall water body	Moderate		Moderate	
Classification	2019 Cycle 2	Objectives	2019 Cycle 2	Objectives
Ecological	Moderate	Good (2021)	Moderate	Good (2021)
Biological quality elements	Moderate	Good (2015)	Moderate	Good (2021)
Macrophytes and Phytobenthos	Moderate	Good (2015)	Moderate	Good (2021)
Fish	High	Good (2015)	Moderate	Good (2015)
Invertebrates	High	High (2015)	High	High (2015)
Hydromorphological supporting elements	Supports Good	Supports Good (2015)	Supports Good	Supports Good (2015)
Physico-chemical quality elements	Good	Good (2021)	Good	Good (2015)
Acid Neutralising Capacity	NA		High	Good (2015)
Ammonia (Phys-Chem)	High	High (2015)	High	High (2015)
Biochemical Oxygen Demand (BOD)	NA		NA (High in 2016)	
Dissolved Oxygen	High	High (2015)	High	High (2015)
pH	High	Good (2015)	High	Good (2015)
Phosphate	Good	Good (2021)	Good	High (2027)
Temperature	High	Good (2015)	Good	Good (2015)
Specific pollutants	High	Not assessed	High	High (2015)
Chemical	Fail	Good (2015)	Fail	Good (2015)
Priority substances	Good	Does not require assessment	Fail	Good (2015)
Other pollutants	Does not require assessment		Good	Good (2015)
Priority hazardous substances	Fail	Does not require assessment	Good	Good (2015)
Reasons for not achieving good Status (RNAG) (2019)	Agriculture and rural land management, Water Industry		Agriculture and rural land management, Water Industry	
Linked Protected Areas**	Special Area of Conservation		Special Protection Areas, Special Area of Conservation	

1.3.2. Groundwater Screening

The groundwater body carried forward for screening was the Upper Hampshire Avon Water Body (GB40801G806900) due to the proposed works on the channel and surrounding areas. The WFD status for the groundwater body is summarised in Table 1-5.

Table 1-5 - WFD Summary for the Upper Hampshire Avon Water Body

Water Body Name	Upper Hampshire Avon	
Water Body ID	GB40801G806900	
Classification (2019 Cycle 2)	Poor	
Classification	2019 Cycle 2	Objectives
Overall water body	Poor	Poor (2015) – unfavourable balance of cost and benefits
Quantitative	Good	Poor (2015) – unfavourable balance of cost and benefits
Quantitative status element	Good	Poor (2015) – unfavourable balance of cost and benefits
Saline intrusion	Good	Good (2015)
Water Balance	Good	Good (2015)
GWDTEs test	Good	Good (2015)
Dependant surface water body status	Good	Poor (2015) – unfavourable balance of cost and benefits
Chemical	Poor	Good (2027)
Chemical status element	Poor	Good (2027)
Drinking water protected areas	Poor	Good (2027)
General chemical test	Poor	Good (2027)
GWDTEs test	Good	Good (2015)
Dependant surface water body status	Good	Good (2027)
Saline intrusion	Good	Good (2015)
Reasons for not achieving good Status (RNAG) (2019)	Agriculture and rural land management	

2. Water Environment Regulations Assessment

2.1. Step 1: Potential generic operational impacts of the proposed Scheme on the hydromorphological quality elements

The Environment Agency has previously developed a list of potential hydromorphological pressures and impacts that proposed Schemes may cause. This was detailed in the original WER for Salisbury River Park Phase 1 (Jacobs, 2021) and relevant elements for the Scheme are shown in Table 2-1 and carried forward to the site-specific assessment in section 3. There are no changes to potential generic operational impacts as a result of the updates in the detailed design assessment, and thus this table is replicated from the previous assessment.

Table 2-1 - Pressures and potential hydromorphological consequences for works to water bodies Replicated from Jacobs (2021)

Pressure	Sub pressure	Potential Impacts
Freshwater - Defence (linear flood defence)	Embankment	Reduced morphological diversity. Loss of shading associated to riparian zone. Loss of floodplain ecology associated with connectivity. Reduction /prevention of sediment input. Reduction/prevention of channel in/outflow. Increase in channel bank-full capacity.
Freshwater - Channel/ watercourse	Watercourse alteration	Reduced morphological diversity. Headward migration. Regrading. Increased sediment supply downstream. Destabilisation of downstream bed and banks. Siltation downstream. Loss of shading associated to riparian zone.
Freshwater - Channel/ watercourse	Bed protection	Reduced morphological diversity. Increased sediment supply downstream. Destabilisation of downstream bed and banks. Siltation downstream
Freshwater – online structure	Culvert	Increased sediment supply downstream Destabilisation of downstream bed and banks
Freshwater – point structure	Sluice, pipe, inlet, outlet, off-take, for example	Increased sediment supply downstream. Destabilisation of downstream bed and banks.

2.2. Step 2: Site specific assessment of the proposed Scheme against biological, physico-chemical and hydromorphological quality elements

Table 2-2 and 2-3 provided in this section detail a site-specific assessment of the Scheme against biological, physico-chemical and hydromorphological elements for the Hampshire Avon (Upper) water body. Table 2-2 (Ashley Road area) and Table 2-3 (The Maltings and Central Car Park area) comprise of previously identified pressures as mitigations against quality elements, and an updated assessment, inclusive of the detailed design aspects.

The key for the table is presented below.

Key:

Positive change	Negligible	Negative	No change

Table 2-2 - Impact assessment for Ashley Road area from the previous assessment, and the updated assessment post detailed design

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
New flood defence embankment and flood wall	**Negligible**	**Invertebrates and macrophytes:** Loss of terrestrial habitat and substrate under footprint. Subsequently a potential loss of detrital inputs utilised by aquatic receptors such as woody debris and leaf litter that was previously provided by any overhanging vegetation removed from footprint.	N/A	New flood defence embankment and flood wall	Negligible	**Invertebrates and macrophytes:** No additional change has been made to the Scheme to impact invertebrates and macrophytes. Therefore, previous quality impacts apply.	N/A
	No change	**Structure of riparian zone:** Overall, no change. The presence of the embankment alters the morphological form of the riparian zone but is being designed to give a natural appearance which will also mimic some natural habitat diversity.			No change	**Structure of riparian zone:** No change has been made to the Scheme to impact the structure of the riparian zone. Therefore, previous quality impacts apply.	
	No change	**Quantity and dynamics of flow and water levels.** No significant change. Reduces uncontrolled flood flows onto the surrounding area as a consequence of retaining walls.			No change	**Quantity and dynamics of flow and water levels.** No change has been made to the Scheme to impact quantity and dynamics of flow and water levels. Therefore, previous quality impacts apply.	

	Negligible	**Water quality and levels**: Potential minor improvement in water quality within the watercourse if surface water carries pollutants e.g. by running off road surfaces; reduced urban flood risk will reduce associated water contamination	N/A		Negligible	**Water quality and levels**: No change has been made to the Scheme to impact water quality and levels. Therefore, previous quality impacts apply.	N/A
During construction:	**Negligible**	Potential sediment remobilisation during works resulting in potential deterioration in quantity and quality to species alongside river channel. Temporary localised potential impact.	All pollution to be controlled under current legislation and best practice. Safeguards to be put in place to reduce the likelihood of sediment plumes and silt in the channel. Will require a Surface Water / Sediment Management Plan	During construction:	Negligible	No additional change has been made to the Scheme to impact potential sediment re-mobilisation. Therefore, previous quality impacts apply.	Previous quality control measures remain unchanged and need to be incorporated into the Construction Environmental Management Plan (CEMP). Measures identified in the Designers Risk Assessment will also need to be reviewed.
	Negligible	Embankments may require plant tracking/movement along the floodplain corridor, potentially damaging habitat within the riparian corridor.	Potential indirect impacts from construction stage of the development can be managed and no likely significant effects are anticipated on the water environment.		Negligible	No additional change has been made to the Scheme to impact riparian corridor damage. Therefore, previous quality impacts apply.	Previous quality control measures remain unchanged and need to be incorporated into the (CEMP). Measures identified in the Designers Risk Assessment will also need to be reviewed.

River Avon and Summerlock Stream – infilling of channel, creation of new channel, and inclusion of control structure	**No change**	**Fish:** Potential current fish migration in existing Summerlock, which is unlikely to change with the Scheme because the replacement channel will provide an (improved) opportunity for fish migration. Potential detrimental effects in Summerlock Stream should there be lowered flows as a result of the new offtake structure.	Incorporate fish-friendly control structure modification. Channels designed to facilitate fish passage during low flows and maintain sediment continuity. Need to ensure flow splits are properly accounted for. A range of instream, marginal and riparian enhancements will be introduced to generate new heterogenous habitat to benefit a range of species, including salmonids.	River Avon and Summerlock Stream – infilling of channel, creation of new channel and inclusion of control structure	Positive	**Fish:** The new Summerlock Stream will be free flowing (take off area is now a freely flowing section of channel compared to the previous structure) and as a result will offer a totally new section of stream and associated habitat benefits and thus will offer significant improvements to fish and migration when compared to the existing situation. A new 600mm diameter pipe will be installed at the existing sluice at the Blackwell hatches, with the feeder pipe integrated into the new crossing to provide a sweetening flow at this location. The existing quality elements surrounding low flows and fish migration will be enhanced as a result of the new reach of stream.	Previous control measures have been addressed in detailed design.
	No change	**Invertebrates:** Loss (most likely by displacement) of habitat/footprint for invertebrates where infill occurs including species dependent on wetting regime at the existing channel margin will be mitigated by colonisation of the replacement	A range of instream, marginal and riparian enhancements will be introduced to generate new		Positive	**Invertebrates:** New measures to the Summerlock Stream mentioned above will additionally offer	Previous control measures have been addressed in detailed design.

		channel and margins. Overall, potential for better habitat development because of more natural structure and change in flow patterns. No change to status of Avon water body because of this particular Scheme element.	heterogenous habitat to benefit a range of species, including water crowfoot communities.			improvements to macro-invertebrate habitat.	
	No change	**Macrophytes:** Same as above. No change to status of Avon water body as a result of this particular Scheme element.			Positive	**Macrophytes:** New measures to the Summerlock Stream mentioned above will additionally offer improvements to macrophyte habitat.	
	No change	**Quantity and dynamics of flow:** No change to Avon other than no offtake to the Summerlock Stream.			**Positive**	**Quantity and Dynamics of flow:** New measures to the Summerlock Stream mentioned above will additionally offer improvements to the quantity and dynamics of flow. This is presented in the wetland habitat.	
	No change	**River depth and width:** Less change in channel width and depth in the Avon as variability prior to infill is a result of discharge into Summerlock Stream.			**Positive**	**River depth and width:** New measures to the Summerlock Stream mentioned above will additionally offer improvements to river depth and width.	
	No change	**Structure and substrate of river:** Better within main Avon channel as sediment is not entrained into the Summerlock Stream. Improved heterogeneity in sediment at this point but no overall benefit.	Scheme should promote variability in sediment size and substrate structure. Need to ensure flow splits are suitable.		**Positive**	**Structure and substrate of river:** New measures to the Summerlock Stream mentioned above will additionally offer improvements to the	Previous quality control measures remain unchanged.

						structure and substrate of the river.	
		Structure of riparian zone: Overall no significant change.			**Positive**	**Structure of riparian zone -** New measures to the Summerlock Stream mentioned above will additionally offer improvements to the riparian zone. Due to improvements from the new length of steam, backwater and wetland habitats, and an enhanced riparian zone. This includes amenity grass seed mix or species rich meadow seed.	
During construction:	**Negligible**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Fish rescue plan should be put in	During construction:	**Negligible**	No additional change to site elements of the River Avon and Summerlock Stream channel infilling, new channel creation and inclusion of control structure, except for a difference in flow dynamics due to the suggestion of a new pipe. However, due to minimal change, the disturbance to species within the river will remain impacted to the	Previous quality control measures remain unchanged, despite the slight change to weir construction due to the inclusion of the new pipe.

			place before construction.			same level, with a potential for disturbance and loss of species over a localised temporary event.	
New culvert on Summerlock Stream beneath the new embankment on the southern boundary of the recreation ground, adjacent to Ashley Road, to limit the passage of floodwater downstream.	**Negligible**	**Fish:** Direct effects due to change in habitat structure as well as impediment to fish passage. The culvert is eight metres long and a box culvert.	Bed of culvert can be designed to encourage fish passage through it – no steps in bed level; textured finish especially for smaller species; baffles / rest areas especially for species with slower swimming speeds and low burst distances	New culvert on Summerlock Stream beneath the new embankment on the southern boundary of the recreation ground, adjacent to Ashley Road, to limit the passage of floodwater downstream.	**Negligible**	**Fish**: Limited additional change has been made to the Scheme to impact fish populations except that the structure will have a natural embedment of 300mm of gravels. Therefore, the previous impacts generally still apply.	Embedment depth of 300mm of gravels have been added.
	Negligible	**Invertebrates and macrophytes:** Localised loss or displacement of species where channel becomes culverted. Numbers of macrophytes may deteriorate with change to the amount of river bed to be available for colonisation by macrophytes.			**Negligible**	**Invertebrates and macrophytes**: Limited additional changes have been made to the Scheme to impact invertebrates and macrophytes. The only change is that structure will have a natural	Embedment depth of 300mm of gravels have been added.

						embedment of 300mm depth of gravels and thus offer a marginal improvement. Therefore, generally previous impacts apply.	
	Negligible	**Channel width and depth:** Constrained and unnatural channel dimensions. Lack of natural channel form.	Consider baffles/deflectors to create semi-sinuous flow to naturalise artificial channel form.		**Negligible**	**Channel width and depth**: No additional change has been made to the Scheme to impact channel width and depth. Therefore, previous impacts apply.	Embedment depth of 300mm of gravels have been added.
	Negligible	**Structure and substrate of the river bed:** Culvert could cause localised silt to build up on the upstream of this structure, causing a decrease in the amount of fine sediment being transported downstream. Need to consider consistent bed levels and ensure sediment does not accrete.	Consider coarse bottom as substitute for a channel bed to trap sediment.		**Negligible**	**Structure and substrate of the river bed**: Limited additional changes have been made to the Scheme to impact structure and substrate of the river bed. The only change is that structure will have a natural embedment of 300mm depth of gravels and thus offer a marginal improvement. Therefore, generally previous impacts apply.	Embedment depth of 300mm of gravels have been added.

During construction:	**Negligible**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event. Potential for fish strandings during low flow if dewatering.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Fish rescue plan before construction takes place.	During construction:	**Negligible**	No additional changes to site elements around the new culvert for construction on the Summerlock stream. Therefore, previous impacts from construction still apply.	Previous quality control measures remain unchanged.
New wetland habitat including swales linked to Summerlock stream and ephemeral streams	**Positive change**	**Fish:** The creation of a new floodplain wetland will provide additional heterogenous habitat which will promote species richness and additional habitat for fish. However, migration to a wetland area may not be appropriate due to increased risk of stranding in shallow/ephemeral features.	Design to ensure no low points that could trap fish then dry out.	New wetland habitat including swales linked to Summerlock stream and ephemeral streams	**Positive change**	**Fish:** Along with the benefits stated previously the wetlands and linked channels have been designed to incorporate a gradient to the channel to reduce the chance of stranding.	A gradient has been incorporated in the wetland and connecting habitats to the channel to reduce the chance of stranding.
	Positive change	**Invertebrates and macrophytes:** Potential for localised change in plant communities and species populations. Additional areas to be used as habitat which improves overall diversity and abundance.			**Positive change**	**Invertebrates and macrophytes**: No additional change have been made to the Scheme to impact invertebrates and macrophytes. Therefore, previous benefits apply.	n/a

	Positive change	**River depth and width: I**ncreases the amount of floodplain restored to its natural function and facilitates natural processes. Sediment variability is likely to increase with additional floodplain connection, resulting in heterogeneous flow. Ephemeral channels will only be activated when water levels are higher. During low flow conditions, their 'channel' could become weathered out or degraded due to poorly defined channel form.			**Positive change**	**River depth and width:** No additional change have been made to the Scheme to impact river depth and width. Therefore, previous benefits apply.	.
	No change	**Quantity and dynamics of flow:** No change as a result of wetland habitat. No change as a result of ephemeral channels. Longer channel length, which is undated during higher flows, will contribute to variable quantity of flow. However, as this is only likely to be during winter, no change is likely overall.			**Positive change**	**Quantity and dynamics of flow:** No additional change has been made to the Scheme to impact quantity and dynamics of flow in the wetland area and therefore, previous benefits apply.	
	Negligible	**Structure and substrate of river:** Due to creation of ephemeral channels, potential for increased siltation, and therefore increased heterogeneity and geomorphic variability over time due to habitat development. Potential temporary increase in localised suspended sediment concentrations but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows. Ephemeral channels will likely degrade during summer months	Ensure distribution of sediments in ephemeral channel design is suitable to avoid bedload armouring and large source of fines to be re-activated during high flows.		**Negligible**	**Structure and substrate:** Impacts are largely the same as predicted previously although the detailed design has yielded a more natural channel design where change is anticipated but will add to the diversity of the habitat that evolves.	n/a

		where there is no water. Depending on sediment size distribution, there is likely to be a propensity for larger sized sediments unable to be transported until higher flows. Areas eroded out likely to have substantial deposits of fines.					
	No change	**Structure of riparian zone:** Potential for improvement with swales as they will improve morphological and hydrological diversity but overall, no change to water body status.			**Positive**	**Structure of riparian zone:** The structure of the riparian zone will improve because of this scheme. Thus while this won't be noticeable at a water body scale it will be at a local one.	n/a
	Negative	**Oxygenation:** Potential risk of deterioration, particularly in warmer conditions when shallower water heats up, and de-oxygenates in ephemeral areas of channel. Most of the year, no problem due to hydrological link with channel.			**Negligible**	**Oxygenation:** Levels will vary due to fluctuating water levels but as the wetlands and associated habitats are linked to the channel any changes are considered to be small. Channel, and marginal vegetation planting from amenity and meadow seed mixes have the potential to improve oxygenation, but only minimally and at a local scale.	n/a

During construction:	**Negligible**	**Water quality:** Potential temporary increase in localised suspended sediment concentrations but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows.	All works to be carried out in accordance with relevant current legislation and best practice. Surface water/Sediment management plan should be implemented. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.	During construction:	Negligible	**Water Quality**: No additional change has been made to the Scheme to impact water quality during construction. Therefore, previous impacts apply.	Channel to be cut in the dry and hence mobilisation of sediment is likely to be reduced.
	Negative	**Ecology (fish and invertebrates)**: Potential disturbance during construction, with localised but temporary disturbance to invertebrates, and on the adjacent floodplain. Working within or near the Avon channel could disturb fish presenting a temporary but localised risk to species within the channel. Noise is likely to be the biggest issue.			Negative	**Ecology (Fish and invertebrates):** No additional change has been made to the Scheme to impact ecology during construction. Therefore, previous impacts apply.	
Shingle beach, boardwalks and picnic areas adjacent to the new	**Negative**	**Hydromorphology – channel width and depth:** Depending on location, possible interruption to channel form and sediment transport due to introduction of artificial sediment sizes, and artificial structure. Likely to create	Needs to be suitable sediment size to avoid armouring of channel bed and re-transport.	Shingle beach, boardwalks and picnic areas adjacent to the new wetland habitat and	**Negative**	**Hydromorphology – channel width and depth**: No additional change has been made to the Scheme to impact hydromorphology.	The upper shingle beach is now set back from the channel to reduce recreational pressure, but the

wetland habitat and improved public access at selected points (e.g., two proposed river, viewing platforms)		scour pools if artificial in structure. Potential to over-deepen and over-widen channel depending on location. Potential for increased erosion at river margin by people and dogs.	Imported material should be geologically appropriate to a chalk river setting,	improved public access at selected points (e.g. two proposed river viewing platforms)		Therefore, previous impacts apply.	risk of impact remains.
	Negative	**Ecology: Deterioration of channel ecology:** Poor habitat (deterioration in quantity and quality), localised loss of species including invertebrates and macrophytes due to potentially constrained channel and loss of footprint. Potential increase in localised suspended sediment concentrations.			**Negative**	**Ecology**: Deterioration of channel ecology: No additional change has been made to the Scheme to impact ecology. Therefore, previous impacts apply.	The upper shingle beach is now set back from the channel to reduce recreational pressure, but the risk of impact remains.
	Negative	**Biological elements – fish:** Potential direct effects on biological quality elements due to change in habitat structure as well as impediment to fish passage (e.g. if any beach narrow or shallows the channel). Potential direct effects on biological quality elements due to change in habitat structure as well as impediment to fish passage (e.g. if any beach narrow or shallows the channel). This should facilitate fish passage upstream, therefore promoting diversity in fish fauna through increase in availability of upstream habitat, benefitting salmonids and other species.	Fish more likely to avoid this area		**Negative**	**Biological elements – Fish**: No additional change has been made to the Scheme to impact biological elements. Therefore, previous impacts apply.	The upper shingle beach is now set back from the channel to reduce recreational pressure, but the risk of impact remains.

	Negligible	**Physico-chemical:** Temporary changes to turbidity concentrations, light and water quality due to people and dogs easily able to enter the river channel.			**Negligible**	**Physio-chemical**: No additional change has been made to the Scheme to impact physico-chemical. Therefore, previous impacts apply.	
During construction:	**Negligible**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Any imported material to be clean. Avoid contamination/spread of invasive species (INNS)	During construction:	**Negligible**	No additional change has been made to the Scheme to create any additional disturbance to species within the river. Therefore, previous impacts of potential loss or disturbance of species from a localised and temporary event applies.	Previous quality control measures remain unchanged.
Localised ground raising or flood wall	**Negligible**	**Invertebrates and macrophytes:** Disturbance due to movement/loss of substrate via runoff towards watercourse.		Localised ground raising or flood wall	**Negligible**	**Invertebrates and macrophytes**: No additional changes have been made to the Scheme to impact invertebrates and macrophytes. Therefore, previous impacts apply.	
	No change	**Quantity and dynamics of flow and water levels.** No significant change. Reduced uncontrolled			**No change**	**Quantity and dynamics of flow**: No additional	

		flood flows onto the surrounding area as a consequence of retaining walls. This is acceptable as it prevents flooding.				change has been made to the Scheme to impact flow quantity and dynamics. Therefore, previous impacts apply.	
During construction:	**Negative**	**Water quality:** Working close to the channel, potential release of sediment and soil, presenting a temporary but localised risk to species within the channel during works. Potential deterioration due to high phosphate levels in the sediment/water column, which will be disturbed during construction. Potential temporary increase in localised suspended sediment concentrations but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Any imported material to be clean. Avoid contamination/spread of invasive species (INNS)	During construction:	**Negative**	No additional changes have been made to the scheme to create additional disturbance to water quality. Therefore, previous impacts apply.	Previous quality control measures remain unchanged.

Table 2-3 - Impact assessment for The Maltings and Central Car Park area from the previous assessment, and the updated assessment post detailed design.

WER Assessment in EIA				**Updated WER assessment in detailed design**			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
Widening of the channel to a maximum width				Widening of the channel is not			

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
of 50m, providing a two-staged channel with marginal wetland habitat on both banks.				occurring in the revised scheme			
Removal of Swimming Pool Gate structure, reprofiling of the bed and inclusion of rock ramps	**Positive change**	**Fish.** This should facilitate improved fish passage to any spawning grounds upstream of the weir and promote movement of resident fish species locally within this reach of the River Avon. This will benefit fish fauna including those migratory fish such as salmonid species.	Possible opportunities for habitat creation/ enhancement within pools and along structure of fish passage to further improve habitat diversity for a range of fish species.	Removal of Swimming Pool Gate structure, reprofiling of the bed and inclusion of rock ramps	**Positive change**	**Fish**: No significant changes have been made to the Scheme to impact the fish populations. Five weirs have been developed through detailed design assessment to make the fish pass function more effectively. Therefore, previous impacts apply.	Measures for enhancement were developed into the detailed design and this includes reduced number of weirs, removal of concrete in defined places and replacement with natural bed.
	Positive change	**Macrophytes and invertebrates:** Improvement in species richness and abundance as a result of improved connectivity. Also allows for change in habitat, and increased variability in a range of species. Potential loss of habitat and/or relocation of some species under footprint of rock ramps and any additional fish pass, if constructed. **Improvement in species diversity and**	Conditions could be improved in channel with inclusion of marginal berms to trap sediment and improve overall species richness. Potential to use bank around structure as additional habitat; planting of macrophytes as		**Positive change**	**Macrophytes and invertebrates**: No additional change has been made to the Scheme to impact the macrophytes and invertebrates. . Therefore, previous impacts apply.	Measures for enhancement were developed into the detailed design and this includes reduced number of weirs, removal of concrete in defined places and replacement with natural bed.

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
		abundance as a result of rock ramps which could act as a substrate for more diverse species; in addition, differing water depths and speeds also support increased diversity in habitat, and increased variability in a range of species.	marginal habitat to benefit all trophic levels within the ecological food web.				
	Positive change	**Channel form and flow:** Improvement due to variable morphology, replicating more natural channel form. Heterogenous flows improve oxygenation, reduces turbidity levels (reduced silt within the water column) and sediment transport, and therefore overall water quality.	Design should prevent over-engineered structure with little naturalness in the channel		**Positive change**	**Channel form and flow:** No additional change has been made to the Scheme to impact the channel form and flow. Therefore, previous impacts apply.	Measures for enhancement were developed into the detailed design and this includes reduced number of weirs, removal of concrete in defined places and replacement with natural bed.
	Positive change	**River width and depth variation:** The proposals could result in the river being returned to something closer to the river characteristics of a natural chalk stream with improved depth variation and heterogeneity in flows, dimensions and sediment. It is expected water levels will lower by up to 0.5 m.	Conditions could be improved in channel with inclusion of marginal berms to trap sediment and improve overall species richness		**Positive change**	**River width and depth:** No additional change has been made to the Scheme to impact the river width and depth.. Therefore, previous impacts apply.	Measures for enhancement were developed into the detailed design and this includes reduced number of weirs, removal of concrete in defined places and replacement with natural bed.

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
	Negligible	**Structure and substrate of the river bed:** Improved potential for transport of sediment of varying sizes. Increased heterogeneity – variable flow and sediment.	Implementation of sediment/surface water management plan. Imported rock/sediment must be geologically appropriate to a chalk river, clean and of suitable size.		**Negligible**	**Structure and substrate of the river bed:** No additional change has been made to the Scheme to impact the structure and substrate of the river bed. Therefore, previous impacts apply.	Measures for enhancement were developed into the detailed design and this includes reduced number of weirs, removal of concrete in defined places and replacement with natural bed.
	Negative	**Water quality:** Pollution from scour out of sediment resulting from additional flow passing down Mill Stream. Potential issue with historic phosphate loading in this sediment.	Implementation of surface water/sediment management plan. Additionally, sediment sampling will be conducted to evaluate the level of contamination that may be present in deposited material. This information will be used to assess the risks associated with any contaminants: monitoring of downstream water quality during the works may be		**Negative**	**Water quality**: Atkins (2021) demonstrates that whilst phosphorus concentrations are within expected ranges of agricultural lowland catchments, construction could mobilise sediment bound phosphorus, in addition to water release from the Avon sluice gate enabling transport. No additional changes have been made, therefore, previous impacts apply.	Sediment management measures will be adopted in the Construction Environmental Management Plan.

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
			implemented to avoid potential deterioration and consideration will be given to removal of fine sediment prior to construction activity.				
During construction:	**Negative**	Disturbance to species within the river at this point due to suspended sediment, working in the channel and noise; potential for disturbance or loss of species over a localised and temporary event. Potential for fish strandings during low flow if dewatering.	Fish rescue plan required. All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Implementation of sediment management plan during in-river works.	During construction:	**Negative**	No additional changes have been made to the scheme to create additional disturbance to species within the river. Therefore, previous impacts apply.	Sediment management measures will be adopted in the Construction Environmental Management Plan.
	Negative	**Ecology (fish and invertebrates)**: Potential disturbance during construction, with localised but temporary disturbance within the channel. Working within the channel will disturb fish presenting a temporary but localised risk to all species	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages		**Negative**	No additional changes have been made to the scheme to create additional disturbance to ecology within the river. Therefore, previous impacts apply.	Sediment management measures will be adopted in the Construction Environmental Management Plan.

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
		present. Potential for impact from construction noise/vibration.	and clean-up systems deployed if any spillage occurs. Implementation of surface water/sediment management plan. Avoid contamination/spread of invasive species (INNS)				
	Negative	**Macrophytes:** Disturbance/degradation during tracking of vehicles during in-channel construction activities.			**Negative**	No additional changes have been made to the scheme to create additional disturbance to macrophytes within the river. Therefore, previous impacts apply.	
	Negative	**Water quality:** Working within the channel, causing release of sediment if flow is maintained. Potential deterioration due to high phosphate levels in the sediment.			**Negative**	No additional changes have been made to the scheme to create additional disturbance to water quality within the river. Therefore, previous impacts apply.	
New twin culvert approximately 2.5m wide and 0.75m high extending over 100m from the River Avon main channel into Summerlock Stream, including	**No change**	**Water quality**. Floodway could cause localised silt build up on the upstream of this structure, causing a decrease in the amount of fine sediment being transported downstream. Need to consider consistent levels above the bed and ensure	Embankment slope angle might be locally steepened to allow this culvert to be short.	New twin culvert approximately 2.5m wide and 0.75m high extending over 100m from the River Avon main channel into Summerlock Stream, including	**No change**	No additional change has been made to the Scheme to water quality. Therefore, previous impacts apply.	Previous quality control measures remain unchanged.

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
inlet/outlet structures; and Extension of twin pipe culverts (each 0.9m in diameter) over a length of approximately 150m to move the outfall of the Waitrose culvert		sediment does not accrete.		inlet/outlet structures; and Extension of twin pipe culverts (each 0.9m in diameter) over a length of approximately 150m to move the outfall of the Waitrose culvert			
During construction:	**Negative**	Disturbance to species within the river at locations where culvert connections are made; potential for disturbance or loss of species over a localised and temporary event. Potential for fish strandings during low flow if dewatering.	All works to be carried out in accordance with relevant current legislation and best practice. Do not allow uncured concrete or concrete residue to enter either still or flowing water, either directly or indirectly through runoff. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.	During construction:	**Negative**	No additional changes have been made to the scheme to create additional disturbance to species within the river. Therefore, previous impacts apply.	Previous quality control measures remain unchanged and managed through the Construction Environmental Management Plan.
Modified layout of existing fish pass weirs at The Maltings by lowering the	**Positive change**	**Fish:** This should facilitate fish passage upstream, therefore promoting diversity in fish fauna through increase in availability of upstream		Modified layout of existing fish pass weirs at The Maltings by	**Positive change**	**Fish**: No additional change has been made to the Scheme to impact the fish	Previous quality control measures remain unchanged.

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
upstream crest level and making any necessary repairs to the structure.		habitat, benefitting salmonids and other species.		lowering the upstream crest level and making any necessary repairs to the structure.		populations. Therefore, previous impacts apply.	.
	Negligible	**Macro-invertebrates:** Improvement in channel connectivity allowing better movement of aquatic macro-invertebrates and connecting sub-populations up- and downstream. Potential localised loss or displacement of species beneath/near to structure.			**Negligible**	**Macro-invertebrates**: No additional change has been made to the Scheme to impact the macro-invertebrates. Therefore, previous impacts apply.	
	No change	**Hydromorphology and water quality.** Likely no change.			**No change**	**Hydromorphology and water quality**: No additional change has been made to the Scheme to impact the hydromorphology and water quality. Therefore, previous impacts apply.	
	No change	**Hydromorphology: sediment, form and water.** No significant change although depends where located with potential effects including: o Increased or reduced sediment supply downstream			**No change**	**Hydromorphology: sediment, form and water**: No additional change has been made to the Scheme to impact sediment, form and water hydromorphology.	

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
		o Destabilisation of downstream bed and banks where unprotected o Variability in upstream and downstream siltation.				Therefore, previous impacts apply.	
During construction:	**Negligible**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice. Do not allow uncured concrete or concrete residue to enter either still or flowing water, either directly or indirectly through runoff. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Sediment management plan implementation for in-channel works.	During construction:	**Negligible**	No additional changes have been made to the Scheme that would cause further species disturbance, therefore, previous impacts apply during construction.	Previous quality control measures remain unchanged and managed through the Construction Environmental Management Plan. .
	Negligible	**Water quality:** Working within or close to the channel, potential release of sediment and soil, presenting a temporary but localised risk to species within the channel during works. Potential deterioration due to high phosphate levels in the sediment/water column, which will be disturbed during construction.			**Negligible**	No additional changes have been made to the Scheme that would cause further water quality deterioration, therefore, previous impacts apply during construction.	
	Negligible	Disturbance to sediment on the channel bed could release fine sediment stored within the substrate currently. As this a legacy issue where pollutants are locked into the fine sediments, this may be difficult to control			**Negligible**	No additional changes have been made to the Scheme that would cause further sediment disturbance, therefore, previous impacts apply during construction.	

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
In-channel works to Mill Stream over an approximate 400m length to improve low flow conveyance	**Positive change**	**Fish fauna:** This should facilitate fish passage within the River Avon increasing connectivity between localised reaches/habitat and facilitating passage for those migratory species, such as Atlantic salmon.		In-channel works to Mill Stream over an approximate 400m length to improve low flow conveyance	**Positive change**	**Fish**: No additional change has been made to the Scheme to impact the fish populations. Therefore, previous impacts apply.	
	Positive change	**Macro-invertebrates:** Improvement in channel connectivity allowing better movement of aquatic macro-invertebrates both longitudinally (downstream drift) and laterally (connectivity of wetted channel with marginal areas) within the channel. Improvement in species richness as a result of differing water depths and velocities.			**Positive change**	**Macro-invertebrates**: No additional change has been made to the Scheme to impact the macro-invertebrates. Therefore, previous impacts apply.	
	Positive change	**Hydromorphology and water quality:** Improvement due to variable morphology, replicating more natural channel form. Heterogeneous flows improve oxygenation, reduce silt within the water column and sediment transport, and therefore overall water quality.			**Positive change**	**Hydromorphology and water quality**: No additional change has been made to the Scheme to impact the hydromorphology and water quality. Therefore, previous impacts apply.	
	Positive change	**River width and depth variation:** The proposals include creation of a low flow			**Positive change**	**River width and depth variation**: No additional change has	

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
		channel by introduction of suitable marginal material designed to work with local natural geomorphological processes, and could result in the river being returned to something closer to the river characteristics of a natural chalk stream with improved depth variation and heterogeneity in flows, dimensions and sediment with installation of pools and weirs.				been made to the Scheme to impact river width and depth variation. Therefore, previous impacts apply.	
	Positive change	**Structure and substrate of the river bed:** Improved potential for sediment transport of sediment of varying sizes. Increased heterogeneity – variable flow and sediment.			**Positive change**	**Structure and substrate of the river bed**: No additional change has been made to the Scheme to impact structure and substrate of the river bed. Therefore, previous impacts apply.	
During construction:	**Negative**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems	During construction	**Negative**	No additional changes have been made to the Scheme that would cause further species disturbance, therefore, previous impacts apply during construction.	Previous quality control measures remain unchanged and managed through the Construction Environmental Management Plan.
	Negative	Disturbance to sediment is likely to unlock legacy deposits of phosphate and			**Negative**	No additional changes have been made to the Scheme that	

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
		other contaminants, along with high volume of fine sediments.	deployed if any spillage occurs. Implementation of sediment management for in-channel works. Implementation of surface water/sediment management plan. Avoid contamination/spread of invasive species (INNS) Imported rock/sediment must be clean, geologically appropriate to a chalk river.			would cause further sediment disturbance, therefore, previous impacts apply during construction.	
	Negative	**Water quality:** Working within or close to the channel, potential release of sediment and soil, presenting a temporary but localised risk to species within the channel during works. Potential deterioration due to high phosphate levels in the sediment/water column, which will be disturbed during construction.			**Negative**	No additional changes have been made to the Scheme that would cause further water quality deterioration, therefore, previous impacts apply during construction.	
New low-level flood embankment adjacent to the Waitrose Culvert watercourse	**No change**	No effect during operation.		New low-level flood embankment adjacent to the Waitrose Culvert watercourse	**No change**	No additional change has been made to the Scheme to produce any additional changes or impacts.	
During construction:	**Negligible**	Potential for silty runoff during works from working area to affect water quality, species within proximity of working area.	All works to be carried out in accordance with relevant current legislation and best practice.	During construction:	**Negligible**	No additional changes have been made to the Scheme that would cause further silty runoff, therefore,	Previous quality control measures remain unchanged and managed

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
			Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.			previous impacts apply during construction.	through the Construction Environmental Management Plan.
Infill of low spots on the existing low level embankment	**No change**	No effect during operation.		Infill of low spots on the existing low level embankment	**No change**	No additional change has been made to the Scheme to produce any additional changes or impacts.	
During construction:	**Negligible**	Potential for silty runoff during works from working area to affect water quality, species within proximity of working area.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.	During construction:	**Negligible**	No additional changes have been made to the Scheme that would cause further silty runoff, therefore, previous impacts apply during construction.	Previous quality control measures remain unchanged and managed through the Construction Environmental Management Plan.
Removal of the existing Library Hatches sluice structure and infill of the Library Side Channel, which connects the Mill Stream to the Avon (may be moved to future				Removal of the existing Library Hatches sluice structure and infill of the Library Side Channel, which connects the Mill Stream to the Avon (may be	Action no longer included in this phase of the works		

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
phases of the RCI).				moved to future phases of the RCI).			
River Avon fish passage measures – new short section of in-channel gravel berm in River Avon just upstream of Mill Stream confluence to increase attractant flow for fish	**Positive change**	**Fish:** Narrowing measures should increase the attraction of fish to the main Avon channel and towards the new fish pass steps. These are designed to be easier for a wider range of species to pass than the existing fish pass at Bishops Mill on the Mill Stream.		River Avon fish passage measures – new short section of in-channel gravel berm in River Avon just upstream of Mill Stream confluence to increase attractant flow for fish	**Positive change**	**Fish**: No additional changes have been made to the scheme, except for the slight change in location of the berm boundary upstream of the Mill Stream confluence. This should have no impacts on the previous assessment on fish, therefore, previous impacts still apply.	
	No change	**Macro-invertebrates and macrophytes:** No significant change likely. Increased local velocities may enhance existing in-channel macrophyte growth. Localised displacement of macro-invertebrate species under footprint of introduced marginal material			**No change**	**Macro-invertebrates and macrophytes:** No additional changes have been made to the scheme, except for the slight change in location of the berm boundary upstream of the Mill Stream confluence. This should have no impacts on the previous assessment	

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
						on macro-invertebrates and macrophytes, therefore, previous impacts still apply.	
	Positive change	**Quantity and dynamics of flow:** Localised variation in velocity profile will add diversity in flow conditions to currently uniform reach in low flows.			**Positive change**	**Quantity and dynamics of flow**: No additional changes have been made to the scheme, except for the slight change in location of the berm boundary upstream of the Mill Stream confluence. This should have no impacts on the previous assessment on quantity and dynamics of flow, therefore, previous impacts still apply.	
	Positive change	**River depth and width:** Localised change in depth and width in low flow conditions will add morphological diversity in channel at this location.			**Positive change**	**River depth and width**: No additional changes have been made to the scheme, except for the slight change in location of the berm boundary upstream of the Mill	

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
						Stream confluence. This should have no impacts on the previous assessment of river depth and width and therefore, previous impacts still apply.	
	No change	**Structure and substrate of river bed:** Narrowing could result in readjustment of local bed profile and increase potential for localised bed movement in high flow conditions if bed shear is increased due to narrowing measures.	Design the berm feature with reference to local hydraulic conditions at high and low flows. Consider introduction of coarser bed material if detailed design indicates a risk of undesirable bed movement.		**No change**	**Structure and substrate of river bed**: No additional changes have been made to the scheme, except for the slight change in location of the berm boundary upstream of the Mill Stream confluence. This should have no impacts on the previous assessment on structure and substrate of the river bed, therefore, previous impacts still apply.	Previous quality control measures remain unchanged.
During construction:	**Negligible**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current	During construction:	**Negligible**	Aside from a slight change in location of the berm boundary, no additional changes have been made to	Previous quality control measures remain unchanged and managed

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
			legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Fish exclusion/rescue plan should be put in place before berm construction.			the Scheme that would cause further species disturbance. Therefore, previous impacts apply during construction	through the Construction Environmental Management Plan.
	Negligible	Potential sediment remobilisation during works resulting in potential deterioration in quantity and quality to species within river channel. Temporary localised potential impact.	All pollution to be controlled under current legislation and best practice. Safeguards to be put in place to reduce the likelihood of sediment plumes and silt in the channel. Will require a Surface Water / Sediment Management Plan.			Aside from a slight change in location of the berm boundary, no additional changes have been made to the Scheme that would cause further sediment remobilisation. Therefore, previous impacts apply during construction	Previous quality control measures remain unchanged and managed through the Construction Environmental Management Plan.
New flood wall (less than 2m in length) set back from the eastern bank of Summerlock	**No change**	**Quantity and dynamics of flow and water levels:** No change.		New flood wall (less than 2m in length) set back from the eastern bank of	**No change**	No additional change has been made to the Scheme to produce any additional changes or impacts.	

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
Stream near Fisherton Street. Addition of non-return valve to existing culvert outfall to left bank of Summerlock Stream.	**No change**	**Protected area:** No change.		Summerlock Stream near Fisherton Street. Addition of non-return valve to existing culvert outfall to left bank of Summerlock Stream.	**No change**	No additional change has been made to the Scheme to produce any additional changes or impacts.	
During construction:	**Negligible**	Disturbance to species within the river at this point during works to fit flapped outfall to culvert; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.	During construciton:	**Negligible**	No additional changes have been made to the Scheme that would cause further species disturbance, therefore, previous impacts apply during construction.	Previous quality control measures remain unchanged.
	Negligible	Potential sediment remobilisation during works resulting in potential deterioration in quantity and quality to species within river channel during works to fit non-return valve. Temporary localised potential impact.	All pollution to be controlled under current legislation and best practice. Safeguards to be put in place to reduce the likelihood of sediment plumes and silt in the channel (part of Surface Water /		**Negligible**	No additional changes have been made to the Scheme that would cause further sediment mobilisation, therefore, previous impacts apply during construction.	Previous quality control measures remain unchanged.

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
			Sediment Management Plan)				
Replacement of Millstream Approach road bridge with new single lane bridge (with capability to be used as a two lane highway bridge in the future) crossing the widened river channel.	**No change**	**Invertebrates, phytobenthos and macrophytes:** Overall, positive interaction with water body status due to less shading and less of a formal structure.		Replacement of Millstream Approach road bridge with new single lane bridge (with capability to be used as a two lane highway bridge in the future) crossing the widened river channel.	**No change**	**Invertebrates, phytobenthos and macrophytes**: No additional change has been made to the Scheme to impact invertebrates, phytobenthos and macrophytes. Therefore, previous impacts apply.	
	No change	**Channel width and depth, and water levels:** No change likely as structures already in place and assume no additional engineering encroachment. Channel width potentially less constrained due to change in structure which could improve with/depth variation due to more naturalised processes operating.			**No change**	**Channel width, depth and water levels**: No additional change has been made to the Scheme to impact channel width, depth and water levels. Therefore, previous impacts apply.	
	Positive change	**Water quality:** Potentially improved due to runoff being prevented from entering the channel form the bridge (assuming currently drains to the river)			**Positive change**	**Water quality**: No additional change has been made to the Scheme to impact water quality.	

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
						Therefore, previous impacts apply.	
During construction:	**Negligible**	Potential temporary increase in localised suspended sediment concentrations but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows.	All works to be carried out in accordance with relevant current legislation and best practice. Do not allow uncured concrete or concrete residue to enter either still or flowing water, either directly or indirectly through runoff. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Implementation of surface water/sediment management plan for soils/runoff.	During construction:	**Negligible**	No additional changes have been made to the Scheme that would cause further suspended sediment, therefore, previous impacts apply during construction.	Previous quality control measures remain unchanged and managed through the Construction Environmental Management Plan.
Raising ground levels over a 0.5ha area at Coach Park to act as a flood defence against	**No change**	**Hydromorphology: sediment, form and water:** No significant change due to location away from the water course.		Raising ground levels over a 0.5ha area at Coach Park to act as a flood	**No change**	No additional change has been made to the Scheme to produce any additional changes or impacts.	

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
overland flood flows, using excavated material from modifications to the main river channel corridor, and removal of the Coach Park culvert.	**No change**	**Quantity and dynamics of flow and water levels:** No significant change. Reduced uncontrolled flood flows onto the surrounding area as a consequence of ground raising. This is beneficial as it prevents flooding and should reduce associated water pollution risk.		defence against overland flood flows, using excavated material from modifications to the main river channel corridor, and removal of the Coach Park culvert.	**No change**	No additional change has been made to the Scheme to produce any additional changes or impacts.	
During construction:	**Negligible**	Potential temporary increase in localised suspended sediment concentrations resulting from ground runoff, but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Implementation of surface water/sediment management plan for soils/runoff.	During construction:	**Negligible**	No additional changes have been made to the Scheme that would further increase suspended sediment concentrations, therefore, previous impacts apply during construction.	Previous quality control measures remain unchanged and managed through the Construction Environmental Management Plan.
Amenity improvements including public viewing area, redeveloped	**Negative**	**Hydromorphology – channel width and depth:** Depending on location, possible interruption to channel form and sediment transport due to	Design in accordance with best practice. Needs to be suitable sediment size to avoid	Amenity improvements including public viewing area,	**Negative**	**Hydromorphology - channel width and depth**: No additional change has been	

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
Coach Park, new footpath/cycleway and shingle beach with stepping stones (if considered appropriate following further investigation). With the exception of the Coach Park, these will be located within the new widened river corridor.		introduction of artificial sediment sizes, and artificial structure. Likely to create scour pools if artificial in structure. Potential to over-deepen and over-widen channel depending on location. Potential for increased erosion at river margin by people and dogs.	armouring of channel bed and also re-transport. Imported material should be geologically appropriate to a chalk river setting.	redeveloped Coach Park, new footpath/cycleway and shingle beach with stepping stones (if considered appropriate following further investigation). With the exception of the Coach Park, these will be located within the new widened river corridor.		made to the Scheme to impact channel width and depth. Therefore, previous impacts apply. Measures have been made to reduce impacts through inhibiting direct access to the channel.	
	Positive change	**Fish:** Potential direct effects on biological quality elements due to change in habitat structure as well as impediment to fish passage (e.g. if any beach narrow or shallows the channel). This should facilitate fish passage upstream, therefore promoting diversity in fish fauna through increase in availability of upstream habitat, benefitting salmonids and other species.	Needs to be suitable sediment size to avoid armouring of channel bed and also re-transport.		**No change**	**Fish**: Measures have been made to reduce impacts through inhibiting direct access to the channel and thus no significant changes will be made to the existing condition.	
	Negligible	**Macro-invertebrates:** Improvement in channel connectivity allowing better movement of aquatic macro-invertebrates and connecting sub-populations up- and downstream. Potential localised loss or displacement of species beneath/near to structure.			Negligible	**Macro-invertebrates**: No additional change has been made to the Scheme to impact macro-invertebrates. Therefore, previous impacts apply.	

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
	Negligible	**Hydromorphology: sediment, form and water.** No significant change although depends where located with potential effects including: o Increased or reduced sediment supply downstream o Destabilisation of downstream bed and banks where unprotected o Variability in upstream and downstream siltation.			Negligible	**Hydromorphology – sediment, form and water**: No additional change has been made to the Scheme to impact sediment, form and water. Therefore, previous impacts apply.	
	Negligible	**Physico-chemical:** Temporary changes to turbidity concentrations, light and water quality due to people and dogs easily able to enter the river channel.			Negligible	**Physico-chemical**: No additional change has been made to the Scheme to physico-chemical. Therefore, previous impacts apply.	
	Negligible	**Protected area:** This will be improved as a result of improved fish movement. Upstream reaches may/will see improvement due to increased connectivity for migratory fish.			Negligible	**Protected areas**: No additional change has been made to the Scheme to impact protected areas. Therefore, previous impacts apply.	

WER Assessment in EIA				Updated WER assessment in detailed design			
Site element	**Quality element impact**		**Control**	**Site element**	**Quality element impact post detailed design assessment**		**Control**
During construction:	**Negligible**	Working within or close to the channel, potential release of sediment and soil, presenting a temporary but localised risk to species within the channel during works. Potential temporary increase in localised suspended sediment concentrations but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows.	All works to be carried out in accordance with relevant current legislation and best practice. Do not allow uncured concrete or concrete residue to enter either still or flowing water, either directly or indirectly through runoff. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Implementation of surface water/sediment management plan for soils/runoff.	During construction:	Negligible	No additional changes have been made to the Scheme that would further increase suspended sediment or soil concentrations, therefore, previous impacts apply during construction.	Previous quality control measures remain unchanged and managed through the Construction Environmental Management Plan.

2.3. Step 3: Assessment of the proposed Scheme against water body mitigation measures

Water Environment Regulations Assessment in previous Environmental Impact Assessment

Within each RBMP, there is a list of mitigation measures, or environmental improvements, which have been identified by the RBMP, which need to be implemented in order to improve the ecology of heavily modified or artificial water bodies by a specified date in order for the UK to meet the target date set by the Regulations. Part of a regulatory compliance assessment is to consider mitigation measures and assess whether a proposed Scheme can contribute to them or might obstruct any of them from being delivered. As the Avon water body is not heavily modified or artificial, there are no mitigation measures to assess the Scheme against.

Water Environment Regulations Assessment in Detailed Design

Despite updates from the detailed designed assessment, there are no mitigation measures as the Avon is not a designated heavily modified or artificial water body. The EA Catchment Data Explorer describes the reasons for not achieving good Status (RNAG) (2022) as agriculture and rural land management, for groundwater bodies, with water industry additionally being an issue for surface water. The LEMP/CEMP will ensure that the scheme does not contribute to the RNAG during construction and operation for surface and groundwater bodies, which would otherwise prevent a good WFD status from being delivered.

2.4. Step 4: Cumulative impact assessment of the proposed Scheme in conjunction with other proposed Schemes planned or in place along the water body

Water Environment Regulations Assessment in previous Environmental Impact Assessment

- Potential hydropower Scheme under consideration at Bishop's Mill site at the Maltings by Salisbury Community Energy: possible future proposal for a water wheel on the Bishop's Mill site to generate electricity. As a planning application for this project has not been submitted, no further details are available at the current time to assess the potential in-combination impacts.
- Combined Schemes from Salisbury Masterplan, which includes in particular a number of in-channel and marginal improvements of habitat and vegetation. The proximity of these Masterplan proposals has the potential to cumulatively impact with the current Scheme on the water body. Some of these potential cumulative effects are related to the results of in-channel construction activities, and it is recommended that there should be a lag between each phase of the Masterplan in order to give some time for the water body to recover. Other cumulative effects are longer-term and related to improvements in the water body through re-naturalisation.

Water Environment Regulations Assessment in Detailed Design

Since the revision of previous Water Environmental Regulations assessment, the potential hydropower Scheme under consideration at Bishop's Mill has been withdrawn and is no longer required to be included as part of the proposed schemes possible to cause a cumulative impact. Combined Schemes from the Salisbury masterplan, as shown above, will still be considered due to

the proximity of the proposals to cumulatively impact the water body. The Wiltshire Council planning services (2022) were consulted to determine the possibility of any additional confirmed planning applications near the Salisbury Phase 1 works. No additional proposed or current schemes were identified, and therefore, there will be no cumulative impacts from existing applications. In conclusion, the effect of the Scheme was identified as providing more positive benefits with no cumulative impacts.

2.5. Step 3: Assessment of the proposed Scheme against objectives in the Regulations

Water Environment Regulations Assessment in previous Environmental Impact Assessment

Taking into consideration the impacts of the Scheme on the biological, physico-chemical and hydromorphological quality elements, it is unlikely to compromise progress towards achieving good ecological potential or cause a deterioration of the overall ecological potential of the river water bodies that are in scope. This would need to be reviewed if there were any major changes in the design of the Scheme.

Water Environment Regulations Assessment in Detailed Design

There have been no major changes to the design of the Scheme since the planning application was submitted, which would have an effect on the biological, physico-chemical and hydromorphological quality elements. Therefore, no additional changes are required to be made. A variety of small changes between the outline design submitted in the Environmental Statement have led to further positive changes on the quality elements but they will not be significant at a water body scale.

2.6. Step 6: Assessment of the proposed Scheme against other legislation

Water Environment Regulations Assessment in previous Environmental Impact Assessment

The Regulations also require consideration of how a new Scheme might impact on other water bodies and other legislation. This requirement originates from the Water Framework Directive that states in Article 4.8 : '…a Member State shall ensure that the application does not permanently exclude or compromise the achievement of the objectives of this Directive in other bodies of water within the same river basin district and is consistent with the implementation of other Community environmental legislation.

The assessment of the Scheme has considered not only the Hampshire Avon (Upper) water body within which it is located, but also all other relevant upstream, downstream and underlying water bodies. The Scheme will improve the reach within which it is located, with no obvious conflict with status objectives for any other water body. Therefore, the current Scheme complies with Article 4.8.

Article 4.9 of the Water Framework Directive requires that "Member States shall ensure that the application of the new provisions guarantees at least the same level of protection as the existing Community legislation".
The Habitats Directive (1992) (as transposed into UK Regulations) promotes the maintenance of biodiversity by requiring governments to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance. There is one European designated site in the vicinity of the Scheme, the River Avon SAC, which has been subject to Appropriate Assessment under the Habitats Regulations. The Appropriate Assessment concluded that "….It is possible to ascertain no adverse effect of the Proposed Scheme on the integrity on the River Avon SAC. This conclusion is dependent on….[application of stated]…. mitigation measures and/or conditions….". The Scheme will also create new aquatic and riparian habitat that will support the interest features of the relevant designations.

The Nitrates Directive (1991): The Scheme will not significantly influence or moderate agricultural land use or land management.

Water Environment Regulations Assessment in Detailed Design

Due to the limited changes made during detailed design, no additional information surrounding the Scheme on legislation is required. Additional work was undertaken during the detailed design to consider the impacts of sediment mobilisation on phosphorus loads. The findings suggest that while mean sediment bound total phosphorus concentrations in both the River Avon and Mill Stream are high (1,740 and 2,300 µg/g, respectively), they sit within the range expected from a lowland agricultural catchment, with heavily urbanised areas in its lower reaches (Atkins, 2021). Good practice measures will be adopted through the Construction Environmental Management Plan to minimise any risk of mobilisation in the construction.

The changes made to the Scheme during detailed design will not cause any impacts to the upstream or downstream water bodies, or have implications for compliance with the Habitats Directive, or Nitrates Directive.

3. Conclusion

As stated in the Jacobs (2021) WER report, compliance with key objectives where proposed works can impact a water body need to be assessed in the detailed design. Those that were previously assessed are outlined in Table 3-1 and updates provided in Table 3-2.

Table 3-1 - Compliance of the Scheme with the environmental objectives of the Water Environment Regulations

Environmental Objective	Scheme	Compliance with the Regulations
No changes affecting high status sites (including sites designated under other legislation)	After consideration as part of the compliance assessment, including the preliminary conclusions from the Appropriate Assessment, the proposed Scheme is considered unlikely to cause a change to the high-status sites in the study area if mitigation is put in place.	Yes.
No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential	After consideration as part of the detailed compliance assessment, the proposed Scheme will not cause deterioration in the status of the Hampshire Avon (Upper) water body if mitigation is put in place. However, this is dependent upon the findings of bedded sediment analysis and development of a sediment management plan during detailed design for implementation during construction and once the Scheme becomes operational.	Yes
No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies	The proposed Scheme will not cause a permanent exclusion or compromise achieving the status objectives in other bodies of water within the same River Basin District (RBD)	Yes.
No changes that will cause failure to meet good groundwater status or result in a deterioration to groundwater status.	The proposed Scheme will not cause deterioration in the status of the Hampshire Avon (Upper) water body.	Yes.

The finding of the updates suggest that any changes made in the detailed design assessment remain in compliance with the regulations and provide further positive enhancements in some areas albeit not at a water body scale.

Table 3-2 - Compliance of the Scheme with environmental objectives of the Water Environment Regulations post detailed design

Environmental Objective	Scheme	Compliance with the Regulations
No changes affecting high status sites (including sites designated under other legislation)	After consideration from the detailed design assessment, including the detailed compliance assessment and the primary conclusions from the Appropriate Assessment, the proposed Scheme is considered unlikely to cause a change to the high-status sites in the study area with appropriate mitigation measures enforced.	Yes
No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential	After consideration from the detailed design assessment, including the detailed compliance assessment and the primary conclusions from the Appropriate Assessment, the proposed Scheme will not cause deterioration in the status of the Hampshire Avon (Upper) water body if mitigation measures are taken forward. Positive impacts have been made on the Scheme, especially in the new Summerlock Stream, in regard to wetland and habitat creation, and there has been a negligible change in dissolved oxygen to surface water quality. Negative impacts are shown to occur through construction and operation to ecology, which have been identified as localised, and therefore, should not cause long-term waterbody status deterioration. The implications of phosphorous impacts through sediment mobilisation were explored by Atkins (2021). Due to the high concentrations of sediment bound phosphorus concentrations in the Avon and Mill stream, they are within expected ranges of lowland agricultural catchments, but the works do have the potential to increase these values. The Scheme operations could mobilise sediment bound phosphorus from the wider catchment, and remove accumulated stores near the works, with the sluice gate timings on the River Avon enabling further transport down the system. As the sampling was not representative on overall mean system values, the phosphorus and sediment in the system will be dependent on antecedent catchment conditions. The landscape ecology management plan further covers this issue. Therefore, the potential for sediment mobilisation should be considered and mitigation measures defined in the Construction Environmental Management Plan to ensure no further surface water deterioration during construction. Additionally, as no further schemes were identified locally, no cumulative impacts are anticipated.	Yes
No changes which will permanently prevent or compromise the Environmental	Changes during the detailed design assessment to the proposed Scheme will not cause permanent exclusion or compromise achieving	Yes

Environmental Objective	Scheme	Compliance with the Regulations
Objectives being met in other water bodies	the status objectives in other bodies of water within the same River Basin District (RBD).	
No changes that will cause failure to meet good groundwater status or result in a deterioration to groundwater status.	Changes during the detailed design assessment to the proposed Scheme will not cause deterioration in the status of the Hampshire Avon (Upper) water body.	Yes

4. References

Atkins. (2021). *River Avon sediment phosphorus sampling*. Salisbury River Park. Environment Agency, pp.1-12

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Appendices

Appendix A. Salisbury River Park Phase 1 Scheme WER Assessment (undertaken by Jacobs)

Salisbury River Park Phase 1 Scheme

Appendix H2: Water Environment Regulations Compliance Assessment

ENVIMSW002033

8 March 2021

Environment Agency

Project Name

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Document Title:	Salisbury River Park Phase 1 Scheme: Water Environment Regulations Compliance Assessment
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Revision	Date	Description	Author	Checked	Reviewed	Approved
0	4.1.21	WER compliance assessment	Rebecca Westlake	Corinna Morgan	Stuart Hedgecott	PS Rayner
1	8.3.21	Additions in accord with latest scheme description	Alastair Morriss	Corinna Morgan	Stuart Hedgecott	PS Rayner

Contents

1. Introduction

The Environment Agency is working in partnership with Wiltshire Council to deliver river corridor improvements in the centre of Salisbury as an integrated part of a wider Salisbury River Park masterplan, which forms part of the Central Area Framework being developed by Wiltshire Council.

This Water Environment Regulations compliance assessment report has been prepared for the proposed works that comprise Phase 1 of the River Corridor Improvements that form part of the Salisbury River Park; these Phase 1 works are hereafter referred to as 'the Scheme'. This detailed compliance assessment provides further assessment in line with the recommendations of the preliminary compliance assessment produced at an earlier stage of the Scheme's development.

1.1 Background

The Water Environment (Water Framework Directive) Regulations 2017 require all water bodies to achieve both good chemical status and good ecological status. For each River Basin District, a River Basin Management Plan (RBMP) outlines the actions required to enable natural water bodies to achieve this (Table 1). Water bodies that are designated in the RBMP as Heavily Modified Water Bodies (HMWB) or Artificial Water Bodies (AWB) may be prevented from reaching good ecological status by the physical modifications for which they are designated or purpose for which they were constructed (e.g. navigation, flood defence, urbanisation). Instead they are required to achieve good ecological potential, through implementation of a series of mitigation measures outlined in the applicable RBMP (and in some cases updated since the publication of the RBMP).

Any activity which has the potential to have an impact on ecology will need consideration in terms of whether it could cause deterioration in the ecological status or potential of a water body. It is, therefore, necessary to consider the possible changes associated with the proposed Scheme.

The Environment Agency (EA), as competent authority is responsible for delivering the Regulations 2017[1]. The Regulations require that environmental objectives are set for all surface and groundwater bodies, which are considered as part of a compliance assessment:

- No changes affecting high status sites;
- No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential;
- No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies; and
- No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.

1.2 Protected Areas

Where there are water-dependent sites protected under other legislation, the Regulations aim for compliance with any relevant standards or objectives for these sites. For this Scheme, this relates to designated sites that are within the study area and designated under the Habitats Regulations. Relevant sites include the River Avon Special Area of Conservation (SAC) and Hampshire Avon (Lower) Drinking Water Protected Area since this is only about 600m downstream of the Scheme (and closer still laterally rather than fluvially, about 150m at the nearest point).

[1] 2017 SI No. 407 WATER RESOURCES, ENGLAND AND WALES. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

2. Outline of the Scheme

2.1 Description of works

A description of the Scheme is detailed in the sections below.

2.1.1 Ashley Road area

- **New flood defence embankment:** The embankment will run along the southern boundary of Fisherton Recreation Ground and Ashley Road Open Space and be approximately 550m long and up to 1.4m high. The embankment will have varying side slopes; on the river side these will be up to 1 in 10 gradient slopes to give a natural appearance and respect the local landscape character and up to 1 in 4 gradient slopes where space for the embankment footprint is limited and on the Ashley Road side. The embankment will be topsoiled with site-won topsoil and seeded with either an amenity grass seed mix, or, if fertility levels in the topsoil are sufficiently low (to be determined during detailed design), it may be seeded with a species-rich meadow seed mix.

  Topsoil stripping will be required to facilitate construction. There may also be some form of below ground cut-off to limit seepage. This would require trenching along the whole length of the embankment and filling with clay material or installing plastic sheet piling. The requirements will be confirmed at detailed design stage.

- **New flood defence walls:**

  (1) New wall approximately 95m long and 1.4m high (above ground), clad in red brick on the river side adjacent to footpath/cycle track, will run close to the Coldharbour Lane Allotments and link Summerlock Bridge to the flood defence embankment to the north. The wall is needed instead of a flood embankment due to space constraints as the width of the recreation area narrows alongside the river and there are adjacent mature Black Poplar trees which we will retain. Improvements will also be made to ditches alongside the allotments to improve drainage.

  Topsoil stripping and excavation by up to approximately 1.0m to the foundation level of the wall will be required to facilitate construction. There may also be some form of below ground cut-off to limit under-seepage below foundation level. This would require additional trenching below foundation level along the whole length of the wall and filling with clay material or alternatively installing plastic sheet piling or similar. The requirements will be confirmed at detailed design stage.

  (2) New wall, approximately 45m long and just over 2.0m high on the river side and 0.6m high on the garden side (above ground), clad in red brick, will extend into one private garden adjacent to Ashley Road and Summerlock Bridge, bordering the right bank of Summerlock Stream. The wall will act as a secondary flood defence. The existing 20m long river-bank wall (mainly built in blockwork) on the Summerlock Stream will be removed and new marginal wetland planting introduced along the edge of the channel to enhance biodiversity.

  (3) Raising the existing parapet upstand on the north side of Ashley Road bridge over Summerlock Stream by approximately 0.3m, with the new reinforced concrete section of upstand dowelled into the existing wall and fitted with new parapet railings. A connecting new flood defence wall will continue to the east, approximately 0.4m high (above ground), clad in red brick with railings, alongside the pavement on Ashley Road. A short length of flood defence embankment then runs to the north along the west bank of Summerlock Stream up to the main flood defence embankment.

- **Two new pumping areas:** These areas will be used on a temporary basis for pumping standing water from drainage and under-seepage ponding behind the defences during flood events. The areas, large enough for the parking of vehicles and setting up temporary pumping equipment will comprise grassed geogrid so they are accessible in all conditions. Each working area includes two new underground pumping sumps, each about 1.2m in diameter rings up to a depth of 2.5m, with a sealed inspection cover.

- **New filter drains:** The drains will run at the back of the new flood defence embankment over its entire length as a drainage connection to the two new pumping areas (see above). The drains will require

trenching to lay a 0.3m diameter perforated pipe, backfilled with graded gravels. New inspection chambers will be installed at intervals along the filter drains, 1.2m diameter and 1.5m depth.

- **Removal of trees:** removal of 18 trees including 10 Lombardy poplar trees and two memorial trees and 30m of hedgerow along the southern boundary of the existing play area adjacent to Coldharbour Lane Allotments to facilitate the construction of the new embankment.

  Removed trees will be replaced with new tree planting as shown on the Landscape Masterplan, including 33 new specimen trees in the Ashley Road area (to include the replacement of six Lombardy poplars in Fisherton Recreation Ground and the replacement or replanting of two memorial trees).

- **Infilling a short section of Summerlock Stream:** Infilling an approximate 10m length of channel at the Summerlock Stream offtake from the River Avon at Blackwell Hatches. As part of the new Summerlock channel, just downstream a backwater amenity and biodiversity feature and shingle beach will be created.

- **New Summerlock Stream offtake structure and offtake channel:** The offtake structure will require breaching the bank of the River Avon at the northern end of Fisherton Recreation Ground. Below this structure, the new offtake channel will pass through Fisherton Recreation Ground and connect with the existing Summerlock Stream just downstream of the Blackwell Hatches.

  During low flows, water will be constrained to a single channel within this area (which may include multiple sub-channels if appropriate) and will be designed to maximise opportunities for fish passage. During higher flows, the channel will provide a connection to the surrounding new wetland habitat area (see below).

  The approximate size of the new offtake channel will be 320m long with a low flow channel about 3-4m wide and up to 1.4m depth below existing ground level. The offtake structure will have reinforced concrete walls and base, and will be clad with natural stone. Berms either side of this low flow channel will vary in width to form a two stage channel for higher flows. The requirements will be confirmed at detailed design stage, with the aim of maintaining the existing low flow regime.

- **New flow control structures:** The structures comprise the new Summerlock Stream offtake described above and a new culvert on the Summerlock Stream, which will pass beneath the new flood defence embankment on the southern boundary of the Fisherton Recreation Ground, near Ashley Road, to limit the peak flood flows passing downstream. These are both passive structures to minimise future operational risks and maintenance costs and have been designed to enable fish passage including eels.

- **New wetland habitat** (see landscape plans in Appendix E1 of the ES): The wetland will include the main low flow channel with marginal berms and adjacent wet grassland and wet woodland located within a ground lowered area, hydrologically connected to the new Summerlock Stream offtake channel, and accommodating water during high flows. It will also incorporate seasonally wetted ephemeral secondary streams, active at different flow states.

- **Two new footbridges and boardwalks:** The footbridges (2m wide) will cross the new Summerlock Stream offtake channel (one will also accommodate a new cycle track) at the north and south end of the new wetland habitat area. The exposed elements of the proposed steel beam pedestrian/cycle bridges such as soffits will be clad in timber. The bridges will be fitted with vertical timber railings. Two sections of boardwalk access will be provided around the wetland area. The boardwalks will be constructed from recycled plastic.

- **New retaining wall** along the edge of the new footpath/cycle track where it runs past Coldharbour Lane Allotments, approximately 70m long and up to 1m high (retained height), required due to space constraints to avoid impacting the native Black poplar trees.

- **New amenity facilities:** These will include a shingle beach and picnic area adjacent to the new wetland habitat, improved public access at selected points (e.g. proposed river viewing platforms) to the new wetland habitat and installation of benches and information boards.

- **Replacement of existing play park:** The play park at Fisherton Recreation Ground will be replaced with a new improved play park on the eastern side of Summerlock Stream in Ashley Road Open Space. The

improved replacement play park will be designed in conjunction with Salisbury City Council and local stakeholders.

2.1.2 Central Car Park/The Maltings area

- **Modifications to the River Avon main channel:** The river channel corridor near the Millstream Coach Park will be reshaped and widened (50m maximum) and reshaped over a length of approximately 250m, providing a multi-staged channel with marginal wetland habitat on both banks. A geosynthetic clay liner or cohesive alluvium backfill will be used to line the widened channel where required, due to the risk of contamination in the made ground in the area.
- **Removal of Swimming Pool Gate structure (radial gate):** The flow control structure on the western branch of the River Avon channel, where it splits (above Millstream Approach), will be removed to improve fish passage and allow reprofiling of the channel bed to remove the large drop in bed level across the existing structure. It will be replaced with a series of new rock weirs for fish passage, with appropriately sized flints/gravels imported to form the substrate of each step. There will be a change in low flow water levels due to the reconfigured layout, by up to about +/-0.2m based on modelling.
- **New floodway culvert:** The culvert extending over approximately 140m will connect the River Avon main channel with the Summerlock Stream, with inlet and outlet structures, designed to carry floodwater only in extreme flood events (it will not impact on low flows). The approximate size will be 4m wide and 1m high (internal dimensions). Construction will require the removal of approximately 19 trees.
- **Extension of twin pipe culverts (each 0.9m in diameter):** The culverts will extend over a length of about 150m to move the outfall of the Waitrose culvert, which currently joins the channel immediately downstream of Swimming Pool Gate, to a position further downstream near the Avon Approach Bridge, providing continued drainage of this watercourse and connected surface water systems.
- **Modified layout of existing fish pass weirs at The Maltings:** This will involve lowering the upstream crest level, strengthening a central wall, and making any necessary repairs to the structure.
- **Tree removal and replanting:** Removal of 67 trees along the existing River Avon corridor to facilitate the construction of the widened channel and river park corridor. A total of 281 replacement trees are to be planted in and adjacent to the reprofiled River Avon corridor, comprising 47 standard trees and 234 transplants within tree and shrub planting plots.
- **Reduction in width of the Mill Stream:** Narrowing to 6 - 8m over an approximate 550m length to improve low flow conveyance and create a more sinuous low flow channel by introducing shallow berms or raised areas (potentially using locally sourced flints/gravels). Requirements will be confirmed at the detailed design stage. The berms will be placed in the existing channel to minimise deposition of silt on the flint/gravel bed under reduced flow conditions and to encourage diversity in local instream and marginal habitats.
- **Removal of hatches from the existing sluice gate structure at The Maltings:** This will reduce upstream water levels within the Mill Stream channel that is potentially silted above its original bed level.
- **Local ground raising:** Infilling low spots to a maximum depth of 0.3m over small areas near the River Avon near the railway embankment and adjacent to the Waitrose Culvert watercourse (open channel) to the north of the substation. The aim will be to reduce flood risk to the adjacent access road.
- **New flood wall (less than 2m in length):** The wall will be set back from the eastern bank of Summerlock Stream near Fisherton Street with flapped opening to retain drainage outflow into river under normal conditions. Associated measures to improve flood resilience of an adjacent property (approximately 1m from the river).
- **Creation of a small Pocket Park:** new park on approximately 500m^2 of land on the northern edge of Millstream Approach between the widened River Avon corridor on the western side and a road adjacent to the Mill Stream on the eastern side
- **Replacement of vehicular and footbridges**

(1) Removal of the existing Millstream Approach road bridge and replacement of Millstream Approach road bridge: The new single lane bridge (with capability to be used as a two lane highway bridge in the future) will cross the widened river channel in a more northerly alignment. The new bridge deck with approximate open span of 20m and width of 10m will be supported on new bridge abutments and piled foundations positioned within the widened river corridor.

Modified road approaches to the replacement road bridge, requiring ground raising to accommodate the higher level of the bridge. On the western side the existing road adjacent to the electricity substation will be raised over a total length of about 100m, with low height retaining walls to accommodate this. On the eastern side the existing ground will need raising to form a new approach road over a total length of about 50m.

(2) New pedestrian steel trussed footbridge further downstream (south of existing Millstream Approach bridge). Footbridge width approximately 2m, length approximately 35m.

(3) Replacement of existing footbridge at Swimming Pool Gate with new wider bridge to accommodate pedestrians and cyclists. The exposed elements of the proposed steel beam pedestrian and cycle bridge such as soffits will be painted in an appropriate colour. Bridge width approximately 6m, length approximately 30m.

For the new bridges the form of construction and finishes will be determined at detailed design. The decks of all bridges will be surfaced with finishes that continue or at least complement the existing surfaces on the adjacent sections of footpath or cycle track.

- **New retaining wall:** The wall will run along the edge of a footpath/cycle track upstream of the replacement road bridge on the western side of the widened river corridor. The approximate size will be 40m long and 1m high (above ground).
- **Coach Park raising:** Raising ground levels over approximately 0.2ha area to act as a flood defence against overland flood flows, using excavated material from modifications to the main river channel corridor, and removal of the Coach Park culvert. The area will be re-surfaced and the drainage improved.

  The layout for coach park area is to be determined as part of the detailed design stage in consultation with Wiltshire Council and interested parties. The area for coach parking will be maximised, taking into consideration safety requirements, with only a small reduction in area compared with the existing coach park, any reduction in area would be kept to a minimum. This can be accommodated without materially affecting the number of coaches that currently use the coach park.
- **New flood alleviation measures at Steynings House:** Short section of new flood wall to infill a localised low spot in the bank on Summerlock Stream which is vulnerable to flooding overland into Fisherton Street downstream. The wall, less than 2m long and approximately 1m high, to be built across an access path to the rear of the main building, clad in red brick to match the existing brickwork.

  The new flood wall at Steynings House will incorporate an appropriately sized drainage slot with flap valve to allow any surface water runoff collecting behind it to drain into Summerlock Stream. A flap valve will be fitted to the large rectangular box culvert outfall within the Summerlock Stream channel at this location. Associated measures to improve flood resilience of the main building, on the river side (undefended), will be considered at detailed design stage.
- **River Avon fish passage measures:** New short section of in-channel berm or raised area on the River Avon downstream of Maltings and just upstream of the confluence where the Mill Stream rejoins at Fisherton Street bridge. This berm will be formed potentially using locally sourced flints/gravels, placed in the existing channel (east side) to locally create higher velocities under low flow conditions to encourage fish passage into the River Avon away from Mill Stream.
- **Amenity improvements:** including public viewing area, new footpath/cycleway and shingle beach with stepping stones (if considered appropriate following further investigation).
- **Improvements to the layout of roads and footpaths within the Central Car Park area:** to accommodate the Scheme proposals and provision of new segregated cycleway route for National Cycle Network Route 45 from Swimming Pool Gate to the southern boundary of the coach park.

- **New low-level lighting:** installed along some of the new Public Rights of Way for safety, security and vandalism purposes, and the locations for this lighting will be agreed in consultation with Natural England during detailed design of the Scheme.

2.1.3 Throughout Scheme area

- **Diversion of services:** Diversion of cables and pipes including gas mains to facilitate widened river corridor and new wetland habitat area and new alignment of some services
- **Diversion of and new Public Rights of Way:** Temporary and permanent diversions of Public Rights of Way (notably public footpaths and cycleways) including signage of all temporary and permanent diversions

  Ashley Road site - newly surfaced paths with either resin-bound gravel or asphalt (to be determined during detailed design

  The Maltings and Central Car Park area – new paths will be tarmac to provide durability in this heavily used area
- **Trees and vegetation:** Planting of standard trees (80 nr.), native species wet woodland (c. 1,450m^2), native species tree and shrub planting (c. 2,070 m^2), native species hedgerow (c.470m) amenity shrub planting (c.900m^2) and marginal wetland habitat creation (c. 3,830m^2). Retained areas of existing grassland disturbed during construction and areas of exposed earth such as new embankments will be topsoiled and seeded with appropriate grass and/or wildflower meadow seed mixes
- **Street furniture, including seating and bins**: will be specifically selected during detailed design to coordinate with the street furniture portfolio used by Salisbury District Council elsewhere in the city. Signage will be consistent with the Wayfaring Strategy currently being developed by Wiltshire Council.

3. Methodology

A previous preliminary assessment was undertaken which included baseline data for relevant water bodies. To avoid repetition, these data are not included in the assessment but a short summary is provided in Section 4. The Scheme plan is included in Figure 1.

There are six principal steps to follow in order to undertake a detailed assessment following on from the baseline. The sequence of the steps is summarised below and the outcomes of each step are reported in Section 5:

- **Step 1.** Identification of potential generic operational impacts of the proposed Scheme on hydromorphological quality elements.
- **Step 2.** Site specific assessment of the proposed Scheme against biological, physico-chemical and hydromorphological quality elements.
- **Step 3.** Assessment of proposed Scheme against water body Mitigation Measures.
- **Step 4.** Cumulative impact assessment of proposed Scheme in conjunction with other proposed Schemes planned on the water body.
- **Step 5.** Assessment of proposed Scheme against waterbody status objectives.
- **Step 6.** Assessment of the proposed Scheme against other legislation (Protected Areas).

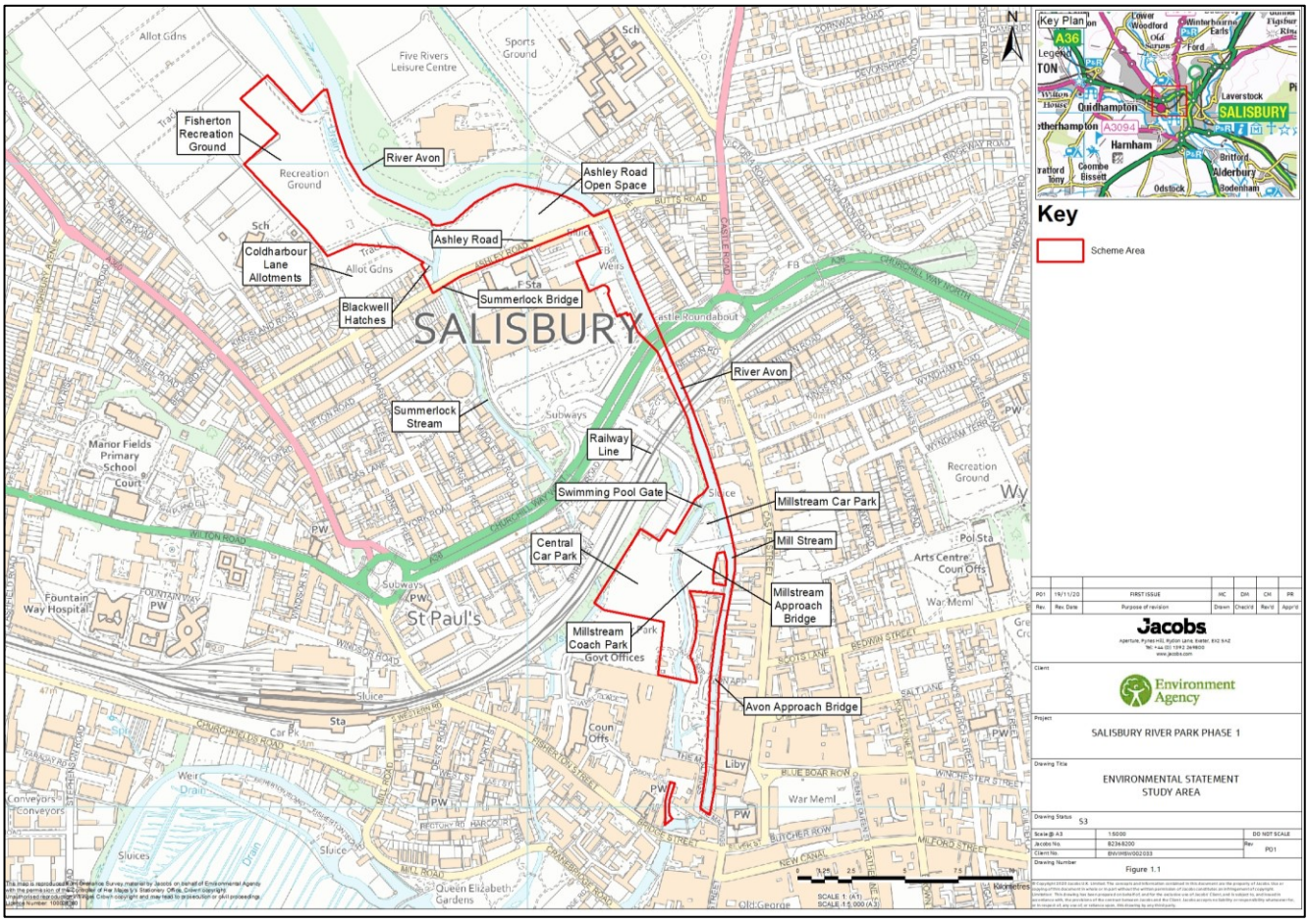


Figure 1: Scheme area

4. Baseline

4.1 Baseline Scoping

4.1.1 Water bodies in the study area

The Scheme is located within the Hampshire Avon River Basin which is within the South West River Basin District and covered by the South West River Basin Management Plan[2].

The EA's Catchment Data Explorer[3] was used to assess water bodies present within the Scheme's study area. The study area follows the red line boundary (Figure 1) plus the nearest upstream and downstream water bodes. The compliance mapping for groundwater risk and status assessment was also reviewed.

The following water bodies (all shown in Figure 2) have been assessed:

- Hampshire Avon (Upper) d/s Nine Mile River confluence; (hereafter referred to as 'Hampshire Avon (Upper)'). This is the river water body directly associated with the Scheme;
- Hampshire Avon (Lower). This is the downstream river water body, approximately 600m from the nearest part of the Scheme; and
- Upper Hampshire Avon groundwater. This is the groundwater body underlying the Scheme.

4.1.2 Upstream water bodies

Water bodies upstream of the Hampshire Avon (Upper) include:

- Hampshire Avon (Upper) upstream of Nine Mile River confluence (ID: GB108043022351). This joins the Hampshire Avon (Upper) (downstream Nine Mile River) confluence at Bulford;
- Nine Mile River (GB108043022360) which also flows into the Hampshire Avon (Upper) (downstream Nine Mile River) confluence at Bulford.

These converge to become the Hampshire Avon (Upper) near Bulford more than 20 km upstream of the Scheme. Given this distance and the nature of the proposed Scheme (in particular the absence of any impoundment), none of the proposed actions will have any effects that could propagate as far as upstream as these upstream water bodies. Therefore, there are no possibilities that flow (or associated functions such as sediment transport, morphology or physico-chemical conditions) in upstream water bodies would be affected.

However, all of the upstream water bodies will benefit from Scheme proposals that will improve fish passage. Notwithstanding this, for the aforementioned reasons, the upstream water bodies can be scoped out of the assessment.

[2] DEFRA/EA. 2015. South West river basin district. River basin management plan LIT 10318
[3] Catchment Data Explorer, http://environment.data.gov.uk/catchment-planning/

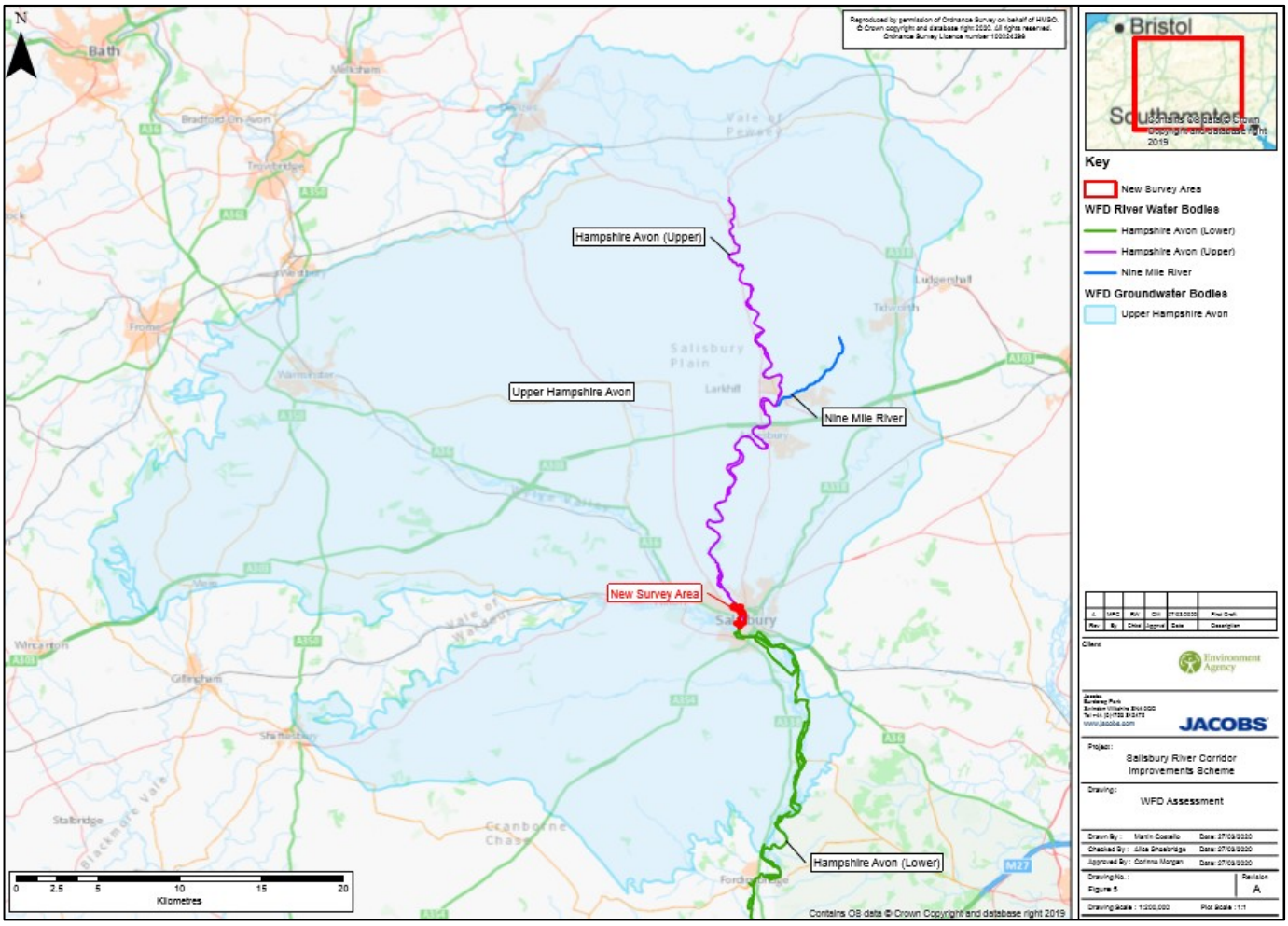


Figure 2: Map of water bodies

4.2 Screening of Scheme components

All Scheme elements are included in the site-specific assessment (Section 5.2) except: the new footbridge across the new channel at the north of the new wetland habitat area; relocated play park; and the new pedestrian timber decked footbridge further downstream. These are not included as they are unlikely to have any effect on the water body and were assessed as having no impact in the preliminary regulatory compliance assessment.

4.3 Scoping of water body elements

Tables 2 to 6 scopes the water body elements that are taken forward into the impact assessment for the river water bodies. Table 7 considers the groundwater elements to be taken forward as part of the assessment. Different groupings of quality elements are relevant to different parts of the Scheme. For brevity, these will be considered in the impact assessment table (Step 2) rather than here.

Because no water bodies in scope are heavily modified or artificial, no assessment is needed of the Scheme's contribution or detriment to morphological mitigation measures.

Table 2: Biological status quality elements for further consideration

Description of biological quality element	Scoped in or out overall
Fish: Composition, abundance and age of structure of fish fauna, presence of sensitive species.	In
Invertebrates: Composition and abundance of benthic invertebrate fauna.	In
Freshwater aquatic plants (macrophytes) and diatoms (phytobenthos): Composition and abundance of aquatic flora.	In

Table 3: Hydromorphological supporting elements for further consideration

Description of hydromorphological element (i.e. hydrological regime and morphology)	Scoped in or out overall
Quantity and dynamics of water flow.	In
Connection to groundwater bodies.	Out
River continuity.	In
River depth and width variation.	In
Structure and substrate of the river bed.	In
Structure of the riparian zone.	In

Table 4: Physico-chemical quality elements for further consideration

Description of physico-chemical quality elements	Scoped in or out overall
Acid neutralising capacity	Out
Ammonia (phys-chem)	Out
Dissolved oxygen	Out
pH	Out
Phosphate	In
Temperature	In

Table 5: Chemical quality elements for further consideration

Description of chemical quality elements	Scoped in or out overall
Pollution including: • All priority substances identified as being discharged into the water body. • Other substances identified as being discharged in significant quantities into the water body.	Out

Table 6: Groundwater water body elements for further consideration

Description of groundwater water body element	Scoped in or out overall
Groundwater dependent terrestrial ecosystems	Out
Saline intrusion	Out
Water balance	Out
Surface water	In
Qualitative Elements	
Drinking Water Protected Area	Out

Groundwater dependent terrestrial ecosystems	Out
Saline intrusion	Out
Surface water	In
General quality	Out

5. Water Environment Regulations Assessment

5.1 Step 1: Potential generic operational impacts of the proposed Scheme on the hydromorphological quality elements

Environment Agency guidance provides a list of the potential hydromorphological pressures or mitigation measures that any proposed Scheme of a particular type may cause or implement. These are shown in Table 7 below for the relevant elements of the Scheme, and have been taken forward into the site-specific assessment in Section 5.2.

Table 7: Pressures, potential hydromorphological consequences for works to water body

Source: Environment Agency Look-up Table C: Potential hydromorphological impacts of new Schemes[4]

Pressure	Sub pressure	Potential Impacts
Freshwater - Defence (linear flood defence)	Embankment	Reduced morphological diversity. Loss of shading associated to riparian zone. Loss of floodplain ecology associated with connectivity. Reduction /prevention of sediment input. Reduction/prevention of channel in/outflow. Increase in channel bank-full capacity.
Freshwater - Channel/ watercourse	Watercourse alteration	Reduced morphological diversity. Headward migration. Regrading. Increased sediment supply downstream. Destabilisation of downstream bed and banks. Siltation downstream. Loss of shading associated to riparian zone.
Freshwater - Channel/ watercourse	Bed protection	Reduced morphological diversity. Increased sediment supply downstream. Destabilisation of downstream bed and banks. Siltation downstream
Freshwater – online structure	Culvert	Increased sediment supply downstream Destabilisation of downstream bed and banks
Freshwater – point structure	Sluice, pipe, inlet, outlet, off-take, for example	Increased sediment supply downstream. Destabilisation of downstream bed and banks.

[4] Modified from Joint Defra/EA Flood and Coastal Erosion Risk Management R&D Programme - WFD Expert Assessment of Flood Management Impacts (2009)

5.2 Step 2: Site specific assessment of the proposed Scheme against biological, physico-chemical and hydromorphological quality elements

This section, Tables 8 and 9, detail a site-specific assessment of the Scheme against quality elements for biology, physico-chemical and hydromorphological elements for the Hampshire Avon (Upper) water body.

Table 8: Impact assessment for Ashley Road area

Key:

Positive change	Negligible	Negative	No change

Site element	Quality element impact		Control
New flood defence embankment and flood wall	**Negligible**	**Invertebrates and macrophytes:** Loss of terrestrial habitat and substrate under footprint. Subsequently a potential loss of detrital inputs utilised by aquatic receptors such as woody debris and leaf litter that was previously provided by any overhanging vegetation removed from footprint.	N/A
	No change	**Structure of riparian zone:** Overall, no change. The presence of the embankment alters the morphological form of the riparian zone but is being designed to give a natural appearance which will also mimic some natural habitat diversity.	
	No change	**Quantity and dynamics of flow and water levels.** No significant change. Reduces uncontrolled flood flows onto the surrounding area as a consequence of retaining walls.	
	Negligible	**Water quality and levels**: Potential minor improvement in water quality within the watercourse if surface water carries pollutants e.g. by running off road surfaces; reduced urban flood risk will reduce associated water contamination	N/A
During construction:	**Negligible**	Potential sediment remobilisation during works resulting in potential deterioration in quantity and quality to species alongside river channel. Temporary localised potential impact.	All pollution to be controlled under current legislation and best practice. Safeguards to be put in place to reduce the likelihood of sediment plumes and silt in the channel. Will require a Surface Water / Sediment Management Plan
	Negligible	Embankments may require plant tracking/movement along the floodplain corridor, potentially damaging habitat within the riparian corridor.	Potential indirect impacts from construction stage of the development can be managed and no likely significant effects are anticipated on the water environment.
River Avon and	**No change**	**Fish:** Potential current fish migration in existing Summerlock, which is unlikely to change with the	Incorporate fish-friendly control structure modification.

Site element	Quality element impact		Control
Summerlock Stream – infilling of channel, creation of new channel, and inclusion of control structure		Scheme because the replacement channel will provide an (improved) opportunity for fish migration. Potential detrimental effects in Summerlock Stream should there be lowered flows as a result of the new offtake structure.	Channels designed to facilitate fish passage during low flows and maintain sediment continuity. Need to ensure flow splits are properly accounted for. A range of instream, marginal and riparian enhancements will be introduced to generate new heterogenous habitat to benefit a range of species, including salmonids.
	No change	**Invertebrates:** Loss (most likely by displacement) of habitat/footprint for invertebrates where infill occurs including species dependent on wetting regime at the existing channel margin will be mitigated by colonisation of the replacement channel and margins. Overall, potential for better habitat development because of more natural structure and change in flow patterns. No change to status of Avon water body as a result of this particular Scheme element.	A range of instream, marginal and riparian enhancements will be introduced to generate new heterogenous habitat to benefit a range of species, including water crowfoot communities.
	No change	**Macrophytes:** Same as above. No change to status of Avon water body as a result of this particular Scheme element.	
	No change	**Quantity and dynamics of flow:** No change to Avon other than no offtake to the Summerlock Stream.	
	No change	**River depth and width:** Less change in channel width and depth in the Avon as variability prior to infill is a result of discharge into Summerlock Stream.	
	No change	**Structure and substrate of river:** Better within main Avon channel as sediment is not entrained into the Summerlock Stream. Improved heterogeneity in sediment at this point but no overall benefit.	Scheme should promote variability in sediment size and substrate structure. Need to ensure flow splits are suitable.
		Structure of riparian zone: Overall no significant change.	
During construction:	**Negligible**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Fish rescue plan should be put in place before construction.
New culvert on Summerlock Stream beneath the	**Negligible**	**Fish:** Direct effects due to change in habitat structure as well as impediment to fish passage. The culvert is eight metres long and a box culvert.	Bed of culvert can be designed to encourage fish passage through it – no steps in bed level; textured finish especially for smaller species; baffles /

Site element	Quality element impact		Control
new embankment on the southern boundary of the recreation ground, adjacent to Ashley Road, to limit the passage of floodwater downstream.			rest areas especially for species with slower swimming speeds and low burst distances
	Negligible	**Invertebrates and macrophytes:** Localised loss or displacement of species where channel becomes culverted. Numbers of macrophytes may deteriorate with change to the amount of river bed to be available for colonisation by macrophytes.	
	Negligible	**Channel width and depth:** Constrained and unnatural channel dimensions. Lack of natural channel form.	Consider baffles/deflectors to create semi-sinuous flow to naturalise artificial channel form.
	Negligible	**Structure and substrate of the river bed:** Culvert could cause localised silt build up on the upstream of this structure, causing a decrease in the amount of fine sediment being transported downstream. Need to consider consistent bed levels and ensure sediment does not accrete.	Consider coarse bottom as substitute for a channel bed to trap sediment.
During construction:	**Negligible**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event. Potential for fish strandings during low flow if dewatering.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Fish rescue plan before construction takes place.
New wetland habitat including swales linked to Summerlock stream and ephemeral streams	**Positive change**	**Fish:** The creation of a new floodplain wetland will provide additional heterogenous habitat which will promote species richness and additional habitat for fish. However, migration to a wetland area may not be appropriate due to increased risk of stranding in shallow/ephemeral features.	Design to ensure no low points that could trap fish then dry out.
	Positive change	**Invertebrates and macrophytes:** Potential for localised change in plant communities and species populations. Additional areas to be used as habitat which improves overall diversity and abundance.	

Site element	Quality element impact		Control
	Positive change	**River depth and width:** Increases the amount of floodplain restored to its natural function and facilitates natural processes. Sediment variability is likely to increase with additional floodplain connection, resulting in heterogeneous flow. Ephemeral channels will only be activated when water levels are higher. During low flow conditions, their 'channel' could become weathered out or degraded due to poorly defined channel form.	
	No change	**Quantity and dynamics of flow:** No change as a result of wetland habitat. No change as a result of ephemeral channels. Longer channel length, which is undated during higher flows, will contribute to variable quantity of flow. However, as this is only likely to be during winter, no change is likely overall.	
	Negligible	**Structure and substrate of river:** Due to creation of ephemeral channels, potential for increased siltation, and therefore increased heterogeneity and geomorphic variability over time due to habitat development. Potential temporary increase in localised suspended sediment concentrations but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows. Ephemeral channels will likely degrade during summer months where there is no water. Depending on sediment size distribution, there is likely to be a propensity for larger sized sediments unable to be transported until higher flows. Areas eroded out likely to have substantial deposits of fines.	Ensure distribution of sediments in ephemeral channel design is suitable to avoid bedload armouring and large source of fines to be re-activated during high flows.
	No change	**Structure of riparian zone:** Potential for improvement with swales as they will improve morphological and hydrological diversity but overall no change to water body status.	
	Negative	**Oxygenation:** Potential risk of deterioration, particularly in warmer conditions when shallower water heats up, and de-oxygenates in ephemeral areas of channel. Most of the year, no problem due to hydrological link with channel.	

Site element	Quality element impact		Control
During construction:	**Negligible**	**Water quality:** Potential temporary increase in localised suspended sediment concentrations but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows.	All works to be carried out in accordance with relevant current legislation and best practice. Surface water/Sediment management plan should be implemented. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.
	Negative	**Ecology (fish and invertebrates)**: Potential disturbance during construction, with localised but temporary disturbance to invertebrates, in particular and on the adjacent floodplain. Working within or near the Avon channel could disturb fish presenting a temporary but localised risk to species within the channel. Noise is likely to be the biggest issue.	
Shingle beach, boardwalks and picnic areas adjacent to the new wetland habitat and improved public access at selected points (e.g. two proposed river viewing platforms)	**Negative**	**Hydromorphology – channel width and depth:** Depending on location, possible interruption to channel form and sediment transport due to introduction of artificial sediment sizes, and artificial structure. Likely to create scour pools if artificial in structure. Potential to over-deepen and over-widen channel depending on location. Potential for increased erosion at river margin by people and dogs.	Needs to be suitable sediment size to avoid armouring of channel bed and also re-transport. Imported material should be geologically appropriate to a chalk river setting,
	Negative	**Ecology: Deterioration of channel ecology:** Poor habitat (deterioration in quantity and quality), localised loss of species including invertebrates and macrophytes due to potentially constrained channel and loss of footprint. Potential increase in localised suspended sediment concentrations.	
	Negative	**Biological elements – fish:** Potential direct effects on biological quality elements due to change in habitat structure as well as impediment to fish passage (e.g. if any beach narrow or shallows the channel). Potential direct effects on biological quality elements due to change in habitat structure as well as impediment to fish passage (e.g. if any beach narrow or shallows the channel). This should facilitate fish passage upstream, therefore promoting diversity in fish fauna through increase in availability of upstream habitat, benefitting salmonids and other species.	Fish more likely to avoid this area
	Negligible	**Physico-chemical:** Temporary changes to turbidity concentrations, light and water quality due to people and dogs easily able to enter the river channel.	
During construction:	**Negligible**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice.

Site element	Quality element impact		Control
			Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Any imported material to be clean. Avoid contamination/spread of invasive species (INNS)
Localised ground raising or flood wall	**Negligible**	**Invertebrates and macrophytes:** Disturbance due to movement/loss of substrate via runoff towards watercourse.	
	No change	**Quantity and dynamics of flow and water levels. /**No significant change. Reduced uncontrolled flood flows onto the surrounding area as a consequence of retaining walls. This is acceptable as it prevents flooding.	
During construction:	**Negative**	**Water quality:** Working close to the channel, potential release of sediment and soil, presenting a temporary but localised risk to species within the channel during works. Potential deterioration due to high phosphate levels in the sediment/water column, which will be disturbed during construction. Potential temporary increase in localised suspended sediment concentrations but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Any imported material to be clean. Avoid contamination/spread of invasive species (INNS)

Table 9: Impact assessment for the Maltings and Central Car Park area

Site element	Quality element impact		Control
Widening of the channel to a maximum width of 50m, providing a two-staged channel with marginal wetland habitat on both banks.	**Positive change**	**Fish fauna.** This should facilitate fish passage within the River Avon increasing connectivity between localised reaches/habitat and facilitating passage for those migratory species. Widened channel will also provide additional habitat opportunities including better refuge for young fish during higher flows.	Channels will be designed to facilitate fish passage during low flows and maintain sediment continuity. A range of instream, marginal and riparian enhancements will be introduced to generate new heterogenous habitat to benefit a range of species, including salmonids and water crowfoot communities.
	Positive change	**Macro-invertebrates and macrophytes:** Improvement in channel connectivity allowing better movement of aquatic macro-invertebrates both longitudinally (downstream drift) and laterally (connectivity of wetted channel with marginal areas) within the channel. Improvement in species richness as a result of differing water	

Site element	Quality element impact		Control
		depths and velocities. The two-stage channel is designed with a variable berm width with marginal wetland habitat. Which will lead to increased flow variability, increased habitat for macrophytes if conditions are suitable. Unlikely to affect phytobenthos overall.	
	Positive change	**Channel flow characteristics:** Improvement due to variable morphology, replicating more natural channel form. Heterogenous flows improve oxygenation, reduce silt within the water column and sediment transport, and therefore overall water quality.	
	Positive change	**River width and depth variation:** The proposals could result in the river being returned to something closer to the river characteristics of a natural chalk stream with improved depth variation and heterogeneity in flows, dimensions and sediment with installation of pools and weirs. The two-stage channel is designed with a variable berm width with marginal wetland habitat.	
	Positive change	**Structure and substrate of the river bed:** Improved potential for transport of sediment of varying sizes. Increased heterogeneity – variable flow and sediment.	
During construction:	**Negative**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Implementation of sediment management plan during in-river works.
	Negative	Sediment disturbance: Potential temporary increase in localised suspended sediment concentrations but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows.	
	Negative	Water quality: Potential deterioration due to high phosphate levels in the sediment/water column, which will be disturbed during construction.	Avoid contamination/spread of invasive species (INNS)
Removal of Swimming Pool Gate structure, reprofiling of the	**Positive change**	**Fish.** This should facilitate improved fish passage to any spawning grounds upstream of the weir and promote movement of resident fish species locally within this reach of the River Avon. This will benefit	Possible opportunities for habitat creation/ enhancement within pools and along structure of fish passage to further improve

Site element	Quality element impact		Control
bed and inclusion of rock ramps		fish fauna including those migratory fish such as salmonid species.	habitat diversity for a range of fish species.
	Positive change	**Macrophytes and invertebrates:** Improvement in species richness and abundance as a result of improved connectivity. Also allows for change in habitat, and increased variability in a range of species. Potential loss of habitat and/or relocation of some species under footprint of rock ramps and any additional fish pass, if constructed. **Improvement in species diversity and abundance** as a result of rock ramps which could act as a substrate for more diverse species; in addition, differing water depths and speeds also support increased diversity in habitat, and increased variability in a range of species.	Conditions could be improved in channel with inclusion of marginal berms to trap sediment and improve overall species richness. Potential to use bank around structure as additional habitat; planting of macrophytes as marginal habitat to benefit all trophic levels within the ecological food web.
	Positive change	**Channel form and flow:** Improvement due to variable morphology, replicating more natural channel form. Heterogenous flows improve oxygenation, reduces turbidity levels (reduced silt within the water column) and sediment transport, and therefore overall water quality.	Design should prevent over-engineered structure with little naturalness in the channel
	Positive change	**River width and depth variation:** The proposals could result in the river being returned to something closer to the river characteristics of a natural chalk stream with improved depth variation and heterogeneity in flows, dimensions and sediment. It is expected water levels will lower by up to 0.5 m.	Conditions could be improved in channel with inclusion of marginal berms to trap sediment and improve overall species richness
	Negligible	**Structure and substrate of the river bed:** Improved potential for transport of sediment of varying sizes. Increased heterogeneity – variable flow and sediment.	Implementation of sediment/surface water management plan. Imported rock/sediment must be geologically appropriate to a chalk river, clean and of suitable size.
	Negative	**Water quality:** Pollution from scour out of sediment resulting from additional flow passing down Mill Stream. Potential issue with historic phosphate loading in this sediment.	Implementation of surface water/sediment management plan. Additionally, sediment sampling will be conducted to evaluate the level of contamination that may be present in deposited material. This information will be used to assess the risks associated with any contaminants: monitoring of downstream water quality during the works may be implemented to avoid potential deterioration and consideration will be given to

Site element	Quality element impact		Control
			removal of fine sediment prior to construction activity.
During construction:	**Negative**	Disturbance to species within the river at this point due to suspended sediment, working in the channel and noise; potential for disturbance or loss of species over a localised and temporary event. Potential for fish strandings during low flow if dewatering.	Fish rescue plan required. All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Implementation of sediment management plan during in-river works.
	Negative	**Ecology (fish and invertebrates)**: Potential disturbance during construction, with localised but temporary disturbance within the channel. Working within the channel will disturb fish presenting a temporary but localised risk to all species present. Potential for impact from construction noise/vibration.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Implementation of surface water/sediment management plan. Avoid contamination/spread of invasive species (INNS)
	Negative	**Macrophytes:** Disturbance/degradation during tracking of vehicles during in-channel construction activities.	
	Negative	**Water quality:** Working within the channel, causing release of sediment if flow is maintained. Potential deterioration due to high phosphate levels in the sediment.	
New twin culvert approximately 2.5m wide and 0.75m high extending over 100m from the River Avon main channel into Summerlock Stream, including inlet/outlet structures; and Extension of twin pipe culverts (each 0.9m in diameter) over a length of approximately 150m to move the outfall of the Waitrose culvert	**No change**	**Water quality**. Floodway could cause localised silt build up on the upstream of this structure, causing a decrease in the amount of fine sediment being transported downstream. Need to consider consistent levels above the bed and ensure sediment does not accrete.	Embankment slope angle might be locally steepened to allow this culvert to be short.

Site element	Quality element impact		Control
During construction:	**Negative**	Disturbance to species within the river at locations where culvert connections are made; potential for disturbance or loss of species over a localised and temporary event. Potential for fish strandings during low flow if dewatering.	All works to be carried out in accordance with relevant current legislation and best practice. Do not allow uncured concrete or concrete residue to enter either still or flowing water, either directly or indirectly through runoff. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.
Modified layout of existing fish pass weirs at The Maltings by lowering the upstream crest level and making any necessary repairs to the structure.	**Positive change**	**Fish:** This should facilitate fish passage upstream, therefore promoting diversity in fish fauna through increase in availability of upstream habitat, benefitting salmonids and other species.	
	Negligible	**Macro-invertebrates:** Improvement in channel connectivity allowing better movement of aquatic macro-invertebrates and connecting sub-populations up- and downstream. Potential localised loss or displacement of species beneath/near to structure.	
	No change	**Hydromorphology and water quality.** Likely no change.	
	No change	**Hydromorphology: sediment, form and water.** No significant change although depends where located with potential effects including: o Increased or reduced sediment supply downstream o Destabilisation of downstream bed and banks where unprotected o Variability in upstream and downstream siltation.	
During construction:	**Negligible**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice. Do not allow uncured concrete or concrete residue to enter either still or flowing water, either directly or indirectly through runoff. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.
	Negligible	**Water quality:** Working within or close to the channel, potential release of sediment and soil, presenting a temporary but localised risk to species within the channel during works. Potential deterioration due to high phosphate levels in the sediment/water column, which will be disturbed during construction.	
	Negligible	Disturbance to sediment on the channel bed could release fine sediment stored within the substrate currently. As this a legacy issue where pollutants are locked into the fine sediments, this may be difficult to control	

Site element	Quality element impact		Control
			Sediment management plan implementation for in-channel works.
In-channel works to Mill Stream over an approximate 400m length to improve low flow conveyance	**Positive change**	**Fish fauna:** This should facilitate fish passage within the River Avon increasing connectivity between localised reaches/habitat and facilitating passage for those migratory species, such as Atlantic salmon.	
	Positive change	**Macro-invertebrates:** Improvement in channel connectivity allowing better movement of aquatic macro-invertebrates both longitudinally (downstream drift) and laterally (connectivity of wetted channel with marginal areas) within the channel. Improvement in species richness as a result of differing water depths and velocities.	
	Positive change	**Hydromorphology and water quality:** Improvement due to variable morphology, replicating more natural channel form. Heterogeneous flows improve oxygenation, reduce silt within the water column and sediment transport, and therefore overall water quality.	
	Positive change	**River width and depth variation:** The proposals include creation of a low flow channel by introduction of suitable marginal material designed to work with local natural geomorphological processes, and could result in the river being returned to something closer to the river characteristics of a natural chalk stream with improved depth variation and heterogeneity in flows, dimensions and sediment with installation of pools and weirs.	
	Positive change	**Structure and substrate of the river bed:** Improved potential for sediment transport of sediment of varying sizes. Increased heterogeneity – variable flow and sediment.	
During construction:	**Negative**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Implementation of sediment management for in-channel works. Implementation of surface water/sediment management plan. Avoid contamination/spread of invasive species (INNS) Imported rock/sediment must be clean, geologically appropriate to a chalk river.
	Negative	Disturbance to sediment is likely to unlock legacy deposits of phosphate and other contaminants, along with high volume of fine sediments.	
	Negative	**Water quality:** Working within or close to the channel, potential release of sediment and soil, presenting a temporary but localised risk to species within the channel during works. Potential deterioration due to high phosphate levels in the sediment/water column, which will be disturbed during construction.	

Site element	Quality element impact		Control
New low-level flood embankment adjacent to the Waitrose Culvert watercourse	**No change**	No effect during operation.	
During construction:	**Negligible**	Potential for silty runoff during works from working area to affect water quality, species within proximity of working area.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.
Infill of low spots on the existing low level embankment	**No change**	No effect during operation.	
During construction:	**Negligible**	Potential for silty runoff during works from working area to affect water quality, species within proximity of working area.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.
Removal of the existing Library Hatches sluice structure and infill of the Library Side Channel, which connects the Mill Stream to the Avon (may be moved to future phases of the RCI).	**Negligible**	**Fish:** Closes potential fish refuge but likely to contribute to fish habitat improvement in the Avon.	
	Positive change	**Invertebrates:** Loss of habitat/footprint for invertebrates where infill occurs. Overall, potential for better habitat development in the Avon, in terms of marginal habitat and within the main channel.	
	Positive change	**Macrophytes:** Same as above. Loss of habitat/footprint for macrophytes where infill occurs. Overall, potential for better habitat development in the Avon, in terms of marginal habitat and within the main channel.	
	Positive change	**Quantity and dynamics of flow:** Improvement to Avon as channel less likely to be vulnerable to low flow conditions or static impounded conditions during winter. Mill Stream likely to suffer with magnitude of change due to changing discharge into it. However, cumulatively, this is a benefit to the Avon as a whole at this point.	
	Positive change	**River depth and width:** As above. Due to normalised conditions in the Avon as a result of	

Site element	Quality element impact		Control
		closure of this channel, river depth and width is likely to be much improved due to naturalised flow conditions.	
	Positive change	**Structure and substrate of river:** Better within main Avon channel as sediment is not entrained elsewhere. No erosion at confluence as stream flows divert out of the Avon. Improved heterogeneity in sediment at this point.	
During construction:	**Negligible**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.
	Negligible	Potential for silt release during works to infill Mill Stream channel.	Sediment management plan implementation for in-channel works.
River Avon fish passage measures – new short section of in-channel gravel berm in River Avon just upstream of Mill Stream confluence to increase attractant flow for fish	**Positive change**	**Fish:** Narrowing measures should increase the attraction of fish to the main Avon channel and towards the new fish pass steps. These are designed to be easier for a wider range of species to pass than the existing fish pass at Bishops Mill on the Mill Stream.	
	No change	**Macro-invertebrates and macrophytes:** No significant change likely. Increased local velocities may enhance existing in-channel macrophyte growth. Localised displacement of macro-invertebrate species under footprint of introduced marginal material	
	Positive change	**Quantity and dynamics of flow:** Localised variation in velocity profile will add diversity in flow conditions to currently uniform reach in low flows.	
	Positive change	**River depth and width:** Localised change in depth and width in low flow conditions will add morphological diversity in channel at this location.	
	No change	**Structure and substrate of river bed:** Narrowing could result in readjustment of local bed profile and increase potential for localised bed movement in high flow conditions if bed shear is increased due to narrowing measures.	Design the berm feature with reference to local hydraulic conditions at high and low flows. Consider introduction of coarser bed material if detailed design indicates a risk of undesirable bed movement.
During construction:	**Negligible**	Disturbance to species within the river at this point; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up

Site element	Quality element impact		Control
			systems deployed if any spillage occurs. Fish exclusion/rescue plan should be put in place before berm construction.
	Negligible	Potential sediment remobilisation during works resulting in potential deterioration in quantity and quality to species within river channel. Temporary localised potential impact.	All pollution to be controlled under current legislation and best practice. Safeguards to be put in place to reduce the likelihood of sediment plumes and silt in the channel. Will require a Surface Water / Sediment Management Plan.
New flood wall (less than 2m in length) set back from the eastern bank of Summerlock Stream near Fisherton Street. Addition of non-return valve to existing culvert outfall to left bank of Summerlock Stream.	**No change**	**Quantity and dynamics of flow and water levels:** No change.	
	No change	**Protected area:** No change.	
During construction:	**Negligible**	Disturbance to species within the river at this point during works to fit flapped outfall to culvert; potential for disturbance or loss of species over a localised and temporary event.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.
	Negligible	Potential sediment remobilisation during works resulting in potential deterioration in quantity and quality to species within river channel during works to fit non-return valve. Temporary localised potential impact.	All pollution to be controlled under current legislation and best practice. Safeguards to be put in place to reduce the likelihood of sediment plumes and silt in the channel (part of Surface Water / Sediment Management Plan)
Replacement of Millstream Approach road bridge with	**No change**	**Invertebrates, phytobenthos and macrophytes:** Overall, positive interaction with water body status due to less shading and less of a formal structure.	
	No change	**Channel width and depth, and water levels:** No change likely as structures already in place and	

Site element	Quality element impact		Control
new single lane bridge (with capability to be used as a two lane highway bridge in the future) crossing the widened river channel.		assume no additional engineering encroachment. Channel width potentially less constrained due to change in structure which could improve with/depth variation due to more naturalised processes operating.	
	Positive change	**Water quality:** Potentially improved due to runoff being prevented from entering the channel form the bridge (assuming currently drains to the river)	
During construction:	**Negligible**	Potential temporary increase in localised suspended sediment concentrations but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows.	All works to be carried out in accordance with relevant current legislation and best practice. Do not allow uncured concrete or concrete residue to enter either still or flowing water, either directly or indirectly through runoff. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Implementation of surface water/sediment management plan for soils/runoff.
Raising ground levels over a 0.5ha area at Coach Park to act as a flood defence against overland flood flows, using excavated material from modifications to the main river channel corridor, and removal of the Coach Park culvert.	**No change**	**Hydromorphology: sediment, form and water:** No significant change due to location away from the water course.	
	No change	**Quantity and dynamics of flow and water levels:** No significant change. Reduced uncontrolled flood flows onto the surrounding area as a consequence of ground raising. This is beneficial as it prevents flooding and should reduce associated water pollution risk.	
During construction:	**Negligible**	Potential temporary increase in localised suspended sediment concentrations resulting from ground runoff, but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows.	All works to be carried out in accordance with relevant current legislation and best practice. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs. Implementation of surface water/sediment management plan for soils/runoff.

Site element	Quality element impact		Control
Amenity improvements including public viewing area, redeveloped Coach Park, new footpath/cycleway and shingle beach with stepping stones (if considered appropriate following further investigation). With the exception of the Coach Park, these will be located within the new widened river corridor.	**Negative**	**Hydromorphology – channel width and depth:** Depending on location, possible interruption to channel form and sediment transport due to introduction of artificial sediment sizes, and artificial structure. Likely to create scour pools if artificial in structure. Potential to over-deepen and over-widen channel depending on location. Potential for increased erosion at river margin by people and dogs.	Design in accordance with best practice. Needs to be suitable sediment size to avoid armouring of channel bed and also re-transport. Imported material should be geologically appropriate to a chalk river setting.
	Positive change	**Fish:** Potential direct effects on biological quality elements due to change in habitat structure as well as impediment to fish passage (e.g. if any beach narrow or shallows the channel). This should facilitate fish passage upstream, therefore promoting diversity in fish fauna through increase in availability of upstream habitat, benefitting salmonids and other species.	Needs to be suitable sediment size to avoid armouring of channel bed and also re-transport.
	Negligible	**Macro-invertebrates:** Improvement in channel connectivity allowing better movement of aquatic macro-invertebrates and connecting sub-populations up- and downstream. Potential localised loss or displacement of species beneath/near to structure.	
	Negligible	**Hydromorphology: sediment, form and water.** No significant change although depends where located with potential effects including: o Increased or reduced sediment supply downstream o Destabilisation of downstream bed and banks where unprotected o Variability in upstream and downstream siltation.	
	Negligible	**Physico-chemical:** Temporary changes to turbidity concentrations, light and water quality due to people and dogs easily able to enter the river channel.	
		Protected area: This will be improved as a result of improved fish movement. Upstream reaches may/will see improvement due to increased connectivity for migratory fish.	
During construction:	**Negligible**	Working within or close to the channel, potential release of sediment and soil, presenting a temporary but localised risk to species within the channel during works. Potential temporary increase in localised suspended sediment concentrations but not substantially greater than present background conditions (high sediment concentrations within river during normal flow). Fines likely to settle in margins and be re-suspended during higher flows.	All works to be carried out in accordance with relevant current legislation and best practice. Do not allow uncured concrete or concrete residue to enter either still or flowing water, either directly or indirectly through runoff. Safeguards to be put in place to reduce the likelihood of spillages and clean-up systems deployed if any spillage occurs.

Site element	Quality element impact		Control
			Implementation of surface water/sediment management plan for soils/runoff.

5.3 Step 3: Assessment of the proposed Scheme against water body mitigation measures

Within each RBMP, there is a list of mitigation measures, or environmental improvements, which have been identified by the RBMP, which need to be implemented in order to improve the ecology of heavily modified or artificial water bodies by a specified date in order for the UK to meet the target date set by the Regulations. Part of a regulatory compliance assessment is to consider mitigation measures and assess whether a proposed Scheme can contribute to them, or might obstruct any of them from being delivered. As the Avon water body is not heavily modified or artificial, there are no mitigation measures to assess the Scheme against.

5.4 Step 4: Cumulative impact assessment of the proposed Scheme in conjunction with other proposed Schemes planned or in place along the water body.

-Potential hydropower Scheme under consideration at Bishop's Mill site at the Maltings by Salisbury Community Energy: possible future proposal for a water wheel on the Bishop's Mill site to generate electricity. As a planning application for this project has not been submitted, no further details are available at the current time to assess the potential in-combination impacts.

-Combined Schemes from Salisbury Masterplan, which includes in particular a number of in-channel and marginal improvements of habitat and vegetation. The proximity of these Masterplan proposals has the potential to cumulatively impact with the current Scheme on the water body. Some of these potential cumulative effects are related to the results of in-channel construction activities, and it is recommended that there should be a lag between each phase of the Masterplan in order to give some time for the water body to recover. Other cumulative effects are longer-term and related to improvements in the water body through renaturalisation.

5.5 Step 5: Assessment of the proposed Scheme against objectives in the Regulations

Taking into consideration the impacts of the Scheme on the biological, physico-chemical and hydromorphological quality elements, it is unlikely to compromise progress towards achieving good ecological potential or cause a deterioration of the overall ecological potential of the river water bodies that are in scope. This would need to be reviewed if there were any major changes in the design of the Scheme.

5.6 Step 6: Assessment of the proposed Scheme against other legislation

The Regulations also require consideration of how a new Scheme might impact on other water bodies and other legislation. This requirement originates from the Water Framework Directive that states in Article 4.8 : '…a Member State shall ensure that the application does not permanently exclude or compromise the achievement of the objectives of this Directive in other bodies of water within the same river basin district and is consistent with the implementation of other Community environmental legislation.

The assessment of the Scheme has considered not only the Hampshire Avon (Upper) water body within which it is located, but also all other relevant upstream, downstream and underlying water bodies. The Scheme will improve the reach within which it is located, with no obvious conflict with status objectives for any other water body. Therefore, the current Scheme complies with Article 4.8.

Article 4.9 of the Water Framework Directive requires that "Member States shall ensure that the application of the new provisions guarantees at least the same level of protection as the existing Community legislation".

The Habitats Directive (1992) (as transposed into UK Regulations) promotes the maintenance of biodiversity by requiring governments to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance. There is one European designated site in the vicinity of the Scheme, the River Avon SAC, which has been subject to Appropriate Assessment under the Habitats Regulations. The Appropriate Assessment concluded that "….*It is possible to ascertain no adverse effect of the Proposed Scheme on the integrity on the River Avon SAC. This conclusion is dependent on*….[application of stated]…. *mitigation measures and/or conditions*….". The Scheme will also create new aquatic and riparian habitat that will support the interest features of the relevant designations.

The Nitrates Directive (1991): The Scheme will not significantly influence or moderate agricultural land use or land management.

5.7 Conclusion

Compliance with the key objectives against which the impacts of proposed works on a water body need to be assessed are outlined below in Table 10.

Table 10: Compliance of the Scheme with the environmental objectives of the Water Environment Regulations

Environmental Objective	Scheme	Compliance with the Regulations
No changes affecting high status sites (including sites designated under other legislation)	After consideration as part of the detailed compliance assessment, including the preliminary conclusions from the Appropriate Assessment, the proposed Scheme is considered unlikely to cause a change to the high status sites in the study area if mitigation is put in place.	Yes.
No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential	Yes, after consideration as part of the detailed compliance assessment, the proposed Scheme will not cause deterioration in the status of the Hampshire Avon (Upper) water body if mitigation is put in place. However, this is dependent upon the findings of bedded sediment analysis and development of a sediment management plan during detailed design for implementation during construction and once the Scheme becomes operational.	Yes
No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies	The proposed Scheme will not cause a permanent exclusion or compromise achieving the status objectives in other bodies of water within the same River Basin District (RBD)	Yes.
No changes that will cause failure to meet good groundwater status or result in a deterioration to groundwater status.	The proposed Scheme will not cause deterioration in the status of the Hampshire Avon (Upper) water body.	Yes.

Appendix B. Detailed Design Drawings

DO NOT SCALE

Millimetres 0 10 100

N

PROPOSED FOOTBRIDGE OVER NEW SUMMERLOCK STREAM OFFTAKE BANKS

EXISTING DRAIN TO BE RETAINED

4m NOMINAL WIDTH CHANNEL

OFFTAKE CHANNEL 2.4m WIDTH

FOOTPATH EMBANKMENT TO BE LOWERED WITH 1:20 SLOPE FROM EXISTING GROUND TO 48.2m AOD OVER AN APPROXIMATELY 58.0m LENGTH TOWARDS SOUTH OF FOOTBRIDGE. SEE DWG NO. ENVIMSW002033-ATK-00-3AR-DR-C-000064 FOR LONG SECTION OF FOOTPATH

EXISTING DITCH/DRAIN TO BE RETAINED

RIVER AVON

RIFFLE CONNECTION TO SUMMERLOCK STREAM 01

BEACH AREA WITH GRAVELBED AND BANKS

BACK CHANNEL

RIFFLE CONNECTION TO SUMMERLOCK STREAM 02

PROPOSED NEW SUMMERLOCK STREAM CHANNEL

NEW CHANNEL BANK SLOPES - SEE NOTES.

NEW BOARDWALK

RIVER AVON

BACKWATER FEATURE

FOR SETTING OUT DETAILS OF NEW SUMMERLOCK STREAM REFER DRAWING NO. ENVIMSW002033-ATK-00-3AR-DR-C-000055 AND 000056

NEW VIEWING PLATFORM

COLDHARBOUR LANE

HYDRAULIC CONTROL REACH FROM CHAINAGE 230 TO 270. FOR DETAILS REFER DRAWING NO. ENVIMSW002033-ATK-00-3AR-DR-C-000053

CONTRACTOR TO NOTE TREE ROOT PROTECTION ZONE.

NEW FEED SUPPLY PIPE INTEGRATED TO ABANDONED BLACKWELL HATCHES - WITH HEADWALL AND VERTICAL SLUICE CONTROL.

NEW 600 DIA PIPE INSTALLED AT EXISTING SLUICE. FOR DETAILS REFER DRAWING NO. ENVIMSW002033-ATK-00-3AR-DR-C-000007

NEW SUMMERLOCK STREAM TO BE TIED INTO EXISTING POOL, DOWNSTREAM OF THE HATCHES

EXISTING WALL REMOVED AND BANK BATTERED TO PROVIDE IMPROVED ACCESS TO THE CHANNEL WITH A MINIMUM SLOPE OF 1:6 AND MAXIMUM SLOPE OF 1:2

ALLOTMENT GARDEN

PROPOSED PRIMARY DEFENCE WALL. FOR DETAIL REFER DRAWING NUMBER ENVIMSW002033-ATK-00-3AR-DR-C-000038

PROPOSED FLOOD DEFENCE EMBANKMENT. FOR DETAIL REFER DRAWING NUMBER ENVIMSW002033-ATK-00-3AR-DR-C-000032 TO 000037

PROPOSED RETAINING WALL TO BE TIED INTO BRIDGE ABUTMENT. FOR DETAIL REFER DRAWING NUMBER ENVIMSW002033-ATK-00-3AR-DR-C-000040

SUMMERLOCK STREAM CONTROL STRUCTURE. FOR DETAIL REFER DRAWING NUMBER ENVIMSW002033-ATK-00-3AR-DR-C-000010

SECONDARY DEFENCE FLOOD WALL. FOR DETAIL REFER DRAWING NUMBER ENVIMSW002033-ATK-00-3AR-DR-C-000031

ASHLEY ROAD

WESTMINSTER

River Avon

Track

- 000048 PLAN
SCALE 1:500

REFERENCE DRAWINGS:

ENVIMSW002033-ATK-00-3AR-DR-C-000032
GENERAL ARRANGEMENT SHEET 01 OF 06

ENVIMSW002033-ATK-00-3AR-DR-C-000033
GENERAL ARRANGEMENT SHEET 02 OF 06

ENVIMSW002033-ATK-00-3AR-DR-C-000034
GENERAL ARRANGEMENT SHEET 03 OF 06

ENVIMSW002033-ATK-00-3AR-DR-C-000035
GENERAL ARRANGEMENT SHEET 04 OF 06

ENVIMSW002033-ATK-00-3AR-DR-C-000036
GENERAL ARRANGEMENT SHEET 05 OF 06

ENVIMSW002033-ATK-00-3AR-DR-C-000040
PROPOSED RETAINING WALL

ENVIMSW002033-ATK-00-3AR-DR-C-000031
SECONDARY DEFENCE FLOOD WALL

ENVIMSW002033-ATK-00-3AR-DR-C-000010
SUMMERLOCK STREAM CONTROL STRUCTURE

ENVIMSW002033-ATK-00-3AR-DR-C-000038
PROPOSED PRIMARY DEFENCE WALL

ENVIMSW002033-ATK-00-3AR-DR-C-000049 TO 000051
SUMMERLOCK STREAM AND WETLAND CROSS SECTIONS

ENVIMSW002033-ATK-00-3AR-DR-C-000052
SUMMERLOCK STREAM LONG SECTION

ENVIMSW002033-ATK-00-3AR-DR-C-000063 AND 000064
LONG SECTIONS OF SUMMERLOCK STREAM POOLS AND OFFTAKE STRUCTURE

10m 0m 10m 20m 30m
Scale 1:500

100m 0m 200m 400m 600m
Scale 1:10000

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

1. WORKING WITHIN WATERCOURSE
2. EXISTING SERVICES AND STRUCTURES
3. LIMITED WORKING SPACE
4. IMPLEMENT A SAFE SYSTEM FOR WORKING IN OR NEAR WATER AND EMERGENCY FLOOD EVACUATION PLAN TO BE DEVELOPED AND IMPLEMENTED FOR STAFF AND EQUIPMENT WORKING NEAR THE RIVER AND/OR FLOODPLAIN.
5. RISK OF SEDIMENT POLLUTION WITHIN WATERCOURSE, APPROPRIATE SEDIMENT MANAGEMENT PLAN TO BE DEVELOPED AND ENFORCED TO MINIMISE FINE SEDIMENT INPUT INTO, AND MANAGE MOBILISATION OF SEDIMENT WITHIN, THE CHANNEL. THIS SHOULD BE IN ACCORDANCE WITH PPG5 AND PPG6, AS WHILE OFFICIALLY WITHDRAWN, ARE SEEN TO REPRESENT GOOD PRACTICE.
6. APPROPRIATE STRATEGY FOR IDENTIFICATION AND, IF PRESENT, ERADICATION OF INVASIVE PLANTS ON SITE TO BE DEVELOPED.
7. VARIABLE GROUND CONDITIONS IN PLACES SO ON-SITE CHANGES TO THE DESIGN MAY BE NECESSARY AS GUIDED BY AN ON-SITE GEOMORPHOLOGIST.
8. WATER VOLES WILL BE TRAPPED FROM THIS AREA UNDER LICENCE PRIOR TO WORKS. IN ADDITION TO NORMAL ECOLOGICAL MEASURES, SITE STAFF MUST HAVE ECOLOGICAL BRIEFING ON LICENCED WORKS.
9. GROUNDWATER LEVELS ARE LIKELY TO BE HIGH SO SAFE SYSTEM OF WORK WOULD NEED TO BE DEVELOPED TO ENSURE THIS IS MANAGED AS THE NEW CHANNEL IS CUT.
10. ALONGSIDE THE RIVER AVON AREAS OF VEGETATION WILL NEED TO BE RETAINED AND THESE AREAS WILL NEED TO BE TEMPORARILY FENCED OFF PRIOR TO THE WORKS TO AVOID IMPACTING THESE AREAS UNNECESSARILY DURING CONSTRUCTION.
11. PUBLIC INTERACTION LIKELY
12. EXCAVATION STABILITY DUE TO HIGH GROUNDWATER
13. HEALTH RISK - ASBESTOS IDENTIFIED IN THE SOIL
14. CONSTRUCTION OF NEW CHANNEL-SEDIMENT RELEASED TO THE AQUATIC ENVIRONMENT

MAINTENANCE/CLEANING

1. SOME NATURAL ADJUSTMENT OF THE CHANNELS IS ENVISAGED AND SHOULD BE ALLOWED TO OCCUR UNLESS THE EXTENT LEADS TO THE THREATENING OF AN ASSET SUCH AS THE TREE ROOT AREA OF THE MATURE BLACK POPLARS. A MONITORING PLAN SHOULD BE DEVELOPED AND IMPLEMENTED TO ASSESS THE SIGNIFICANCE OF ANY CHANGE AND ADAPTIVE MANAGEMENT MEASURES PUT IN PLACE WHERE NECESSARY.
2. IDENTIFICATION AND ERADICATION OF INVASIVE PLANTS ON SITE WILL BE REQUIRED DURING MONITORING PERIOD AND THROUGHOUT THE LIFE OF THE SCHEME.
3. THERE ARE STEEP AND VARYING CHANNEL SIDES (BANKS) ON CHANNEL REALIGNMENT WITH SOME HIDDEN DEEPER WATER POOLS AND CHANNELS. CARE TO BE TAKEN WHEN ENTERING THE WETTED AREAS
4. MAINTENANCE ACCESS IS REQUIRED
5. POTENTIAL FOR SLIPS, TRIPS AND FALLS.
6. ENVIRONMENTAL HAZARD - PRESENCE OF PHYTOPHTHORA IDENTIFIED

DECOMMISSIONING/DEMOLITION

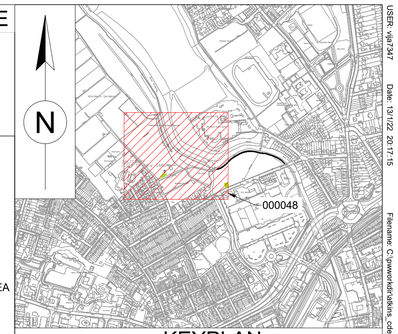
NONE ALTHOUGH NOTE CONSTRUCTION ADVICE ON SEDIMENTS, INVASIVE SPECIES, GROUNDWATER AND WORKING NEAR WATER.

KEYS:

- MAJOR CONTOUR
- EXISTING WATERCOURSE
- PROPOSED WATERCOURSE
- PROPOSED EMBANKMENT
- PROPOSED EMBANKMENT
- PROPOSED FOOT PATH
- HYDRAULIC CONTROL REACH
- TREE PROTECTION FENCING AREA
- GPR IDENTIFIED FEATURE
- ELECTRICITY CABLES
- WATER PIPES
- GAS MAIN
- BRITISH TELECOMMUNICATION
- GAS MEDIUM PRESSURE
- WATER DISTRIBUTION MAINS
- VIRGIN COMMUNICATION MEDIA
- COMMS TELECOMMUNICATION
- LOW VOLTAGE (SCOTTISH AND SOUTHERN ELECTRICITY)
- SCOTISH AND SOUTHERN ELECTRICITY_33kv
- EXISTING STRUCTURES TO BE REMOVED

GRAY SERVICES BASED ON STATUTORY UNDERTAKER C2 RETURNS. COLOURED SERVICES ARE BASED ON GPR SURVEY RESULTS

- BRICK FLOOD WALL
- FLOOD WALL
- EXISTING TREE
- TREE CANOPY
- 80% ROOT PROTECTION AREA
- 500 DEEP CHANNEL SLOPE 1:2
- 500 DEEP CHANNEL SLOPE 1:3
- 500 DEEP CHANNEL SLOPE 1:4
- 500 DEEP CHANNEL SLOPE TRANSITION
- POOL 1:3 SLOPE TYING INTO SUMMERLOCK STREAM CHANNEL



KEYPLAN
SCALE 1:10000

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN m AOD UNLESS OTHERWISE SPECIFIED.
3. TEMPORARY DEFENCES ARE TO BE PROVIDED DURING CONSTRUCTION WORKS WHEREVER EXISTING DEFENCE LEVELS ARE REDUCED TO FACILITATE WORKS.
4. EXACT LOCATION OF UNDERGROUND SERVICES TO BE CONFIRMED BY TRIAL DIGHOLE.
5. PRIOR TO USING THE WORKS INFORMATION SHOWN ON THIS DRAWING THE CONTRACTOR MUST REFER TO THE DESIGNER'S DESIGN RISK ASSESSMENT (ENVIMSW002033-ATK-ZZ-300-RA-Z-000001.XLSX) FOR RISKS CONCERNING THIS SECTION OF THE WORKS. THE PRINCIPAL CONTRACTOR AND OTHER CONTRACTORS SHOULD NOTE THAT THE RISKS IDENTIFIED IN THIS DOCUMENT ARE NOT EXHAUSTIVE AND FURTHER CONSIDERATION BY THEM MAY BE NECESSARY.
6. UNLESS OTHERWISE AGREED WITH THE ENVIRONMENT AGENCY WORKS MUST NOT COMMENCE UNTIL IT IS CONFIRMED THAT THE CONSENT OR APPROVAL FOR THE WORKS INFORMATION SHOWN ON THIS DRAWING HAS BEEN GRANTED.
7. TREE PROTECTION DETAILS REFER DRAWING NUMBER: ENVIMSW002033-ATK-00-3AR-DR-L-000301 TO 000304

DRAFT

Rev.	Date	Description	By	Chk'd	App'd
P01	13/01/2022	FOR REVIEW	VK	DK	SR

Drawing Status: FOR REVIEW
Suitability: S3

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Client: Environment Agency

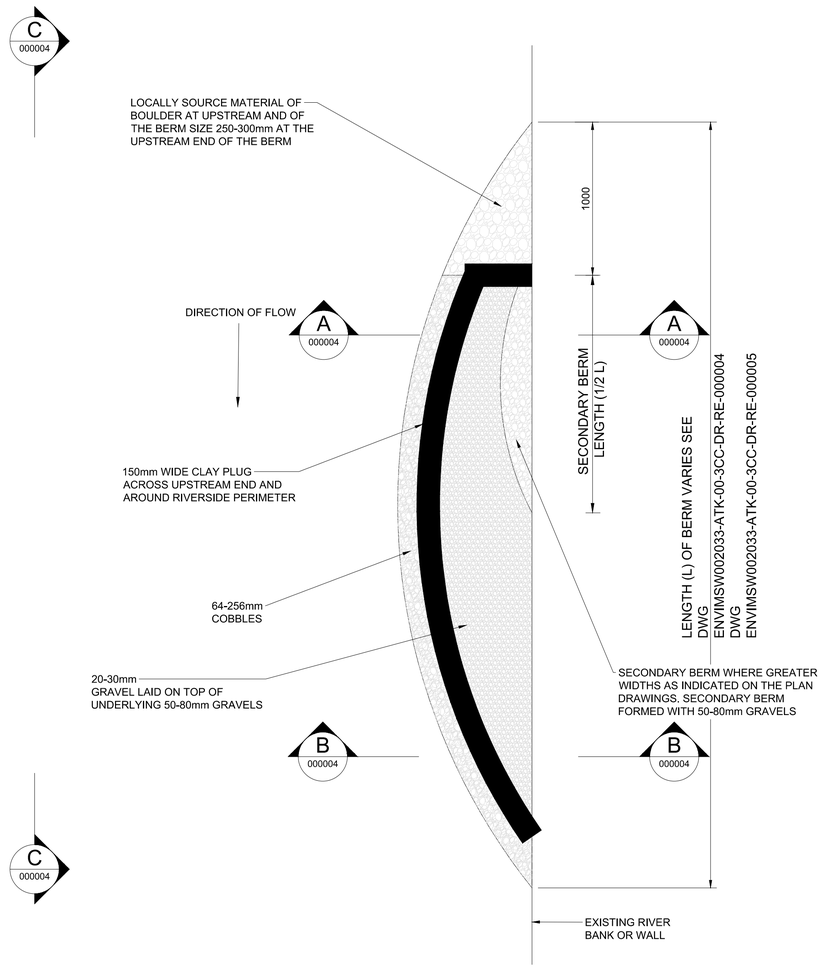
Project Title: SALISBURY RIVER PARK PHASE 1

Drawing Title: ASHLEY ROAD SUMMERLOCK STREAM CHANNEL PLAN

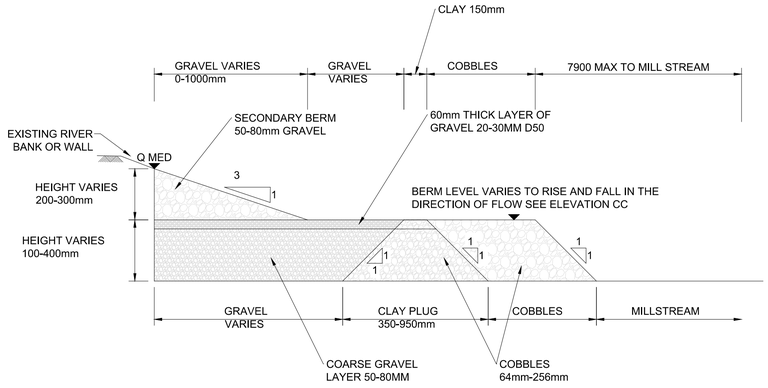
Scale	Drawn	Checked	Reviewed	Authorised
AS SHOWN	VK	DK	SSK	SR
Original Size	Date	Date	Date	Date
A1	05/01/2022	05/01/2022	05/01/2022	13/01/2022

Drawing Number: ENVIMSW002033-ATK-00-3AR-DR-C-000048
Revision: P01

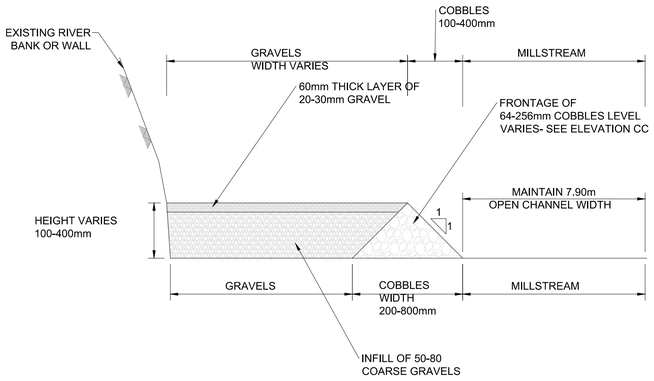
DO NOT SCALE



- 000004 TYPICAL PLAN OF BERMS
SCALE 1:20



A 000004 TYPE 1 BERM SECTION
SCALE 1:20



B 000004 TYPE 2 BERM SECTION
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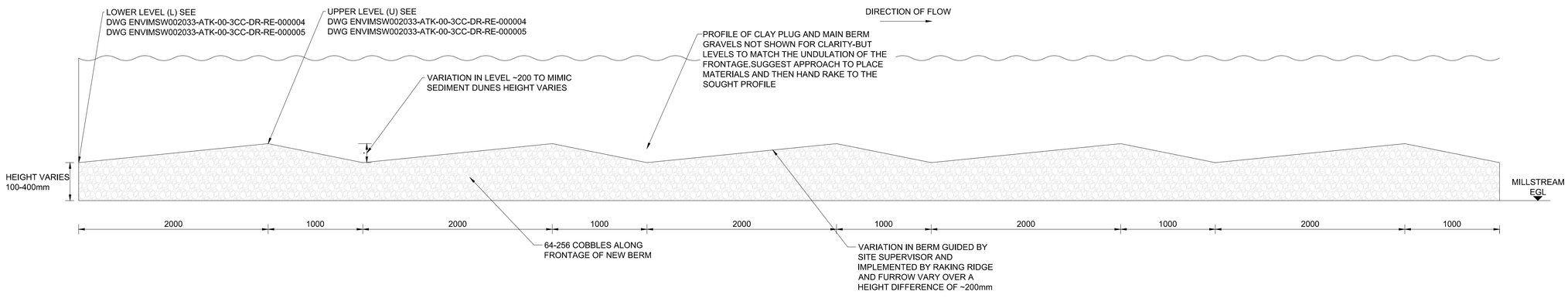

C 000004 SECTIONAL ELEVATION OF BERMS
SCALE 1:25

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION
SERVICES
EXISTING WALL STABILITY
LIMITED WORKING SPACE

MAINTENANCE/CLEANING
GROUND ANCHOR INSPECTIONS
WORKING WITHIN WATER

DECOMMISSIONING/DEMOLITION
EXISTING STRUCTURE

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE mAOD UNLESS OTHERWISE SPECIFIED.
3. FOR PLAN REFER DWG NO. DWG ENVIMSW002033-ATK-00-3CC-DR-RE-000004 DWG ENVIMSW002033-ATK-00-3CC-DR-RE-000005

0.5m 0m 0.5m 1m
Scale 1:20

0.5m 0m 0.5m 1m
Scale 1:25

DRAFT

Rev.	Date	Description	By	Chk'd	App'd
P01	13/01/22	FOR REVIEW	LR	AC	SR

Drawing Status: FOR REVIEW
Suitability: S3

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Client: Environment Agency

Project Title: SALISBURY RIVER PARK

Drawing Title: CENTRAL CAR PARK MILLSTREAM BERM TYPICAL DETAIL

Scale	Drawn	Checked	Reviewed	Authorised
AS SHOWN	LR	AC	MV	SR
Original Size: A1	Date: 13/01/2022	Date: 13/01/2022	Date: 13/01/2022	Date: 13/01/2022

Drawing Number: ENVIMSW002033-ATK-00-3CC-DR-C-000004
Revision: P01

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Millimetres 0 10 100

PROPOSED STEPS FOR DETAILS
REFER DRAWING ENVIMSW002033-ATK-00-3AR-DR-C-000107

RIVER AVON

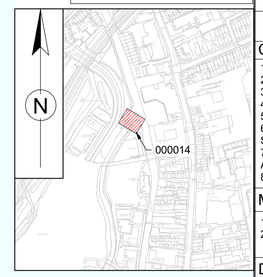
B 000015

ROCK WEIR ON TOP OF CONCRETE BASE

SHEET PILE CUTOFF DETAILS TBC

SOP DETAILS		
SOP NO	EASTING(m)	NORTHING(m)
SOP 01	414273.933	130484.567
SOP 02	414270.433	130476.476
SOP 03	414267.628	130471.802
SOP 04	414278.337	130465.376
SOP 05	414281.215	130470.171
SOP 06	414291.501	130472.843

DO NOT SCALE



KEY PLAN
SCALE 1 : 5000

PROPOSED REINFORCED CONCRETE WALLS EACH SIDE OF WEIR

ELEC

PROPOSED HANDRAILS 1150 HIGH

420 WIDE AND 100 DEEP POCKET

PROPOSED 600 WIDE, 200 DEEP NOTCH IN ROCK WEIR FOR FISH PASSAGE

450x450x450 PURBECK STONE SUITABLE FOR RIVER ENGINEERING WORKS TO BE PLACED TO MAXIMISE INTERLOCKING INTERFACE WITH RANDOMLY VARYING ALIGNMENT

SOP 01 SOP 02 SOP 03 SOP 04 SOP 05 SOP 06

450 450 450 450

SSL 45.60 mAOD

TOWL 47.00 mAOD

A 000015 A 000015 C 000015 C 000015 D 000015 D 000015

8795

3600

5422

1800

2000 2000

SLOPE 1:3 SLOPE 1:3

10875

24°

136°

NEW FOOT AND CYCLE BRIDGE. REFER ENVIMSW002033-ATK-RB-3CC-DR-C-000010 FOR DETAILS

12489

25THK IJ

0.05

EXISTING LAMP POST TO BE RELOCATED

MH101 Communications CL: 48.20m

MH100 Communications (UTL) CL: 48.01m

LT(S) LT(S) LT(S)

A 000014 PLAN CONTROL STRUCTURE
SCALE 1 : 50

2.5 2.0 1.5 1.0 0.5 0 1 2 3
SCALE 1:50 (m)

250 200 150 100 50 0 100 200 300
SCALE 1:5000 (m)

DRAFT

REFERRENCE DRAWINGS :

ENVIMSW002033-ATK-00-3CC-DR-C-000081
CENTRAL CAR PARKING GENRAL ARRANGEMENT PLAN SHEET 02 OF 06

ENVIMSW002033-ATK-00-300-DR-C-000015
CONTROL WEIR STRUCTURE GA SHEET 2 OF 2

EXISTING SERVICES

ELEC ELEC — ELECTRICITY CABLES
GPR GPR — GPR SERVICES
COM COM — UTILITY SERVICES

NOTE:

GREY SERVICES BASED ON STATUTORY UNDERTAKER C2 RETURNS. COLOURED SERVICES ARE BASED ON GPR SURVEY RESULTS.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

1. EXISTING FOOTBRIDGE
2. WORKING WITHIN WATERCOURSE
3. EXISTING SERVICES
4. WORKING ADJACENT TO FOOT/CYCLEWAY
5. SIGNIFICANT FLOODING OF THE WORKS AND THE CITY.
6. SERVICES - BURIED ELECTRIC ACROSS ROUTE DUE TO ADJACENT SUBSTATION
7. ENVIRONMENTAL HAZARD -CONTAMINATED LAND, INCLUDING SOME ASBESTOS
8. SOFT GROUND ADJACENT TO THE STRUCTURE

MAINTENANCE/CLEANING

1. WORKING WITHIN WATERCOURSE
2. FLOW CONTROL STRUCTURE COULD BE A CONFINED SPACE

DECOMMISSIONING/DEMOLITION

1. EXISTING FOOTBRIDGE
2. WORKING WITHIN WATERCOURSE
3. EXISTING SERVICES

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

NOTES :

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN m AOD UNLESS OTHERWISE SPECIFIED.
3. TEMPORARY DEFENCES ARE TO BE PROVIDED DURING CONSTRUCTION WORKS WHEREVER EXISTING DEFENCE LEVELS ARE REDUCED TO FACILITATE WORKS.
4. EXACT LOCATION OF UNDERGROUND SERVICES TO BE CONFIRMED BY TRIAL DIG.
5. ISOLATION JOINTS TO BE PROVIDED FOR WALLS CAST ADJACENT / AGAINST EXISTING STRUCTURE.
6. CONCRETE BLINDING SHALL BE GEN3.
7. CONCRETE GRADE TO THE STRUCTURE COMPRISES
   COMPRESSIVE STRENGTH = C40/50
   MAX WATER CEMENT RATIO = 0.40
   MIN. CEMENT CONTENT = 380kg/m³
   ALLOWABLE CEMENT TYPE = IIIA + SR (66% GGBS)
   MAX AGGREGATE SIZE = 20mm
   CHLORIDE CONTENT CLASS = Cl 0.30
   CONSISTENCE CLASS = S3
8. FDL INCLUDED 300mm FREEBOARD. FDL VARIES LINEARLY BETWEEN KNOWN VALUES.
9. MADE GROUND BELOW FOUNDING LEVEL TO BE REPLACED WITH CLASS 6 FILL AS PER SHW SERIES 600.
10. SITE WON MATERIAL TO BE PROCESSED BEFORE BACKFILLING IF THE NATIVE SOIL FOUND TO BE MADE GROUND.

KEY:

IJ - ISOLATION JOINT
SSL - STRUCTURAL SLAB LEVEL
TOWL - TOP OF WEIR LEVEL
TOC - TOP OF CONCRETE
- EXISTING WATERCOURSE
- EXISTING LAMP POST
- PROPOSED WATERCOURSE

Rev.	Date	Description	By	Chk'd	App'd
P01	13/01/2022	FOR REVIEW	AT	DK	SR

Drawing Suitability: **FOR REVIEW** Status: **S3**

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Client: Environment Agency

Project Title: SALISBURY RIVER PHASE - 1

Drawing Title: CENTRAL CAR PARK CONTROL WEIR STRUCTURE GENERAL ARRANGEMENT SHEET 01 OF 02

Scale	Drawn	Checked	Reviewed	Authorised
AS SHOWN	AT	DK	SSK	SR
Original Size	Date	Date	Date	Date
A1	13/01/2022	13/01/2022	13/01/2022	13/01/2022

Drawing Number: ENVIMSW002033-ATK-00-3CC-DR-C-000014 Revision: P01

Work in-Progress 13/01/2022 21:29:07
Atkins Project Number: 5193244

DO NOT SCALE

EXISTING WAITROSE CULVERT

PROPOSED LOCAL GROUND RAISING WITH SLOPE OF 1 IN 5

EXISTING NETWORK RAIL PALISADE FENCE TO BE REINSTATED UP AND OVER THE PROPOSED EMBANKMENT

EXISTING ROAD UNDERPASS

GROUND PROTECTION MEASURES

PLAY AREA

EXISTING RAILWAY TRACK

EXISTING WAITROSE CULVERT OUTFALLS INTO OPEN DITCH NEXT TO ELECTRICITY SUB STATION

TREE PROTECTION FENCING SHOWN INDICATIVELY. DESIGN OF TREE PROTECTION FENCING AND GROUND PROTECTION AT THIS LOCATION TO BE DETERMINED ON SITE WITH SCHEME ARBORIST.

EXISTING LAMP POST TO BE RETAINED

EXISTING PUBLIC RIGHT OF WAY AND CYCLE ROUTE

SOP 01

SOP 02

SOP 03

SOP 04

R39.806m
CENTRE OF CURVE
E 414213.306m
N 130566.131m

R40.257
CENTRE OF CURVE
E 414209.773m
N 130560.698m

R14.183m
CENTRE OF CURVE
E 414235.239m
N 130566.730m

MILLSTREAM APPROACH ROAD

RIVER AVON

ARCHERS COURT

T1

T3

A 000101

- 000080

PLAN
SCALE 1:200

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-C-000081

100m 0m 200m 400m 600m
Scale 1:10000

5m 0m 5m 10m
Scale 1:200

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

1. EXISTING SERVICES.
2. WORKING WITHIN ROOT PROTECTION AREA OF TREES.
3. WORKING WITHIN NETWORK RAIL LAND
4. WORKING ADJACENT TO FOOT/CYCLE WAY
5. SIGNIFICANT FLOODING OF THE WORKS AND THE CITY.
6. SERVICES - BURIED ELECTRIC ACROSS ROUTE DUE TO ADJACENT SUBSTATION
7. ENVIRONMENTAL HAZARD -CONTAMINATED LAND, INCLUDING SOME ASBESTOS
8. SOFT GROUND ADJACENT TO THE STRUCTURE

MAINTENANCE/CLEANING

1. POTENTIAL FOR COLLISION BETWEEN CYCLISTS / PEDESTRIANS.

DECOMMISSIONING/DEMOLITION

NO ADDITIONAL HAZARDS

SOP DETAILS		
SOP NO	EASTING(m)	NORTHING(m)
SOP 01	414235.544	130587.974
SOP 02	414245.495	130580.775
SOP 03	414249.301	130568.575
SOP 04	414248.429	130561.517

REFERENCE DRAWINGS:

ENVIMSW002033-ATK-00-3CC-DR-C-000081
GENERAL ARRANGEMENT SHEET 02 OF 06

ENVIMSW002033-ATK-00-3CC-DR-L-000001
FINAL LANDSCAPE MASTERPLAN

ENVIMSW002033-ATK-00-3CC-DR-RE-000001
GENERAL ARRANGEMENT AVON RIVER PARK SHEET 02 OF 06

ENVIMSW002033-ATK-00-300-DR-L-000001 to 000006
TREATMENT FOR EXISTING TREES

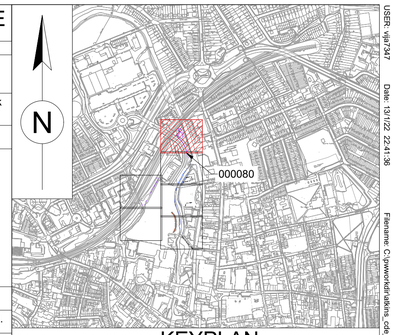
EXISTING SERVICES FROM GPR:

- GPR — GPR — GPR IDENTIFIED FEATURE
- ELEC — ELECTRICITY CABLES
- SW> — SURFACE WATER PIPES
- COM — COM — UTILITY SERVICES

EXISTING SERVICES FROM C2 RETURNS:

- LV(S) — LOW VOLTAGE (SCOTTISH AND SOUTHERN ELECTRICITY)
- HV(S) — SCOTTISH AND SOUTHERN ELECTRICITY_33kV
- BT(S) — BRITISH TELECOMMUNICATION
- VM COM(S) — COMMUNICATIONS VIRGIN MEDIA
- LP GAS(S) — LOW PRESSURE GAS MAIN
- SW(S) > — SURFACE WATER
- IN COM(S) — COMMUNICATION NETWORK

GREY SERVICES BASED ON STATUTORY UNDERTAKER C2 RETURNS. COLOURED SERVICES ARE BASED ON GPR SURVEY RESULTS



KEYPLAN
SCALE 1:10000

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN m AOD UNLESS OTHERWISE SPECIFIED.
3. TEMPORARY DEFENCES ARE TO BE PROVIDED DURING CONSTRUCTION WORKS WHEREVER EXISTING DEFENCE LEVELS ARE REDUCED TO FACILITATE WORKS.
4. EXACT LOCATION OF UNDERGROUND SERVICES TO BE CONFIRMED BY TRIAL DIG HOLE.
5. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH OTHER DISCIPLINE DRAWINGS.

KEYS:

- TREE PROTECTION FENCING
- EXISTING WATERCOURSE
- PROPOSED GROUND RAISING
- EXISTING TREE
- ROOT PROTECTION AREA
- TREE CANOPY
- HAZARD

DRAFT

Rev.	Date	Description	By	Chk'd	App'd
P01	13/01/2022	FOR REVIEW	VK	DK	SR

Drawing Status: FOR REVIEW
Suitability: S3

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Client: Environment Agency

Project Title: SALISBURY RIVER PARK PHASE 1

Drawing Title: CENTRAL CAR PARKING GENERAL ARRANGEMENT PLAN SHEET 01 OF 06

Scale	Drawn	Checked	Reviewed	Authorised
AS SHOWN	NM	DK	SSK	SR
Original Size	Date	Date	Date	Date
A1	13/01/2022	13/01/2022	13/01/2022	13/01/2022

Drawing Number: ENVIMSW002033-ATK-00-3CC-DR-C-000080
Revision: P01

USER: vijir7347
Date: 13/1/22 22:41:36
Filename: C:\Users\vijir7347\d\12087\ENVIMSW002033-ATK-00-3CC-DR-C-000080.dwg

Millimetres 100 10 0

DO NOT SCALE

N

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

1. EXISTING SERVICES.
2. WORKING WITHIN ROOT PROTECTION AREA OF TREES.
3. WORKING ADJACENT TO FOOT/CYCLE WAY
4. LIFTING OF CULVERT PIPES
5. SIGNIFICANT FLOODING OF THE WORKS AND THE CITY.
6. SERVICES - BURIED ELECTRIC ACROSS ROUTE DUE TO ADJACENT SUBSTATION
7. ENVIRONMENTAL HAZARD -CONTAMINATED LAND, INCLUDING SOME ASBESTOS
8. SOFT GROUND ADJACENT TO THE STRUCTURE

MAINTENANCE/CLEANING

1. POTENTIAL FOR COLLISION BETWEEN CYCLISTS / PEDESTRIANS.

DECOMMISSIONING/DEMOLITION

NO ADDITIONAL HAZARD

EXISTING SERVICES FROM GPR:

- GPR — GPR — GPR IDENTIFIED FEATURE
- ELEC — ELECTRICITY CABLES
- SW> — SURFACE WATER PIPES
- COM — COM — UTILITY SERVICES

EXISTING SERVICES FROM C2 RETURNS:

- LV(S) — LOW VOLTAGE (SCOTTISH AND SOUTHERN ELECTRICITY)
- HV(S) — SCOTTISH AND SOUTHERN ELECTRICITY_33kV
- BT(S) — BRITISH TELECOMMUNICATION
- COM — COM — UTILITY SERVICES
- LP GAS(S) — LOW PRESSURE GAS MAIN
- ELEC(S) — ELECTRICITY CABLES
- WA(S) — WESSEX WATER DISTRIBUTION MAIN
- IN COM(S) — COMMUNICATION NETWORK
- UNK — UNK — UNKNOWN SERVICE

GREY SERVICES BASED ON STATUTORY UNDERTAKER C2 RETURNS. COLOURED SERVICES ARE BASED ON GPR SURVEY RESULTS

REFERENCE DRAWINGS:

ENVIMSW002033-ATK-00-3CC-DR-C-000080
GENERAL ARRANGEMENT SHEET 01 OF 06

ENVIMSW002033-ATK-00-3CC-DR-C-000082
GENERAL ARRANGEMENT SHEET 03 OF 06

ENVIMSW002033-ATK-00-3CC-DR-C-000084
GENERAL ARRANGEMENT SHEET 05 OF 06

ENVIMSW002033-ATK-00-3CC-DR-L-000001
FINAL LANDSCAPE MASTERPLAN

ENVIMSW002033-ATK-00-3CC-DR-RE-000002
GENERAL ARRANGEMENT AVON RIVER PARK SHEET 03 OF 06

ENVIMSW002033-ATK-00-300-DR-L-000001 to 000006
TREATMENT FOR EXISTING TREES

100m 0m 200m 400m 600m
Scale 1:10000

5m 0m 5m 10m
Scale 1:200

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-C-000080

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-C-000084

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-C-000082

TREE PROTECTION FENCING

MILLSTREAM APPROACH ROAD

EXISTING PUBLIC RIGHT OF WAY AND CYCLE ROUTE

RIVER AVON

CONTROL WEIR ACCESS STEPS, FOR DETAILS REFER DRAWING. ENVIMSW002033-ATK-00-3CC-DR-C-000107

EXISTING GULLY

EXISTING LAMP POST TO BE RETAINED

DIVERTED 900 DIA TWIN DRAINAGE PIPES FROM OPEN DITCH OUTFALL INTO RIVER AVON. REFER DRAWING: ENVIMSW002033-ATK-00-3CC-DR-C-000091

EXISTING MANHOLE

PROPOSED CONTROL WEIR STRUCTURE. FOR DETAILS REFER DRAWING. ENVIMSW002033-ATK-00-3CC-DR-C-000014

EXISTING FOOTBRIDGE TO BE REPLACED WITH CYCLE TRACK AND FOOTBRIDGE. REFER BRIDGE DRAWING FOR DETAILS. ENVIMSW002033-ATK-RB-3CC-DR-C-000010

EXISTING ELECTRIC INSPECTION CHAMBER TO BE REMOVED

EXISTING LAMP POST TO BE RETAINED

EXISTING LAMP POST TO BE REPOSITIONED

PROPOSED ROAD LEVEL

PROPOSED REPROFILED RIVER CHANNEL. FOR DETAIL REFER DRAWING. ENVIMSW002033-ATK-00-3CC-DR-C-000086

EXISTING MANHOLE TO BE REMOVED

EXISTING OFFTAKE STRUCTURE TO BE DEMOLISHED

FOR DETAILS OF BERM REFER DRAWING ENVIMSW002033-ATK-00-3CC-DR-RE-000004 and 000005

EXISTING FENCE AND FOOTPATH TO BE REMOVED

PROPOSED MILLSTREAM APPROACH BRIDGE AND ASSOCIATED CARRIAGEWAY WORKS. FOR DETAIL REFER BRIDGE DRAWINGS

EDGE OF RIVER BANK ABOVE EGL TIE INTO EGL TO BE PROVIDED WITH BACK SLOPE OF 1:2 TEMPORARILY TILL THE POCKET PARK DESIGN COMPLETE

EXISTING GULLY TO BE REMOVED

EXISTING LAMP POST TO BE REPOSITIONED

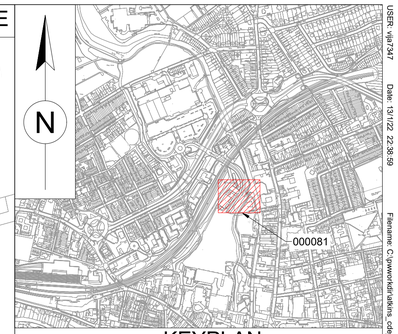
PROPOSED BERM. FOR DETAIL REFER DRAWINGS ENVIMSW002033-ATK-00-3CC-DR-RE-000003 TO 000006

PROPOSED WALKWAY FOR DETAILS REFER LANDSCAPE DRAWINGS

MILLSTREAM APPROACH ROAD

B 000101

- 000081 PLAN SCALE 1:200



KEYPLAN
SCALE 1:10000

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN m AOD UNLESS OTHERWISE SPECIFIED.
3. TEMPORARY DEFENCES ARE TO BE PROVIDED DURING CONSTRUCTION WORKS WHEREVER EXISTING DEFENCE LEVELS ARE REDUCED TO FACILITATE WORKS.
4. EXACT LOCATION OF UNDERGROUND SERVICES TO BE CONFIRMED BY TRIAL DIG HOLE.
5. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH OTHER DISCIPLINE DRAWINGS.

KEYS:

- EXISTING WATERCOURSE
- PROPOSED WATERCOURSE
- HANDRAIL
- EXISTING RIVER CHANNEL
- STRUCTURE TO BE REMOVED
- RIVER BERM
- PROPOSED FOOTPATH
- PROPOSED CYCLEPATH
- INFILL AREA
- EXISTING TREE
- TREE CANOPY
- HAZARD

DRAFT

Rev.	Date	Description	By	Chk'd	App'd
P01	13/01/2022	FOR REVIEW	NM	DK	SSK

Drawing Status: FOR REVIEW
Suitability: S3

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Client: Environment Agency

Project Title: SALISBURY RIVER PARK PHASE 1

Drawing Title: CENTRAL CAR PARKING GENERAL ARRANGEMENT PLAN SHEET 02 OF 06

Scale	Drawn	Checked	Reviewed	Authorised
AS SHOWN	DK	NM	SSK	SR
Original Size	Date	Date	Date	Date
A1	13/01/2022	13/01/2022	13/01/2022	13/01/2022

Drawing Number: ENVIMSW002033-ATK-00-3CC-DR-C-000081
Revision: P01

USER: vijar7347
Date: 13/1/22, 22:38:59
Filename: C:\Users\vijar7347\d01208787\ENVIMSW002033-ATK-00-3CC-DR-C-000081.dwg

DO NOT SCALE

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-C-000081

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-C-000084

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-C-000085

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-C-000083

PROPOSED ROCK WEIRS FOR DETAILS REFER DRAWING. ENVIMSW002033-ATK-SW-3CC-DR-C-000001

EXISTING ALIGNMENT OF MILLSTREAM APPROACH BRIDGE TO BE DEMOLISHED

PROPOSED FLOODWAY INLET STRUCTURE, FOR DETAILS REFER DWG NO. ENVIMSW002033-ATK-00-300-DR-C-000016

PROPOSED GROUND RAISING OVER FLOODWAY CULVERT TO PROVIDE 200 FILL. SIDE SLOPE OF FILL TO BE 1:20.

PROPOSED FLOODWAY CULVERTS, FOR DETAILS REFER DRAWING. ENVIMSW002033-ATK-00-3CC-DR-C-000020

EXISTING LAMP POST TO BE REPOSITIONED

EXISTING MANHOLE TO BE RELOCATED TO SUIT AT SITE

PROPOSED REALIGNMENT OF WAITROSE CULVERT 900Ø TWIN PIPE, FOR DETAIL REFER DRAWING:. ENVIMSW002033-ATK-00-3CC-DR-C-000091

PROPOSED WALKWAY

RIVER AVON

WEIR 1

WEIR 2

WEIR 3

WEIR 4

WEIR 5

EDGE OF RIVER BANK ABOVE EGL. TIE INTO EGL TO BE PROVIDED WITH BACK SLOPE OF 1:2 TEMPORARILY TILL THE COACH PARK LEVEL IS RAISED.

EXISTING WALL TO BE DEMOLISHED

EXISTING RIVER CHANNEL

EXISTING CABINET AND CCTV TO BE REPOSITIONED

EXISTING LAMP POST TO BE REPOSITIONED

COACH PARK

PROPOSED BERM. FOR DETAIL REFER DRAWINGS ENVIMSW002033-ATK-00-3CC-DR-RE-000003 TO 000006

EXISTING MANHOLE TO BE REMOVED

EXISTING LAMP POST TO BE REPOSITIONED

EXISTING GULLY TO BE REMOVED

PROPOSED RIVER CORRIDOR INCORPORATING WIDENED TWO-STAGE RIVER CHANNEL AND VEGETATED BERMS

PROPOSED FOOTBRIDGE FOR DETAILS REFER BRIDGE DRAWINGS ENVIMSW002033-ATK-RB-3CC-DR-C-000001

EXISTING WALL TO BE RETAINED

EXISTING ELECTRICITY CABLE TO BE DIVERTED.

EXISTING GULLY TO BE REMOVED

PROPOSED OUTFALL OF WAITROSE CULVERT. FOR DETAILS REFER DRAWING. ENVIMSW002033-ATK-00-3CC-DR-C-000104

MILL STREAM

C 000101

- 000082 PLAN SCALE 1:200

REFERENCE DRAWINGS:

ENVIMSW002033-ATK-00-3CC-DR-C-000081 GENERAL ARRANGEMENT SHEET 02 F 06

ENVIMSW002033-ATK-00-3CC-DR-C-000083 GENERAL ARRANGEMENT SHEET 04OF 06

ENVIMSW002033-ATK-00-3CC-DR-C-000084 GENERAL ARRANGEMENT SHEET 05 OF 06

ENVIMSW002033-ATK-00-3CC-DR-C-000085 GENERAL ARRANGEMENT SHEET 06OF 06

ENVIMSW002033-ATK-00-3CC-DR-L-000001 FINAL LANDSCAPE MASTERPLAN

ENVIMSW002033-ATK-00-3CC-DR-RE-000003 GENERAL ARRANGMENT AVON RIVER PARK SHEET 04 OF 06

ENVIMSW002033-ATK-00-300-DR-L-000001 to 000006 TREATMENT FOR EXISTING TREES

EXISTING SERVICES FROM GPR:

- GPR — GPR IDENTIFIED FEATURE
- ELEC — ELECTRICITY CABLES
- SW> — SURFACE WATER PIPES
- COM — COM — UTILITY SERVICES

EXISTING SERVICES FROM C2 RETURNS:

- LV(S) — LOW VOLTAGE (SCOTTISH AND SOUTHERN ELECTRICITY)
- HV(S) — SCOTTISH AND SOUTHERN ELECTRICITY_33kV
- BT(S) — BRITISH TELECOMMUNICATION
- WA(S) — WATER PIPES
- LP GAS(S) — LOW PRESSURE GAS MAIN
- FW(S) > — FOUL WATER
- VM COM(S) — COMMUNICATIONS VIRGIN MEDIA
- UNK — UNK — UNKNOWN SERVICE

GREY SERVICES BASED ON STATUTORY UNDERTAKER C2 RETURNS. COLOURED SERVICES ARE BASED ON GPR SURVEY RESULTS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

1. EXISTING SERVICES.
2. WORKING ADJACENT TO FOOT/CYCLE WAY
3. LIFTING OF PIPE CULVERTS
4. WORKING WITHIN WATERCOURSE
5. SIGNIFICANT FLOODING OF THE WORKS AND THE CITY.
6. SERVICES - BURIED ELECTRIC ACROSS ROUTE DUE TO ADJACENT SUBSTATION
7. ENVIRONMENTAL HAZARD -CONTAMINATED LAND, INCLUDING SOME ASBESTOS
8. SOFT GROUND ADJACENT TO THE STRUCTURE

MAINTENANCE/CLEANING

1. POTENTIAL FOR COLLISION BETWEEN CYCLISTS / PEDESTRIANS.

DECOMMISSIONING/DEMOLITION

NO ADDITIONAL HAZARD

100m 0m 200m 400m 600m

Scale 1:10000

5m 0m 5m 10m

Scale 1:200

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-C-000083

KEYPLAN

SCALE 1:10000

000082

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN m AOD UNLESS OTHERWISE SPECIFIED.
3. TEMPORARY DEFENCES ARE TO BE PROVIDED DURING CONSTRUCTION WORKS WHEREVER EXISTING DEFENCE LEVELS ARE REDUCED TO FACILITATE WORKS.
4. EXACT LOCATION OF UNDERGROUND SERVICES TO BE CONFIRMED BY TRIAL DIG HOLE.
5. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH OTHER DISCIPLINE DRAWINGS.

KEYS:

- EXISTING WATERCOURSE
- PROPOSED WATERCOURSE
- HANDRAIL
- RIVER BERM
- PROPOSED FOOTPATH
- PROPOSED CYCLEPATH
- GROUND RAISING
- EXISTING TREE
- TREE CANOPY
- HAZARD

DRAFT

Rev.	Date	Description	By	Chk'd	App'd
P01	13/01/2022	FOR REVIEW	VK	DK	SR

Drawing Status: FOR REVIEW

Suitability: S3

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Client: Environment Agency

Project Title: SALISBURY RIVER PARK PHASE 1

Drawing Title: CENTRAL CAR PARKING GENERAL ARRANGEMENT PLAN SHEET 03 OF 06

Scale	Drawn	Checked	Reviewed	Authorised
AS SHOWN	DK	NM	SSK	SR
Original Size	Date	Date	Date	Date
A1	13/01/2022	13/01/2022	13/01/2022	13/01/2022

Drawing Number: ENVIMSW002033-ATK-00-3CC-DR-C-000082

Revision: P01

USER: vijir7347
Date: 13/1/22 22:33:29
Filename: C:\Users\vijir7347\OneDrive - Atkins\Desktop\ENVIMSW002033-ATK-00-3CC-DR-C-000082.dwg

DO NOT SCALE

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-C-000082

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-C-000085

EXISTING LAMP POLE TO BE REINSTATED

EXISTING GULLY TO BE REMOVED

PROPOSED WALKWAY

EXISTING LAMP POST TO BE RETAINED

EXISTING RIVER BANKS TO BE ASSESSED FOR REQUIREMENTS TO INFILL LOW SPOTS AND BASIC REPAIRS

EXISTING FLOODWALL TO BE RETAINED ALONGSIDE THE ROAD

PROPOSED REPROFILED RIVER CHANNEL.

EXISTING FLAP VALVE 100Ø IL 46.64 TO BE RETAINED

EXISTING LAMP POST TO BE RETAINED

EXISTING STREET FURNITURE TO BE REMOVED. SEE LANDSCAPE DRAWINGS FOR REPLACEMENT

EXISTING 100Ø CAST IRON PIPE IL 46.25 TO BE RETAINED

EXISTING CHANNEL

RIVER AVON

AVON APPROACH

MILL STREAM

HEALTH CENTRE

CENTRAL HEALTH CLINIC

SUB STA

POSTS

PC

Ticket Machine

Borehole

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

1. EXISTING SERVICES.
2. WORKING WITHIN ROOT PROTECTION AREA OF TREES.
3. WORKING ADJACENT TO FOOT/CYCLE WAY
4. LIFTING OF PIPE CULVERTS
5. WORKING WITHIN WATERCOURSE
6. SIGNIFICANT FLOODING OF THE WORKS AND THE CITY.
7. SERVICES - BURIED ELECTRIC ACROSS ROUTE DUE TO ADJACENT SUBSTATION
8. ENVIRONMENTAL HAZARD -CONTAMINATED LAND, INCLUDING SOME ASBESTOS
9. SOFT GROUND ADJACENT TO THE STRUCTURE

MAINTENANCE/CLEANING

1. POTENTIAL FOR COLLISION BETWEEN CYCLISTS / PEDESTRIANS.

DECOMMISSIONING/DEMOLITION

NO ADDITIONAL HAZARD

EXISTING SERVICES FROM GPR:

- GPR — GPR IDENTIFIED FEATURE
- ELEC — ELECTRICITY CABLES
- WA — WATER PIPES
- CD — COMBINED SEWER
- COM — UTILITY SERVICES

EXISTING SERVICES FROM C2 RETURNS:

- LV(S) — LOW VOLTAGE (SCOTTISH AND SOUTHERN ELECTRICITY)
- HV(S) — SCOTTISH AND SOUTHERN ELECTRICITY_33kV
- BT(S) — BRITISH TELECOMMUNICATION
- VM COM(S) — COMMUNICATIONS VIRGIN MEDIA
- LP GAS(S) — LOW PRESSURE GAS MAIN
- SW(S) — SURFACE WATER
- IN COM(S) — COMMUNICATION NETWORK
- FW — FOUL WATER
- WA(S) — WESSEX WATER DISTRIBUTION MAIN

GREY SERVICES BASED ON STATUTORY UNDERTAKER C2 RETURNS. COLOURED SERVICES ARE BASED ON GPR SURVEY RESULTS

REFERENCE DRAWINGS:

ENVIMSW002033-ATK-00-3CC-DR-C-000082
GENERAL ARRANGEMENT SHEET 03 OF 06

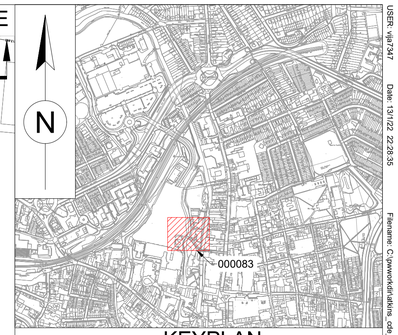
ENVIMSW002033-ATK-00-3CC-DR-C-000085
GENERAL ARRANGEMENT SHEET 06 OF 06

ENVIMSW002033-ATK-00-3CC-DR-L-000001
FINAL LANDSCAPE MASTERPLAN

ENVIMSW002033-ATK-00-3CC-DR-RE-000003
GENERAL ARRANGMENT AVON RIVER PARK SHEET 04 OF 06

ENVIMSW002033-ATK-00-300-DR-L-000001 to 000006
TREATMENT FOR EXISTING TREES

- PLAN
000083 SCALE 1:200



KEYPLAN
SCALE 1:10000

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN m AOD UNLESS OTHERWISE SPECIFIED.
3. TEMPORARY DEFENCES ARE TO BE PROVIDED DURING CONSTRUCTION WORKS WHEREVER EXISTING DEFENCE LEVELS ARE REDUCED TO FACILITATE WORKS.
4. EXACT LOCATION OF UNDERGROUND SERVICES TO BE CONFIRMED BY TRIAL DIG HOLE.
5. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH OTHER DISCIPLINE DRAWINGS.

KEYS:

- EXISTING WATERCOURSE
- PROPOSED WATERCOURSE
- RIVER BERM
- PROPOSED FOOTPATH
- EXISTING TREE
- TREE CANOPY
- HAZARD

DRAFT

Rev.	Date	Description	By	Chk'd	App'd
P01	13/01/2022	FOR REVIEW	VK	DK	SR

Drawing Status: FOR REVIEW
Suitability: S3

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Client: Environment Agency

Project Title: SALISBURY RIVER PARK PHASE 1

Drawing Title: CENTRAL CAR PARKING GENERAL ARRANGEMENT PLAN SHEET 04 OF 06

Scale	Drawn	Checked	Reviewed	Authorised
AS SHOWN	NM	DK	SSK	SR
Original Size	Date	Date	Date	Date
A1	13/01/2022	13/01/2022	13/01/2022	13/01/2022

Drawing Number: ENVIMSW002033-ATK-00-3CC-DR-C-000083
Revision: P01

100m 0m 200m 400m 600m
Scale 1:10000
5m 0m 5m 10m
Scale 1:200

DO NOT SCALE

Millimetres 100 0 10

N

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

1. WORKING WITHIN WATERCOURSE
2. SLOPE STABILITY
3. EXISTING SERVICES

MAINTENANCE/CLEANING

1. WORKING WITHIN WATER COURSE

DECOMMISSIONING/DEMOLITION

1. GROUND WATER

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-RE-000001

CENTRAL CAR PARK CONTROL STRUCTURE. FOR DETAILS REFER ENVIMSW002033-ATK-00-3CC-DR-C-000014

DIA 900 WAITROSE TWIN PIPE OUTFALL. FOR DETAILS REFER ENVIMSW002033-ATK-00-3CC-DR-C-000092

GRADIENT FROM THE BED LEVEL TO THE BERM TO HAVE A SLOPE OF 1:2

RIVER BERM ALONG THE CHANNEL TO HAVE A SLOPE OF 1:10

REPLACEMENT MILLSTREAM APPROACH BRIDGE

SCOUR PROTECTION TO BE PROVIDED TO THE RAIL EMBANKMENT FOR A LENGTH UPTO 30m. DETAIL TBA

PROPOSED FLOODWAY CULVERT INSITU. FOR DETAILS REFER ENVIMSW002033-ATK-00-3CC-DR-C-000020

PROPOSED FLOODWAY INLET STRUCTURE. FOR DETAILS REFER ENVIMSW002033-ATK-00-3CC-DR-C-000016

PROPOSED FLOODWAY OUTLET STRUCTURE DISCHARGES INTO EXISTING SUMMERLOCK STREAM. FOR DETAILS REFER ENVIMSW002033-ATK-00-3CC-DR-C-000018

WEIR 1

WEIR 2

WEIR 3

PROPOSED CHANNEL BED LEVEL CHANGES AT WEIRS

DIA 900 WAITROSE TWIN PIPE OUTFALL. FOR DETAILS REFER ENVIMSW002033-ATK-00-3CC-DR-C-000092

RAISED RIGHT BANK TO TIE INTO FOOTPATH. REFER ENVIMSW002033-ATK-00-3CC-DR-L-000001 FOR DETAILS

PROPOSED RIVER CORRIDOR INCORPORATING WIDENED TWO-STAGE RIVER CHANNEL AND VEGETATED BERMS. SEE LANDSCAPE DRAWING ENVIMSW002033-ATK-00-3CC-DR-L-000001 FOR DETAILS

LARGE EXISTING CULVERT TO BE ABONDONED AS REPLACED AS PART OF THE NEW COACH PARK WORK

NEW STONE ROCK WEIR WITH A LOW FLOW NOTCH FOR FISH PASSAGE FOR DETAILS REFER DRAWING NO. ENVIMSW002033-ATK-SW-3CC-DR-C-000001

NOTE TWO ADDITIONAL WEIRS WILL BE REQUIRED IN THIS REACH - NOT CURRENTLY SHOWN OVERALL FALL IN BED WILL REMAIN THE SAME, BUT USING MORE SMALLER STEPS.

COACH PARK AREA, SEE NOTE 7

EXISTING WALL TO BE DEMOLISHED

EXISTING 100 DIA OUTFALLS ON RIVER AVON TO BE REPLACED BY OUTFALLS INTO THE NEW TWO STAGE RIVER AVON.

Car Park

FOR CONTINUATION SEE ENVIMSW002033-ATK-00-3CC-DR-RE-000003

- 000002 PLAN SCALE 1:250

Scale 1:10000 (100m 0m 200m 400m 600m)

Scale 1:250 (5m 0m 5m 10m 15m)

REFERENCE DRAWINGS:

ENVIMSW002033-ATK-00-3CC-DR-C-000081 TO 000083
GENERAL ARRANGEMENT DRAWING

ENVIMSW002033-ATK-00-3CC-DR-L-000001
FINAL LANDSCAPE MASTERPLAN

ENVIMSW002033-ATK-00-300-DR-L-000001 TO 000006
TREATMENT FOR EXISTING TREES

ENVIMSW002033-ATK-00-3CC-DR-RE-000001
RIVER AVON GENERAL ARRANGEMENT
SHEET 01 OF 03

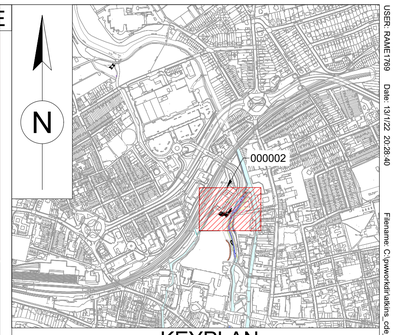
ENVIMSW002033-ATK-00-3CC-DR-RE-000001
RIVER AVON GENERAL ARRANGEMENT
SHEET 03 OF 03

ENVIMSW002033-ATK-00-3CC-DR-C-000086 TO 000091
RIVER AVON PROPOSED CHANNEL GENERAL ARRANGEMENT AND CROSS SECTIONS

ENVIMSW002033-ATK-00-3CC-DR-C-000086
RIVER AVON SETTING OUT POINTS

ENVIMSW002033-ATK-00-3CC-DR-RE-000006
RIVER AVON TYPICAL CROSS SECTION

ENVIMSW002033-ATK-00-3CC-DR-RE-000008
RIVER AVON SECTION DRAWING



KEYPLAN
SCALE 1:10000

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN m AOD UNLESS OTHERWISE SPECIFIED.
3. TEMPORARY DEFENCES ARE TO BE PROVIDED DURING CONSTRUCTION WORKS WHEREVER EXISTING DEFENCE LEVELS ARE REDUCED TO FACILITATE WORKS.
4. EXACT LOCATION OF UNDERGROUND SERVICES TO BE CONFIRMED BY TRIAL DIG.
5. DESIGN SHOWS 5 SECONDARY WEIRS. THIS COULD CHANGE TO UP TO SEVEN DEPENDANT ON FINAL FISH PASS PANEL DESIGN.
6. BERMS SHOWN ON PLAN AS 750-1500 WIDTH. THIS IS TO BE MANAGED LOCALLY BY SITE SUPERVISOR TO PROVIDE THIS VARIATION.
7. DESIGN OF THE COACH PARK ON THE LEFT BANK OF THE NEW TWO STAGE RIVER IS ONGOING BY WILTSHIRE COUNCIL.
8. A-E SHOWS SECONDARY WEIR CROSS SECTIONS. FOR DETAILS REFER ENVIMSW002033-ATK-00-3CC-DR-RE-000008
9. 1 AND 2 SHOW TYPICAL NEW TWO STAGE RIVER CROSS SECTIONS AND FORMATION OF THE NEW RIVER BED. FOR DETAILS REFER ENVIMSW002033-ATK-00-3CC-DR-RE-000006.

KEYS:

- EXISTING WATERCOURSE
- PROPOSED WATER COURSE
- RIVER BERM
- NEW TWO STAGE RIVER EDGE
- EXISTING RIVER EDGE
- EXISTING WALL TO BE DEMOLISHED

DRAFT

Rev.	Date	Description	By	Chk'd	App'd
P01	13/01/22	FOR REVIEW	LR	AC	SR

Drawing Status: FOR REVIEW
Suitability: S3

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Client: Environment Agency

Project Title: SALISBURY RIVER PARK

Drawing Title: CENTRAL CAR PARK AVON RIVER GENERAL ARRANGEMENT SHEET 02 OF 03

Scale	Drawn	Checked	Reviewed	Authorised
AS SHOWN	LR	AC	MV	SR
Original Size	Date	Date	Date	Date
A1	13/01/2022	13/01/2022	13/01/2022	13/01/2022

Drawing Number: ENVIMSW002033-ATK-00-3CC-DR-RE-000002
Revision: P01

Millimetres 100 10 0

DO NOT SCALE

N

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

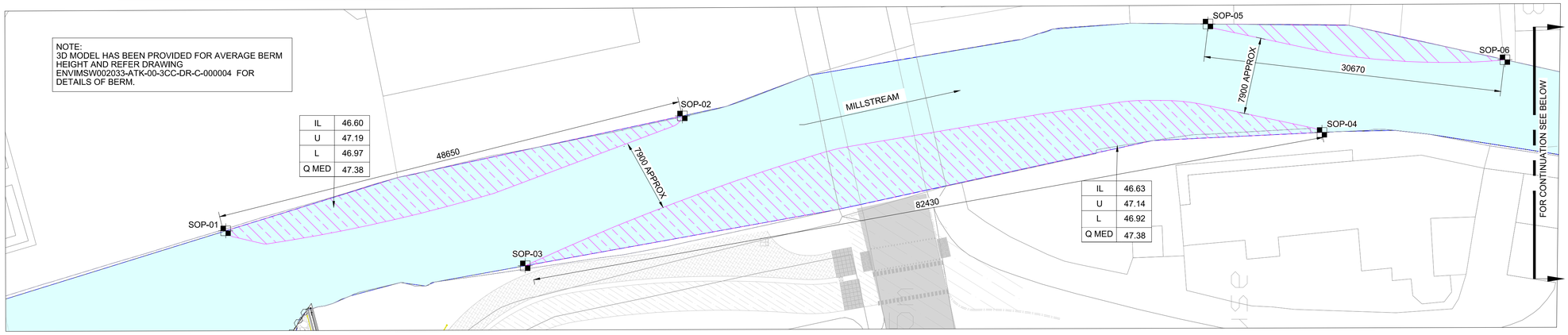
1. WORKING WITHIN WATERCOURSE
2. SLOPE STABILITY
3. EXISTING SERVICES

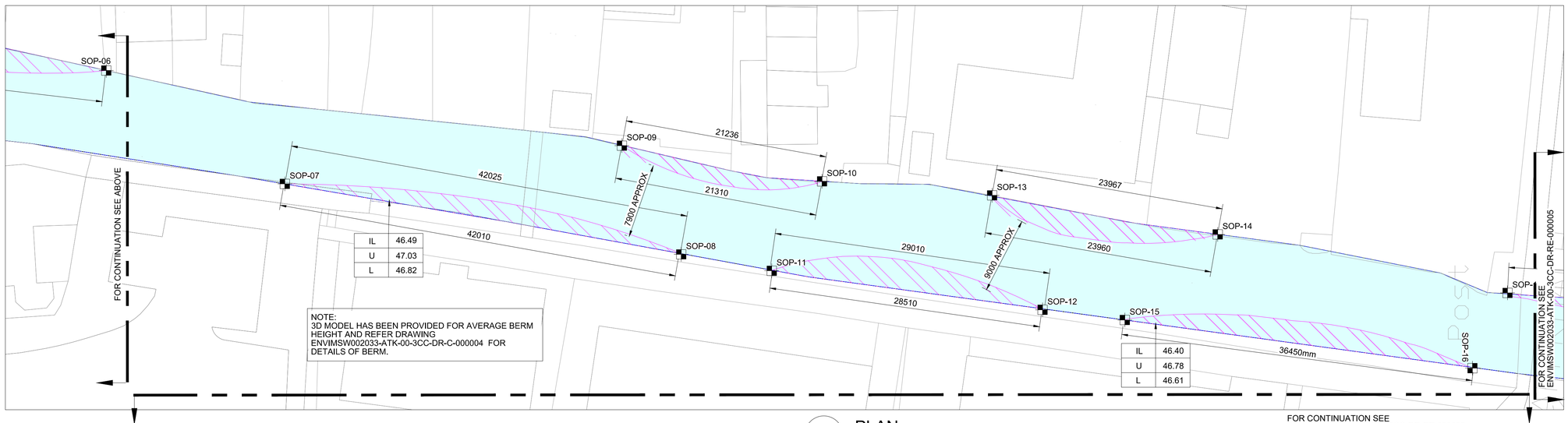
MAINTENANCE/CLEANING

WORKING WITHIN WATERCOURSE

DECOMMISSIONING/DEMOLITION

GROUND WATER





- / 000004 PLAN

SCALE 1:250

SOP DETAILS		
SOP NO	EASTING (m)	NORTHING (m)
SOP-01	414299.472	130481.320
SOP-02	414311.282	130434.372
SOP-03	414295.882	130450.527
SOP-04	414309.588	130368.618
SOP-05	414320.729	130380.342
SOP-07	414305.188	130331.115
SOP-08	414297.808	130289.624
SOP-09	414309.193	130295.834
SOP-10	414305.453	130274.883
SOP-11	414296.088	130280.148
SOP-12	414291.998	130251.798
SOP-13	414303.986	130257.081
SOP-14	414299.895	130233.467
SOP-15	414290.931	130243.188
SOP-16	414285.885	130206.798

REFERENCE DRAWINGS:

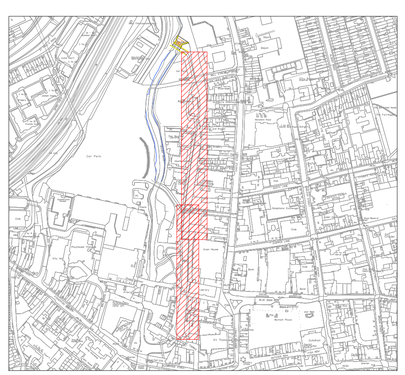
ENVIMSW002033-ATK-00-3CC-DR-C-000081 TO 000083
GENERAL ARRANGEMENT DRAWING

ENVIMSW002033-ATK-00-3CC-DR-L-000001
FINAL LANDSCAPE MASTERPLAN

ENVIMSW002033-ATK-00-300-DR-L-000001 to 000006
TREATMENT FOR EXISTING TREES

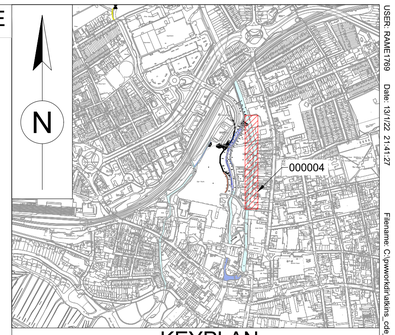
ENVIMSW002033-ATK-00-3CC-DR-RE-000005
MILLSTREAM BERM GENERAL ARRANGEMENT DETAIL SHEET 02 OF 02

ENVIMSW002033-ATK-00-3CC-DR-C-000004
CENTRAL CAR PARK MILLSTREAM BERM TYPICAL DETAIL



SITE LOCATION PLAN

SCALE 1:5000



KEYPLAN

SCALE 1:10000

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN m AOD UNLESS OTHERWISE SPECIFIED.
3. TEMPORARY DEFENCES ARE TO BE PROVIDED DURING CONSTRUCTION WORKS WHEREVER EXISTING DEFENCE LEVELS ARE REDUCED TO FACILITATE WORKS.
4. EXACT LOCATION OF UNDERGROUND SERVICES TO BE CONFIRMED BY TRIAL DIG.
5. UPPER,LOWER AND QMED LEVELS FOR BERMS ARE SUBJECT TO CHANGE SLIGHTLY DEPENDANT ON FINAL HYDRAULIC MODELING.
6. FOR DETAILS OF TYPE 1 AND TYPE 2 BERMS REFER TO ENVIMSW002033-ATK-00-3CC-DR-C-000004.

KEYS:

EXISTING WATERCOURSE

TYPE 1 RIVER BERM

TYPE 2 RIVER BERM

LEVELS SHOWN REFLECT THE DESIRED UNDULATIONS AND LEVELS OF THE BERM PLATFORMS.

IL	INVERT OF RIVER CHANNEL [EXISTING]
U	UPPER LEVEL OF THE BERM UNDULATION
L	LOWER LEVEL OF THE BERM UNDULATION
QMED	MEDIAN FLOOD LEVEL FOR SECONDARY BERM

100m 0m 200m 400m 600m
Scale 1:10000

5m 0m 5m 10m 15m
Scale 1:250

DRAFT

Rev.	Date	Description	By	Chk'd	App'd
P01	13/01/22	FOR REVIEW	LR	AC	SR

Drawing Status: FOR REVIEW
Suitability: S3

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Client: Environment Agency

Project Title: SALISBURY RIVER PARK

Drawing Title: CENTRAL CAR PARK MILLSTREAM BERMS GENERAL ARRANGEMENT PLAN SHEET 01 OF 02

Scale	Drawn	Checked	Reviewed	Authorised
AS SHOWN	LR	AC	MV	SR
Original Size: A1	Date: 13/01/2022	Date: 13/01/2022	Date: 13/01/2022	Date: 13/01/2022

Drawing Number: ENVIMSW002033-ATK-00-3CC-DR-RE-000004
Revision: P01

N

Millimetres 0 10 100

ASHLEY ROAD GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3AR-DR-C-000032

PROPOSED SUMMERLOCK OFFTAKE CHANNEL

WATER WAY APPROX 800mm ABOVE PROPOSED SUMMERLOCK OFFTAKE CHANNEL

ASHLEY ROAD GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3AR-DR-C-000034

PROPOSED VEHICLE ACCESS RAMP

ASHLEY ROAD GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3AR-DR-C-000033

RIVER AVON

RETAINING WALL

FOOTBRIDGE

PROPOSED EMBANKMENT

PROPOSED VEHICLE ACCESS RAMP

REINFORCED CONCRETE FLOOD DEFENCE WALL

PROPOSED PEDESTRIAN ACCESS RAMPS

ASHLEY ROAD GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3AR-DR-C-000037

ACCESS RAMPS FOR CYCLE PATH AND FOOTPATH

SECONDARY FLOOD DEFENCE WALL

ASHLEY ROAD CONTROL STRUCTURE

ASHLEY ROAD GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3AR-DR-C-000035

ASHLEY ROAD

ASHLEY ROAD GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3AR-DR-C-000036

CHURCHILL WAY WEST

CENTRAL CAR PARKING GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000080

PROPOSED LOCAL GROUND RAISING TO INFILL LOW SPOT IDENTIFIED ALONG RIVER BANK,

CENTRAL CAR PARKING GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000081

PROPOSED FLOODWAY INLET

PROPOSED FLOODWAY CULVERT

PROPOSED HEADWALL

PROPOSED CONTROL WEIR STRUCTURE

WILTON ROAD

COACHPARK

CENTRAL CAR PARKING GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000084

PROPOSED ROCK WEIR ON A CONCRETE FOUNDATION SLAB, WITH LOW FLOW NOTCH FOR FISH PASSAGE

CENTRAL CAR PARKING GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000082

PROPOSED WAITROSE CULVERT HEADWALL

CENTRAL CAR PARKING GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000085

CENTRAL CAR PARKING GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000083

STEYNINGS HOUSE GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000085

CONTINUED IN LEFT ABOVE

CONTINUED FROM RIGHT BELOW

MALTINGS FISH PASS GENERAL ARRANGEMENT SEE DWG: ENVIMSW002033-ATK-00-3CC-DR-C-000093

-- 000001 PLAN

SCALE 1:2000

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

MAINTENANCE/CLEANING

DECOMMISSIONING/DEMOLITION

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN m AOD UNLESS OTHERWISE SPECIFIED.

KEYS:

- RIVER CENTRE LINE
- PROPOSED WAITROSE CULVERT
- PROPOSED CHANNEL
- PROPOSED EMBANKMENT
- ACCESS RAMP
- EXISTING WATERCOURSE
- PROPOSED WATERCOURSE
- RIVER BERM

50m 0m 50m 100m

Scale 1:2000

DRAFT

Rev.	Date	Description	By	Chk'd	App'd
P01	13.01.2022	FOR REVIEW	MN	DK	SR

Drawing Status: FOR REVIEW

Suitability: S3

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Client: Environment Agency

Project Title: SALISBURY RIVER PARK

Drawing Title: OVERVIEW PLAN

Scale	Drawn	Checked	Reviewed	Authorised
AS SHOWN	MN	DK	SSK	SR
Original Size: A1	Date: 13/01/2022	Date: 13/01/2022	Date: 13/01/2022	Date: 13/01/2022

Drawing Number: ENVIMSW002033-ATK-00-300-DR-C-000001

Revision: P01

USER: magr7853
Date: 13/1/22 23:19:02
Filename: C:\powerbi\drawings_cds_uk\401208716\ENVIMSW002033-ATK-00-300-DR-C-000001.dwg

Appendix B. Detailed Design Drawings

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United Kingdom
Tel: +44 (0) 121 483 5706

AMemo

To:	Environment Agency		
From:	Archie Cross	Email:	archie.cross@atkinsglobal.com
Date:	17 August 2022	Phone:	
Ref:	ENVIMSW002033-ATK-00-3AR-TM-RE-000001	cc:	
Subject:	Transfer License at Ashley Road		

This memo supports the application for a Transfer License at Ashley Road, Salisbury. The Environment Agency is undertaking a £27M project in Salisbury city centre, Wiltshire, to improve flood protection and provide biodiversity and amenity benefits in and around the city centre. As part of this work a new wetland area is being created, through which the existing Summerlock Stream will flow. This application is being submitted due to the offtakes from the River Avon to the Summerlock Stream being changed by the scheme.

In the current day, the Blackwell Hatches provide an offtake from the River Avon into the Summerlock Stream. This vertical sluice structure is being abandoned as part of the River Park Scheme and replaced with a new offtake upstream which feeds the Summerlock via a new wetland and associated channel. This new channel and wetland were designed to, as best possible, replicate the existing flow regime through the Blackwell Hatches. There is not an agreed flow split between the Summerlock Stream and the River Avon, and there is no requirement to define an exact flow split/transfer with the proposed arrangement. However, due to the environmental designation of these watercourses (SAC and SSSI), there is a requirement to maintain a certain habitat which requires a sufficient depth of water for fish during low flows.

During the design process the low flow modelling highlighted that the new wetland channel and offtake was unable to pass the same amount of flow into the Summerlock Stream as the existing Blackwell Hatches offtake (as a result of various hydraulic constraints). The design implication of this was that a feed pipe will be laid through the abandoned Blackwell Hatches to provide an additional flow. This structure will consist of two pipes, one of which will be shut off following construction. This second pipe is included purely for future adaptation if the predicted flow splits are not sufficient to provide the desired habitat.

This application is for a Water Resource Licence for the new feed pipes at Blackwell Hatches. As the new wetland and channel are a relocation of the existing offtake, in discussion with the Environment Agency's Water Resource Permitting Service, it has been agreed that this element of the scheme does not require a Water Resource Licence.

The pipes have been designed to complement the relocated offtake, and between them better replicate the flow splits of the existing structure. More details on these flow splits and how they have been designed can be seen in Ashley Road Low Flow Technical supplied with the application. The existing and scheme offtakes can be seen in Figure 1 & Figure 2.

The structure will have 2 x 750 mm dia pipes with the potential for penstocks on the front of both, although only one will be installed initially. The one penstock being installed will be set initially to 250 mm below the culvert soffit. This design was developed through the FRAP process, and the penstock level will only be adjusted if the required habitats are not being provided during low flows. The proposed twin pipes were initially 600 mm dia however there was a concern that this would lead to velocities at the downstream outfall into the Summerlock Stream near Ashley Road, which could harm fish migration. To lower these velocities, it was agreed that 750 mm pipes will be installed. Using a penstock on the upstream end of the pipe allows the pipe to provide the appropriate flow split as detailed in the "Ashley Road Low Flow Technical Note", as well as lowering

the velocities at its outfall. Details on the structures can be seen in the design drawings attached to this application.

The scheme has gone through a planning application (PL/2021/03601) and has been the subject of several environmental assessments, the following are attached with this application.

- Environmental Action Plan including key mitigation measures for the construction;
- WFD assessment and updates following detailed design;
- Habitats Regulations Assessment (HRA) including Screening and Appropriate Assessment. This was developed in consultation with Natural England;
- Construction Environmental Management plan for the works; and
- Environmental Statement Non-technical summary including details on recommendations from the EIA and key residual environmental risks.

The scheme has also applied for and received a Flood Risk Application Permit. This permit covers the wider scheme including work at Central Car Park along with this work at Ashley Road. This permit is included with the application.

The Environment Agency has a right of access to the structure and this register is included with this application.

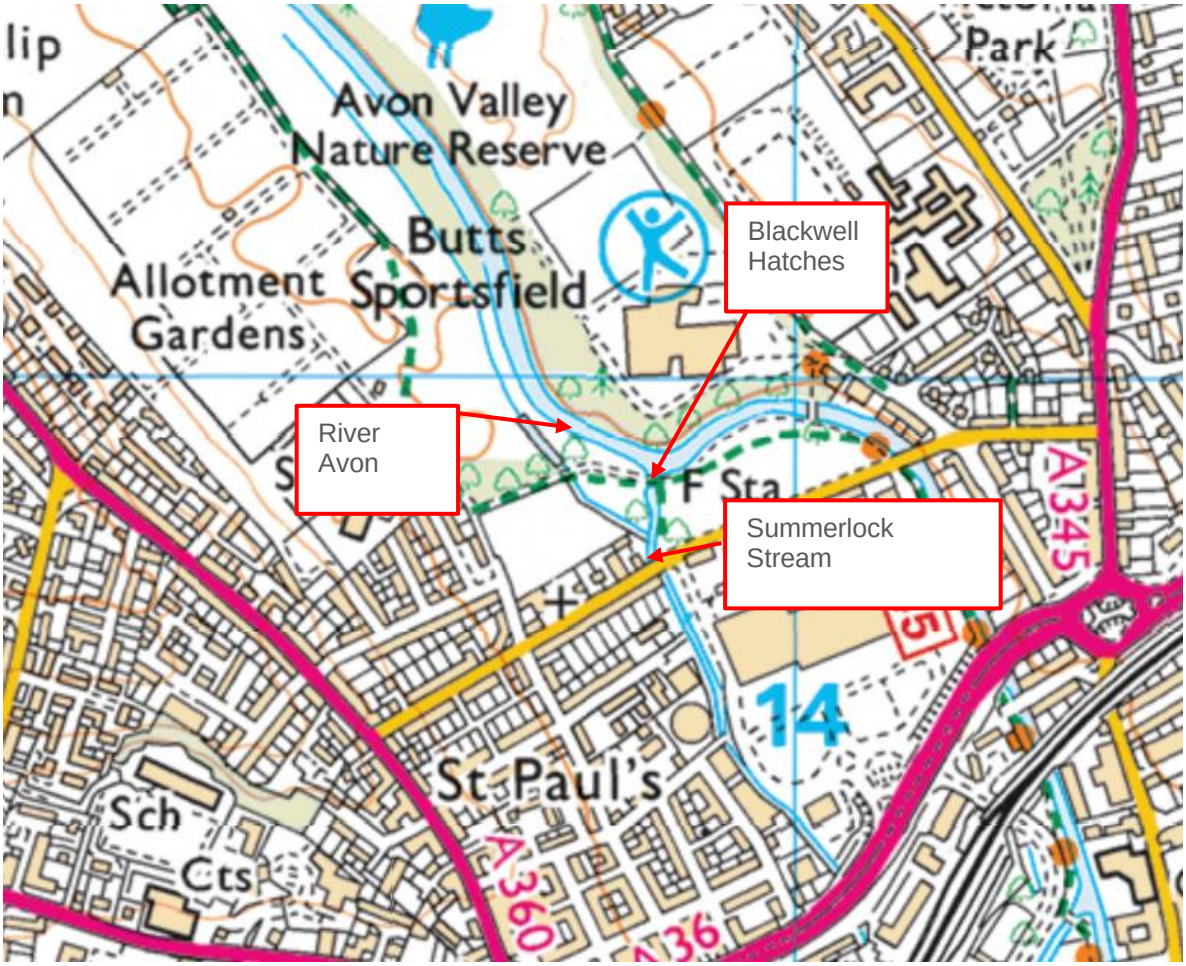


Figure 1 - Existing Offtake from River Avon to Summerlock Stream

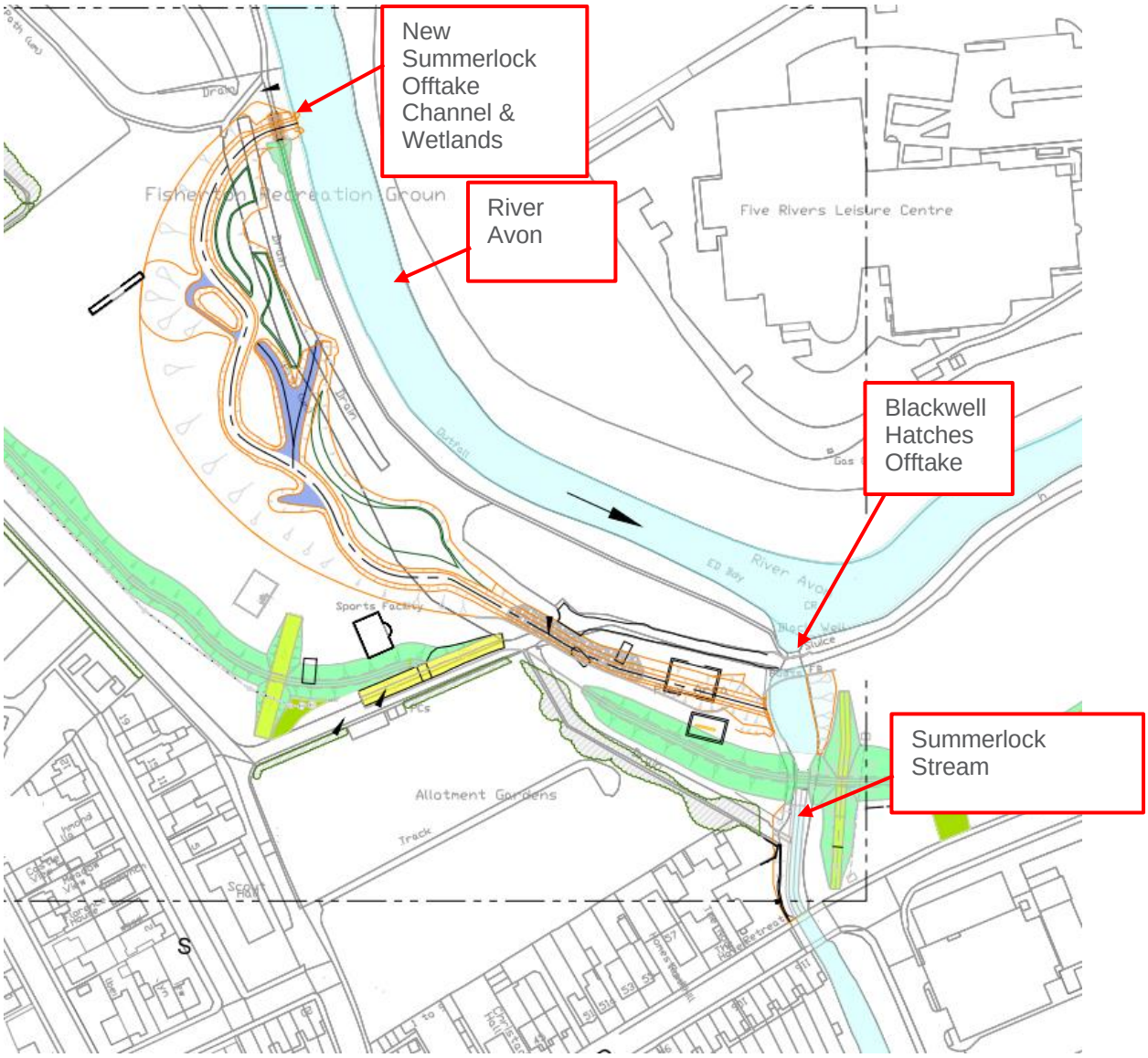


Figure 2 - Scheme Offtakes from River Avon to Summerlock Stream

SSSI Assessment form: Appendix 4

Application for permission - Formal Notice (For Advice/Consultation)

This is a formal notice from the Environment Agency (EA) to Natural England (NE) (or other relevant Statutory Nature Conservation Body (SNCB)) to meet the requirements under Section 28I of the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act (CRoW) 2000).

This is the duty in relation to granting any consent, licence or permit for activities likely to damage Sites of Special Scientific Interest (SSSI). We must seek advice (consult NE, or other SNCB) before permitting any activities that may damage a SSSI.

This notice was not sent to Natural England or other SNCB for consultation.

An additional component charge for habitats assessment was levied for this application.

Version number and date: Draft 1 - 17/07/2023

1. Name of SSSI

River Avon System SSSI

2. Type of permission

Abstraction Licence

3. Proposed timing of permission

All year

4. Predicted 28 day date for NE (or other SNCB) response (under S28 I (4))

24 August 2023

5. EA reference number

Licence Number: SW/043/0021/030

Application Number: NPS/WR/037978

6. EA site/project name

Salisbury River Park Scheme, Blackwell Hatches Intake.

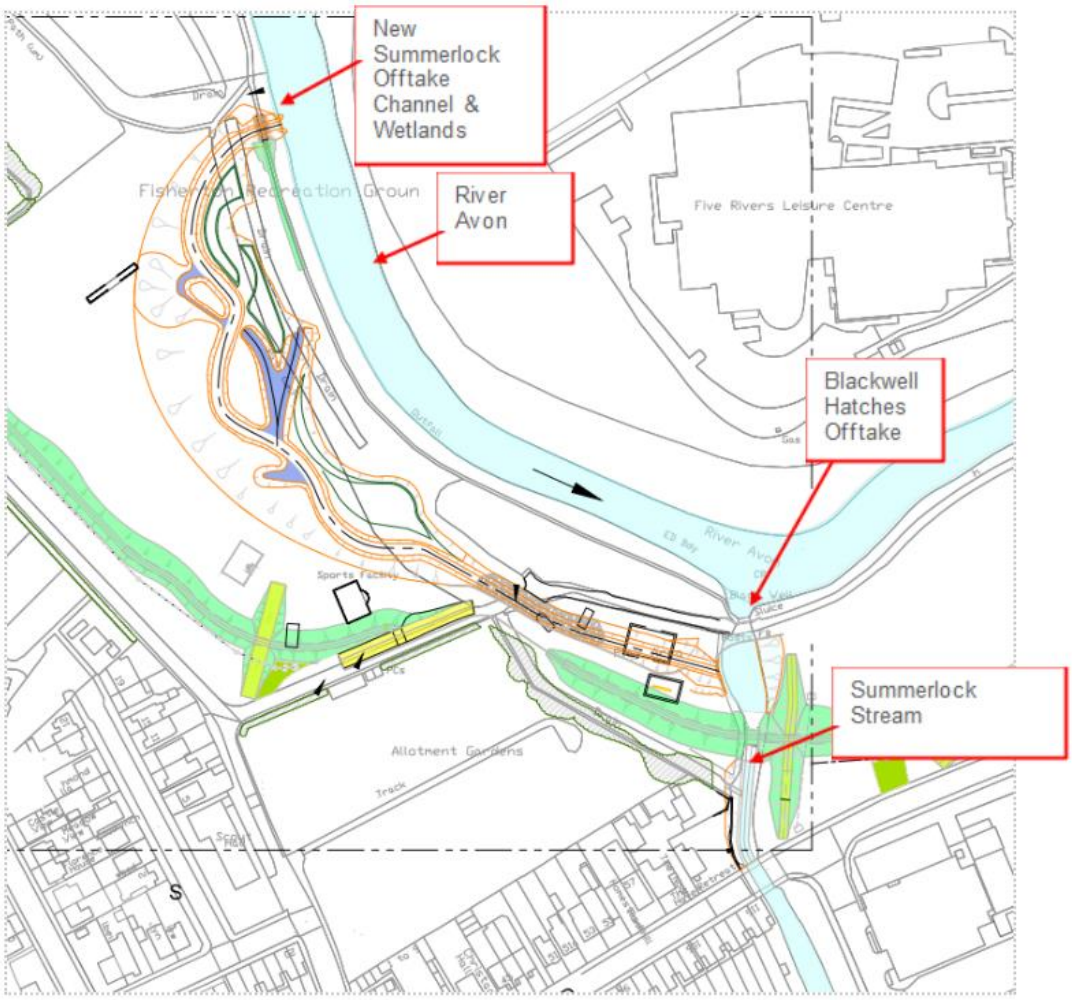
7. National grid reference

SU 13855 30897

8. Description of proposal

The Environment Agency, in partnership with Wiltshire Council, are proposing a scheme to reduce flood risk and provide environmental and amenity improvements in the centre of Salisbury. This is the 'Salisbury River Park Phase 1 Scheme' and is part of a wider Salisbury River Park Master Plan, which itself is part of the Central Area Framework being developed by Wiltshire Council to regenerate the city centre. The city centre is vulnerable to flooding from the River Avon, Mill stream and Summerlock stream. The scheme will combine new flood defences with enlarged channels and open spaces that can carry or store additional water, improvements to amenity space, and improvements for wildlife along the river.

As part of the scheme a new offtake is being created to take water from the River Avon into the Summerlock stream at a point just upstream of the existing offtake at Blackwell Hatches. It was intended that this would maintain the current flow regime in Summerlock stream, however modelling has shown that this offtake is unable to pass the same quantity of water into the Summerlock stream as the current mechanism. In order to replicate the existing flow regime, two pipes are to be constructed in the existing Blackwell Hatches structure. To authorise this modification to the Blackwell Hatches structure, the Environment Agency are applying for a transfer licence. The licence will grant the transfer of water from the River Avon, at National Grid Reference SU 13855 30897, to Summerlock stream, for the purpose of maintaining river flow. The transfer will occur via two pipes controlled by penstock sluice gates.



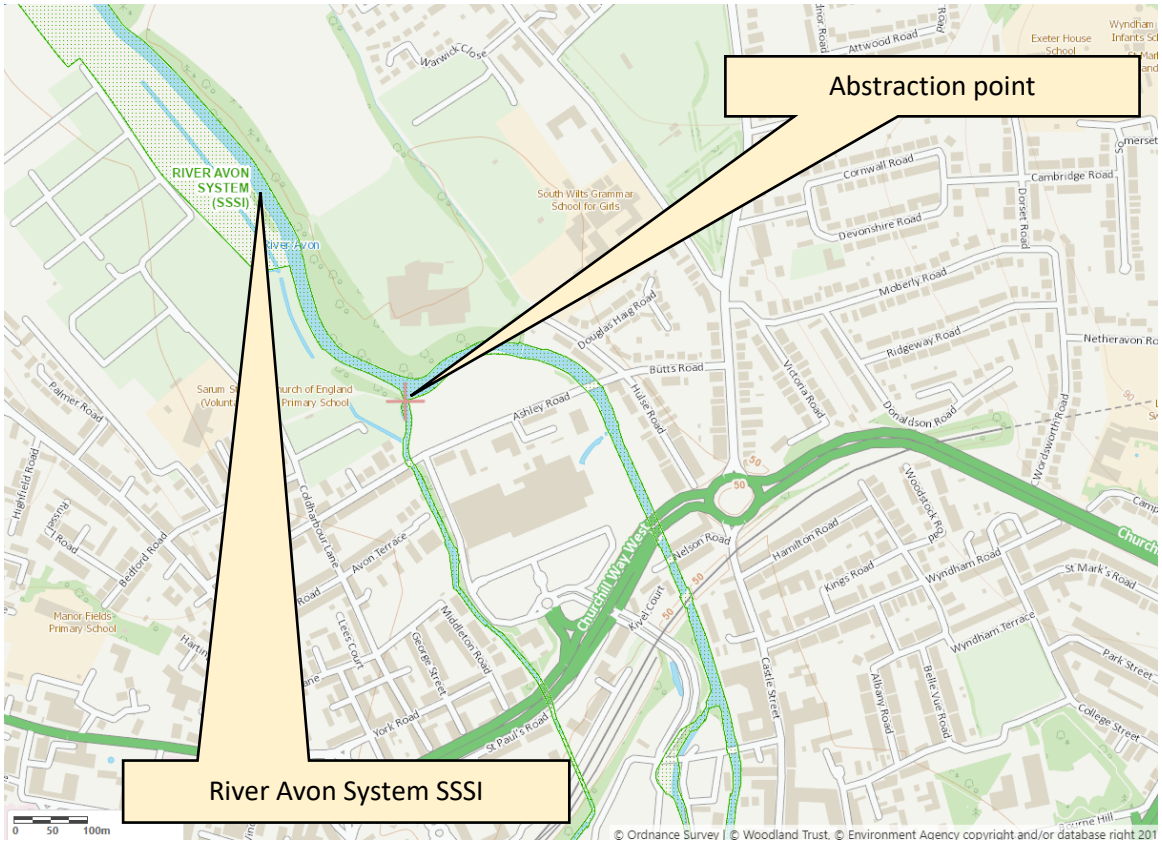
Map showing location of the new offtake and Blackwell Hatches offtake.

The volumes applied for are: 1,433 m3 per hour, 34,387 m3 per day, and 1,046,992 m3 per year. These volumes will be permitted each year until the licence expires. The maximum daily and hourly quantities are modelled on Q5 flows (i.e. very high flows), with both pipes fully open. The annual volume is estimated using Q50 flows.

Construction activities have been assessed previously during the planning application. A Flood Risk Activity Permit (FRAP) has already been assessed and granted for the scheme. This HRA is only assessing the potential impact of the licenced activity of transferring water from the River Avon to the Summerlock stream at National Grid Reference SU 13855 30897. This is an intrinsic part of the larger scheme proposed to assist in retaining the current flow regime in the Summerlock stream.

9. Is the proposed activity within (wholly or partially) the SSSI boundary?

Yes, the proposal is located within the River Avon System SSSI at Salisbury.



10. Has there been any discussion or correspondence with NE or other SNCB?

Natural England have not been consulted specifically on this licence application but were consulted throughout the planning process and provided input on the options for the Salisbury River Park ‘phase 1’ scheme. They were also consulted via a HRA stage 1 screening and Appropriate Assessment compiled by Jacobs on behalf of the Environment Agency.

The previous assessment concluded that there would be a likely significant effect from the development on the integrity of the SAC, however that there is sufficient information to conclude that potential impacts to the site can be avoided, mitigated or compensated.

Natural England (James Hughes) agreed with the conclusions of the Appropriate Assessment. Natural England confirmed that ‘we concur with the assessment conclusions, providing that all mitigation measures are appropriately secured in any planning permission given.’

11. Operations Requiring Consent or other activities associated with the work

The following 'Operations Requiring Consent' (or other activities associated with the work) that may cause damage are relevant to the proposed works:

14 - Water impoundment, storage and alterations to water levels and tables. Abstraction from surface and ground water bodies and water utilisation including irrigation and the introduction or restoration of water meadow flooding except as defined in Footnote 3 (of the Operations requiring Natural England's consent document).

Footnote 3:

Alteration of water levels, abstractions and discharges (ref OLDs 7, 14)

The alteration of water levels with hatches and sluices operates largely through traditional arrangements and cooperation between land managers and the Environment Agency. Such operations shall not constitute "Operations likely to Damage the Special Interest" where currently** practised to apportion water flows between river channels (eg to disperse cut weed and feed subsidiary channels that normally flow), unless:

a. The activity requires a consent from the Environment Agency that has not been issued

b. No individual channel is deprived of a significant proportion of its average annual flow for more than five days

Footnote a. applies to this application in that a consent has not yet been granted.

12. Assessment of effects on features[1]

River Avon System SSSI

The River Avon System SSSI, originates in the Kennet and Wiltshire districts of Wiltshire. It is approximately 205.11 km in area running south and entering the sea at Christchurch Harbour, Dorset. It is richer and more varied than most chalk streams with over 180 species of aquatic plant having been recorded, one of the most diverse fish faunas in Britain and a wide range of aquatic invertebrates. Of significance is the habitat defined as floating vegetation of *Ranunculus* of plain and *submountainous* rivers. The water crowfoot *Ranunculus penicillatus var*. *pseudofluitans* is dominant through most of the river. Other water crowfoot species are present, reflecting different conditions. In the upper reaches *R. peltatus* occurs, in the middle reaches *R. fluitans* and in the lower, more sluggish, river *R. circinatus.* The Dockens Water supports *R. flammula* and *R. omiophyllus*

[1] List of notified features provided by Natural England on 23 June 2022

which are characteristic more of bogs than rivers. Other groups of aquatic plants are characteristic of the different geological influences. The Avon River system is important for invertebrate species containing most that are associated with large running rivers in calcareous areas. It also has notable habitats for good populations of breeding and wintering birds.

The site has 49 units. The following table shows that the majority of the site is in unfavourable condition.

Favourable	Unfavourable - Recovering	Unfavourable – No change	Unfavourable - Declining
2.82%	7.46%	85.61	4.10%

The Views About Management document explains the management of the rivers and streams is aimed at maintaining the natural flow regime including natural erosion and sedimentation processes. Abstraction levels should be managed to protect the characteristic flow regime, including seasonal base flows and flushing flows. It is generally deemed that compensation flows are not an acceptable alternative to reducing abstraction, and river transfers are often considered to have undesirable effects on river ecology.

Feature	Exposure, mechanism/pathway and scale of effect
Flowing waters - Type I: naturally eutrophic lowland rivers with a high base flow Flowing waters - Type II: slow-flowing, naturally eutrophic lowland rivers, dominated by clays Flowing waters - Type III: base-rich, low-energy lowland rivers and streams, generally with a stable flow regime Flowing waters - Type VIII: rivers common throughout western Britain over hard rocks MG10 - Holcus Lanatus - Juncus Effusus MG4 - Alopecurus pratensis - Sanguisorba officinalis grassland	Any abstraction of water from the SSSI has the potential to impact flows and water levels and the associated risks, such as reduced dilution capacity, change in water chemistry, change in surface water inundation, change in freshwater flow to the estuary and change in salinity regime. Any change to these factors could alter the current hydrological regime on which the designated features rely. This proposal is situated within unit 54 of the SSSI. Unit 54 is classed as unfavourable no change. This is thought to mostly be caused by inappropriate water levels particularly at low flows (those below Q81). This proposal is to transfer water from the River Avon into Summerlock stream to ensure that the Salisbury Park River scheme does not alter the flow to the Summerlock stream, River Avon or further downstream. The

MG5 - Cynosurus cristatus - Centaurea nigra grassland MG8 - Cynosurus cristatus - Caltha palustris grassland Population of RDB mollusc - Pisidium tenuilineatum, Pea Mussel Population of RDB mollusc - Valvata macrostoma, Large-mouthed Valve Snail S14 - Sparganium erectum swamp S22 - Glyceria fluitans water-margin vegetation S26 - Phragmites australis - Urtica dioica tall-herb fen S28 - Phalaris arundinacea tall-herb fen S4 - Phragmites australis swamp and reed-beds S5 - Glyceria maxima swamp S7 - Carex acutiformis swamp W5 - Alnus glutinosa - Carex paniculata woodland W6 - Alnus glutinosa - Urtica dioica woodland W7 - Alnus glutinosa - Fraxinus excelsior - Lysimachia nemorum woodland	transfer will occur via a passive pipe arrangement taking water from the Avon into the Summerlock in the vicinity of the existing Blackwell Hatches. Volumes will be controlled by a penstock. This proposal will cause a depleted reach downstream of the new Blackwell Hatches offtake. In practice this proposal seeks to replicate the current flow regime in Summerlock stream and therefore will ultimately transfer the same amount of water from the River Avon into Summerlock stream as per the current set up. Spot gauging along with modelling, based on current agreed operating procedures, have demonstrated that flow in the Summerlock and River Avon can be maintained at current levels. Flow velocity typically showed a nominal increase in flow speed, with an average increase of 0.0m/s in low flow conditions and 0.1m/s in flood flow. Thus this proposal will have no effect on the flows and subsequently no effect on freshwater flow to the estuary, salinity regime, water chemistry, or dilution capacity. Modelling has shown that there is very minimal change in water levels. The results showed a general increase in water level of 7mm in daily flows and reduction of 30mm in flood flows. The greatest impact was predicted at Q10 with an average 101mm reduction along the reach (on an average depth of 1.6m). Overall the change is considered negligible. It is proposed that further flow and stage gauging will be undertaken for at least the first five years after completion of the Scheme. This monitoring will provide a greater understanding of the low flow splits between the different channels, and

	how these vary with season and vegetation growth. This will also help inform how the system is managed during drought conditions when decisions may be required on how to best distribute the flow when it may not be possible to sustain flow on all channels. This is no different to how the system is currently operated and will be detailed further in a Scheme Operation and Maintenance Manual which will be used to guide management of the site. It is to be confirmed whether monitoring will form a condition on the licence. It is recommended that reference to the Operation and Maintenance Manual form part of the licence. It should be reiterated that both the River Avon and Summerlock stream are designated as part of the SSSI (unit 54). Therefore although this transfer supports Summerlock stream at the expense of the River Avon, it does not take water from the SSSI system. Additionally this proposal, in conjunction with the new offtake further upstream, is designed to take the same volume of water from the River Avon as the current regime. Based on the above information, it is deemed that this proposal is not likely to cause damage to the features of the SSSI. Without this transfer of water the Summerlock stream would not receive enough flow from the new offtake alone and could be damaged at times of low flows. This transfer will prevent that from occurring.

13. Decision

River Avon System SSSI

The proposed permission is not likely to damage any of the flora, fauna or geological or physiological features which are of special interest.

Permission

The Environment Agency is minded to issue the permission.

Name of Environment Agency officer: Kelvin Lofthouse

Job title: Habitats Regulations Assessment Team Officer

Contact phone or e-mail: 07795 256924

Date sent to NE (or other SNCB), if applicable: 27 July 2023

For use when the notice has been sent to NE (or other SNCB)

14. NE (or other SNCB) comment on notice

|| NE advise against permitting the operation / the operation can go ahead with / without conditions. ||

Write here...

Name of Natural England (or other SNCB) officer:

Job title:

Contact phone or e-mail:

Date of response: || Select date ||

Stage 1 Habitats Regulations Assessment

Environment Agency record of screening for likely significant effects

This is a record of the screening for likely significant effects required by Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended), undertaken by the Environment Agency in respect of the permission, plan or project (PPP) detailed in Section 1, for the following relevant site(s):

River Avon SAC (UK0013016)^

Version: Draft 1 - 06/07/2023

This record was not sent to Natural England for consultation.

An additional component charge for habitats assessment was levied for this application.

1. Permission, plan or project (PPP) details

Type of PPP: Abstraction Licence

Environment Agency reference: Licence Number: SW/043/0021/030

Application Number: NPS/WR/037978

National grid reference: SU 13855 30897

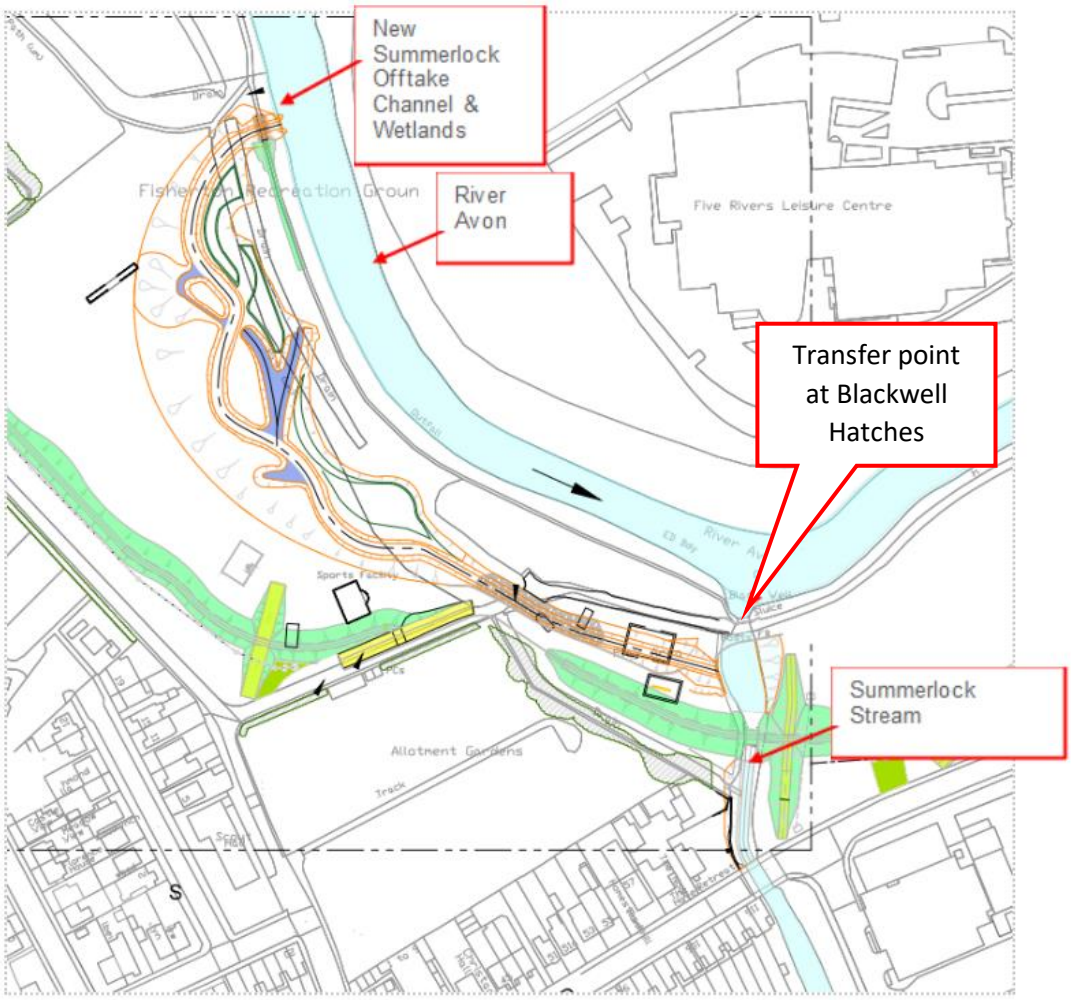
Site/project name or reference: Salisbury River Park Scheme, Blackwell Hatches Intake.

2. Description of proposal

The Environment Agency, in partnership with Wiltshire Council, are proposing a scheme to reduce flood risk and provide environmental and amenity improvements in the centre of Salisbury. This is the 'Salisbury River Park Phase 1 Scheme' and is part of a wider Salisbury River Park Master Plan, which itself is part of the Central Area Framework being developed by Wiltshire Council to regenerate the city centre. The city centre is vulnerable to flooding from the River Avon, Mill stream and Summerlock stream. The scheme will combine new flood defences with enlarged channels and open spaces that can carry or store additional water, improvements to amenity space, and improvements for wildlife along the river.

As part of the scheme a new offtake is being created to take water from the River Avon into the Summerlock stream at a point just upstream of the existing offtake at Blackwell Hatches. It was intended that this would maintain the current flow regime in Summerlock stream, however modelling has shown that this offtake is unable to pass the same quantity of water into the Summerlock stream as the current mechanism. In order to replicate the existing flow regime, two pipes are to be constructed in the existing Blackwell Hatches structure. To authorise this modification to the Blackwell Hatches structure, the Environment Agency are

applying for a transfer licence. The licence will grant the transfer of water from the River Avon, at National Grid Reference SU 13855 30897, to Summerlock stream, for the purpose of maintaining river flow. The transfer will occur via two pipes controlled by penstock sluice gates.



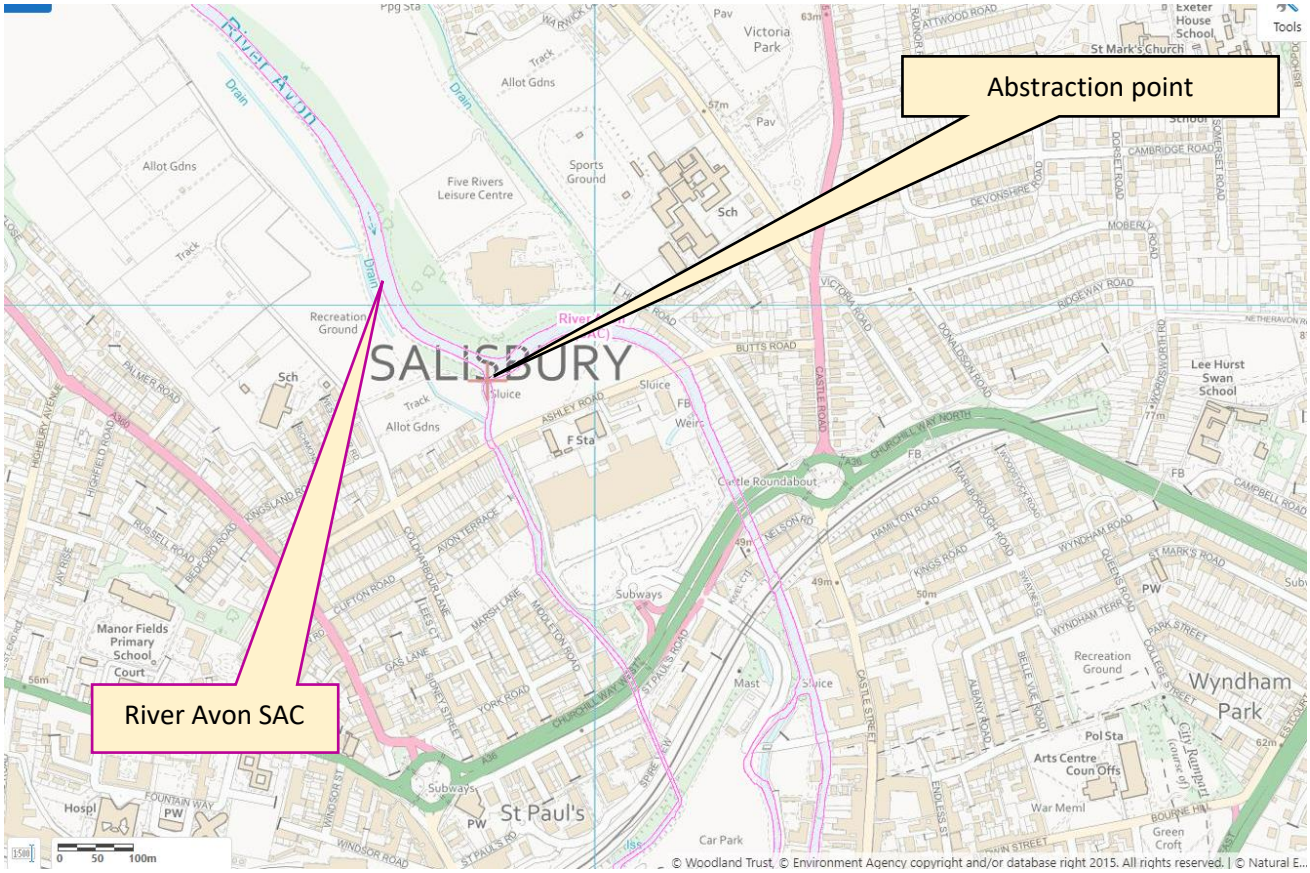
Map 1:Location of the new offtake and Blackwell Hatches offtake.

The volumes applied for are 1,433 m^3 per hour, 34,387 m^3 per day, and 1,046,992 m^3 per year. These volumes will be permitted on an all year basis until the licence expires. The maximum daily and hourly quantities are modelled on Q5 flows (i.e. very high flows), with both pipes fully open. The annual volume is estimated using Q50 flows.

Construction activities have been assessed previously during the planning application. A Flood Risk Activity Permit (FRAP) has already been assessed and granted for the scheme. This HRA is only assessing the potential impact of the licenced activity of transferring water from the River Avon to the Summerlock stream at National Grid Reference SU 13855 30897. This is an intrinsic part of the larger scheme proposed to assist in retaining the current flow regime in the Summerlock stream.

The abstraction point is located within the River Avon SAC.

3. Map showing PPP location and European site.



Map 2: Location of abstraction point and River Avon SAC.

4. European sites requiring assessment[1]

River Avon SAC (UK0013016)^

Atlantic salmon; Brook lamprey; Bullhead; Desmoulin's whorl snail; Sea lamprey; Water courses of plain to montane levels with R. fluitantis

5. Conservation objectives

The screening for likely significant effects (and appropriate assessment, if required) will consider the implications of the proposal in view of the site's conservation objectives.

River Avon SAC (UK0013016)^:

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of qualifying natural habitats and habitats of qualifying species
- The structure and function (including typical species) of qualifying natural habitats
- The structure and function of the habitats of qualifying species
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
- The populations of qualifying species, and,
- The distribution of qualifying species within the site.

Natural England's document – The Site Improvement Plan: Avon River and Valley refers to both abstraction and hydrological regime.

Abstraction is considered a pressure for a number of features. These include Rivers with floating vegetation often dominated by water-crowfoot, sea lamprey, brook lamprey, Atlantic salmon, and bullhead. The improvement measure identified by the plan is to investigate and restore river flows (favourable condition targets).

[1] This is based on screening criteria the Environment Agency consider appropriate to identify possible significant risk.
^ Protected area under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017
* Priority natural habitat/priority species
~ Marine Protected Area
Feature information sourced from Natural England

Hydrological changes are deemed a threat to Desmoulin's whorl snail. The improvement measure identified is to restore hydrology to sites and wetland mosaic/network that supports Desmoulin's whorl snail.

6. Risks (pressures) relevant to the type of PPP being assessed

These are the reasonably foreseeable risks for this type of PPP. Some of these risks may not be relevant to the particular activity being assessed and this is explained here. The risks which are not relevant do not require further assessment.

Change in flow or velocity regime

Change in freshwater flow to estuary

Change in salinity regime

Change in surface water inundation

Change in water chemistry

Change in water levels or table

Entrainment/impingement

Habitat loss

Reduced dilution capacity

7. HRA Stage 1 screening[2]

This section is a record of the screening for each risk (pressure) and the qualifying features that could be sensitive to that risk. The features may be grouped if they will be affected in the same way and the screening is the same for each feature. If appropriate, the assessment may be considered at a site level, rather than feature by feature.

River Avon SAC (UK0013016)^

River Avon SAC

[2] Only features the Environment Agency consider likely to be sensitive to the type of PPP being assessed are included, see *Habitats Regulations Assessment: Risk definitions and matrices*

^ Protected area under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

* Priority natural habitat/priority species

~ Marine Protected Area

The River Avon SAC covers an area of 498.24 hectares in the south of England, originating in the counties of Wiltshire, and Hampshire and running to Christchurch harbour, Dorset, where it enters the sea. It is one of the richest chalk rivers in Europe. It is a lowland river system with floating vegetation often dominated by water –crowfoot *Ranunculus* for which it is designated. There are five aquatic species of *Ranunculus* in the river system but stream water-crowfoot *Ranunculus penicillatus ssp. pseudofluitans* and river water-crowfoot *R. fluitans* are the main dominants. The site is important for its fish communities, The bullhead *Cottus gobio* is an important component of this community, particularly in the tributaries. A healthy, stable population of brook lamprey *Lampetra planeri* occurs in the main river and a number of tributaries. The main river, and in particular its tributaries, provides beds of gravel for spawning and extensive areas of fine silt for juveniles to burrow into. There are also excellent examples of the features that the sea lamprey *Petromyzon marinus* needs for survival, including areas of sand and gravel in the middle to lower reaches of the river where the species is known to spawn. The Avon also supports Atlantic salmon *Salmo salar* populations typical of a high-quality chalk stream, unaffected by the introduction of genetic stock of non-native origin. The excellent mosaic of aquatic habitats includes extensive areas of gravels essential for spawning and growth of juvenile fry.

The site is also important for its extensive populations of Desmoulins Whorl Snail *Vertigo moulinsiana* which inhabit the margins and associated wetlands.

Atlantic salmon

Atlantic salmon (*Salmo salar*) are migratory species, moving from the marine environment upstream into freshwater environments to spawn, utilising clean gravels. Records indicate the presence of Atlantic salmon throughout the main stem of the River Avon and its tributaries, upstream and downstream of the proposal.

Brook lamprey

Brook lamprey (*Lampreta planeri*) are a non-migratory fish species that live in freshwater environments. The brook lamprey requires clean gravel beds for spawning at specific times of the year and slow flowing areas with sandy/silt substrate during juvenile development. Brook lamprey have been recorded by the in the River Avon, including within the Summerlock stream.

Bullhead

Bullhead (*Cottus gobio*) are non-migratory bottom-dwelling freshwater species. They predominantly occur in stony rivers and streams with moderate flows and oxygen rich waters and have a high fidelity to their habitat patches. Records indicate bullhead are within the River Avon and its tributaries and this species would be expected to be present in the vicinity of this proposal.

Desmoulin's whorl snail

It is understood that Natural England have confirmed that Desmoulin's whorl snail (*Vertigo moulinsiana*) is not present in this part of the Avon catchment (See HRA Version 3 dated 01.03.21 completed by Alice Shoebridge & Corinna Morgan, Jacobs and submitted for the construction of Urban flood risk management scheme with amenity and habitat benefits) For these reasons, Desmoulin's whorl snail has been screened out of this assessment.

Sea lamprey

Fisheries surveys have been undertaken by the Environment Agency for over 20 years at many sites within the River Avon and its tributaries. Over that time only two individuals have been identified in the catchment. These were recorded approximately 40km downstream of the site. As such, sea lamprey has been screened out of the assessment.

Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

This habitat is characterised by the abundance of water crowfoots (*Ranunculus* species) and stonewort, which are important aquatic plant communities within the River Avon SAC. They provide shelter and food for macro-invertebrates and fish, promote silt deposition and create flow diversity within the channel. Observations from the site walkover conducted by Jacobs as part of the planning application indicate the presence of Ranunculus communities in the Summerlock stream.

Change in flow or velocity regime

Summary of likely significant effect alone:

This water transfer is part of the wider 'Salisbury River Park Phase 1 Scheme' which is being undertaken to reduce flood risk and provide environmental benefit. This assessment is for the transfer of water from the River Avon to the Summerlock stream at Blackwell Hatches. This proposal has the potential to alter flows in both the River Avon and Summerlock stream. A change in the flow or velocity regime could potentially reduce the quantity of water supporting the designated site and thus alter the conditions that the notified features rely upon.

It should be noted that both the River Avon and Summerlock stream are designated as part of the SAC. Therefore, although this transfer supports Summerlock stream at the expense of the River Avon, it does not take water from the SAC system. Additionally, this proposal, in conjunction with the new offtake further upstream, is designed to take the same volume of water from the River Avon as the current regime.

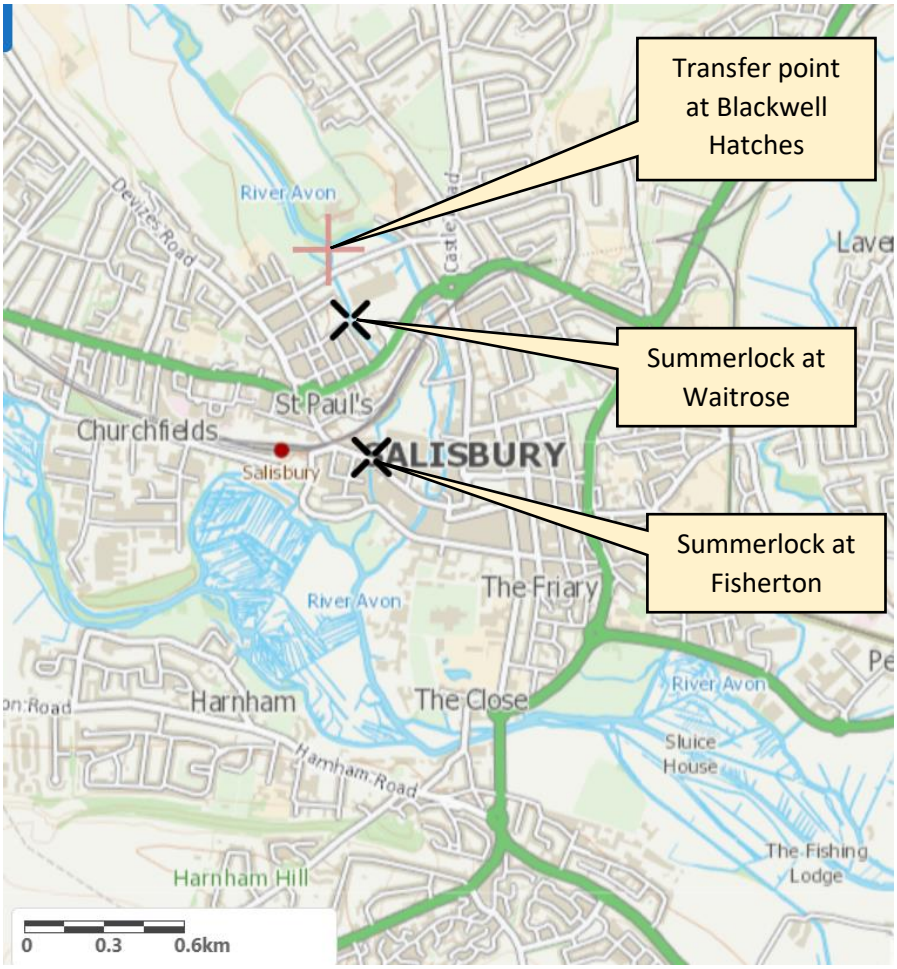
Spot gauging and flow modelling demonstrated that the initial designs for the Salisbury River Park scheme would not maintain baseline flow into the Summerlock stream. As part of a variety of design changes it was determined

that two new supply pipes would be needed to transfer water from the River Avon to the Summerlock stream to maintain the baseline flow. That transfer is the subject of this assessment however is intrinsic to the larger scheme and thus not entirely separable. The abstraction for transfer is for the purpose of maintaining flows in the Summerlock stream, thus in itself is for the protection of the flow and velocity regime within the SAC.

Spot gauging and modelling was used to estimate the impact of the Salisbury River Park 'phase 1' scheme (including this transfer proposal) on flows into the Summerlock stream. The table below shows the predicted impact of the entire scheme on flow velocity at various Q-values in the Summerlock stream, at two locations; Summerlock at Waitrose, approximately 180m downstream and Summerlock at Fisherton, approximately 880m downstream.

Location	Baseline Q95 velocity	Q95	Q70	Q50	Q10	Q5
Summerlock at Waitrose	0.35 m/s	0.08	0.01	-0.01	-0.00	0.02
Summerlock at Fisherton	0.27 m/s	0.05	0.01	-0.01	-0.01	0.03

Table 1: Change in velocity in the Summerlock stream m/s



Map 3: Spot gauging locations on Summerlock Stream.

The results show that velocities at all Q-values are impacted by less than ±0.1m/s.

Spot gauging and modelling was also used to estimate the impact of the entire Salisbury River Park 'phase 1' scheme (including this transfer proposal) on flows in the River Avon. The result for flow velocity typically showed a nominal increase in flow speed, with an average increase of 0.0m/s in low flow conditions and 0.1m/s in flood flow. These results show the Salisbury River Park 'phase 1' scheme will cause only a minor change in flow.

This transfer of water supports the overall Salisbury River Park scheme, which without it would not allow enough flow into the Summerlock stream to support the baseline flow. Therefore we are satisfied that the transfer is beneficial to the flow in the Summerlock stream whilst having a negligible effect on the River Avon SAC. We therefore conclude no likely significant effect alone.

Summary of likely significant effect in combination:

Any changes in flow caused by this proposal alone will be negligible, however could act in combination with other permitted activities to a greater effect. This proposal only effects the area between the offtake at Blackwell Hatches downstream to where Summerlock stream re-joins the River Avon at National Grid Reference SU 13976 29677. There are no licenced activities identified in this area that could act in combination with this proposal. Therefore we conclude no likely significant effect in combination.

See section 9 for further information.

The assessment of likely significant effect from this risk for the following features is:

> Atlantic salmon - no effect. Brook lamprey - no effect. Bullhead - no effect. Water courses of plain to montane levels with R. fluitantis - no effect.

Change in freshwater flow to estuary

Summary of likely significant effect alone:

Any change in the freshwater flow to the estuary could alter the salinity regime of the designated site and subsequently impact upon the species and habitats which rely on the current conditions of the site.

This proposal only effects the area between the offtake at Blackwell Hatches downstream to where Summerlock stream re-joins the River Avon at National Grid Reference SU 13976 29677. The tidal range of the estuary is many kilometres downstream of this point and as such will not be affected by this proposal. We are satisfied that there will be no effect on freshwater flow to the estuary. We therefore conclude there will be no effect on freshwater flow to the estuary.

Summary of likely significant effect in combination:

All effects were avoided so there are no residual effects to consider.

The assessment of likely significant effect from this risk for the following features is:

> Atlantic salmon - no effect.

Change in salinity regime

Summary of likely significant effect alone:

Any change in the freshwater flow to the estuary could alter the salinity regime of the designated site and subsequently impact upon the species and habitats which rely on the current conditions of the site.

There is no change in freshwater flow to the estuary and so no pathway for change to the salinity regime. We are satisfied that there will be no effect on the salinity regime. We therefore conclude no likely significant effect alone.

Summary of likely significant effect in combination:

All effects were avoided so there are no residual effects to consider.

The assessment of likely significant effect from this risk for the following features is:

> Atlantic salmon - no effect. Brook lamprey - no effect. Bullhead - no effect. Water courses of plain to montane levels with R. fluitantis - no effect.

Change in surface water inundation

Summary of likely significant effect alone:

The transfer of water from one waterbody to another has potential to reduce surface water inundation from the donor waterbody and increase it in the receiving waterbody. Any change in the surface water inundation could alter the habitats reliant on the current regime and thus the species that rely upon them.

The Salisbury River Park ‘phase 1’ scheme aims to reduce the risk of surface water inundation (flooding) of the city centre. This is primarily being done though landscaping and construction and should result in not only reducing flood risk to urban areas but create new floodplain areas planted with flood tolerant grass and tree species. These elements are not subject to this assessment.

This assessment is for the transfer of water from the River Avon to the Summerlock stream via two new supply pipes at Blackwell Hatches. The aim of the transfer is to maintain current level of flow in the Summerlock stream. Gauging and modelling has demonstrated that the change in water levels across the stretch of the SAC is minimal, but will result in a slightly reduced water level at flood flows (see change in water levels or table below for further details). These changes however are negligible and occur in a highly modified stretch of the river. Conversely this transfer is aimed at supporting water

levels within the Summerlock stream, in which the designated habitat, water courses of plain to montane levels with R.fluitantis, is known to occur. Modelling has shown that water levels at Q5 flows in Summerlock are likely to increase by 10mm. This is deemed negligible and unlikely to effect this designated feature. We are satisfied that there will be no effect on surface water inundation. We conclude no likely significant effect alone.

Summary of likely significant effect in combination:

Any changes in surface water inundation caused by this proposal alone will be negligible, however could act in combination with other permitted activities to a greater effect. This proposal only effects the area between the offtake at Blackwell Hatches downstream to where Summerlock stream re-joins the River Avon at National Grid Reference SU 13976 29677. There are no licenced activities identified in this area that could act in combination with this proposal. Therefore we conclude no likely significant effect in combination.

See section 9 for further information.

The assessment of likely significant effect from this risk for the following features is:

Water courses of plain to montane levels with R. fluitantis - no effect.

Change in water chemistry

Summary of likely significant effect alone:

The transfer of water from one waterbody to another could potentially change the water chemistry of the receiving waterbody. Any increase or decrease in chemicals could effect the habitats reliant on the current regime and thus the species that rely upon them.

This proposal is aimed at maintaining the flow of water in the Summerlock stream, using water from the River Avon, from which the Summerlock stream is already fed. Therefore there is no mechanism for change of water chemistry from this proposal.

We are satisfied that there will be no effect on water chemistry. We conclude no likely significant effect alone.

Summary of likely significant effect in combination:

All effects were avoided so there are no residual effects to consider.

The assessment of likely significant effect from this risk for the following features is:

> Atlantic salmon - no effect. Brook lamprey - no effect. Bullhead - no effect.Water courses of plain to montane levels with R. fluitantis - no effect.

Change in water levels or table

Summary of likely significant effect alone:

This water transfer is part of the wider 'Salisbury River Park Phase 1 Scheme' which is being undertaken to reduce flood risk and provide environmental benefit. This assessment is for the transfer of water from the River Avon to the Summerlock stream at Blackwell Hatches. This proposal has the potential to alter flows in both the River Avon and Summerlock stream. A change in water levels could potentially alter the quantity of water supporting the designated site and thus alter the conditions that the notified features rely upon.

It should be noted that both the River Avon and Summerlock stream are designated as part of the SAC. Therefore although this transfer supports Summerlock stream at the expense of the River Avon, it does not take water from the SAC system. Additionally this proposal, in conjunction with the new offtake further upstream, is designed to take the same volume of water from the River Avon as the current regime.

Spot gauging and flow modelling demonstrated that the initial designs for the Salisbury River Park scheme would not maintain baseline flow into the Summerlock stream. As part of a variety of design changes it was determined that two new supply pipes would be needed to transfer water from the River Avon to the Summerlock stream. That transfer is the subject of this assessment however is intrinsic to the larger scheme and thus not entirely separable.

Spot gauging and modelling was used to estimate the impact of the entire Salisbury River Park ‘phase 1’ scheme (including this transfer proposal) on water level in the Summerlock stream. The table below shows the predicted impact of the scheme on water levels at various Q-values in the Summerlock stream, at two locations: Summerlock at Waitrose, approximately 180m

downstream and Summerlock at Fisherton, approximately 880m downstream, (see map 3 above).

Location	Baseline Q95 depth	Q95	Q70	Q50	Q10	Q5
Summerlock at Waitrose	186mm	+50mm	-10mm	-40mm	-40mm	+10mm
Summerlock at Fisherton	102mm	+70mm	-10mm	-30mm	-30mm	+10mm

Table 2: Change in water levels in the Summerlock stream

The results show that changes in water levels are varied with the greatest being +70mm at Fisherton at Q95. The site is known to suffer from inappropriate water levels at low flows (below Q81). Therefore, an increase in water levels at this Q95 may actually lessen this stress. These changes in water levels are not deemed likely to adversely impact the features of this SAC.

Spot gauging and modelling was used to estimate the impact of the Salisbury River Park 'phase 1' scheme (including this transfer proposal) on water levels in the River Avon between SU 13703 31081 and SU 13976 29677. The results showed a general increase in water level of 7mm in daily flows and reduction of 30mm in flood flows. The greatest impact was predicted at the Q10 with an average 101mm reduction along the reach (on an average depth of 1.6m). The site is known to suffer from inappropriate water levels at low flows. The impact of a reduction in water levels at flood flows and Q10 is unlikely to have an impact on the features of this SAC as it is at a time when water levels are plentiful. These changes have been assessed as having a negligible impact. We are satisfied that there will be no significant effect on the water levels. We therefore conclude no likely significant effect alone.

Summary of likely significant effect in combination:

Any changes in water levels caused by this proposal alone will be negligible, however could act in combination with other permitted activities to a greater effect. This proposal only effects the area between the offtake at Blackwell Hatches downstream to where Summerlock stream re-joins the River Avon at National Grid Reference SU 13976 29677. There are no licenced activities identified in this area that could act in combination with this proposal. Therefore we conclude no likely significant effect in combination.

See section 9 for further information.

The assessment of likely significant effect from this risk for the following features is:

Atlantic salmon - no effect. Brook lamprey - no effect. Bullhead - no effect. Water courses of plain to montane levels with R. fluitantis - no effect.

Entrainment/impingement

Summary of likely significant effect alone:

The transfer of water will be controlled by penstocks used to increase or decrease the flow into gravity fed pipes. There is no mechanism for entrainment which is the drawing of fish and other biota into intakes such as abstraction intakes or turbines. There is no mechanism for impingement which is when fish or other species are trapped on the surface of an abstraction/turbine intake filter screen by the force of the intake.

We are satisfied that there is no mechanism for impact, therefore we conclude no likely significant effect alone.

Summary of likely significant effect in combination:

All effects were avoided so there are no residual effects to consider.

The assessment of likely significant effect from this risk for the following features is:

Atlantic salmon - no effect. Brook lamprey - no effect. Bullhead - no effect. Water courses of plain to montane levels with R. fluitantis - no effect.

Habitat loss

Summary of likely significant effect alone:

Abstraction for the purpose of transferring water can alter the hydrological regimes for the donor or receiving water body. Any change in the hydrological regime can affect habitats which are accustomed to and reliant on the current conditions. This can directly or indirectly impact on the features of the designated site.

The purpose of this water transfer is to maintain current hydrological conditions. Modelling demonstrates that this proposal will fulfil that aim with negligible effects on flow velocity and water levels. We are satisfied that there will be no effect on habitat loss. We conclude no likely significant effect alone.

Summary of likely significant effect in combination:

All effects were avoided so there are no residual effects to consider.

The assessment of likely significant effect from this risk for the following features is:

> Atlantic salmon - no effect. Brook lamprey - no effect. Bullhead - no effect. Water courses of plain to montane levels with R. fluitantis - no effect.

Reduced dilution capacity

Summary of likely significant effect alone:

Any abstraction to transfer water could reduce the dilution capacity of the donor waterbody. Reduced dilution capacity could affect the overall water quality of the waterbody and thus have a detrimental impact upon the designated site and the features its supports.

The purpose of this water transfer is to maintain current hydrological conditions. Modelling demonstrates that this proposal will fulfil that aim with no impact on flow velocity compared to current conditions and negligible or positive impact on water levels. We are satisfied that there will be no effect on reduced dilution capacity. We conclude no likely significant effect alone.

Summary of likely significant effect in combination:

Any changes in water levels or flow caused by this proposal alone will be negligible, however could act in combination with other permitted activities to a greater effect. This proposal only effects the area between the offtake at Blackwell Hatches downstream to where Summerlock stream re-joins the River Avon at National Grid Reference SU 13976 29677. There are no other permitted abstraction licences in this area which would act in combination to reduce dilution capacity.

There are two permitted discharges identified in this area. Permit 40164 discharges to a soakway with no connection to surface waterbodies and will therefore not act upon the SAC. Permit 400462 discharges site drainage into the Summerlock stream. This proposal is aimed at ensuring flows in the Summerlock stream remain similar to the existing regime. Therefore without this proposal the scheme would likely see a reduced dilution capacity in the Summerlock stream increasing any effects of permit 400462.

We are satisfied that there will no effect on reduced dilution capacity in combination. We conclude no effect in combination.

The assessment of likely significant effect from this risk for the following features is:

Atlantic salmon - no effect. Brook lamprey - no effect. Bullhead - no effect. Water courses of plain to montane levels with R. fluitantis - no effect.

8. Alone assessment (further details)

This proposal aims to transfer water from the River Avon into Summerlock stream to ensure that the Salisbury Park River scheme retains the current flow regime within the Summerlock. The transfer will occur via a passive pipe arrangement taking water from the Avon into the Summerlock in the vicinity of the existing Blackwell Hatches. Volumes will be controlled by a penstock.

Spot gauging along with modelling, based on current agreed operating procedures, have demonstrated that flow in the Summerlock and River Avon can be maintained close to current levels (see section 7). Thus this proposal will have a minimal effect on the flows and associated risks. Modelling has shown that there is very minimal change in water levels (see section 7).

Whilst hydraulic modelling provided a reasonable match with the recent gauged records, the applicant acknowledges that the Avon system through Salisbury experiences significant seasonal and annual variations in the passage of water. It is understood that channel vegetation is a dominant factor in the bifurcation of flows, which varies both seasonally and annually. An adaptive management approach will be able to accommodate for these variations. To ensure the expected flow splits are achieved, structures such as the penstock at Blackwell Hatches will be adjusted appropriately to allow more or less water into the Summerlock as required. In a very low flow event which is causing a reduction in the quality of desired habitats, the penstocks would be closed. This, along with the installation of stop logs in the Summerlock stream would ensure flow is maintained within the River Avon which is intended as the preferential route for fish passage following scheme completion.

It is proposed that further flow and stage gauging will be undertaken for at least the first five years after completion of the Scheme. This monitoring will provide a greater understanding of the low flow splits between the different channels, and how these vary with season and vegetation growth. This will also help inform how the system is managed during drought conditions when decisions may be required on how to best distribute the flow when it may not be possible to sustain flow on all channels. This is no different to how the system is currently operated and will be detailed further in a Scheme Operation and Maintenance Manual which will be used to guide management of the site. It is to be confirmed whether monitoring will form a condition on the licence. It is recommended that reference to the Operation and Maintenance Manual form part of the licence.

It should be reiterated that both the River Avon and Summerlock stream are designated as part of the SAC. Therefore although this transfer supports Summerlock stream at the expense of the River Avon, it does not take water from the SAC system. Additionally this proposal, in conjunction with the new offtake further upstream, is designed to take the same volume of water from the River Avon as the current regime. This proposal is to ensure that current flows through the River

Avon, and Summerlock stream are maintained. Modelling and gauging suggests that this proposal in conjunction with the Salisbury River Park scheme will maintain very similar flows are per the current regime and that any changes will be negligible. We are satisfied that this proposal will have no significant effect on the integrity of the River Avon SAC. We conclude no likely significant effect alone.

9. In combination assessment (further details)

Both the River Avon and Summerlock stream are designated as part of the SAC. Therefore although this transfer supports Summerlock stream at the expense of the River Avon, it does not take water from the SAC system. Water from the Summerlock stream re-joins the River Avon at National Grid Reference SU 13976 29677, approximately 1.35 kilometres downstream. Therefore it is only within this area that effects are likely to occur.

No permitted abstractions, or impoundments have been identified in this area. Two discharge permits were identified and concluded unlikely to act in combination with this proposal, (see section 7). Therefore we are satisfied that this proposal will have no effect in combination. We conclude no effect in combination.

10. Information / Advice

This section summarises the information and or advice requested / received during the screening.

Environment Agency internal advice and consultation (if applicable)

Internal consultation with Integrated Environmental Planning, Hydrology, Fisheries, Biodiversity, Geomorphology, and Land and Water (Environment Management) was conducted. No concerns were raised but it was suggested that the licence have a link to the Operational and Maintenance (O&M) manual to ensure we have a means to manage the abstraction to best effect going forward.

Natural England information / advice (if applicable)

Natural England have not been consulted specifically on this licence application but were consulted throughout the planning process and provided input on the options for the Salisbury River Park ‘phase 1’ scheme. They were also consulted via a HRA stage 1 screening and Appropriate Assessment compiled by Jacobs on behalf of the Environment Agency.

The previous assessment concluded that there would be a likely significant effect from the development on the integrity of the SAC, however that there is sufficient information to conclude that potential impacts to the site can be avoided, mitigated or compensated.

Natural England (James Hughes) agreed with the conclusions of the Appropriate Assessment. Natural England confirmed that 'we concur with the assessment conclusions, providing that all mitigation measures are appropriately secured in any planning permission given.'

Third party advice (if applicable)

N/a

11. References

River Avon SAC Conservation objectives & River Avon SAC Citation found at

https://publications.naturalengland.org.uk/publication/6048472272732160?category=6528471664689152

Stage 1 and 2 Habitats Regulations Assessment Version 3 dated 01.03.2021 and written by Alice Shoebridge & Corinna Morgan, Jacobs on behalf of the Environment Agency and submitted as part of the planning application for the larger Salisbury River Park Phase 1 scheme.

12. Decision

The Environment Agency concludes there is no likely significant effect.

Name of Environment Agency officer: Kelvin Lofthouse

Job title: Habitats Regulations Assessment Team Officer

Date: 27 July 2023

13. Consultation (if applicable)

Date sent to Natural England for consultation: 27 July 2023

Date response received from Natural England: || Select date ||

Natural England advice on the screening for likely significant effects (if applicable)

Write here...

Do Natural England have concerns about the assessment? || Yes / No ||

Do Natural England have concerns about the decision? || Yes / No ||

Name of Natural England officer:

Job title:

Date: || Select date ||

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Subject	**Salisbury River Park Phase 1 Indicative Low Flow Estimation**	**Project Name**	Salisbury River Park Phase 1
Author	Rachel Hopgood	**Project No.**	B2368200
Reviewed by	PS Rayner	**Client Project No.**	ENVIMSW002033
Date	Feb'21	**Doc No.**	ENVIMSW002033-CH2-ZZ-300-TN-HY-1083
		Rev.	P03

1. Introduction

This note details work undertaken to derive indicative estimates of low flows for use in hydraulic modelling to support geomorphological assessment of the Salisbury River Park scheme. It also documents subsequent analysis of model results and gauged data to determine the flow splits, in low flow conditions, at the various watercourse confluences within Salisbury. The flow splits are needed to identify design criteria for the Salisbury River Park scheme.

The low flows model is adapted from the Environment Agency's 1D-2D flood model of the area and has been truncated to remove the 2D domain and areas which do not have a significant effect on the area of interest. The extent of the low flows model and the locations at which low flow estimates were required is shown in Figure 1-1. No flow estimates were produced to account for lateral inflows to the watercourses between the upstream and downstream extents of the model as these were expected to be minimal compared to the upstream inflows and subject to considerable uncertainty in low flow conditions.

The purpose of this assessment was to provide an indicative estimate of flows under a range of low flow conditions with readily available data, in order to identify general trends in how the watercourses may behave in low flow conditions. Further refinement and hydrological analysis would be required to provide more accurate flow estimates for the purposes of detailed design and defining flow conditions at specific locations.

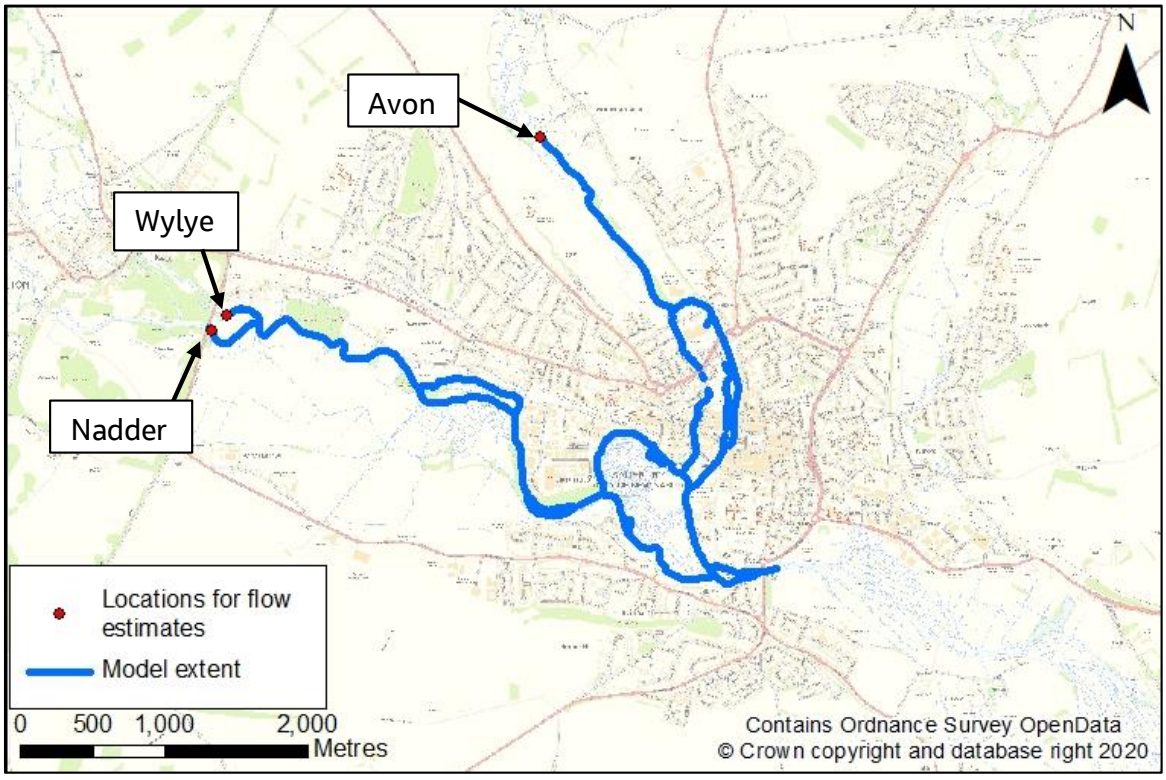


Figure 1-1: Locations for low flow estimates

2. Low flow estimates

There are gauging stations located close to the study area on all three watercourses for which flow estimates are required. The locations of the gauging stations and the extents of their upstream catchments are shown in Figure 2-1. It should be noted that the groundwater catchments feeding low flows at these locations may differ from the topographic catchments shown. Details of the gauging stations, obtained from the National River Flow Archive (NRFA)[1], are given in **Error! Reference source not found.**.

Table 2-1: Gauging station summary

Station no	Station name	Catchment area (km^2)	Period of record	Authority
43005	Avon at Amesbury	324	1965 - present	EA
43006	Nadder at Wilton	221	1966 - present	EA
43008	Wylye at South Newton	445	1966 - present	EA

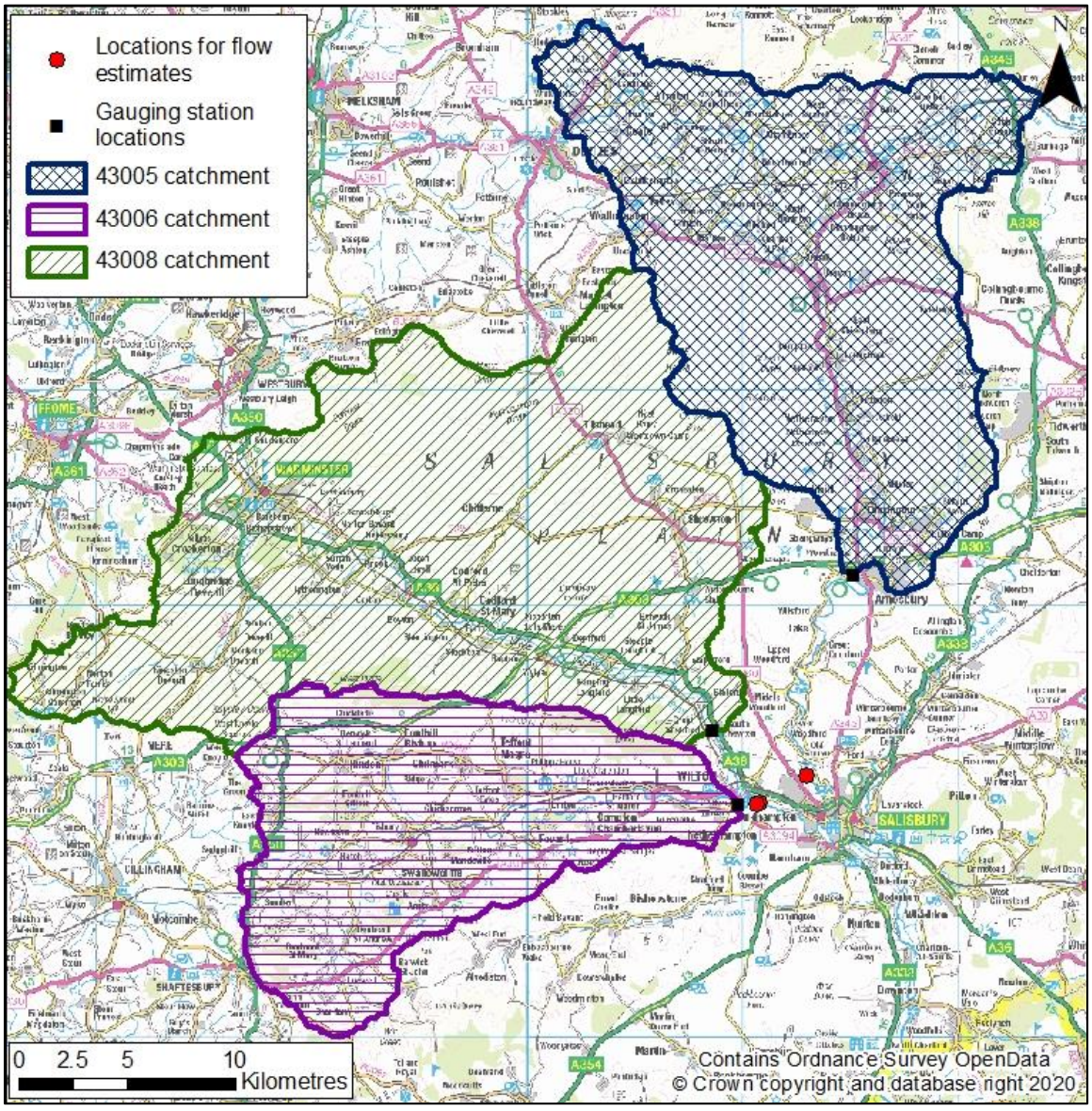


Figure 2-1: Gauging station locations and catchments

[1]CEH, 2020. https://nrfa.ceh.ac.uk/ [Accessed September 2020]

2.1 Nadder and Wylye estimates

The proposed scheme is located on the River Avon and approximately 400m upstream of its confluence with the Nadder/Wylye. Water levels in the confluence area are not considered to have a significant impact on model results within the scheme area. For this reason, alongside the limited additional catchment area between the gauges and the flow estimation points, the low flow estimates at the Nadder and Wylye gauges are considered appropriate for use in the model without further scaling.

Low flow estimates for the Nadder and Wylye have been obtained directly from the gauging station "daily flow data" pages on the NRFA website[2]. The values used for the modelling were obtained on 12/05/20. It should be noted these values are continuously updated as new gauging data becomes available. However, due to the long period of record this is not expected to result in significant fluctuation in low flow estimates over the project timescales.

The low flow estimates for the Nadder and Wylye that are used in the model are shown in Table 2-2.

Table 2-2: Nadder and Wylye low flows

Low flow event*	Nadder flow estimate (m^3/s)	Wylye flow estimate (m^3/s)
Q95	0.91	1.10
Q70	1.44	1.87
Q50	2.10	2.83
Q10	5.79	8.47
Q5	7.35	10.70

***low flow events expressed as percentiles for exceedance, e.g. Q95 flow is exceeded by 95% of measured flows**

2.2 Avon estimates

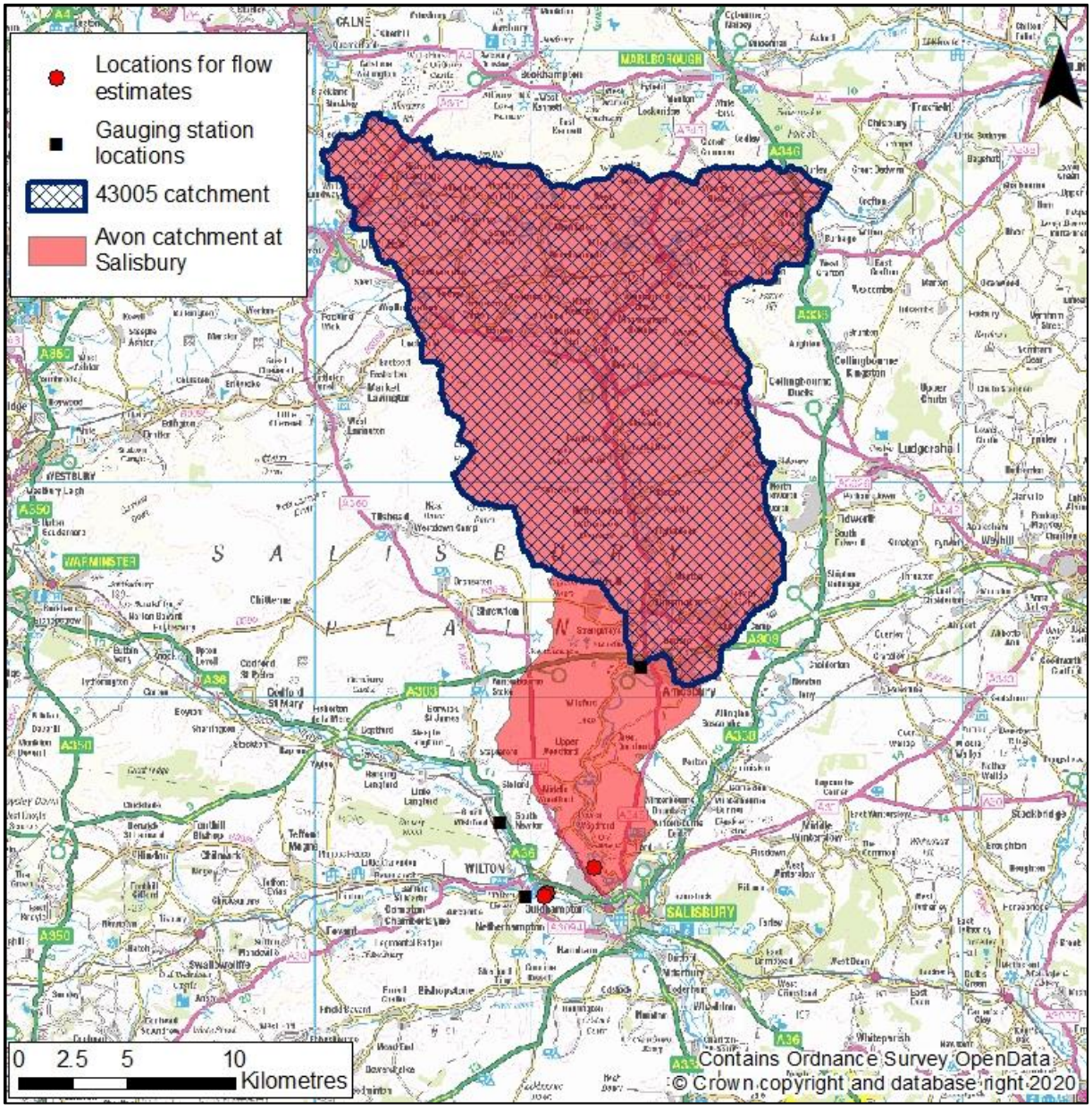
The Avon at Amesbury gauge is located approximately 12.5km upstream of the modelled area. The catchment area at the gauge is approximately 326km^2 but increases to approximately 398km^2 by central Salisbury, an increase of around 20%. This is illustrated in Figure 2-2. For the purpose of these indicative low flow estimates the groundwater catchments are considered to have the same extent as the topographic catchments.

Spot gaugings undertaken at Fisherton Recreation Ground in Salisbury (close to the upstream extent of the model) have been compared with daily flow data at the Amesbury gauge. This comparison shown in

[2] Nadder: https://nrfa.ceh.ac.uk/data/station/meanflow/43006
Wylye: https://nrfa.ceh.ac.uk/data/station/meanflow/43008

Table 2-3. The values have been plotted as a graph (Figure 2-3) and a linear line of best fit plotted, assuming an intercept at 0 – i.e. 0m^3/s flow at Amesbury would result in 0m^3/s flow in Salisbury. There are several limitations of this approach which are discussed in Section **Error! Reference source not found.**.

Figure 2-3 indicates that, assuming a linear relationship between flow at Amesbury and Salisbury (see Section **Error! Reference source not found.** for limitations of this assumption), there is around a 20% increase between flows at Amesbury and flows at Salisbury. This is consistent with the change in catchment area between these locations. Based on this, for the purposes of indicative estimates of low flow conditions, low flow estimates for the Salisbury gauge from the NRFA website [3] have been scaled by 1.2 for use in the model. The low flow estimates at Amesbury and the indicative flows at Salisbury are shown in Table 2-4.



[3] Avon: https://nrfa.ceh.ac.uk/data/station/meanflow/43005

Figure 2-2: Increase in Avon catchment area between gauge and model

Table 2-3: Comparison of flows in Amesbury and Salisbury

Date	Gauged flow at Amesbury (m^3/s)	Spot gauging in Salisbury (m^3/s)
26/11/2012	12.00	12.14
28/11/2012	10.60	14.23
03/01/2013	13.50	17.38
03/02/2013	9.85	12.94
27/07/2015	1.60	2.30
25/03/2019	3.86	5.25
08/05/2019	2.83	3.97
29/07/2019	0.99	1.64
10/07/2020	1.87*	2.48
24/07/2020	1.47*	2.18
07/08/2020	1.31*	2.00
19/10/2020	1.96*	2.83

*recent gauged data which is unchecked

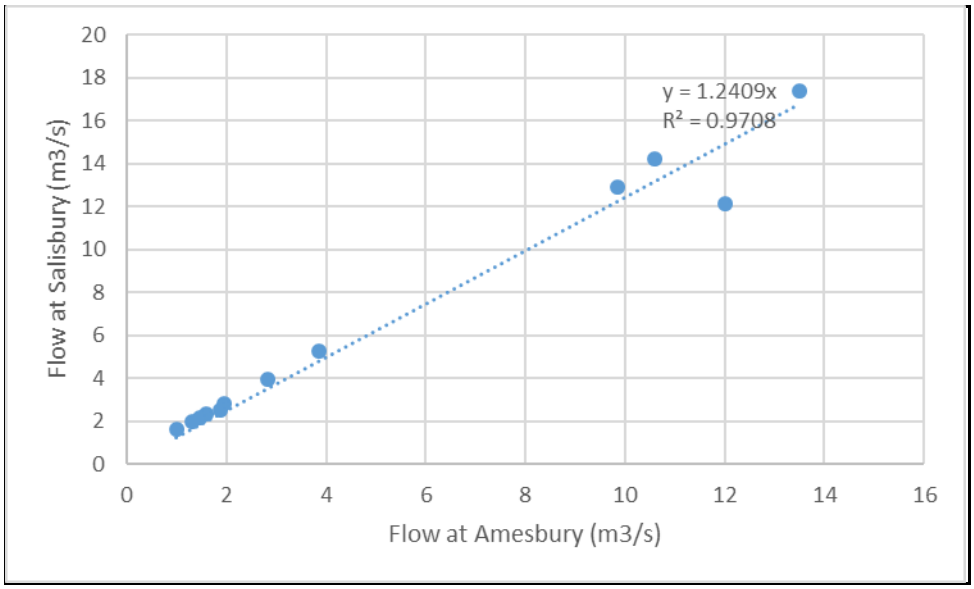


Figure 2-3: Comparison of flow at Amesbury and Salisbury

Table 2-4: Avon low flows

Low flow event*	Low flow estimate at Amesbury gauge (m^3/s)	Scaled flow at Salisbury (m^3/s)
Q95	1.12	1.34
Q70	1.89	2.27
Q50	2.72	3.26
Q10	6.76	8.11
Q5	8.30	9.96

*low flow events expressed as percentiles for exceedance,
for example the Q95 flow is exceeded by 95% of measured flows

3. Baseline flow split estimates

There are two main bifurcations of the River Avon in Salisbury:

- Blackwell Hatches, where there is an offtake to the Summerlock Stream; and
- Swimming Pool Gate, where the Avon splits between main River Avon channel and Mill Stream.

The locations of these, alongside other key flow control infrastructure in Salisbury, is shown in Figure 3-1.

Estimates are required of the current amount of flow going into each watercourse at these two locations for a range of flow conditions, in order to provide a baseline to inform design criteria for the Salisbury River Park scheme.

Existing flow splits at these locations are dependent on a number of factors including channel geometry, hydraulic roughness and operation of the flow control structures. The River Avon and its tributaries are understood to be relatively geomorphologically stable, although there is movement of fine sediment through the system which may result in localised variation in the channel geometry, and therefore flow conditions, over time. The Avon in Salisbury is also subject to seasonal weed growth and cutting which has a significant effect on the hydraulic roughness of the channels and flow conveyance.

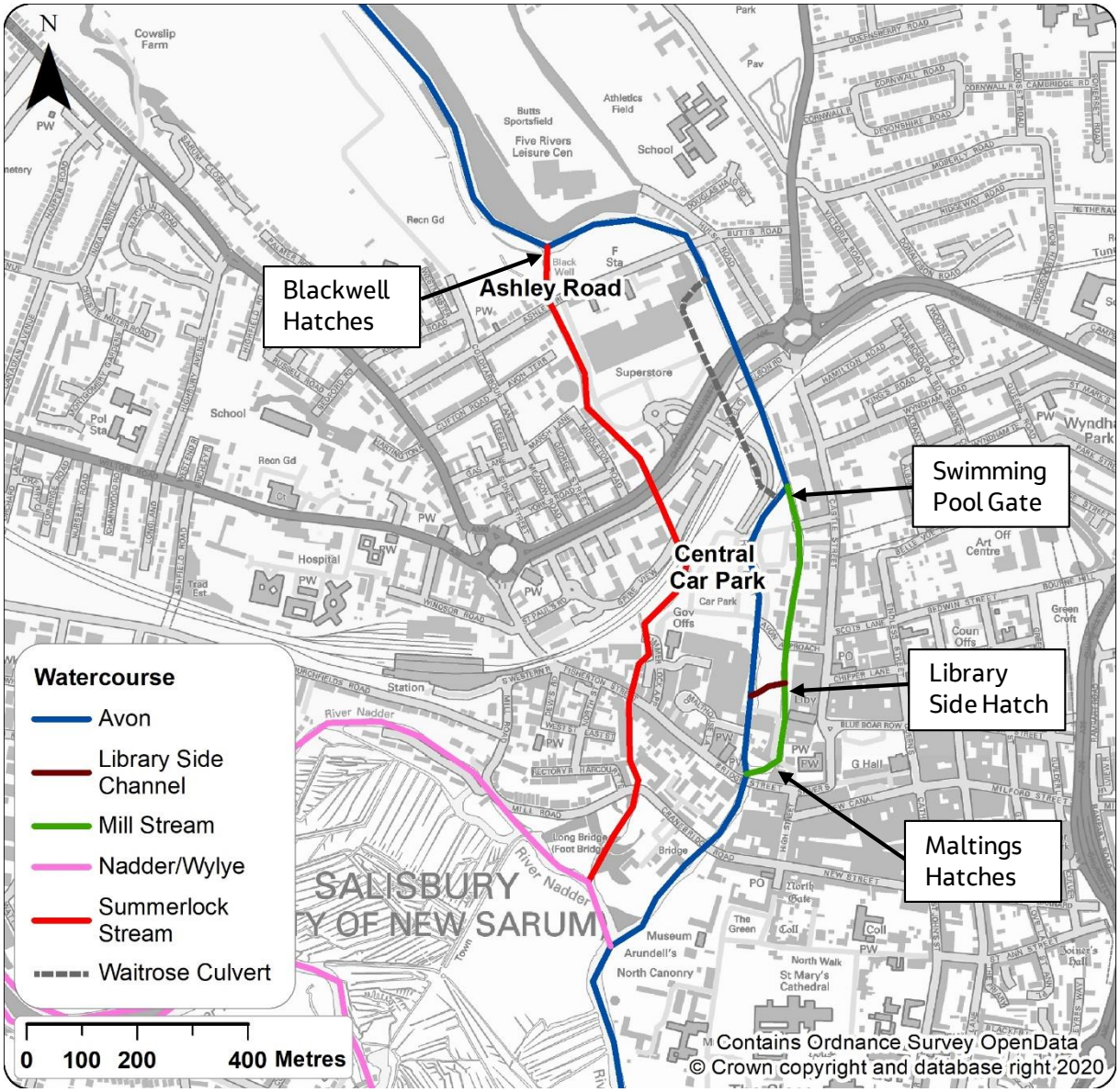


Figure 3-1: Flow control structures in Salisbury

The sluice structures at Blackwell Hatches and Swimming Pool Gate are used to control flows in both flood and low flow conditions at the two bifurcations and there are several additional structures in Salisbury which may also act to influence the flow splits through backwater effect (see Figure 3-1). Swimming Pool Gate is automatically operated, based on telemetry, but the other structures are set manually. Whilst there are agreed operating rules for the structures, it is possible that there is some variation in how these are operated depending on conditions observed on site. Furthermore, there is no information readily available on whether there have been any changes to the operating rules over time (although it is known that Blackwell Hatches is now inoperable due to health and safety concerns so has been set to a permanent position).

Given the variables described above it is important to note that determining a single baseline condition for a given flow (e.g. the percentage flow to the Summerlock Stream for a Q95 flow) is not possible. It is more appropriate to consider an indicative range of flow conditions. In order to identify these conditions, a combination of observed data and hydraulic modelling has been used.

There are no permanent flow gauges within the study area (only level gauges are present) so observed flows have been obtained from spot gaugings. Information on spot gaugings undertaken in Salisbury has been obtained from the Environment Agency's WISKI database. There are records dating back as far as 1959 but there has been no regular programme of flow monitoring and flow gaugings have not always been undertaken at consistent locations or using the same method. The locations of spot gaugings undertaken are shown in Figure 3-2. These include the gaugings described in Table 2-3, some of which were undertaken to inform the Salisbury River Park project. It should be noted that a grid reference has not been supplied with every record and some locations have therefore been identified from a description only.

In order to determine the amount of flow in each watercourse for a range of low flow conditions, spot gaugings recorded downstream of each of the two bifurcations have been compared to the upstream flow into Salisbury on the same day. From this, it is possible to estimate where in the low flow range (Q95 to Q5) flows in Salisbury were when the gauging was collected. In the majority of cases the upstream flow into Salisbury has been taken directly from the "Avon at Fisherton Rec" location. Where this was not available, the inflow into to Salisbury has been calculated as the sum of flows recorded at the "Summerlock at Ashley Road" and "Avon at Ashley Road" locations.

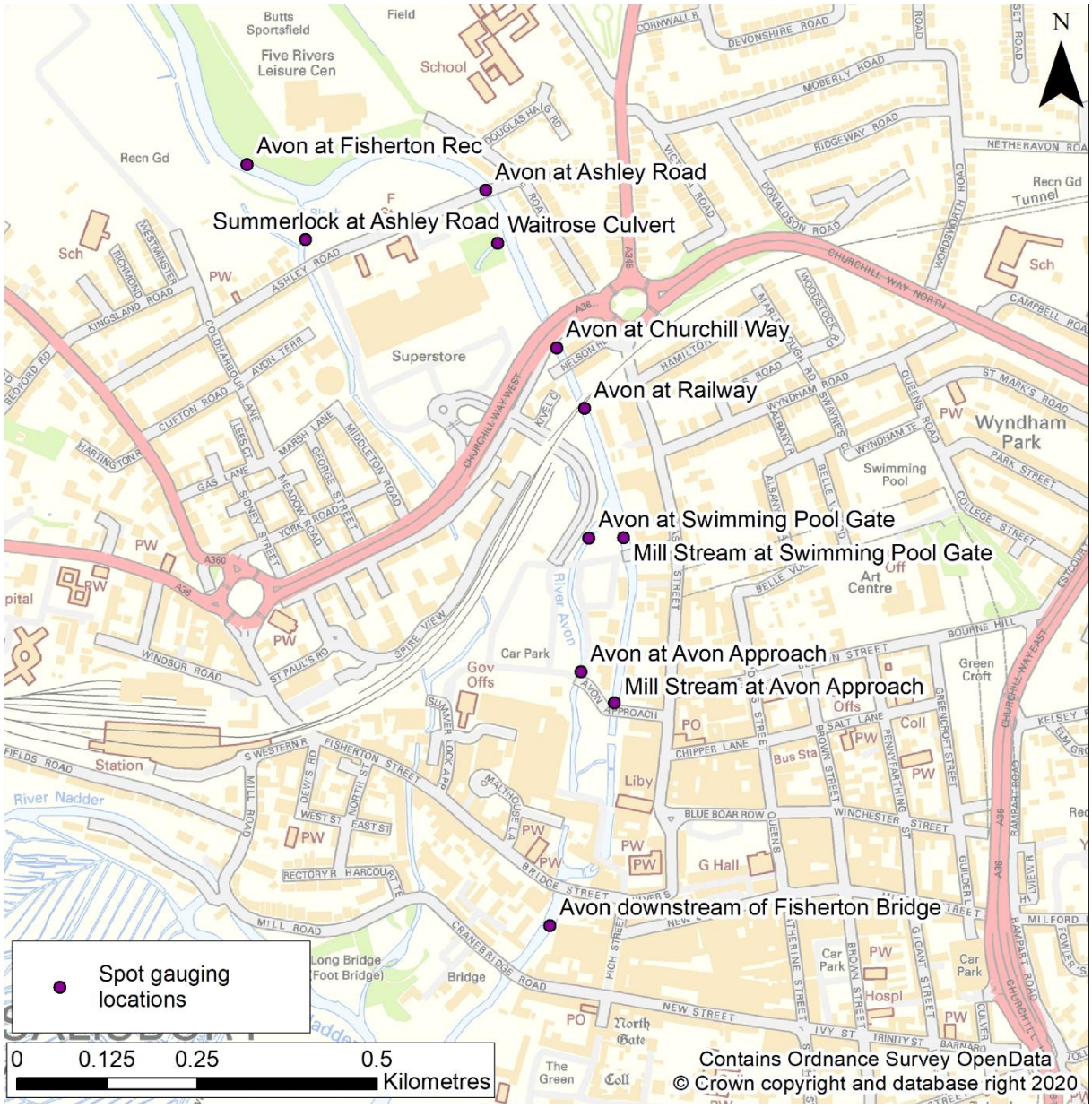


Figure 3-2: Spot gauging locations in Salisbury

In addition to the gauged data, hydraulic modelling has been undertaken to determine flow splits for a range of low flow conditions (Q95 to Q5). As described in Section 1, the 1D component of the Environment Agency's hydraulic model for Salisbury has been used. This is considered appropriate as flows are expected to remain in channel in these events for the area of interest. Several modifications have been made to the baseline model, as summarised below:

- Blackwell Hatches operating rules set to one gate fully open (0.65m opening) and one gate fully closed to match current conditions.
- Additional rule added to Swimming Pool Gate controls to reduce the opening if upstream water level is less than 47.2mAOD. This is to prevent the model from crashing due to there being no flow in the Mill Stream. This is considered appropriate as, in reality, the Mill Stream would not be allowed to dry out.
- Library Side Hatches set to fully closed, to improve stability.

- Maltings Hatches gates set to fully closed (as would be expected in low flow conditions to retain water in the Mill Stream) with flow only allowed through fish pass.
- Minor modifications to improve model stability, including: modification of low flow bottom slot settings in culverts, removal of some unstable sections of the model away from the area of interest, inclusion of sweetener flows at several locations, minor adjustments to bed levels and panel markers in unstable areas, spills between channels added at bed level in some locations.

The Manning's n values in the existing model have been reviewed. Manning's n values account for hydraulic roughness based on a number of factors including bed material, channel sinuosity and variation, obstacles to flow and vegetation within the channel. For low flow models, Manning's n values are often increased to allow for these factors having a greater effect in low flows. For example, in flood conditions in-channel vegetation may be somewhat flattened by high flows whereas in lower flows vegetation may form more of an obstruction, reducing conveyance. As there is considerable variation in a number of these factors and the model is intended to provide indicative information on flow splits rather than a detailed calibrated model, the existing Manning's n values have been retained. Limitations of this approach are discussed in Section 5.

The baseline model results and gauged data for the flow splits is shown in Figure 3-3 to Figure 3-6. For all figures, gauged records obtained between July and October 2020 to inform the Salisbury River Park project have been highlighted in blue. These measurements have been undertaken using a consistent method and at the same locations each time, unlike spot gaugings taken previously.

The model results show generally good agreement with the gauged flows at both Blackwell Hatches and Swimming Pool Gate. Variations between the modelled and gauged data (and between spot gaugings taken for similar upstream flow conditions) can be explained by uncertainty in both of the sources of data as well as potential variability in weed growth, channel geometry and operation of structures. Additional flow monitoring would improve confidence in the results. In particular, there is very little gauged data above Q50.

At Blackwell Hatches, the effects of the existing structure on flows in the Summerlock Stream can be seen from the model results. At Q95 flows into the Summerlock are controlled by (drowned) weir flow through the open gate. However, as flows increase and the soffit of the gate is reached, flows are limited by the gate opening size. Based on this, it is possible that there has been considerable variation in flow conditions over time due to changes in operation of the structure. This may partially explain the variability in gauged flows (although this may also be influenced by the other factors described above). It is therefore not possible to define a single set of "existing" flow conditions at this location.

At Swimming Pool Gate, model results show an approximately linear increase in flow to the Mill Stream, as flow into Salisbury increases, between Q95 and Q10. Above Q10, flow to the Mill Stream remains steady at between 3.0m^3/s and 3.5m^3/s. This is as a result of gate operating rules at Swimming Pool Gate which open the gate to reduce upstream water levels in the Avon (also reducing water levels in the Mill Stream). As for Blackwell Hatches, it can be seen that the existing flow split at Swimming Pool Gate is highly dependent on gate operation.

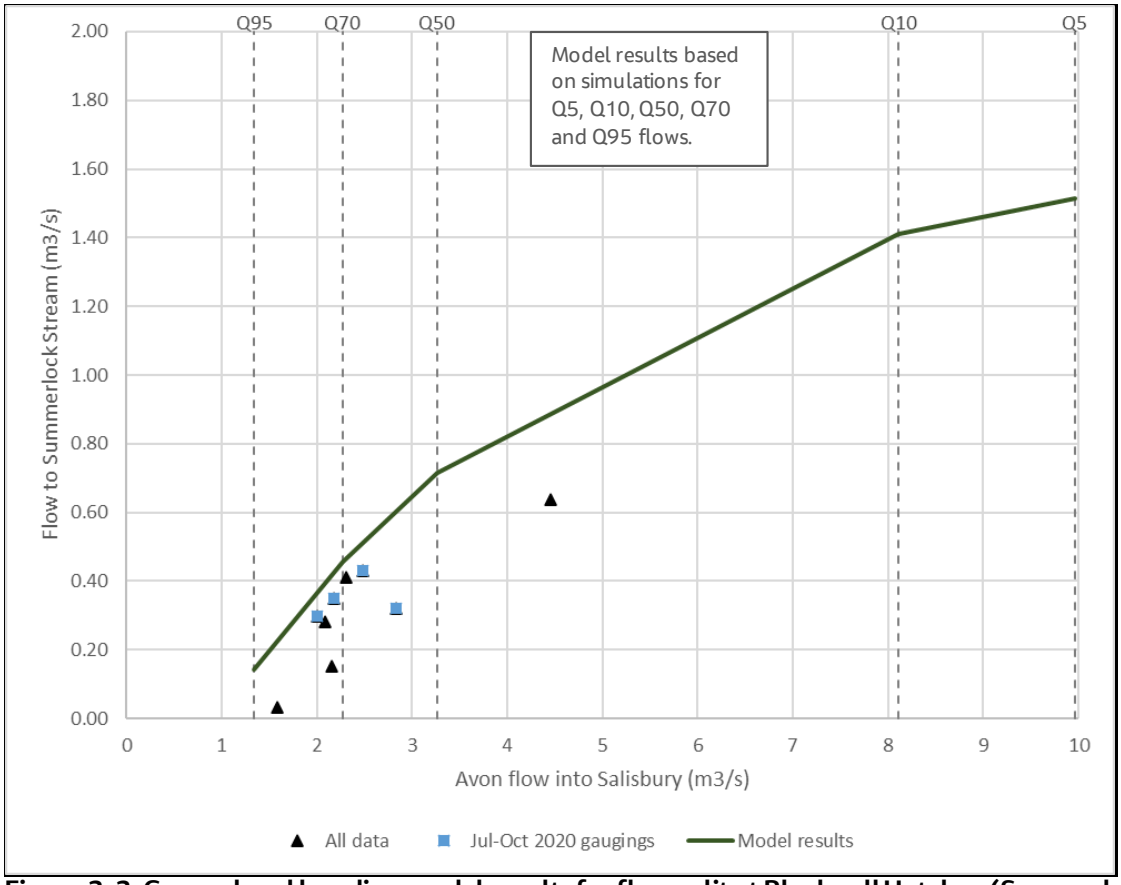


Figure 3-3: Gauged and baseline model results for flow split at Blackwell Hatches (Summerlock)

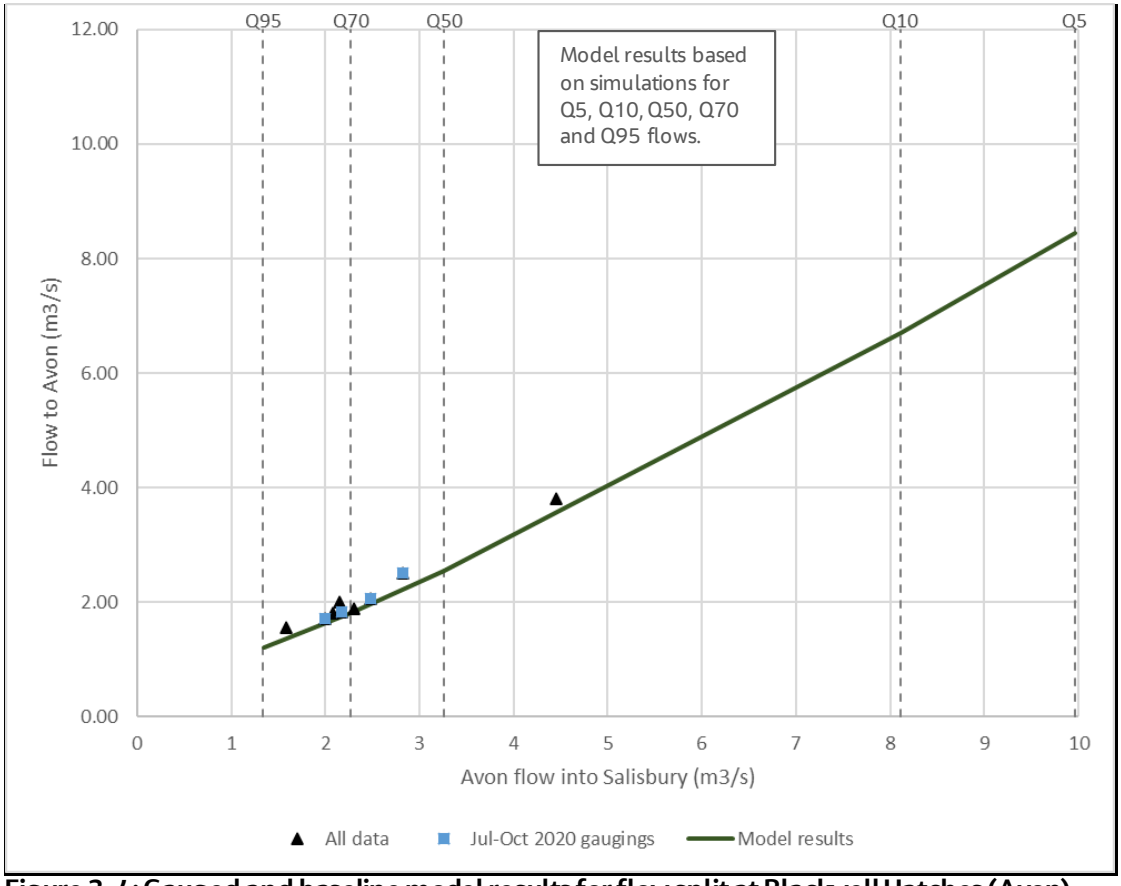


Figure 3-4: Gauged and baseline model results for flow split at Blackwell Hatches (Avon)

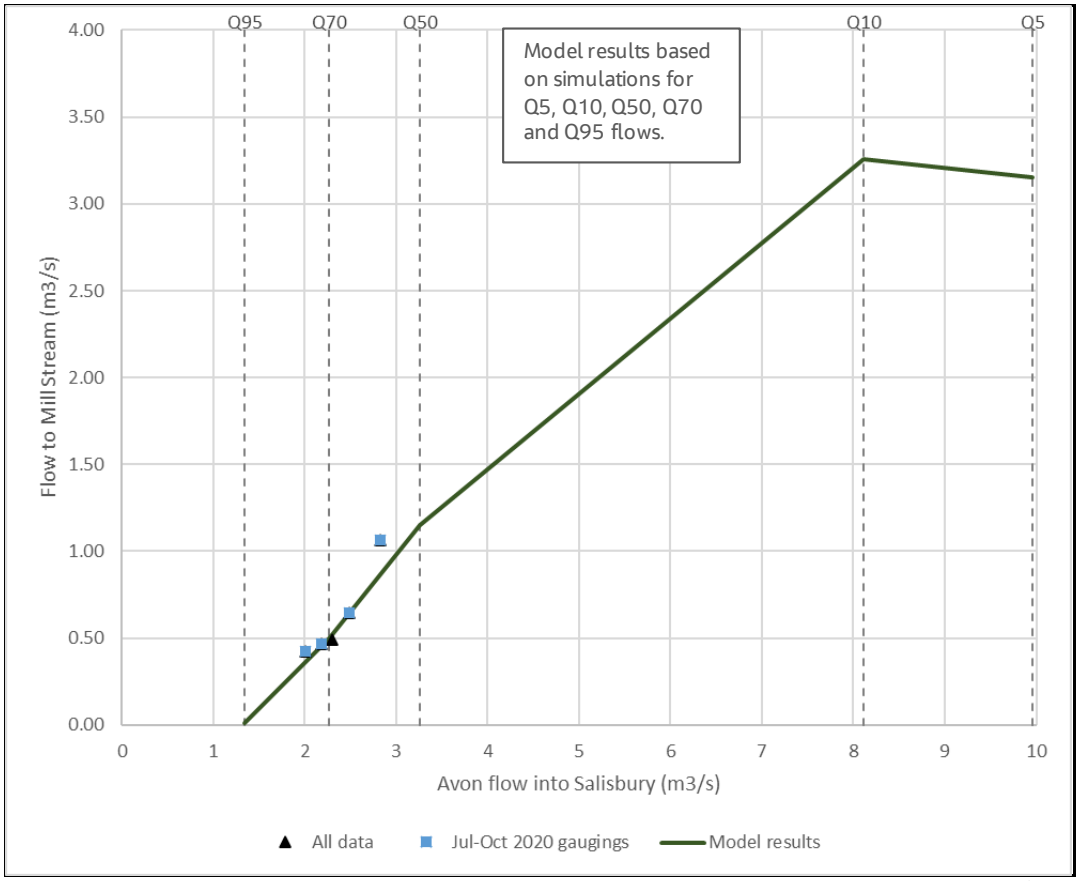


Figure 3-5: Gauged and baseline model results for flow split at Swimming Pool Gate (Mill Stream)

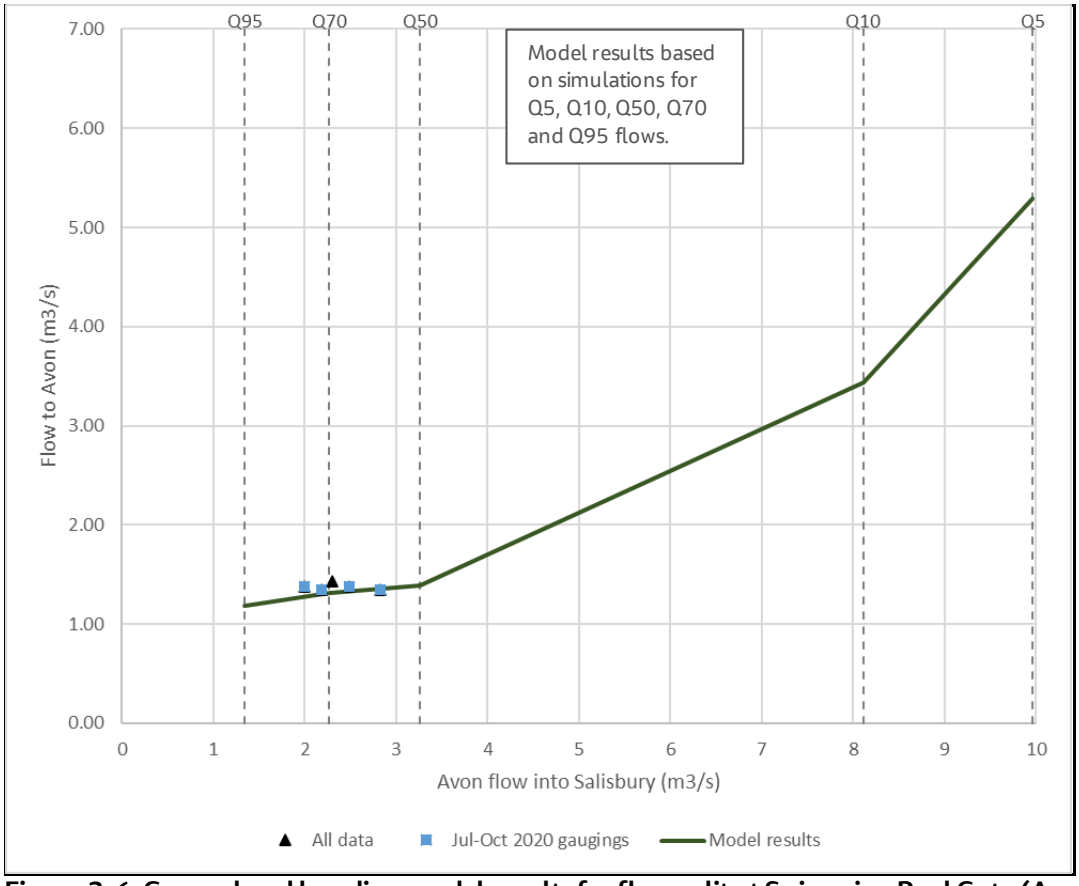


Figure 3-6: Gauged and baseline model results for flow split at Swimming Pool Gate (Avon)

4. With scheme flow splits

A with scheme hydraulic model has been developed to give an indication of how the system is likely to behave with the Salisbury River Park Phase 1 scheme in place, in terms of flow splits at Blackwell Hatches and Swimming Pool Gate. The baseline model described in Section 3 has been modified to include the following in-channel features which form part of the scheme:

- Removal of Blackwell Hatches structure (channel to be infilled), with a new offtake constructed further upstream and a new channel and wetland area linking the new offtake with the existing Summerlock Stream at Ashley Road.
- Orifice flow control structure on the Summerlock Stream through the proposed new embankment just upstream of Ashley Road.
- Replacement of Swimming Pool Gate with a new fixed crest weir (with a notch for low flows). New multi-stage widened river corridor to be constructed between new weir and Avon Approach bridge. Upstream end of new channel to be a cascade of riffles/rock weirs and pools to allow fish passage - modification of bed levels in this area requires Waitrose culvert outlet to be diverted further downstream.
- Relocation of Millstream approach bridge over River Avon.
- Addition of marginal planting within the Mill Stream.
- Reduction in crest height of the fish pass at the Maltings Hatches and removal of the gates.

Initial model testing indicated that the slope and cross-sectional area in the new wetland area had a greater influence on the flow split at Blackwell Hatches than the offtake structure itself, due to the low gradient of the channel in this area. Modifications were therefore made to the proposed channel width to better match baseline conditions at low flows. Further investigation will be required at detailed design stage to confirm the channel width required.

As discussed in Section 3, it is not possible to define a single baseline or with scheme condition for a given flow due to the multiple variables that can influence real-life flow conditions. Given the potential uncertainties in both the hydraulic modelling and the multiple variables which may have influenced real-life conditions at the time of the spot gaugings, both the modelled and gauged data have been compared to the with scheme modelled flow splits. This comparison is shown in Figure 4-1 to Figure 4-4.

At Blackwell Hatches, the with scheme modelled flows to the Summerlock Stream are a good match to the baseline model flows at Q95 and Q5. Between these flows there is some variation from the modelled baseline condition but the with scheme results are reasonably consistent with gauged flows, indicating that the flows into the Summerlock Stream resulting from the scheme are expected to be in a similar range to those experienced in existing conditions, allowing for uncertainty in the data. It is important to note that the proposed offtake and wetland area at this location will be subject to further detailed design where there will be opportunity to further improve the agreement between existing and with scheme conditions. However, these preliminary results indicate that the conceptual design developed for this area achieves a flow split that is in the desired range, in terms of replicating existing flow conditions.

At Swimming Pool Gate, the with scheme results show an overall reduction in flows in the Mill Stream compared to baseline conditions and an increase in flows to the main Avon channel (except for the lowest flows at around Q95). However, this is one of the intended outcomes of the proposed scheme which aims to make the main Avon channel the preferential flow route. The proposed marginal vegetation in the Mill Stream and reduction in fish pass crest level at the Maltings should help to mitigate any changes in velocity resulting from the reduced flow to the Mill Stream. The change in flow split at Q95 is due to the change from an undershot sluice gate structure to a weir structure. If required, a better match to baseline conditions could be achieved here by modify the proposed notch at detailed design stage, although this may also reduce the flow to the Mill Stream in other events.

Further information on the potential impacts on ecology and geomorphology can be found in the Environmental Statement and Geomorphology Report for the scheme.

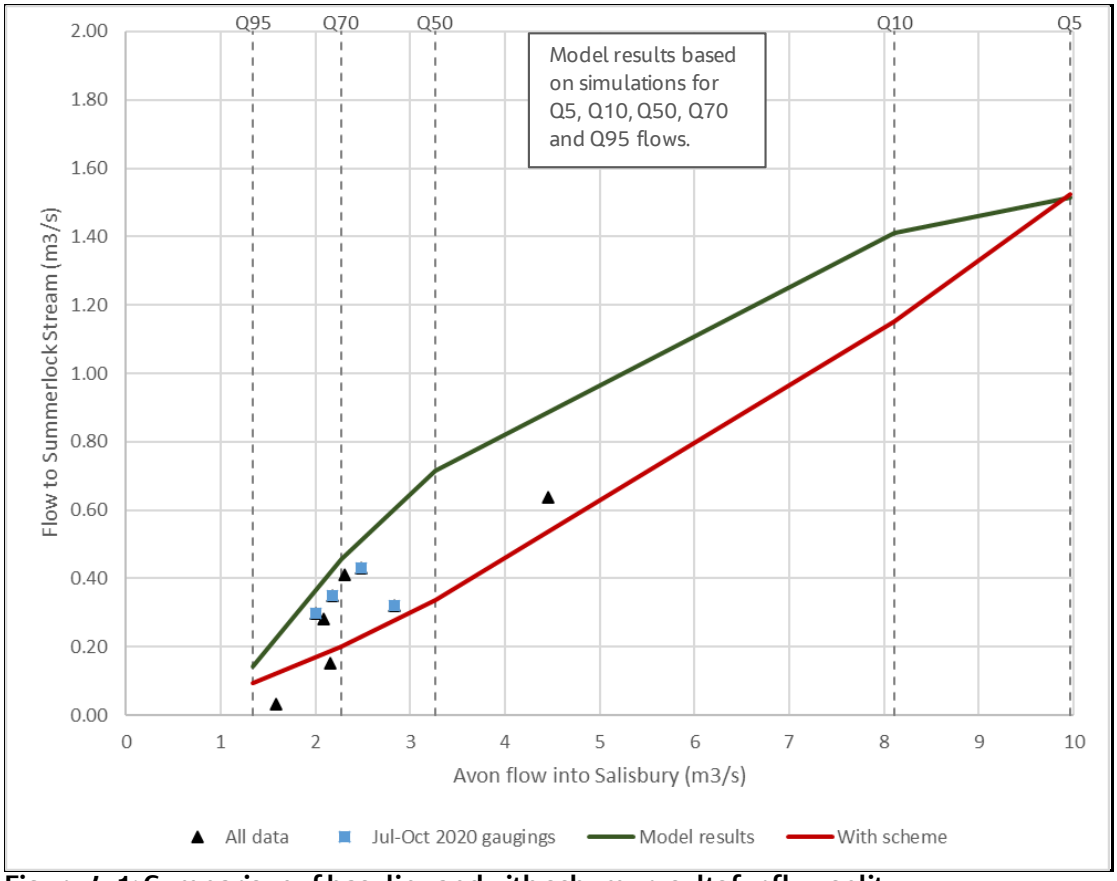


Figure 4-1: Comparison of baseline and with scheme results for flow split at Blackwell Hatches (Summerlock)

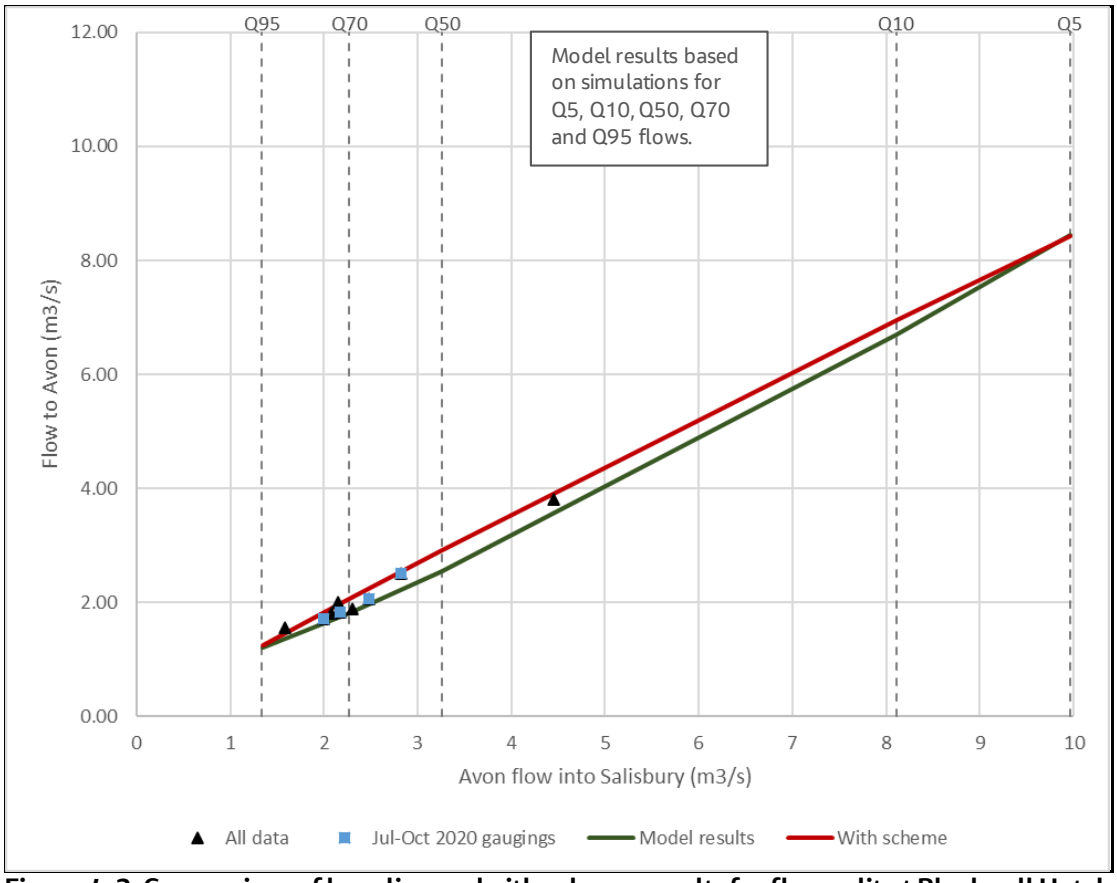


Figure 4-2: Comparison of baseline and with scheme results for flow split at Blackwell Hatches (Avon)

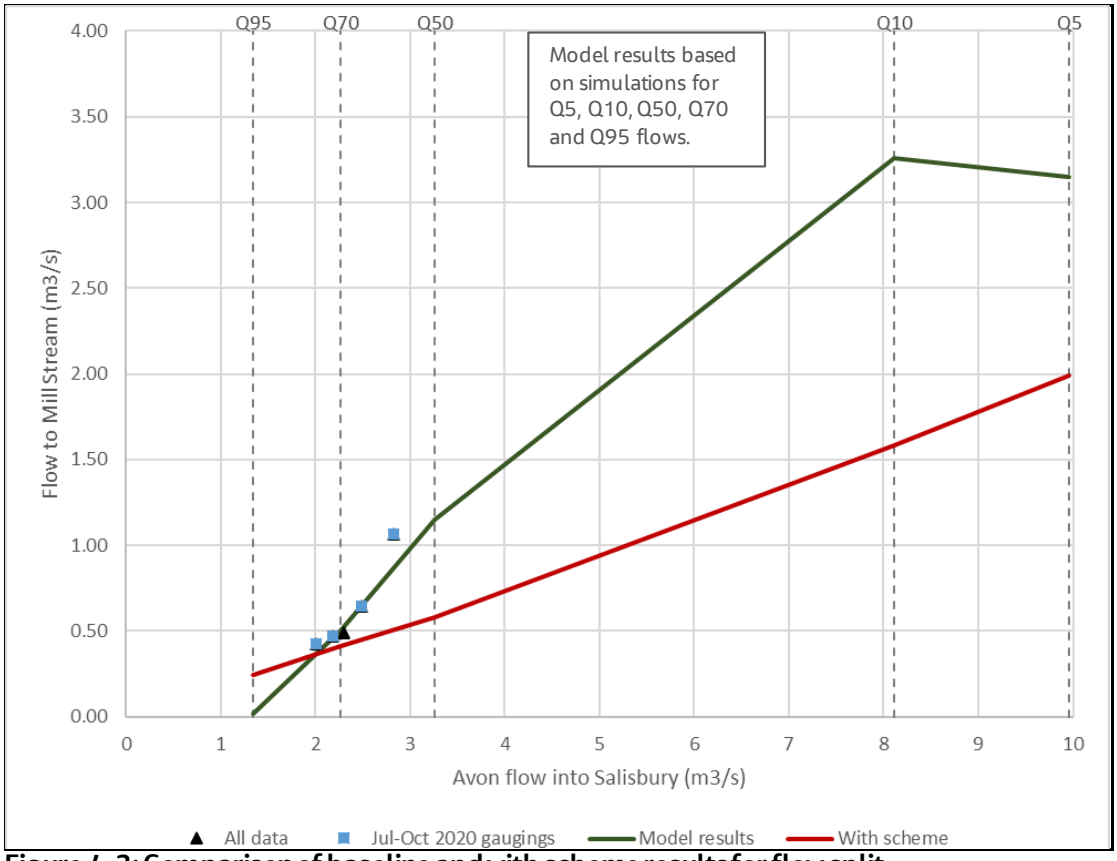


Figure 4-3: Comparison of baseline and with scheme results for flow split at Swimming Pool Gate (Mill Stream)

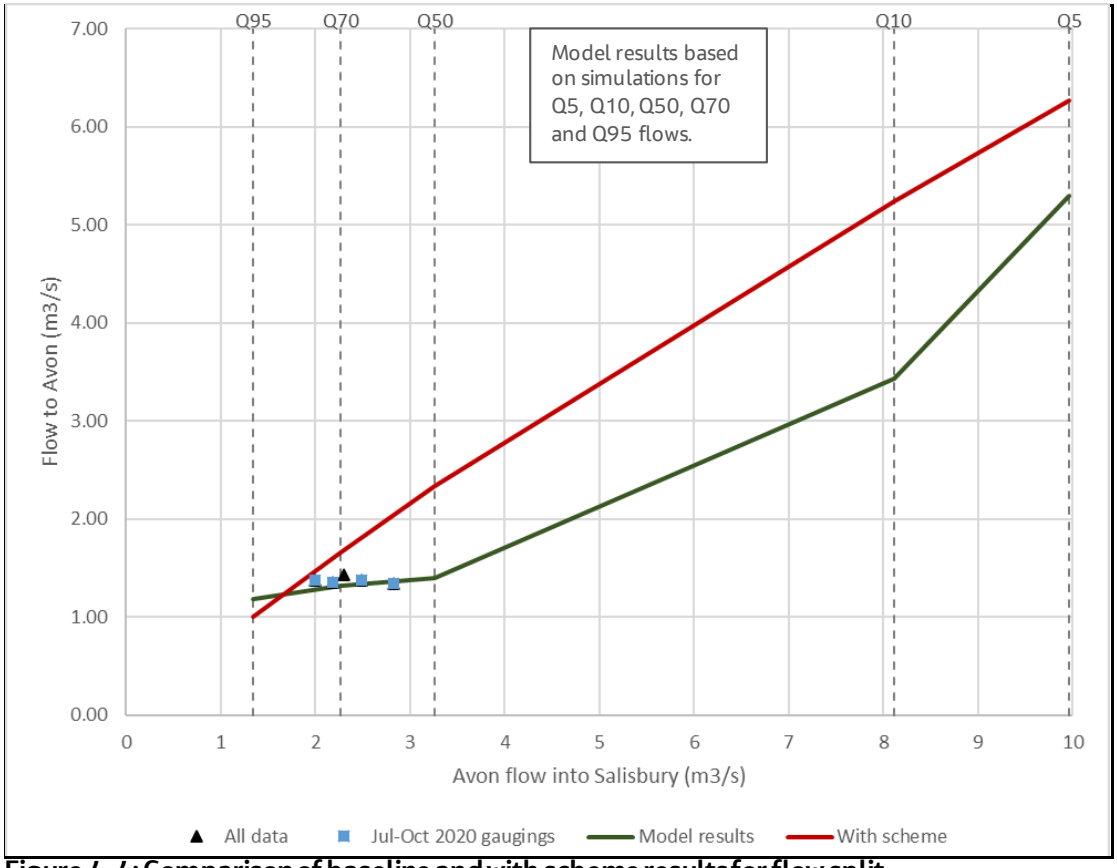


Figure 4-4: Comparison of baseline and with scheme results for flow split at Swimming Pool Gate (Avon)

5. Limitations

As discussed above, the purpose of this study was to provide indicative low flow estimates from readily available data in order to consider general trends in low flow conditions in Salisbury. The estimates are not considered appropriate for detailed design or for defining low flow conditions at specific locations or probabilities. This is due to assumptions made in the estimation process which are sources of considerable uncertainty. The most significant sources of uncertainty in the flow estimates are as follows:

- The assessment has assumed a linear relationship between flows at Amesbury and at Salisbury. Due to the complexities in catchment topography, groundwater transmission contributing to baseflow, and difference in the proportions of baseflow and surface flow depending on flow conditions, this is unlikely to be the case. It is noted that, from the spot gaugings available, the scaling factor between Amesbury and Salisbury is generally larger for lower flows.
- Whilst the R^2 value for the line of best fit shows reasonable correlation with the gauged data, it is noted that this is based on only ten data points and all obtained in the last ten years. No assessment has been made of the statistical significance of the dataset.
- The assessment uses the change in area in the topographic catchment to provide further support for use of the scaling factor of 20%. It should be noted that the topographic catchment may not be the same as the groundwater catchment feeding baseflow in the watercourse.
- The assessment compares daily flow data at Amesbury with spot gaugings taken at a particular time on that day in Salisbury. Whilst there is not generally significant fluctuation in flows in Salisbury over these timescales due to slow response time, there may be some variation in flows measured throughout the day.
- No lateral flows into the watercourses within the model area have been derived. Additionally, no increase in flow downstream of the Nadder or Wylye gauges has been allowed for. Whilst the scale of any inflows within this area is likely to be fairly small compared to the wider catchment, it is noted that the area may be subject to both overland and underground lateral inflows. Drainage infrastructure within the urban area may further affect flows.

Further work would be required to obtain more accurate low flow estimates. This could include a more detailed review of catchment characteristics, gauged flows and/or use of low flow estimation software.

In addition to the uncertainty in the flow estimates themselves there is also considerable uncertainty in both the gauged and modelled flow splits due to the high level of variation in factors such as the hydraulic roughness of the channels and the gate operating rules both of which can have a significant influence on flows in the watercourses. The assumptions made in the modelling are discussed in Section 3 but it is recommended that the modelling is revisited should more information become available with which to calibrate it. Further sensitivity testing should also be undertaken on key parameters.

It is also noted that the existing spot gaugings have not necessarily been undertaken at consistent locations or using consistent methods so there is likely to be some variation in the collected data. Additional spot gaugings could be undertaken using the locations and methods used in the July-October 2020 monitoring to provide improved confidence in the conditions observed and over a wider range of flows. It may also be beneficial to include metadata on observed weed growth and gate settings for any future spot gaugings. Further work should also be undertaken at detailed design stage to confirm the flow conditions at each structure for the final design.

6. Next steps

The work described in this report provides indicative low flow estimates and flow splits within Salisbury in order to demonstrate that the proposed scheme can achieve similar conditions to the baseline at low flows and to support the Environmental Statement for the proposed Salisbury River Park Phase 1 scheme. The planning application for the scheme (including Environmental Statement) is due to be submitted in early 2021. Following submission of the planning application, detailed design of the scheme will commence. At this stage further work will be undertaken to confirm the performance of the scheme at low flows.

Due to the uncertainty in both the baseline and with scheme conditions it is recommended that further work is undertaken at detailed design stage to improve confidence in the baseline and with scheme flow splits. This could include additional low flow monitoring, further hydraulic modelling and hand calculations to confirm flow splits for the final design.

Salisbury River Park Phase 1 Scheme




Volume 2: Environmental Statement

March 2021

Prepared by Jacobs on behalf of the Environment Agency

Environment Agency

We are the Environment Agency. We protect and improve the environment and make it a better place for people and wildlife.

We operate at the place where environmental change has its greatest impact on people's lives. We reduce the risks to people and properties from flooding; make sure there is enough water for people and wildlife; protect and improve air, land and water quality and apply the environmental standards within which industry can operate.

Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do.

We cannot do this alone. We work closely with a wide range of partners including government, business, local authorities, other agencies, civil society groups and the communities we serve.

Published by:

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Bristol BS1 5AH
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Quality Assurance

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Project SOP Code	ENVIMSW002033
Date	March 2021
Version number	2
Author	Rachel Shaw/Corinna Morgan

Approvals

Name	Signature	Title	Date	Version
Stuart Hedgecott	S Hedgecott	Senior Associate Director Environment	16/12/20	1
Stuart Hedgecott	S Hedgecott	Senior Associate Director Environment	2 March 2021	2

Statement of competency

Environmental reviewer/quality control

Stuart Hedgecott BSc

Stuart has more than 30 years' experience as a technical author and as a Chartered Biologist (Institute of Biology) and Registered Environmental Practitioner (Institute of environmental Management and Assessment). This experience includes more than 20 years specifically related to environmental assessment of flood risk management schemes and other water projects.

Environment Lead

Corinna Morgan, BSc (Hons) Geography with Geology (1998), CWEM, CEnv

Corinna is an IEMA Registered EIA Practitioner and Chartered Environmentalist with 22 years' experience in leading the successful delivery of Environmental Impact Assessments (EIA) and Habitat Regulation Assessments (HRA) for the Environment Agency and other public sector clients. Corinna has an excellent understanding of environmental issues and legislation to lead on the management of environmental risks, identifying environmental and socially acceptable solutions that are sustainable, and that deliver multiple benefits to affected local communities and the environment. She engages stakeholders and the public to discuss options and suitable solutions, understands concerns and expectations, builds trust, and develops effective partnerships for third party funding.

Environmental support

Rachel Shaw, BSc Environmental Science (2006), PIEMA

Rachel is a practitioner member of the Institute for Environmental Assessment (IEMA) and has 14 years' experience in environmental management and compliance. Rachel works as an environmental coordinator and technical author for projects of various scale and stage of development across a wide range of sectors including flood risk management, water, highway and energy.

Water technical lead

Rebecca Westlake, BSc Hons Physical Geography (1997), MSc Coastal and Marine Resource Management (1998), LLM Environmental Law and Practice (2018), PhD Geomorphology (2007)

Rebecca Westlake has 23 years of experience in the field of geomorphology and Water Framework Directive as a consultant, regulator and an academic. She previously worked for the EA as a technical specialist in the Solent and South Downs Regional office. She has been a Chartered Scientist and Chartered Marine Scientist since 2009 (CSci, CMarSci) with IMaREST (Institute of Marine Science and Technology).

Hydrogeology technical lead

Ian Coleman, BSc Geology & Geography (1985), MSc Groundwater Engineering (1995), PhD Hydrogeology (2010).

Ian Coleman is a hydrogeologist with over 20 years' experience providing consultancy support to infrastructure, industrial, public sector and private clients

in groundwater, contaminated land and environmental assessment. His experience includes environmental impact assessment, site investigation, environmental monitoring and development of groundwater flow and contaminant transport models. Recent project experience includes work on EIA for large infrastructure developments in England, Scotland and Wales, hydrogeological assessment for water resources development and quarry dewatering. He is a fellow of the Geological Society (FGS).

Biodiversity technical lead

Debbie MacKenzie, BSc (Hons) Environmental Science and a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM)

Debbie has over 25 years of experience of working in the environment and ecology field, specialising in botany and protected species. The majority of her time has been spent working on large flood defence schemes, and road and rail transport projects in the UK.

Cultural heritage technical lead

Nathan Thomas, BSc Archaeology (2006), MSc Archaeological Prospection (2008) Member of the Chartered Institute for Archaeologists (MCIfA).

Professional archaeologist and geophysicist since 2006. He has experience of a wide range of archaeological projects, including flood protection and coastal defence schemes for the EA.

Landscape technical lead

Simon Murray, PGDipLA, CMLI

Simon has over 24 years' experience in landscape and visual impact assessment of large scale infrastructure projects, including numerous flood defence schemes. He is a fully chartered member of the Landscape Institute.

Population and health technical lead

Anne Robinson, BSc Biology and Environmental Management (2005), PgDip Person-Centred Counselling (2012)

Anne has worked for Jacobs since 2008 and moved to the stakeholder engagement team in 2017. Anne is an experienced stakeholder engagement professional with a background that includes working with the Environment Agency, Highways England, Defra and local authorities. Her project experience ranges from working on internal engagement as part of the Environment Agency's Humber Strategy to producing an Equality Assessment and Inclusion Action Plan for a strategic study for Highways England. Anne is a strong advocate for inclusive engagement, working with local authorities to ensure projects reach all members of the community.

Air quality technical lead

Sam Pollard, BEng Environmental Engineering (2002), MSc Geographical Information Science (2010)

Sam is an air quality consultant with over 18 years' experience of undertaking air quality assessments, both in the UK and abroad. He has been responsible for managing and producing air quality assessments in support of large-scale infrastructure projects, highways schemes, oil and gas production operations and industrial, residential and commercial developments. Sam is a full member

of the Institute of Air Quality Management (IAQM) and a Chartered Environmentalist (CEnv).

Noise technical lead

Richard Stait, BSc Mathematics and Statistics (1994), PG Diploma Acoustics and Noise Control (2004)

Richard Stait has over 25 years' experience in the assessment of the impacts of noise and vibration from large infrastructure projects, both from the construction and operation. Throughout the UK and in the Middle East, these include road and rail transport projects, flood defence schemes, and power and energy installations. He is a full member of the Institute of Acoustics (IoA).

Traffic and transport technical lead

Andrew Mileham, Member of the Chartered Institution of Highways & Transport, Chartered Institute of Logistics & Transport and Institution of Civil Engineer

Andrew is an adaptable and innovative Associate Director, with 21 years' experience of transport consultancy work in both private and public sector within the United Kingdom and internationally. Andrew has assisted in managing projects from feasibility, through to detailed design and implementation. Through the diversity of the work, Andrew has required the preparation of a range of technical documentation and a range of detailed modelling, including: Multi-modal Feasibility Studies to support pre-planning advice and considerations; Transport Assessments and Travel Plans to support planning applications; Proofs of Evidence and Hearing Statements to support and contribute to representations at Public Inquiry.

Ground conditions and contamination technical lead

Robin Lancefield, BSc Environmental Science and Geology (1991).

Robin is a Chartered Geologist (CGeol) with over 25 years' experience in all aspects of investigation, risk assessment and remediation of contaminated land, including inputs to environmental statements. Robin is a "Qualified Person" (CL:AIRE definition of waste Code of Practice) and Chair of the Environmental Protection UK Land Quality Committee.

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1. Background

1.1 Introduction

We, the Environment Agency, in partnership with Wiltshire Council are proposing a river corridor improvement scheme in the centre of Salisbury, Wiltshire - the 'Salisbury River Park Phase 1 Scheme' (hereafter referred to as the 'Scheme'). We have designed a multi-beneficial Scheme that provides improvements to landscape, biodiversity and amenity in combination with flood risk reduction measures.

The Scheme comprises the construction of flood defence embankments and walls, flood control measures, new bridges and culverts and river channel modifications to reduce flood risk to people and property in Salisbury. The design also incorporates improved green space for recreational use, provides opportunities for biodiversity that are designed to ensure a net gain in habitat and improved fish passage, and enhanced routes for pedestrians and cyclists that are accessible for all groups of people.

The Scheme is being led by the Environment Agency and is Phase 1 of a wider Salisbury River Park Master Plan, which itself is part of the Central Area Framework being developed by Wiltshire Council to regenerate the city centre (see Section 2.1.2).

We have prepared this Environmental Statement (ES) to present the statutory Environmental Impact Assessment (EIA) of the Scheme. This ES has been prepared to accompany a planning application to Wiltshire Council (see Section 1.5).

1.2 The problem

Salisbury has a long history of flooding, principally from fluvial sources but also groundwater flooding in some areas, with high groundwater levels having contributed to previous flood events. There is flooding risk to communities locally both upstream and downstream of Salisbury from four main watercourses (River Avon, River Wylye, River Bourne and River Nadder) that converge in Salisbury. The main proportion of properties and assets at risk however are within the centre of Salisbury, where the River Avon, flows in from the north.

There are 378 properties (264 homes and 114 non-residential, including commercial units) in central Salisbury currently at risk of fluvial flooding in a 1 in 100 year (1% annual probability) fluvial event, which could rise to 580 properties (372 homes and 208 non-residential) based on projected climate change scenarios by the 2080s. There is also flooding to the A36, which is a key strategic trunk road linking Salisbury to Bath, Trowbridge and Warminster in the north-west and Southampton/M27 in the south-east.

The most recent significant fluvial flood event occurred in 2014 (1 in 20 year or 5% annual probability fluvial event), with 20 properties flooded internally, and significant disruption due to flooding of infrastructure. This event highlighted that only a small further increase in flood levels would have resulted in a significant increase in the number of properties at risk. The Scheme is therefore required to manage the flood risk to existing properties and infrastructure in the centre of Salisbury while facilitating future regeneration of the city centre.

Figure 1.1 shows the current areas of medium and high flood risk in the centre of Salisbury, meaning that each year these areas have a chance of flooding of 1% or higher.

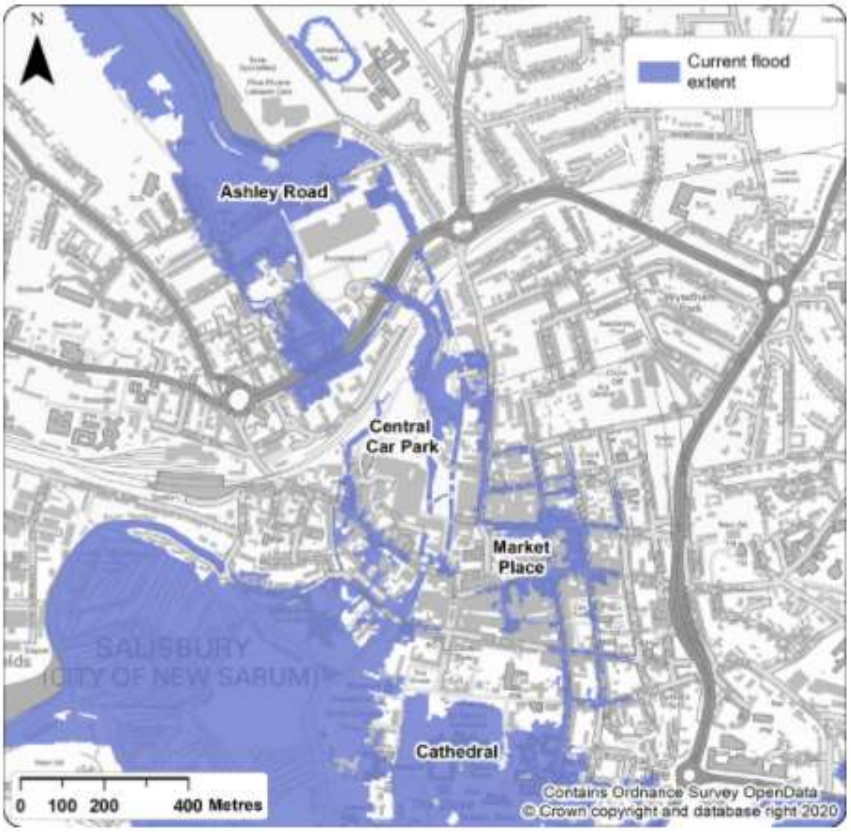


Figure 1.1: Medium and high flood risk areas in the centre of Salisbury

1.3 Location and site description

Salisbury is a medieval cathedral city located in south-east Wiltshire, at the confluence of four rivers; River Avon, River Wylye, River Bourne and River Nadder. The River Avon and its tributaries (Summerlock Stream and Mill Stream) flow in a southerly direction through the centre of the city.

The footprint of the Scheme encompasses areas around the River Avon in central Salisbury that are susceptible to flooding, and encompasses two mains parcels of land, described in this ES as the Ashley Road area and the Maltings and Central Car Park area, which is situated approximately 500m further south (see Figure 1.2).

The total extent of the Scheme area is approximately 10.2ha and covers the permanent Scheme works (i.e. the footprint of the completed Scheme) and temporary working areas required for construction of the Scheme.

Land uses within the Scheme area predominantly comprise residential and commercial properties, road and rail infrastructure, recreational and leisure areas, and tourist and community facilities. The footprint of the completed Scheme in the Ashley Road area mainly lies within public open space (at Fisherton Recreation Ground and Ashley Road Open Space) but also falls within areas of high

conservation value (River Avon and Summerlock Stream), a domestic garden, allotments and public footpaths. Within the Maltings and Central Car Park area, the footprint of the completed Scheme predominantly covers the River Avon, the Mill Stream, and parts of the Millstream Coach Park and Central Car Park.

Ancillary works (including culverts, new or removed control structures and new or replacement bridges) are scattered throughout the Scheme area. The nature conservation importance of the Scheme area is reflected in the designation of international (River Avon Special Area of Conservation, SAC), national (River Avon System Site of Special Scientific Interest, SSSI) and local conservation sites. The Scheme area lies within two Conservation Areas and passes under a Generating Station Listed Building within the Maltings.

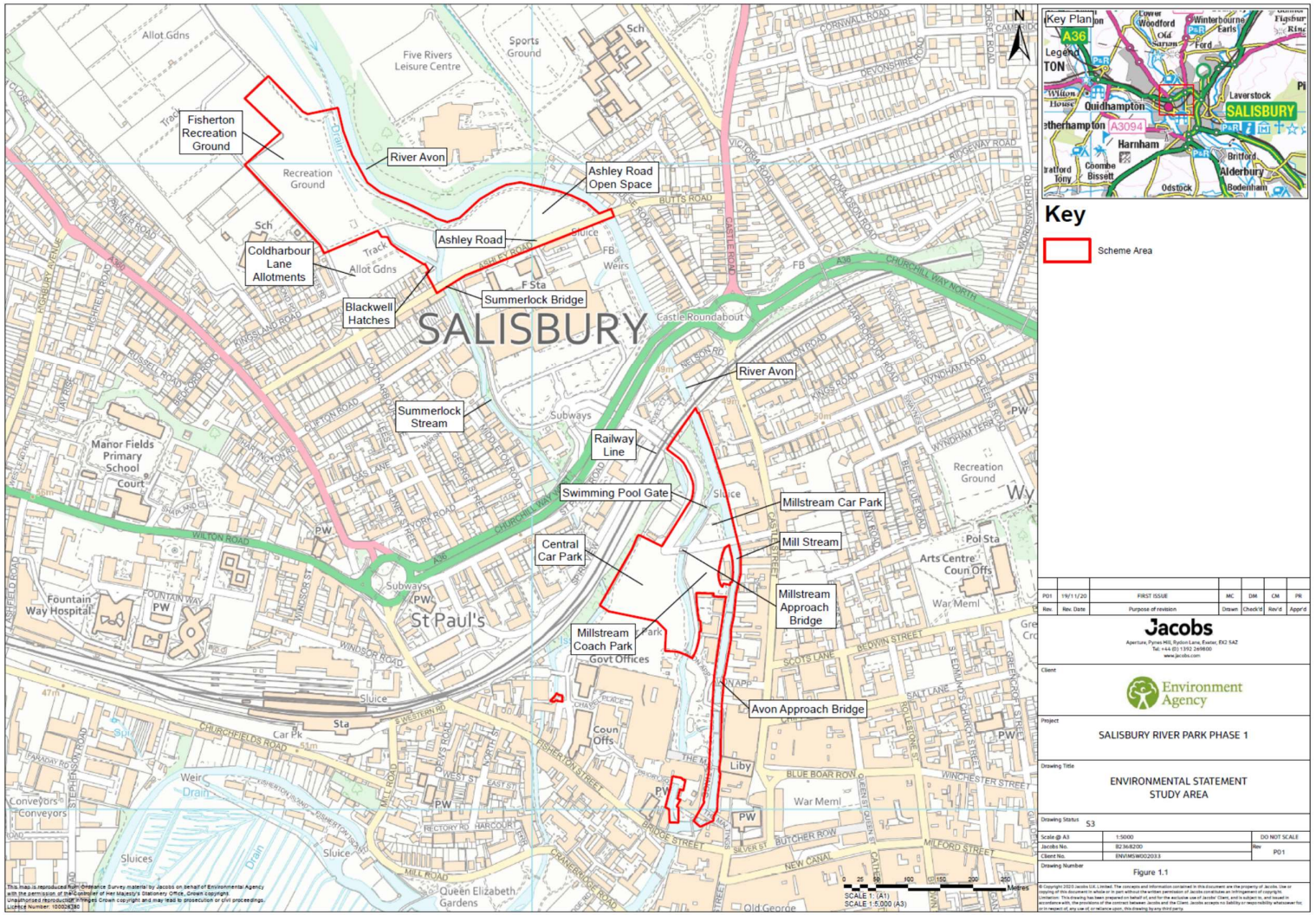


Figure 1.2: Scheme area

1.4 Project objectives

The five key objectives of the Scheme were identified and agreed by our project partners and are set out in Table 1.1. We also defined more detailed environmental objectives, as set out in Table 1.2.

Table 1.1: Project objectives

Item	Objective
Objective 1	Reduce flood risk to people, property and infrastructure in the centre of Salisbury and provide resilience/adaptive measures to climate change
Objective 2	Achieve environmental, social and economic benefits, consistent with the principles of sustainable development, maximising environmental outcomes and supporting development in Salisbury with high quality blue and green infrastructure
Objective 3	Reduce health and safety risks and future maintenance costs associated with operation of in channel structures in Salisbury
Objective 4	Contribute to the objectives of The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017
Objective 5	Enable redevelopment of the Maltings and Central Car Park regeneration site in line with the endorsed Maltings and Central Car Park Masterplan by reducing flood risk and providing environmental enhancements

Table 1.2: Project environmental objectives

Topic	Objectives
Landscape/ Townscape	L1. To improve the landscape/townscape and aesthetic character of the Scheme areas e.g. by re-connecting the River Avon with its floodplain and by meeting the requirements of the Salisbury Core Strategy 2015, in particular Core Policy 57 - ensuring high quality design and place shaping.
Historic environment	H1. To maintain and improve the historic environment including the conservation areas, listed buildings (in particular the Grade 2 Listed Salisbury Generating Station), archaeological sites and their setting.
Biodiversity	B1. To work in partnership with key stakeholders to provide a Scheme that benefits biodiversity and ensures a net gain in habitat quantity and quality. B2. To improve existing spaces for biodiversity including local wildlife sites B3. To contribute to meeting the objectives of the River Avon SAC (i.e. conserving and helping to restore as much natural function and characteristic habitat that supports its qualifying features as

Topic	Objectives
	possible) within the constraint of providing flood protection to people and infrastructure.
Water Environment Regulations (WER)	W1. To contribute to the achievement of Water Environment Regulations environmental objectives W2. To contribute to Defra's outcome measures (OM4) including (but not limited to) water dependent habitat within the River Avon SSSI and improvements to fish passage along the River Avon corridor.
Access, amenity and tourism	A1. To develop urban greening, improving accessibility to, the connection of, and the quality of green spaces and publicly accessible areas A2. To enable a connected river corridor through the city centre
Sustainability and health	S1. To support a sustainable economy by improving flood resilience in the area in and around the Maltings, and supporting the regeneration ambitions of Wiltshire Council, encouraging future investment and tourism. S2. To support active lifestyles within the Scheme areas through improved accessibility (see A1). S3. To ensure the Scheme is resilient to future climate change and seeks to minimise carbon emissions and carbon footprint over the whole life of the Scheme.

In meeting our project objectives and discharging our functions in accordance with the Environment Act 1995 'to protect and enhance the environment', we have addressed various environmental challenges. These challenges have included avoiding and minimising impacts on areas of high ecological and archaeological sensitivity. The Scheme we have developed represents a unified design that reduces the flood risk to Salisbury while protecting environmental sensitivities, and integrating benefits that create and improve wildlife habitats, and enhances landscapes.

1.5 Legislation and regulatory requirement

Wiltshire Council has developed the Salisbury River Park Master Plan (see Section 2.1.2), which sets out design principles and specific requirements for development proposals in a total of six phases, which are location specific. This Scheme falls within Phase 1 of the master plan and is entirely complementary to future phases of the master plan (i.e. the Scheme will not compromise the achievement of the objectives of the master plan).

The Scheme will require planning permission from Wiltshire Council's planning authority. The Scheme falls under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017. The Scheme is likely to give rise to significant environmental effects and therefore requires a statutory EIA.

The Scheme will require the temporary and permanent diversion of public footpaths and cycleways (see Chapter 7 'Recreation and access') under Section 257 of the Town and Country Planning Act 1990.

We have designed the Scheme to ensure it is compliant with the Conservation of Habitats and Species Regulations 2017 and the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

This ES has been prepared with consideration of the Accessibility Regulations 2018 to fulfil our obligations to people who have a disability under the Equality Act 2010.

1.6 Structure of the report

The ES is presented in three volumes:

Volume One, comprises the Non-technical Summary which provides an outline of the Scheme and highlights the key impacts and mitigation measures of the Scheme in non-technical language.

Volume Two, is the Main Report, which is presented as follows:

- Chapter 1 ‘Background’: provides a background to the Scheme, and describes the purpose and structure of this document, and how comments on its content can be made.
- Chapter 2 ‘Project development’: presents information on how the Scheme developed through the preliminary stages and on the alternative options considered.
- Chapter 3 ‘Scheme description’: describes the Scheme in detail, with information on both construction and operational aspects.
- Chapter 4 ‘Key issues and EIA methodology’: presents the approach and EIA methods used during the assessment.
- Chapter 5 – 15: present the results of the EIA for each environmental issue. For each issue, sections on baseline conditions, potential impacts during construction and operation, mitigation and residual impacts are provided.
- Chapter 16 ‘Cumulative effects’: presents the assessment of cumulative impacts of the Scheme and other known developments.
- Chapter 17 ‘Summary’: presents the key findings of the assessment.
- List of references.
- Environmental figures are provided at the back of the Main Report.

Volume Three provides the supporting information for the Main Report (Volume 2). It comprises a series of appendices, as follows:

Appendix A Planning Drawings

Appendix B EIA Scoping

- Appendix B1: EIA Scoping Technical Note (Jacobs 2020)
- Appendix B2: EIA Scoping Opinion

Appendix C Equality Assessment Report

Appendix D Noise Assessment

- Appendix D1: Assumed Construction Plant
- Appendix D2: Estimated Construction Noise at Representative Receptors

Appendix E Landscape Assessment

- Appendix E1: Landscape Plans
- Appendix E2: Landscape Masterplan
- Appendix E3: Landscape Habitat Management Plan

Appendix F Flora and Fauna Assessment

- Appendix F1: Preliminary Ecological Appraisal Document
- Appendix F2: Great Crested Newt Survey Reports
- Appendix F3: Invertebrate Desk-Based Assessment
- Appendix F4: Waterways Breeding Bird Survey Report and Kingfisher Report
- Appendix F5: Badger Survey Report
- Appendix F6: Ground Based Bat Tree Assessment, Secondary Bat Survey and Bat Transect and Passive Bat Detector Survey Reports
- Appendix F7: Otter and Water Vole Survey Reports
- Appendix F8: Reptile Survey Reports
- Appendix F9: Water Crowfoot (Ranunculus spp) Survey Report
- Appendix F10: Invasive Species Survey Report
- Appendix F11: River Condition Assessment
- Appendix F12: Water Vole Method Statement/Mitigation Strategy
- Appendix F13: Biodiversity Net Gain Assessment

Appendix G Arboricultural assessment, tree survey and vegetation management

- Appendix G1: Tree Survey
- Appendix G2: Arboricultural Method Statement and Tree Protection Plans

Appendix H Water Assessment

- Appendix H1: Abstraction Licences
- Appendix H2: Water Environment Regulations Compliance Assessment
- Appendix H3: Flood Risk Assessment

Appendix I Historic Environment

- Appendix I1: Heritage Desk-Based Assessment
- Appendix I2: Geophysical Survey

Appendix J Habitat Regulations Assessment (HRA)

Appendix K Natural Capital Assessment

Appendix L Air Quality Construction Methodology

Appendix M Materials Management Plan

Appendix N Environmental Action Plan

Appendix O Planning Policy

Appendix P Traffic Assessment

- Appendix P1: Outline Construction Traffic Management Plan
- Appendix P2: Annual Average Weekday Traffic Information

In line with the requirements of the Equality Act 2010 and Public Sector Bodies (Websites and Mobile Applications) (No. 2) Accessibility Regulations 2018, reasonable adjustments have been made to this ES and associated documents to ensure the document structure and format is accessible to as many people as possible. In some instances, this has not been possible due to the technical nature of the document. A Non-Technical Summary (Volume 1) has been provided.

Please see the Environment Agency's Accessible documents policy for more information: https://www.gov.uk/government/organisations/environment-agency/about/accessible-documents-policy

2. Project development

2.1 Strategic context

An essential design activity has been to review the objectives of relevant strategic level documents, together with relevant policies in the planning and legislative framework, including Wiltshire Council's Local Development Framework (see Appendix O). This helps us to ensure that our designs are capable of meeting the relevant policies or directions, and do not prejudice their achievement by others.

These objectives (related amongst other things to flooding, recreation and access, health and well-being, biodiversity, culture, landscape, cultural heritage and transport) are considered in the environmental technical chapters 5 to 15 of this ES. If there is a risk that implementation of the Scheme could compromise the objectives of other strategies and projects, then we describe this as an impact.

2.1.1 Relevant plans and policies

Appendix O 'Planning legislation, policy and guidance' summarises relevant key legislation, plans, polices and guidance and their influence, that were considered during the development of the Scheme, as well as topic-specific legislation.

The key planning documents comprise:

National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government 2019).

The NPPF sets out the Government's planning policies for England and provides guidance on how these policies are expected to be applied. The NPPF provides a framework for local people and councils to produce distinctive local and neighbourhood plans which reflect the needs and priorities of their communities and sets out policies for:

- the historic environment – the Scheme needs to sustain and enhance heritage assets, consider the contribution that conservation assets can make to sustainable communities and ensure that the Scheme makes a positive contribution to local character and distinctiveness;
- habitats and biodiversity – the Scheme needs to protect, and where possible, enhance the designated and non-designated nature conservation features;
- climate change and flood risk – the Scheme seeks to ensure that it does not exacerbate flood risk and that it supports movement towards a low carbon future;
- ensuring the vitality of town centres – through a reduction in flood risk and improvements to the public realm, we have designed a Scheme that helps to improve the long-term vitality of Salisbury's city centre;
- promoting healthy and safe communities – the Scheme seeks to encourage healthy lifestyles through the proposed recreational and open space improvements integrated into its design; and

- achieving well-designed places – the Scheme provides a well-designed and visually attractive river corridor that is sympathetic to the local character, history and surrounding environment.

Transport policies can also help facilitate sustainable development as well as contribute to wider sustainability, health and economic objectives.

Salisbury Central Area Framework (Wiltshire Council et al 2020a) and **Salisbury River Park Master Plan** (Wiltshire Council et al 2020b)

The Scheme is being developed as part of a wider Salisbury River Park Master Plan, which forms part of the **Salisbury Central Area Framework (CAF)** being developed by Wiltshire Council.

The **Salisbury CAF** aims to provide a connected green infrastructure corridor through the city centre along the River Avon and improve flood risk mitigation infrastructure to address flood risk in the central area and the wider city, as well as environmental improvements. Other developments within the Salisbury CAF additional to the Salisbury River Park, which may influence or be influenced by the Scheme include:

- Fisherton Street Gateway – this project proposes to provide a new welcoming entrance to the city with various interventions including implementation of people-friendly streets principles, creation of waterside seating areas to complement the existing café culture and public art in key locations. This proposal may fall within the Salisbury River Park Master Plan, and the study area for the Scheme;
- Station Quarter – various interventions are being proposed to improve the quality of the public realm around the station, including an enhanced travel interchange, improved Stonehenge visitor experience, improved wayfinding, landscaping and car parking facilities. This project will be the subject of a Master Plan, which is located within the study area for the Scheme;
- People Friendly Streets - this project was proposed (and initial measures trialled) to improve walking and cycling routes in and out of the city centre but has now been suspended due to lack of stakeholder support and is therefore not considered further in this ES;
- Illuminating Salisbury – this project proposes an outdoor visitor light attraction that will illuminate the stories of Salisbury's rich heritage. This proposal will be located within the study area for the Scheme;
- Public Arts – proposals for a number of public art and lighting artists to create high quality public realm interventions in Fisherton Street. Lighting as part of public arts may be installed within the study area for the Scheme; and
- Wayfinding Strategy - this will inform measures to improve signage in the city, to support visitors' experience of moving through the city. The Scheme has sought to align with the aspirations of this Wayfinding Strategy.

The **Salisbury River Park Master Plan** sets out design principles and specific requirements for development proposals in a total of six phases, which are location specific (see Figure 2.1). The Scheme forms the principal part of Phase 1 of the master plan.

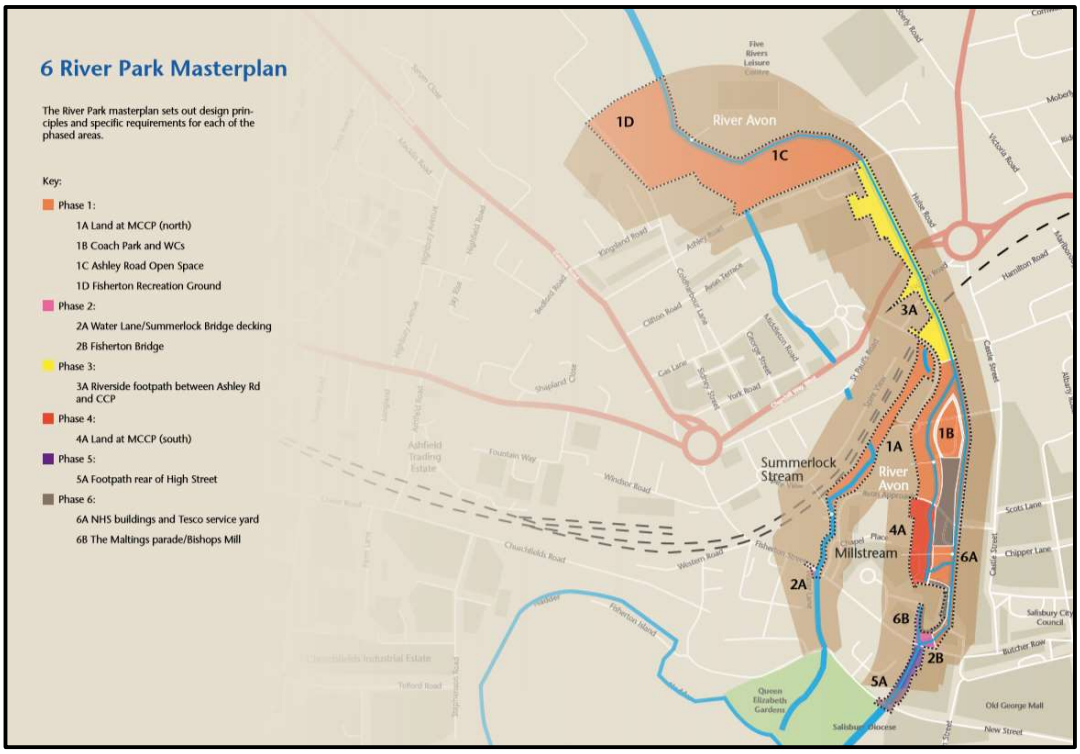


Figure 2.1: Phased areas of Salisbury River Park Master Plan

The master plan sets out a vision to connect and enhance the linear riverside route from Ashley Road Open Space to Elizabeth Gardens, north to south through the centre of Salisbury along the River Avon. The master plan is a framework to guide the phased development of the River Park and identifies the Ashley Road Open Space and the Maltings/ Central Car Park areas as key parts in the strategy for reducing flood risk. Future phases of the master plan include additional river corridor improvement works in and around The Maltings including further modifications to the River Avon main channel e.g. widening of the channel between the Avon Approach road bridge and the Maltings Shopping Arcade and replacement of Avon Approach road bridge.

The master plan sets out the framework for improving flood risk management and green infrastructure in accordance with Wiltshire Core Strategy (WCS) Core Policy 67 and CP52 green infrastructure and the NPPF section on 'Meeting the challenge of climate change, flooding and coastal change'.

Future phases of the master plan proposed by Wiltshire Council (which are not assessed as part of this ES) will need to be informed by the redevelopment of The Maltings, are yet to be planned in detail and/or rely on the identification of funding sources by Wiltshire Council and its partners. Future phases of the master plan will be subject to separate planning applications and EIA.

Maltings and Central Car Park Masterplan (Wiltshire Council 2019)

This masterplan sets out Wiltshire Council's broad requirements for the redevelopment of The Maltings and Central Car Park, Salisbury. The site is allocated for development by Core Policy 21 of the WCS, which is supported by an appended Development Template setting out the broad intentions for the site. This masterplan provides site specific instructions for the strategic development of the site. The masterplan sets out five broad areas in the

Maltings and Central Car Park area that have been identified for development opportunities. The study area for the Scheme is partially located within Areas 1 'Market Walk and the Maltings', Area 3 'Commercial and Residential Core' and 'Area 4 - Riverside and Salisbury Coach Park welcome'.

The masterplan provides developers, Wiltshire Council's planning officers, and the local community with a prospectus of how the development will be delivered. The masterplan sets out the strategy for a new development including its general layout, scale and other aspects that will need consideration. The process of developing the masterplan has tested options and considered the most important parameters for the area such as; the environmental constraints/opportunities, mix of uses, requirement for open space, transport infrastructure identified by the Salisbury Transport Strategy, the amount and scale of buildings, and the quality of buildings. The Scheme has taken these factors into account during the project development.

Salisbury Transport Strategy (Wiltshire Council 2018)

This Strategy supports the housing and employment growth identified in the Wiltshire Core Strategy (Wiltshire Council 2015). The Strategy has been developed around three main themes:

- providing for strategic development sites;
- improving the accessibility and attractiveness of the city centre; and
- maintaining the strategic function of the A36 and key roads.

The Strategy comprises highway enhancement schemes, public transport network improvements and pedestrian and cycling improvements to mitigate against the impacts of additional demand for transport. The Strategy sets out a range of measures to improve pedestrian and cycling within Salisbury including:

- improving pedestrian facilities and pedestrian priority in the city centre;
- wayfinding improvements (signs, maps, route features, etc.);
- maintaining and increasing cycle parking near key destinations and transport interchanges; and
- walking and cycling infrastructure improvements on a number of key routes that link proposed development sites to the city centre and employment sites.

The amenity improvements proposed as an integrated part of the Scheme will complement the objectives of the Salisbury Transport Strategy.

The following UK requirements are also relevant to the Scheme:

- Conservation of Habitats and Species Regulations 2017 – an internationally designated site for nature conservation (River Avon SAC - see Table 4.3) runs through the study area and therefore there is a duty to ensure that the Scheme will have no negative impacts on the integrity of this site;
- Water Environment (Water Framework Directive) Regulations 2017 – the Scheme must not compromise the physical, chemical or ecological characteristics of water bodies within the study area, while seeking to contribute to achieving environmental objectives set out in the Regulations;

- Flood and Water Management Act 2010 - the Scheme needs to consider the management of flood risk in line with the South West River Basin District flood risk management plan, which responds to the requirements of this Act;
- Environment Act 1995 – the Act defines the Environment Agency's aims, objectives and responsibilities in discharging its functions to protect or enhance the environment; and
- Salmon and Freshwater Fisheries Act 1975 (amended) - this Act provides protection to salmon and freshwater fish including protection of migration routes.

2.1.2 Flood risk management plans and strategies

The Scheme (described in Section 3) addresses strategic requirements to reduce the risk of flooding. This includes Defra and Environment Agency policy to increase resilience to flood risk and enhance the natural environment and policy set by the Hampshire Avon Catchment Flood Management Plan (CFMP) (Environment Agency 2009) to reduce flood risk for Salisbury. The Scheme falls within a Policy 5 area i.e. 'areas of moderate to high flood risk where we can generally take further action to reduce flood risk'. The actions we identified in the CFMP to implement the preferred policy for Salisbury are:

- carry out further studies to provide complete understanding of risk to Salisbury and Wilton. Model asset operations. Use outcomes from studies and urban drainage pilots to evaluate possible improvements, including developing flood warning, and asset operation procedures;
- identify and survey infrastructure at risk and take measures to increase flood resilience; and
- use results of studies to encourage appropriate future development.

The Scheme has also been developed to align with the goals of the 25 Year Environment Plan (HM Government 2018) i.e. to reduce risk of harm from environmental hazards such as flooding and drought.

The Scheme also aligns with the Strategic Flood Risk Assessment (SFRA) produced for the county (Wiltshire Council 2013), which was used to inform the Flood Risk Assessment (Appendix H3) for this Scheme. The Wiltshire Council Level 1 SFRA forms part of the evidence base for the Wiltshire Local Plan and assesses the risk of flooding from all sources to existing and proposed development in Wiltshire. The SFRA defines and maps the Functional Floodplain (Flood Zone 3b) for the Wiltshire Council area, which interacts with the Scheme area.

The Wiltshire Local Flood Risk Management Strategy (Wiltshire Council 2014) guides flood risk management in the county and has influenced the Scheme. The Strategy sets out its aim to work with other organisations including the Environment Agency to identify options for reducing flood risk in the community of Salisbury.

2.1.3 Green infrastructure

Green Infrastructure (GI) is defined as being 'the network of natural and semi-natural features, green spaces, rivers and lakes that intersperse and connect villages, towns and cities' (Landscape Institute 2013).

The Scheme will be carried out within and adjacent to a range of GI assets including allotments (e.g. at Coldharbour Lane in the Ashley Road area, and further north at Fisherton Farm), ecological spaces, green links, amenity land (e.g. Fisherton Recreation Ground and Ashley Road Open Space) including a playground and sports facilities, a garden and Public Rights of Way.

The Scheme has been designed in consultation with Salisbury Area Greenspace Partnership (SAGP); a community-led initiative that is mapping local greenspace assets in the main urban area of Salisbury with a view to developing a local GI strategy and action plan, planning and influencing work and carrying out practical projects.

The SAGP represent a wide range of interests in greenspace in the local area. The SAGP Connectivity Plan, 'Working toward a Green Infrastructure Strategy for the Salisbury Area' illustrates the potential to improve connectivity for pedestrians and cyclists through the development of a network of safer, off-road, dedicated greenways within and around the city. The Radial Greenway 1 'St Peters Place to City Centre' is a key proposal in the GI Strategy, located within the Scheme area. We have integrated the Radial Greenway into our Scheme design as well as including new and improved pedestrian and cycle routes and new pedestrian/cycle bridges to improve connectivity throughout the Scheme area (see Chapter 7 'Recreation and Access').

2.2 Consultation

2.2.1 General

Effective stakeholder and public engagement is central to the development of the Scheme to arrive at a solution that addresses the project objectives whilst being acceptable to as many parties as possible, and to engage those parties in the appraisal and design process. Consultation is also an essential part of the EIA process. This consultation has informed and will continue to assist decision-making by:

- raising awareness of flood risk management issues within and around Salisbury and informing stakeholders of the development process and how decisions have been made;
- informing the development of the Scheme by involving, providing information to and working closely with stakeholders to understand their views, concerns and values, and ensure their views are clearly considered;
- gathering information from stakeholders to inform the development of the Scheme;
- forming a partnership with key stakeholders to encourage decision-making and investment in the Scheme;
- minimising project risks and managing public relations and perceptions; and
- ensuring the Scheme influences related decisions, plans and strategies (e.g. development planning) and is successfully implemented.

2.2.2 Stakeholder events

Consultation has been carried out with statutory, non-statutory and local organisations, businesses and members of the general public during the development of the Maltings and Central Car Park Masterplan, Central Area Framework, the Salisbury Riverpark Master Plan and the proposed Scheme. Early and effective stakeholder engagement has been central to the development of the Scheme in order to identify a solution that addresses all the Scheme objectives and which is acceptable to key stakeholders and consenting authorities.

Our communications and engagement strategy ensured inclusive engagement, particularly with protected characteristic groups and seldom heard groups including ethnic or language minorities, disabled people, young people, the elderly, people with low literacy levels, those who are uninterested in civic affairs and people who do not think their participation will make a difference. We carried out an Equality Assessment (Appendix C) to inform our communications and engagement strategy for the Scheme, and shared our findings with our partners Wiltshire Council who are leading on the communications for the wider Salisbury CAF and Salisbury River Park Master Plan.

Prior to consultation on the Scheme, we presented the initial draft of the CAF jointly with Wiltshire Council at Salisbury City Hall in September 2019. We used the consultation findings to identify issues, understand stakeholder concerns in the Scheme area and obtain information that could inform the development of the Scheme.

To date, the following stakeholder events have been held to introduce the Scheme to consultees, to discuss the development of flood risk management options and to present the preferred Scheme:

- options appraisal and concept design workshops: various workshops including concept design, and preferred options stages between October 2019 and May 2020, attended by Wiltshire Council, Salisbury City Council, Environment Agency and Natural England;
- information event held jointly with Wiltshire Council in November 2019 at the Five Rivers Leisure Centre to present various designs of the Scheme in the Ashley Road area;
- two consultation events on the Salisbury River Park (part of a theme called Open Space and Landscape) in January 2020 during the official launch of the second consultation on the CAF at the United Reformed Church and at the Playhouse. This consultation took into consideration comments from the September 2019 consultation on the CAF;
- stakeholder focus groups (each focus group was also attended by our Environment Agency technical specialists):
- ecology meeting (October 2020): attended by Wiltshire Council, Natural England, Wessex Rivers Trust and Wiltshire Wildlife Trust to discuss biodiversity issues relating to the Scheme;
- EIA and planning meeting (October 2020): attended by Wiltshire Council to discuss the latest Scheme proposals, wetland habitat creation and planning requirements;

- geomorphology meetings (October and November 2020): attended by Wiltshire Council and Natural England to discuss the latest Scheme proposals and geomorphological issues;
- river engineering/ maintenance meetings (October 2020 and January 2021): meeting attended by Wiltshire Council and Salisbury City Council to discuss the Scheme, flood alleviation and river flow control and future maintenance associated with the Scheme;
- transport planning meetings (October and November 2020): attended by Wiltshire Council planners, bridge and traffic engineers and highways;
- urban design/landscaping and heritage meetings (October and November 2020): attended by Wiltshire Council, Natural England, Salisbury City Council and Historic England to discuss the Scheme, and how it aligns with the CAF and River Park Master Plan objectives and development principles and heritage constraints; and
- public consultation on proposed Scheme and its EIA (19 November 2020 to 7 January 2021): Our methodology for public consultation and engagement on the proposed Scheme and its associated EIA has been impacted by the COVID-19 pandemic. At the time of writing the ES, we have not been able to meet face to face with stakeholders and run public exhibitions and events. We have created an online website to host the consultation, have presented two webinars to discuss the proposed Scheme and have made available paper copies of all information on the website to people without internet access. Additionally we created display boards (in conjunction with Wiltshire Council) to advertise the consultation, which was displayed in at the Salisbury Allotments and Gardens Association Trading Hut, Fisherton Recreation Ground, Sainsbury's, Salisbury Library and vacant shop units on the High Street and The Maltings. Through Wiltshire Council's Community Engagement Officer, communications regarding the public consultation event were also sent to a range of community groups, including those representing seldom heard groups. Wiltshire Council have existing connections with the following organisations which were used to channel our communications: Safe and Supportive Salisbury, Disabled Access and Walking Forum, Wiltshire Sight, Wiltshire Climate Alliance, Alabare Salisbury, John Baker House, Salisbury Trust for Homeless and Faith Leaders Forum. Our equality analysis (Appendix C) details how we have ensured all protected characteristic groups have been equally engaged during this process. In particular, our online consultation was supported by some traditional communication methods to ensure that older people were not excluded (for example, Wiltshire Council posted letters to residents and we made paper copies of consultation materials available on request), given that Salisbury has a high proportion of over 65 year olds.

A Statement of Community Involvement has been prepared separately to support the planning application for the Scheme. This statement describes the stakeholder engagement that has been undertaken during the development of the Scheme and how this has informed its design. The statement considers all comments received and explains how any concerns have been addressed.

2.2.3 Consultation responses

Key issues raised during the consultation and engagement events to-date are summarised below:

- consider how to safely incorporate and manage public access to river, and need for controlled access balanced between ecology and public use;
- wish to better understand the geographical extent of any planning application and available information on the adjacent regeneration proposals;
- the Scheme requires community buy-in, particularly with houses overlooking park and school;
- desire for improved/renovated area with opportunity to pull natural feel of Avon path nearer to town/ residential area;
- consider operational and maintenance liabilities of future use;
- need to maintain flora and fauna and consider opportunities to improve biodiversity including fish habitat; and
- need to consider physical impacts on heritage remains and opportunities to raise cultural heritage awareness.

Those comments specific to the Ashley Road area were:

- maintain Fisherton Recreation Ground and Ashley Green as important multi-functional open spaces and retain flexibility in their use, maximising the amount of space available for large scale events;
- opportunity to achieve some of the longer term aims of the Avon Valley Nature Reserve Management plan;
- opportunity to start to make much needed improvements to connectivity for pedestrians and cyclists within Salisbury;
- welcome a beach area along Summerlock Stream;
- Scheme design should take into account recently planted trees in Ashley Road area; and
- welcome proposed tree planting along Ashley Road.

Those comments specific to the Maltings and Central Car Park area were:

- provide clarity on reasons for selecting/rejecting options e.g. for removing impounding effects of structures on the main channel of the River Avon at Swimming Pool Gate, and associated effects on water levels, water quality;
- need to maintain key points of access from A36 and Castle Street;
- need to maintain the historic boundary and value of the Mill Stream;
- opportunity to open up views of cathedral e.g. from coach park/ entry point;
- align Scheme with climate change e.g. opportunity to accommodate flooding within the developed space;
- understand future use of the Maltings area, which will influence river corridor improvements and ensure space is accommodated and the development of The Maltings can be phased, e.g. formal frontage reflected in the space retained along the river corridor; and

- consider impact of Scheme on availability of parking spaces.

The findings of a questionnaire prepared for public consultation on the Scheme found that:

- 70% of respondents to the consultation questionnaire said they were supportive of the proposed works in the Maltings and Central Car Park area, with only 7% saying they were not in support. The remainder partly supported the proposed works.
- 81% of respondents to the consultation questionnaire said they were supportive of the proposed works in the Ashley Road area, with only 4% saying they were not in support. The remainder partly supported the proposed works.

Consultation with environmental consultees has also been undertaken by Wiltshire Council as part of the wider CAF, which includes the Scheme.

All environmental risks raised by consultee and stakeholders were taken into account in the EIA.

2.2.4 Future communication

Communication will be continued with statutory consultees, key organisations and interest groups (including conservation and fishing interests), landowners, residents and the general public throughout the development and construction of the Scheme, subject to consenting. Newsletters and press releases will be issued to the public in 2021 and social media events arranged to explain the nature and timing of the Scheme if approved, and likely disruption. Regular updates relating to the construction works will also be provided on our website and through social media.

2.3 Alternative options

2.3.1 Option development

We appraised several strategic options and developed the preferred Scheme in alignment with national guidance on flood risk management. We considered the following flood alleviation and river corridor improvement options during development of the Scheme and either rejected them or short-listed them for the reasons described:

- the 'do nothing' option where no improvement works would be undertaken and all existing maintenance and operation of structures would stop. This option was used as a baseline against which to assess the environmental impacts of the chosen Scheme;
- the 'do minimum' option where proactive maintenance of the existing flood defences and reacting to flood events would continue (baseline option). This option was taken forward as a short-listed option;
- water level management and fish passage measures. Measures to replace regulating structures with passive ones such as at Blackwell hatches, Swimming Pool Gate and Maltings hatches were short-listed as they would remove barriers to fish passage;

- new and raised flood defences
    - options identified on Summerlock Stream in the Ashley Road and Maltings areas to replace and raise river-bank walls were rejected due to risks of impacts on the designated conservation site and fisheries;
    - flood defence measures on the River Avon and Summerlock Stream, including a low height flood embankment set-back from river corridor in the Ashley Road area and river-bank raising to infill low spots in the Maltings area, were short-listed;
- options identified on Summerlock Stream to replace and raise one footbridge that acts as a bottleneck in the Ashley Road area and which can avoid in-river works were short-listed;
- minor raising of footpaths and temporary defences for gaps in walls. These measures were short-listed as they provide an affordable and feasible option in areas where groundwater flooding may dominate, such as the Salisbury Cathedral/Close area. However, these measures (if implemented alone) would deliver a lower standard of flood protection than other options;
- changes to flood flow conveyance (e.g. operational changes to restrict flood flows along Summerlock Stream in the Ashley Road area) were short-listed;
- river corridor improvements to widen the river corridor and reconfigure the floodplain to reduce flood risks through the Maltings area and create high quality blue/green corridor were short-listed as they provide significant opportunities to improve the environment and support regeneration of the city centre. These proposals would align with the objectives of the River Avon Restoration Project through a reduction in flow impoundment and water retaining structures, reducing concrete lining and revetments and moving towards more naturally functioning and less constrained channels;
- local measures for property flood resilience were short-listed as they provide a low cost approach that may be the only feasible and affordable option in areas where groundwater flooding dominates, such as the Friary area;
- complementary options including upstream initiatives on ‘Working with Natural Processes’ (i.e. implementing measures such as 'natural flood management' that help to protect and restore the natural function of the river catchment see Glossary) were shortlisted as they were considered to potentially 'slow the flow' and reduce runoff during shorter duration storms and locally benefit biodiversity and geomorphology. An option for flood storage upstream of Salisbury was considered and later rejected as it is only likely to have a minimal impact on extreme flooding in Salisbury. Any new structures would also need to be ‘engineered’ and actively operated during flood events (and would likely be economically unviable).

Additionally A36 drainage improvements planned by Highways England were also considered.

The short-listed options which were subsequently developed comprised combinations of: -

- do nothing and do minimum;

- replacement (or removal) of regulating structures with passive ones to improve fish passage;
- flood defence measures on the River Avon and Summerlock Stream;
- replace and raise one footbridge on Summerlock Stream;
- minor raising of footpaths and temporary defences for gaps in walls;
- changes to flood flow conveyance;
- river corridor improvements specific to Maltings regeneration area;
- increase downstream flood flow conveyance on the River Bourne in the A36/commercial area; and
- local measures for property flood resilience.

These short-listed options were appraised in order to benefit six main areas at fluvial flood risk (upstream catchments, Ashley Road, the Maltings and Central Car Park area, the Cathedral/the Friory, Southampton Road and Mill Road) with particular consideration of the following factors, and their technical, environmental and social aspects, costs, benefits, sensitivity and risks:

- the extent to which the option would reduce flood risk to properties, infrastructure and regeneration area;
- safety and operational risks associated with managing water levels by operating the in-river flow control structures;
- maximising environmental outcomes i.e. additional length of watercourse open to fish passage and/or additional habitat areas provided;
- provision of high quality blue/green infrastructure;
- community support for options;
- level of maintenance required;
- affordability, funding and resilience to climate change; and
- sustainability.

This option appraisal process, supported by consultation, targeted surveys and assessments identified river corridor improvements to reduce flood risk with proposed works in the Ashley Road and the Maltings and Central Car Park areas (see Chapter 3 'Scheme description'). This is to provide the maximum flood risk benefit from the proposed works and to fit in with Wiltshire Council's wider ambitions for this area. In addition, we identified compatible works to remove barriers to fish passage, increase the biodiversity and amenity value of the river corridors and naturalise the river channels. In order to naturalise and widen the river corridor, we also identified the requirement to construct new and replacement bridges over new and widened channels, respectively, to maintain pedestrian and vehicle routes, as described in Chapter 3 'Scheme description'.

It was determined that the remaining areas at fluvial flood risk will only require flood resilience measures such as individual property protection, or need to be considered alongside future projects being undertaken by others.

2.3.2 Alternative design options for the Scheme

The following options were considered for the Scheme, which is described in Chapter 3 'Scheme description'.

Changes to design of new channel and wetland habitat at Ashley Road area

Following the presentation of three alternative design options for the Ashley Road area at a public information event in 2019, we selected the most publicly favoured option for habitat creation in the Ashley Road area, which maximises the amount of available land for amenity purposes while retaining areas of wetland habitat and tree planting (but on a smaller scale).

Modifications to the design at this location were also made to

- the new channel layout with options including a multi-braided channel and various secondary channels to determine the optimum design for geomorphology. Consideration was also given to backwaters but due to concerns of fish stranding after flooding, this option was rejected and the Scheme now includes lowered areas and side channels with connectivity to the River Avon and new main channel;
- avoid impacting on the allotments by ensuring the dimensions of the embankment at this location are as narrow as possible;
- maintain open land for car boot sales and fun fairs at Ashley Road Open Space by moving some of the proposed tree planting at this location to Fisherton Recreation Ground; and
- ensure that Fisherton Recreation ground can accommodate a multi-use games area and informal recreational area with space for a 7-a-side football pitch, as well as a newly landscaped channel (including natural wildlife areas) to help reduce flood risk. This design necessitated moving the existing children's play park further east to Ashley Road Open Space.

Alternative modifications to existing channels and control structures

Various modifications have been considered for the River Avon, Mill Stream and Summerlock Stream to naturalise the river system, optimise flood storage/conveyance and enhance biodiversity including improved fish passage. These changes have been subject to further study and modelling to understand environmental, social, maintenance and engineering constraints, costs, risks, benefits and sensitivities. We also took the views of the public, statutory consultees, landowners and other stakeholders into account alongside engineering and socio-environmental criteria.

The key channel/control structure modifications that have been considered during the development of the Scheme comprise:

- we considered various means of changing and moving flood flows and selected a Scheme that reduces peak flood flows in the Summerlock Stream, by using the River Avon to convey extra flow down to the Central Car Park area where it can be returned to the Summerlock Stream via a new floodway culvert. An alternative option of carrying floodwater in an open channel under extreme flood events was rejected for environmental reasons (i.e. would likely collect litter and would not provide any biodiversity benefits being a dry channel) and land-take, and constraints on future land use.
- we considered alternative options for widening the River Avon channel through the Central Car Park area to increase flood flow conveyance as an alternative to constructing new and significant lengths of flood defence walls

and embankments, which limits opportunities for environmental improvement;

- we considered complete removal of as many control structures as possible to naturalise the river system including Swimming Pool gate but due to a potential reduction in water levels upstream and potentially significant changes to Mill Stream, it was determined that the Swimming Pool Gate structure would best be replaced with a new passive weir and a series of rock weirs;
- various modifications to control water levels at the downstream end of the Mill Stream at The Maltings were considered. The preferred Scheme includes lowering the crest level of the upstream weir of the fish pass with no change to the old Maltings hatches except that it will no longer be necessary to operate the gates and they will remain open;
- we considered alternative options for a short section of Summerlock Stream that is no longer required as part of the Scheme design, including turning this area into a backwater channel, infilling a 20m section and partial infilling. It was concluded, in agreement with Natural England (due to its SAC status) that we should provide a new re-engineered backwater and amenity feature to the new Summerlock Stream (with no through flow of water); and
- various changes were considered to the Mill Stream to improve low flow conveyance. The preferred Scheme includes the creation of marginal berms to narrow the Mill Stream to a width of 6 - 8m in some locations along an approximate 400m length to improve low flow conveyance and improve biodiversity.

Options for Millsteam Approach Bridge

Options were considered to remove the bridge and not replace it, to replace the existing Millstream Approach Bridge on its current alignment and to replace the bridge at a location approximately 35m north of the existing, with a new cycle and pedestrian footbridge to the south of the existing. The option that was progressed was building a new bridge to the north of the existing bridge with vehicle only access, and provision of a new pedestrian footbridge located 70m to the south of Millstream Approach Bridge.

Alternative types and alignments of structures

Alternative flood defence types and alignments have been explored and incorporated into the Scheme design to maximise use of land for recreation in areas of public open space, to avoid the loss of trees and vegetation where possible (see Section 8.3 for specific measures considered to minimise landscape impacts), particularly those trees of landscape, cultural or wildlife value and to minimise impacts on private landowners. For example,

- we have selected a flood wall adjacent to the allotments at Fisherton Recreation Ground to minimise impacts on trees, including native black poplars; and
- we considered alternative alignments for a new flood embankment/wall at the rear of a garden next to Ashley Road to minimise disturbance to the landowner. Alignments included a flood wall close to the bank of the Summerlock Stream and a wall set back by approximately 10m from the stream in close proximity to the property. The proposed flood wall was

selected in consultation with the landowner and was agreed to be located set back 3m from the river bank for stability reasons, with the retention of steps down to the stream and a regraded bank/marginal berm.

Additional alternative alignments and elevations for new access ramps and control structures were considered during the design of the Scheme.

Public Rights of Way

We have considered various diversion routes for public footpaths and cycleways in the Ashley Road area and in the Maltings and Central Car Park area e.g.

- considered various alignments and elevations for the new cycleway at the south-eastern end of Ashley Road Open Space between mature willow trees (one Weeping Willow and two Crack Willows) to try and maintain these prominent landscape features and avoid excavating in their root protection area. The preferred alignment comprises a realigned segregated cycleway and footpath, which avoids any adverse impact on the trees and limits the impact on the recreational area, with the proposed alignment agreed with Wiltshire Council's transport planners;
- we considered several alternatives for re-aligning an existing footpath and new cycle way (segregated) across a new single bridge crossing of the existing Summerlock Stream to reduce excavation works and limit construction of new surfacing within the root protection areas of adjacent black poplars. The proposed alignment has been agreed with Wiltshire Council's transport planners;
- new boardwalks were considered for the Ashley Road area in and around the new wetland habitat and along the right bank of the River Avon (with lowering of the flood bank) linking up with the Local Nature Reserve to the north of the Scheme area.

We considered a range of surfaces for the new and diverted footpaths and cycleways based on their usage (i.e. need to be sufficiently robust to meet local requirements), visual appearance to blend in with the local environment and requirement to provide access for all. Surface types comprised timber and recycled plastic for new boardwalks, asphalt, tarmac, stone/chippings, resin-bound gravel and tarmac rolled in aggregate for the other new footpaths in the Scheme area. Following consultation with a range of stakeholders, it was agreed that the surfaces of the paths at the Ashley Road site will be resin-bound gravel. Within the Maltings and Central Car Park area, the new pathways will be tarmacked to provide a hard-wearing surface due to its high use. Any new footpaths/cycleways have been designed to meet and exceed (where possible) guidelines on width and material requirements.

Options for material movement, re-use and disposal: alternative options for the beneficial re-use of soil were considered including the raising of Millstream Coach Park.

Various options for the movement of materials were considered including road transport, rail transport and use of rivers. Rail transport was rejected due to the existing raised elevation of the track and it was deemed inappropriate for the scale of the works and the use of barges to remove/import material via the River Avon is not feasible due to the size of the river in the Scheme area (as well as

its ecological sensitivity. The Scheme proposes to use roads for the movement of construction materials.

Alternative working methodologies: options were considered to reduce the footprint of temporary access routes and working areas in areas of environmental sensitivity, as well as alternative locations for site compounds. The following alternative working methodologies were selected to minimise environmental disturbance and/or landowner concerns:

- construction of the Scheme over two summers (2022 and 2023) rather than over three years to minimise disruption to the local community and the environment; and
- staged removal of the sheet-piled cut off wall at Swimming Pool Gate during its decommissioning to restrict flows and minimise sediment movement downstream**.**

Alternative finishes of new structures were considered (e.g. red brick/limestone cladding for flood walls and bridges, steel and timber for bridge railings etc) for the new offtake structures, flood walls, footbridges and new Millstream Approach Bridge to ensure that they are appropriate to their location and landscape character. The new structures have been designed to blend in with the landscape character of the study area and are described in Chapter 8 ‘Landscape and Visual Amenity’.

3. Scheme description

The Scheme (see Section 3.1) comprises construction of flood defence embankments and walls, flood control measures and river channel modifications including river widening and rock weirs, which are shown on the engineering drawings in Appendix A. The design has sought to avoid the use of hard defence structures and provide more natural flood management by removing existing structures and creating more natural channels to increase flood capacity.

This Scheme is Phase 1 of the Salisbury River Park Master Plan, which is described in Section 2.1.1. Future river corridor improvement works may be carried out as part of future phases of the master plan.

3.1 Description of Scheme

A description of the Scheme is detailed in the sections below.

3.1.1 Ashley Road area

- **New flood defence embankment:** The embankment will run along the southern boundary of Fisherton Recreation Ground and Ashley Road Open Space and be approximately 550m long and up to 1.4m high. The embankment will have varying side slopes; on the river side these will be up to 1 in 10 gradient slopes to give a natural appearance and respect the local landscape character and up to 1 in 4 gradient slopes where space for the embankment footprint is limited and on the Ashley Road side. The embankment will be topsoiled with site-won topsoil and seeded with either an amenity grass seed mix, or, if fertility levels in the topsoil are sufficiently low (to be determined during detailed design), it may be seeded with a species-rich meadow seed mix.

  Topsoil stripping will be required to facilitate construction. There may also be some form of below ground cut-off to limit seepage of floodwater underneath the embankment. This would require trenching along the whole length of the embankment and filling with clay material or installing plastic sheet piling. The requirements will be confirmed at detailed design stage.

- **New flood defence walls:**

  (1) New wall approximately 95m long and 1.4m high (above ground), clad in red brick on the river side adjacent to footpath/cycle track, will run close to the Coldharbour Lane Allotments and link Summerlock Bridge to the flood defence embankment to the north. The wall is needed instead of a flood embankment due to space constraints as the width of the recreation area narrows alongside the river and there are adjacent mature black poplar trees which we will retain. Improvements will also be made to ditches alongside the allotments to improve drainage.

  Topsoil stripping and excavation by up to approximately 1.0m to the foundation level of the wall will be required to facilitate construction. There may also be some form of below ground cut-off to limit under-seepage below foundation level. This would require additional trenching below foundation level along the whole length of the wall and filling with clay material or

alternatively installing plastic sheet piling or similar. The requirements will be confirmed at detailed design stage.

(2) New wall, approximately 45m long and just over 2.0m high on the river side and 0.6m high on the garden side (above ground), clad in red brick, will extend into one private garden adjacent to Ashley Road and Summerlock Bridge, bordering the right bank of Summerlock Stream. The wall will act as a secondary flood defence. The existing 20m long river-bank wall (mainly built in blockwork) on the Summerlock Stream will be removed and new marginal wetland planting introduced along the edge of the channel to enhance biodiversity.

(3) Raising the existing parapet upstand on the north side of Ashley Road bridge over Summerlock Stream by approximately 0.3m, with the new reinforced concrete section of upstand dowelled into the existing wall and fitted with new parapet railings. A connecting new flood defence wall will continue to the east, approximately 0.4m high (above ground), clad in red brick with railings, alongside the pavement on Ashley Road. A short length of new flood defence embankment will then run to the north along the west bank of Summerlock Stream up to the main flood defence embankment.

- **Two new pumping areas**: These areas will be used on a temporary basis for pumping standing water from drainage and under-seepage ponding behind the defences during flood events. The areas, large enough for the parking of vehicles and setting up temporary pumping equipment will comprise grassed geogrid so they are accessible in all conditions. Each working area includes two new underground pumping sumps, each about 1.2m in diameter rings up to a depth of 2.5m, with a sealed inspection cover.
- **New filter drains:** The drains will run at the back of the new flood defence embankment over its entire length as a drainage connection to the two new pumping areas (see above). The drains will require trenching to lay a 0.3m diameter perforated pipe, backfilled with graded gravels. New inspection chambers will be installed at intervals along the filter drains, 1.2m diameter and 1.5m depth.
- **Removal of trees:** removal of 18 trees including 10 Lombardy poplar trees and two memorial trees and 30m of hedgerow along the southern boundary of the existing play area adjacent to Coldharbour Lane Allotments to facilitate the construction of the new embankment.

  Removed trees will be replaced with new tree planting as shown on the Landscape Masterplan, including 33 new specimen trees in the Ashley Road area (to include the replacement of six Lombardy poplars in Fisherton Recreation Ground and replacement or replanting of two memorial trees).
- **Infilling a short section of Summerlock Stream:** Infilling an approximate 10m length of channel at the Summerlock Stream offtake from the River Avon at Blackwell Hatches. As part of the new Summerlock channel, just downstream a backwater amenity and biodiversity feature and shingle beach will be created.
- **New Summerlock Stream offtake structure and offtake channel:** The offtake structure will require breaching the bank of the River Avon at the northern end of Fisherton Recreation Ground. Below this structure, the new offtake channel will pass through Fisherton Recreation Ground and connect

with the existing Summerlock Stream just downstream of the Blackwell Hatches.

During low flows, water will be constrained to a single channel within this area (which may include multiple sub-channels if appropriate) and will be designed to maximise opportunities for fish passage. During higher flows, the channel will provide a connection to the surrounding new wetland habitat area (see below).

The approximate size of the new offtake channel will be 320m long with a low flow channel about 3-4m wide and up to 1.4m depth below existing ground level. The offtake structure will have reinforced concrete walls and base, and will be clad with natural stone. Berms either side of this low flow channel will vary in width to form a two stage channel for higher flows. The requirements will be confirmed at detailed design stage, with the aim of maintaining the existing low flow regime.

- **New flow control structures**: The structures comprise the new Summerlock Stream offtake described above and a new culvert on the Summerlock Stream, which will pass beneath the new flood defence embankment on the southern boundary of the Fisherton Recreation Ground, near Ashley Road, to limit the peak flood flows passing downstream. These are both passive structures to minimise future operational risks and maintenance costs and have been designed to enable fish and eel passage.
- **New wetland habitat** (see landscape plans in Appendix E1): The wetland will include the main low flow channel with marginal berms and adjacent wet grassland and wet woodland located within a ground lowered area, hydrologically connected to the new Summerlock Stream offtake channel, and accommodating water during high flows. It will also incorporate seasonally wetted ephemeral secondary streams, active at different flow states.
- **Two new footbridges and boardwalks**: The footbridges (2m wide) will cross the new Summerlock Stream offtake channel (one will also accommodate a new cycleway) at the north and south end of the new wetland habitat area. The exposed elements of the proposed steel beam pedestrian/cycle bridges, such as soffits, will be clad in timber. The bridges will be fitted with vertical timber railings. Two sections of boardwalk access will be provided around the wetland area. The boardwalks will be constructed from recycled plastic.
- **New retaining wall** along the edge of the new footpath/cycleway where it runs past Coldharbour Lane Allotments, approximately 70m long and up to 1m high (retained height), required due to space constraints to avoid impacting the native **b**lack poplar trees.
- **New amenity facilities**: These will include a shingle beach and picnic area adjacent to the new wetland habitat, improved public access at selected points (e.g. proposed river viewing platforms) to the new wetland habitat and installation of benches and information boards.
- **Replacement of existing play park:** The play park at Fisherton Recreation Ground will be replaced with a new improved play park on the eastern side of Summerlock Stream in Ashley Road Open Space. The improved

replacement play park will be designed in conjunction with Salisbury City Council and local stakeholders.

3.1.2 The Maltings and Central Car Park area

- **Modifications to the River Avon main channel:** The river channel corridor near the Millstream Coach Park will be reshaped and widened (50m maximum) and reshaped over a length of approximately 250m, providing a multi-staged channel with marginal wetland habitat on both banks. A geosynthetic clay liner or cohesive alluvium backfill will be used to line the widened channel where required, due to the risk of contamination in the made ground in the area.
- **Removal of Swimming Pool Gate structure (radial gate):** The flow control structure on the western branch of the River Avon channel, where it splits (above Millstream Approach), will be removed to improve fish passage and allow reprofiling of the channel bed to remove the large drop in bed level across the existing structure. It will be replaced with a series of new rock weirs for fish passage, with appropriately sized flints/gravels imported to form the substrate of each step. There will be a change in low flow water levels due to the reconfigured layout, by up to about +/-0.2m based on modelling.
- **New floodway culvert:** The culvert extending over approximately 140m will connect the River Avon main channel with the Summerlock Stream, with inlet and outlet structures, designed to carry floodwater only in extreme flood events (it will not impact on low flows). The approximate size will be 4m wide and 1m high (internal dimensions). Construction will require the removal of approximately 19 trees.
- **Extension of twin pipe culverts (each 0.9m in diameter):** The culverts will extend over a length of about 150m to move the outfall of the Waitrose culvert, which currently joins the channel immediately downstream of Swimming Pool Gate, to a position further downstream near the Avon Approach Bridge, providing continued drainage of this watercourse and connected surface water systems.
- **Modified layout of existing fish pass weirs at The Maltings:** This will involve lowering the upstream crest level, strengthening a central wall, and making any necessary repairs to the structure.
- **Tree removal and replanting:** Removal of 67 trees along the existing River Avon corridor to facilitate the construction of the widened channel and river park corridor. A total of 281 replacement trees are to be planted in and adjacent to the reprofiled River Avon corridor, comprising 47 standard trees and 234 transplants within tree and shrub planting plots.
- **Reduction in width of the Mill Stream**: narrowing to 6 - 8m over an approximate 550m length to improve low flow conveyance and create a more sinuous low flow channel by introducing shallow berms or raised areas (potentially using flint). Requirements will be confirmed at the detailed design stage. The berms will be placed in the existing channel to minimise deposition of silt on the flint bed under reduced flow conditions and to encourage diversity in local instream and marginal habitats.

- **Removal of hatches from the existing sluice gate structure at The Maltings:** This will reduce upstream water levels within the Mill Stream channel that is potentially silted above its original bed level.
- **Local ground raising:** Infilling low spots to a maximum depth of 0.3m over small areas near the River Avon near the railway embankment and adjacent to the Waitrose Culvert watercourse (open channel) to the north of the substation. The aim will be to reduce flood risk to the adjacent access road.
- **New flood wall (less than 2m in length):** The wall will be set back from the eastern bank of Summerlock Stream near Fisherton Street with flapped opening to retain drainage outflow into river under normal conditions. Associated measures to improve flood resilience of an adjacent property (approximately 1m from the river).
- **Creation of a small pocket park**: new park on approximately 500m^2 of land on the northern edge of Millstream Approach between the widened River Avon corridor on the western side and a road adjacent to the Mill Stream on the eastern side
- **Replacement of vehicular and footbridges**

  (1) Removal of the existing Millstream Approach road bridge and replacement of Millstream Approach road bridge: The new single lane bridge (with capability to be used as a two lane highway bridge in the future) will cross the widened river channel in a more northerly alignment. The new bridge deck with approximate open span of 20m and width of 10m will be supported on new bridge abutments and piled foundations positioned within the widened river corridor.

  Modified road approaches to the replacement road bridge, requiring ground raising to accommodate the higher level of the bridge. On the western side the existing road adjacent to the electricity substation will be raised over a total length of about 100m, with low height retaining walls to accommodate this. On the eastern side the existing ground will need raising to form a new approach road over a total length of about 50m.

  (2) New pedestrian steel trussed footbridge further downstream (south of existing Millstream Approach bridge). Footbridge width approximately 2m, length approximately 35m.

  (3) Replacement of existing footbridge at Swimming Pool Gate with new wider bridge to accommodate pedestrians and cyclists. The exposed elements of the proposed steel beam pedestrian and cycle bridge such as soffits will be painted in an appropriate colour. Bridge width approximately 6m, length approximately 30m.

  For the new bridges the form of construction and finishes will be determined at detailed design. The decks of all bridges will be surfaced with finishes that continue or at least complement the existing surfaces on the adjacent sections of footpath or cycleway.
- **New retaining wall:** The wall will run along the edge of a footpath/cycleway upstream of the replacement road bridge on the western side of the widened river corridor. The approximate size will be 40m long and 1m high (above ground).

- **Coach Park raising:** Raising ground levels over approximately 0.2ha area to act as a flood defence against overland flood flows, using excavated material from modifications to the main river channel corridor, and removal of the Coach Park culvert. The area will be re-surfaced and the drainage improved.

  The layout for the coach park area is to be determined as part of the detailed design stage in consultation with Wiltshire Council and interested parties. The area for coach parking will be maximised, taking into consideration safety requirements, with only a small reduction in area compared with the existing coach park; any reduction in area would be kept to a minimum. This can be accommodated without materially affecting the number of coaches that currently use the coach park.

- **New flood alleviation measures at Steynings House:** Short section of new flood wall to infill a localised low spot in the bank on Summerlock Stream which is vulnerable to flooding overland into Fisherton Street. The wall, less than 2m long and approximately **0.6**m high, to be built across an access path to the rear of the main building, clad in red brick to match the existing brickwork.

  The new flood wall at Steynings House will incorporate an appropriately sized drainage slot with flap valve to allow any surface water runoff collecting behind it to drain into Summerlock Stream. A flap valve will be fitted to the large rectangular box culvert outfall within the Summerlock Stream channel at this location. Associated measures to improve flood resilience of the main building, on the river side (undefended), will be considered at detailed design stage.

- **River Avon fish passage measures**: New short section of in-channel berm or raised area on the River Avon downstream of Maltings and just upstream of the confluence where the Mill Stream rejoins at Fisherton Street bridge. This berm will be formed potentially using locally sourced gravel, placed in the existing channel (east side) to create higher velocities under low flow conditions to encourage fish passage into the River Avon away from Mill Stream.

- **Amenity improvements:** including public viewing area, new footpath/cycleway and shingle beach with stepping stones (if considered appropriate following further investigation).

- **Improvements to the layout of roads and footpaths within the Central Car Park area:** to accommodate the Scheme proposals and provision of new segregated cycleway route for National Cycle Network Route 45 from Swimming Pool Gate to the southern boundary of the coach park.

- **New low-level lighting:** installed along some of the new Public Rights of Way for safety, security and vandalism purposes, and the locations for this lighting will be agreed in consultation with Natural England during detailed design of the Scheme.

3.1.3 Throughout Scheme area

- **Diversion of services**: Diversion of cables and pipes including gas mains to facilitate widened river corridor and new wetland habitat area and new alignment of some services

- **Diversion of and new Public Rights of Way**: Temporary and permanent diversions of Public Rights of Way (notably public footpaths and cycleways) including signage of all temporary and permanent diversions**.**

  Ashley Road site - newly surfaced paths with either resin-bound gravel or asphalt (to be determined during detailed design

  The Maltings and Central Car Park area – new paths will be tarmac to provide durability in this heavily used area

- **Trees and vegetation:** Planting of standard trees (80 nr.), native species wet woodland (c. 1,450m^2), native species tree and shrub planting (c. 2,070 m^2), native species hedgerow (c.470m) amenity shrub planting (c.900m^2) and marginal wetland habitat creation (c. 3,830m^2). Retained areas of grassland disturbed during construction and areas of exposed earth such as new embankments will be topsoiled and seeded with appropriate grass and/or wildflower meadow seed mixes
- **Street furniture, including seating and bins:** will be specifically selected during detailed design to coordinate with the street furniture portfolio used by Salisbury District Council elsewhere in the city. Signage will be consistent with the Wayfaring Strategy currently being developed by Wiltshire Council.

3.2 Construction, operation and maintenance

A detailed construction programme will be developed during the detailed design stage of the Scheme, which will minimise disruption to residents, tourists and businesses in Salisbury, particularly those using the river corridor, and to avoid impacting on known protected species and fish.

We estimate that the main earthworks associated with the Scheme will take two years (during 2022 and 2023), as follows

Ashley Road area:

- January to March 2022 - there will be several months before the main works start when the contractor will be setting up facilities in the Scheme area including diverting/protecting services, carrying out environmental mitigation works including memorial tree replanting and tree felling and shrub clearance.
- Spring 2022 - the contractor will start to set up the site and install a site compound on Ashley Road Open Space (see Section 3.2.1).
- Spring to Summer 2022 (until the weather deteriorates) - construction of Summerlock offtake structure including footbridge and landscaping, flood embankments and access ramps and flood walls. Earthworks and start of new offtake channel and wetland habitat creation.
- Spring to Summer 2023 - continuation of earthworks, offtake channel and wetland habitat creation.
- Summer to Winter 2023 - completion of the earthworks and landscaping.

Maltings and Central Car Park area

- January to July 2022 - there will be several months before the main works start when the contractor will be setting up facilities in the Scheme area

including diverting/protecting services, carrying out environmental mitigation works including tree felling and shrub clearance.

- June to August 2022 - the contractor will set up the site in the Maltings and Central Car Park area including boundary fencing and temporary river crossing.
- July 2022 to June 2023 - river corridor works in the Maltings and Central Car Park area including closure of the River Avon, earthworks, extension of culverts to move the Waitrose outfall and construction of the new Millstream Approach Bridge.
- Winter 2022 to Spring 2023 – high level culverts and road works connecting the new Mill Stream Approach Bridge will be undertaken in the Maltings/Central Car Park area.
- Summer to Winter 2023 - completion of the river channel improvement works in the Mill Stream and Fisherton Street area.

It is planned that all the main works will be within the summer months when there is less risk of high flows and wet ground conditions, which could affect construction activities and increase the risk of soil and sediment mobilisation.

The normal working hours for the construction of the Scheme will be 7.00am to 6.00pm Monday to Friday. We will avoid construction activities at weekends, Public Holidays and during special events/festivals other than in emergency or other exceptional circumstances.

Detailed site management plans will be prepared by the Contractor in advance of the construction works, and these will include arrangements for traffic management, delivery of materials and equipment to the various working areas and site compounds. The provisional locations of the primary site compounds (subject to agreement with stakeholders and landowners) are shown on Figure 12.2.

A draft Construction Traffic Management Plan is provided in Appendix P1, which will be updated during the detailed design stage of the Scheme.

The proposed Scheme will employ up to 35 staff on site at peak time during construction of the Scheme.

Some temporary lighting will be required during construction of the Scheme at the site compounds and around Millstream Approach Bridge.

The Scheme will be operational by December 2023.

An outline Scheme Operation and Maintenance Manual has been prepared for discussion with Salisbury City Council and Wiltshire Council as future part operators of the Scheme (see Section 3.4). This manual presents the maintenance requirements for the flood defences and other engineering works (bridges, footpaths, cycleways, boardwalks and street furniture) that will be essential after completing the Scheme construction.

Regular maintenance will be carried out on the flood defences and other Scheme elements, so that they operate at optimum efficiency. Where the responsibility for maintenance rests with a landowner, the aim will be to secure co-operation in ensuring appropriate maintenance takes place. Wiltshire Council as landowner will take over responsibility for the majority of the Scheme that forms the new river park. We, the Environment Agency, are the relevant

operating authority for flood defences on designated main rivers and our responsibility will extend to the new flood defences and associated in-river flow control structures.

Our appointed civil engineering contractor who will be constructing the flood defences and associated engineering works for the Scheme will carry out routine maintenance during a one year defects period after completion of construction. In addition, we will appoint specialist landscaping contractors to undertake the landscaping works, including a programme of inspection, maintenance and replacement of failed planting for up to five years after completion of construction.

3.2.1 Indicative construction methods

Construction of flood defences

To enable the construction of the new flood defences in the Ashley Road area, the following works will be undertaken:

- a temporary bridge will be placed across Summerlock Stream for construction plant access to Fisherton Recreation Ground;
- topsoil will be stripped across the area and stored locally. Topsoil not required within the new wetland area will be utilised within the shoulders of the new flood defence embankment on their completion;
- works will commence on the western side of the recreation ground and work towards the temporary bridge, and subsequently, works will continue into Ashley Road Open Space following the same sequence and continuing to work west to east;
- a trench will be excavated and filled with compacted imported clay to form an impermeable core for the embankment. Embankment material will be gained from excavation of the channel and wetlands area and placed and compacted to build the embankment up in compacted layers. The clay core will be trenched in and compacted as the layers proceed;
- the embankment sides will be regraded to the required profile as the embankment proceeds and material gained utilised in the works;
- topsoil will be placed over the embankment; and
- the brick and stone cladding and reinforced concrete flood walls will be constructed during the Fisherton Recreation Ground earthworks so that the new flood embankment construction can seal into the ends.

Construction plant will be a bulldozer, 14 to 20 tonne 360˚ tracked excavator and heavy-duty sheep's foot compaction roller.

Excavation of new channel and wetland area

- excavations will commence on the western side of Fisherton Recreation Ground whilst sheet piles are inserted to permit construction of the offtake structure;
- excavation works will progress west to east with all excavated material being transported either for use in the flood embankment both in Fisherton Recreation Ground or taken across the temporary bridge to Ashley Road Open Space;

- following top soil strip the bulldozer will reduce the whole area to the wetlands profile with the excavator forming the main channel and loading dumpers. Topsoil will be replaced across the area if required assuming its suitability for the proposed plant species (to be confirmed during detailed design);
- the wetlands and channel will be connected to the Summerlock Stream after completion of the lower levels of the new passive control structure;
- the connection to the River Avon will follow completion of the above construction methodology at Summerlock Stream and the new offtake structure**;** and
- planting will subsequently be undertaken in line with the Landscape Masterplan.

Construction plant will be a bulldozer, 14 to 20 tonne 360˚ tracked excavators and wheeled dumpers.

Channel widening

- a sheet piled cut off wall will be constructed across the River Avon at the new passive Control Structure location with all the flow diverted down the Mill Stream. Some of this flow may also be diverted down the Summerlock Stream. Appropriate controls to manage sediment movement in the Mill Stream will be identified and confirmed in agreement with Natural England during the detailed design of the Scheme;
- a fish rescue will be carried out and a clay barrier constructed at the southern extent of the works by the Avon Approach Bridge;
- once the river is 'dry', works will commence at the southern end of the proposed widened section and progress northwards towards the new control structure;
- selected suitable excavation material will be stockpiled by dump truck to provide river bed raising material for the northerly section and for the alluvium strata cut off trench material. All other excavated material will be removed from site to a licenced tip/ WRAP approved facility by road lorries; and
- as the channel works progress northwards the rock weirs will be formed, the strata cut of trenches installed in the banks and top soil replaced.

Construction plant will be a 20 to 25 tonne 360˚ tracked excavator loading to dumper trucks/road lorries on the left bank of the River Avon.

Culverts and spillway

- the floodway culverts will be offloaded in the compound and reloaded to a suitable hiab lorry for installation;
- works will commence at the floodway outlet location where the Summerlock Stream is culverted under the rail line. Excavation and culvert installation will progress north up to the spillway structure location. Outfall construction will progress once the first section of culverts are laid. To benefit from the dewatered River Avon, the spillway construction will commence with culverts laid into it as available; and

- backfilling to road level will be carried out as culvert laying progresses with the car park surface reinstated on completion.

Construction plant will be a 20 to 25 tonne 360˚ tracked excavator loading to dumper trucks/ road lorries, heavy duty compaction roller and machine laid asphalt resurfacing equipment.

Control structures

- the existing radial gate structure at Swimming Pool gate will be decommissioned and demolished once the River Avon flows are diverted to the Mill Stream;
- the new passive flow control structure will be constructed following these works**;**
- the structure will be commissioned by cutting/removal of the sheet piled cut off wall once all channel earthworks, weir structures, planting and downstream barrier are removed; and
- the removal of the sheet piled wall will be staged to restrict flows and mitigate sediment movement.

3.2.2 Vehicle movements

We have estimated the total number of vehicle movements for various locations and construction activities throughout the Scheme area during construction. These are presented in Chapter 12 'Traffic and transport' and in the Outline Construction Traffic Management Plan (Appendix P1).

3.2.3 Access routes and site compound

An indicative construction route is provided for the Scheme on Figure 12.2 (see Chapter 12 'Traffic and transport'), with final details to be confirmed with key stakeholders during detailed design of the Scheme. The proposed construction routes link haul roads to the local and strategic road networks.

The primary considerations for the routeing strategy were to:

- use shortest route from location of access points to the strategic road network;
- use A roads as a first priority, then B roads, then C roads and then unclassified roads;
- where possible avoid single carriageway roads unless these provide direct access to a construction site; and
- avoid sensitive receptors to minimise impact on local residents and sensitive road users.

During detailed design, a site audit will be undertaken along the proposed construction routes and access points to the Scheme area, and all permitted access points for construction traffic will be agreed with the Highway Authorities.

The routes highlighted in yellow on Figure 12.2 have identified no restrictions in terms of height or weight. All routes proposed can therefore be used by the

anticipated construction traffic. In addition to the routes highlighted in yellow, an additional route along Coldharbour Lane (illustrated in pink) will be used for the Ashley Road area in January and February 2022 and will consist of around three Large Goods Vehicles (LGVs) (3 tonne or less) each day.

Access to the Ashley Road area will be taken from the A36, with vehicles travelling via a priority junction on Butts Road/Castle Road (A345) which is located at the eastern end of the Scheme area. Construction traffic will be controlled by a banksman who will be positioned adjacent to the Salisbury Fire Station. No construction vehicles will be allowed to continue in a westerly direction due to the residential nature of Ashley Road to the west.

For the compound access, it is proposed that access will be taken via Ashley Road onto the open space/playing fields and will require the removal of Salisbury City Council bollards to achieve the required width for construction vehicles.

Access into the Maltings and Central Car Park area will be taken from the A36 (Castle Roundabout) and construction vehicles will travel south via Castle Street before heading west along the Mill Stream Approach to reach the on-site compound.

The site compound locations are shown on Figure 12.2. The main compound location will be located in the Central Car Park in the Maltings.

Each site compound area will be established on hard-standing and will include sufficient parking space for staff, operatives and construction related visitors. Working areas and compounds will be fenced and signs will be erected to warn the public of the dangers of construction sites. The most appropriate fencing type will be used based on the location and type of works. For example, Heras fencing will securely demarcate site compounds and areas that are open to the public. Post and wire fence will be used to segregate work areas from adjacent footpaths. Unless existing services are available at the compound locations, electrical services will be provided via generators, water by bowsers and wastewater placed into tanks and collected for off-site disposal.

Appropriate signage will be fixed to the gates and where vehicles meet pedestrians and cyclists, arrangements such as barriers put into place to denote vehicle and pedestrian crossover areas. If they cannot reasonably be avoided, traffic marshalls will be in attendance.

Access routes to the compounds and working areas will be provided, where required, from the closest and most suitable access and egress points from the highway network. Temporary haulage routes will be constructed to provide a suitable running surface for plant and delivery vehicles as required within the working areas.

3.3.4 Materials management

We will build the embankment around the southern perimeter of Fisherton Recreation Ground and Ashley Road Open Space mainly using material excavated as part of the Scheme, where this is suitable. Where possible, we will also use some of the excavated material from the channel widening in the Maltings to locally raise levels at The Maltings Coach Park. This will use only a small proportion of the material and approximately 11,000m^3 of alluvium, gravel, topsoil and other materials will need to be taken off site. All made ground

excavated in the Maltings and Central Car Park area will be disposed of at a suitably licensed facility.

We have prepared a Materials Management Plan for the Scheme, which is presented in Appendix M.

3.4 Reinstatement and habitat/landscape management

As part of the detailed design development, our outline Operation and Maintenance Manual indicating the reinstatement, routine maintenance, monitoring and other (periodic or exceptional) maintenance activities that will be undertaken within the Scheme area will be updated. No elements of the works will need to be decommissioned.

Reinstatement of areas of land affected by temporary construction works will include replanting with native trees and shrubs that are resilient to climate change, as shown on planting plans that have been produced for the Scheme (and submitted with the planning application). Some ornamental shrubs and trees will be planted along the right bank of the River Avon in the Maltings and Central Car Park area. All reinstatement proposals will be discussed and agreed with affected landowners.

We have produced a Landscape Habitat Management Plan (Appendix E3), which sets out the long-term landscape and habitat management proposals for areas of land affected by the Scheme and for the proposed habitat mitigation areas. This plan will be developed in more detail during the detailed landscape design, to provide detailed management guidelines for the first five years in respect of all soft landscaping areas and outline guidelines for maintenance beyond the first five years and up to 30 years to ensure that the biodiversity net gain of the Scheme is achieved.

4. Key issues and methodology

4.1 Scoping methodology

We prepared an EIA scoping technical note (Jacobs 2020 - Appendix B1) to provide a record of the initial environmental scoping of the early Scheme design, and to assist the planning authority in the determination of an EIA Scoping Opinion. A formal Scoping Determination (see Appendix B2) was received from Wiltshire Council in August 2020 that outlined the scope of the statutory EIA required under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017.

Following receipt of the Scoping Determination, we subsequently discussed further technical issues with some of the 'scoping opinion' consultees, and we also received further responses to our scoping opinion request from the Local Planning Authority. To ensure agreement on the final scope of the EIA, we prepared a Technical Note (see Appendix B2) to explain:

- additional discussions that took place with consultees or additional consultee responses received since receipt of the EIA scoping opinion, where these resulted in changes to the scope of the EIA;
- our understanding of consultee requirements where there was some uncertainty relating to the scope of assessment requested; and
- how we proposed to address any changes to the scope of the EIA.

The planning authority acknowledged and further amended the scope of the relevant EIA activities on 2 December 2020 (see Appendix B2).

The environmental topics scoped in and out of the assessment, identified during the scoping stage and through subsequent consultation are detailed in the individual assessment methodologies for technical receptors in Section 4.3. A summary of the key issues and potentially significant effects relevant to the Scheme is provided below.

- the consequences of improved flood risk management for Salisbury;
- the consequences for communities of changes in land use and access to open space;
- temporary disruption of local communities during construction;
- changes in the local landscape and views, including loss of trees;
- temporary visual impacts during construction;
- changes to biodiversity during construction and on completion of Scheme;
- changes to surface water, groundwater and flood risk;
- changes in the setting of cultural heritage features;
- temporary changes to traffic and associated temporary impacts on air quality during construction;
- changes to coach/car parking during construction and upon completion of Scheme; and
- carbon footprint of whole project life of Scheme.

4.2 Baseline information

Chapters 5 to 15 describe the environmental baseline of the Scheme area, which was used to support the impact assessment for each environmental receptor.

Environmental baseline information for the study area has been collated from:

- ordnance Survey mapping, historic mapping and documentary sources held at the Wiltshire and Swindon History Centre, aerial photography (including that held at the Historic England Archive) and satellite imagery available online;
- records of protected and notable species provided by Wiltshire and Swindon Biological Records Centre;
- arboricultural (tree) survey / arboricultural impact assessment (Appendix G);
- initial geomorphological walkover survey;
- ecological surveys:
    - Preliminary Ecological Appraisal Report (Extended Phase 1 Habitat Survey) (Appendix F1);
    - Great crested newt survey (Appendix F2);
    - Waterways Breeding Bird Surveys (Appendix F4);
    - Badger survey (Appendix F5);
    - Ground based bat tree assessment and bat activity surveys (Appendix F6);
    - Otter and Water Vole Survey Reports (Appendix F7)
    - Reptile survey (Appendix F8);
    - Water crowfoot survey (Appendix F9);
    - Invasive species survey (Appendix F10);
    - River condition assessment (Appendix F11);
- geophysical survey at Ashley Road area (Appendix I2);
- heritage and archaeological data including:
    - National Heritage List for England for information on designated cultural heritage assets;
    - Wiltshire Historic Environment Record for information on non-designated archaeological sites and monuments; non-designated historic buildings and previous archaeological investigations;
    - consultation with Wiltshire Council for information on Conservation Areas and locally listed buildings;
- ground investigation reports for the Scheme and geological information held by the British Geological Survey including digital geological mapping (https://www.bgs.ac.uk: Geology of Britain viewer);
- Wiltshire and Swindon Historic Landscape Characterisation Project;
- the Salisbury Extensive Urban Survey (Cave-Penney, 2004);
- survey data on ground levels;

- traffic flow data from Wiltshire Council and Highway England's Webtris portal;
- desk-based studies as part of this EIA including:
    - Cultural Heritage Desk-Based Assessment (Appendix I1);
    - Natural Capital Assessment (Appendix K);
    - Habitat Regulations Assessment (Appendix J);
    - Invertebrate Desk-Based Assessment (Appendix F3); and
    - Water Environment Regulations Compliance Assessment (Appendix H1);
- the Multi-Agency Geographic Information System (GIS) for the Countryside website (www.magic.gov.uk);
- the University of Exeter's Outdoor Recreation Valuation Tool (ORVal);
- site visits between 2020 and 2021; and
- consultation with Environment Agency specialists, key consultees, landowners and the general public (see Section 2.2) to help identify relevant environmental features in the study area and understand the key issues and interactions between receptors, to inform the route alignment and to help influence the design of the Scheme.

4.3 Assessment methodology

4.3.1 General approach

The following general procedure was used to evaluate the environmental impacts of the Scheme (although some technical assessment methodologies differed slightly as described below):

- mapping of environmental resources likely to be affected by the implementation of the proposed Scheme;
- overlay of the Scheme boundary onto this baseline information to define spatial relationships;
- identification of the value or sensitivity of each environmental resource according to the criteria in Table 4.1;
- consideration of the interactions of the Scheme with the environment, to identify the potentially significant environmental impacts (e.g. physical change) at both the construction and operational phases;
- assessment of the magnitude of these impacts using the criteria presented in Table 4.2;
- evaluation of the significance of the impacts based on their value or sensitivity and impact magnitude using criteria shown in Table 4.3. These may be modified to be receptor-specific;
- consideration of the duration (temporary or permanent) of the impact;
- where necessary, specification of mitigation measures to ameliorate or reduce predicted significant impacts to an acceptable level;
- identification of the potential residual impacts of the mitigated Scheme.

Table 4.1: General criteria for classifying the value or sensitivity of environmental resources

Value	Criteria
Very High	International importance
High	National importance
Medium	Regional/County importance
Low	District/Parish importance
Negligible	No listed importance

Table 4.2: General criteria for classifying the magnitude of environmental effects

Value	Criteria
Major negative	Impact with serious consequences and/or on a large area
Moderate negative	Impact with undesirable consequences
Minor negative	Discernible negative impact and/or on a small area
Negligible	No impact or no discernible impact
Minor positive	Discernible positive impact and/or on a small area
Moderate positive	Impact with favourable consequences
Major positive	Impact provides substantial gains and/or on a large area

Table 4.3: Assessment of significance of environmental effects and residual effects

	Value/sensitivity			
Magnitude	**Very High**	**High**	**Medium**	**Low**
Major negative	Major adverse	Moderate adverse – Major adverse	Moderate adverse	Minor adverse – Moderate adverse
Moderate negative	Moderate adverse – Major adverse	Moderate adverse	Minor adverse – moderate adverse	Minor adverse
Minor negative	Minor adverse – moderate adverse	Minor adverse – Moderate adverse	Minor adverse	Minor adverse
Negligible	Nil impact			

	Value/sensitivity			
Magnitude	**Very High**	**High**	**Medium**	**Low**
Minor positive	Minor beneficial – Moderate beneficial	Minor beneficial – Moderate beneficial	Minor beneficial	Minor beneficial
Moderate positive	Moderate beneficial – Major beneficial	Moderate beneficial	Minor beneficial – Moderate beneficial	Minor beneficial
Major positive	Major beneficial	Moderate beneficial – Major beneficial	Moderate beneficial	Minor beneficial – Moderate beneficial

A significant effect under the meaning of the EIA Regulations is assessed in this ES to be **moderate** or **major adverse/beneficial** (except for flora and fauna where a minor negative impact can sometimes be significant - see Table 4.27).

4.3.2 Study area

Each technical chapter defines its own individual study area for assessment purposes. The Scheme area, which refers to the overall permanent and temporary working areas of the Scheme, is described in Section 1.3 and shown on Figure 1.2.

4.3.3 Local community

Those issues scoped into the 'local community' assessment are as follows: -

- reduced flood risk to people living, working and visiting Salisbury;
- improved appearance of Scheme areas with associated beneficial impacts on community assets;
- long-term changes to groups protected by equality legislation;
- improved flood resilience to support the wider regeneration proposals for the city;
- beneficial socio-economic impacts of Scheme on people, shops and businesses from improved desirability of area (increasing visitor numbers) and reduced flood risk including future investment in Salisbury as a result of the Scheme;
- beneficial impacts from enabling regeneration of key brownfield site with associated growth and employment opportunities;
- beneficial impacts on human health of reduced flood risk;
- changes to human health through changes in recreational use of the area and potential for increases or decreases in commuting by walking or cycling;
- potential educational opportunities;

- disruption to community assets, and occupants of residential/industrial properties during construction including groups protected by equality legislation;
- temporary socio-economic changes resulting from construction on people, shops and businesses;
- potentially negative changes to human health from temporary restricted access to recreational land/public rights of way;
- changes in air pollution on public health during construction; and
- health impacts associated with ground contamination and land raising.

Scoped out

- health surveys; we have not and do not propose to carry out any health surveys for the Scheme as no significant adverse impacts on health are anticipated.

The assessment of impacts on the local community follows the broad assessment methodology outlined in Section 4.3.1, with the exception of Table 4.1, which classifies the sensitivity and value of receptors.

The ‘local community’ assessment has assumed that ‘people and human health’ and ‘residential buildings’ have a ‘very high’ value or sensitivity, community buildings such as schools, village halls, churches/cathedrals, care homes and medical centres have a 'high value', and industrial properties or facilities, and public toilets have a 'medium' value, based on professional judgement. However, community facilities such as allotments have been classified based on their geographic importance, in accordance with Table 4.1.

4.3.4 Noise and vibration

Those issues scoped into the 'noise and vibration' assessment are as follows:

- direct noise/vibration from construction plant and increased traffic on the local population and occupants of residential and other occupied buildings, including schools, hospitals, Cathedral and offices, Fisherton Recreation Ground, leisure centre and rights of way); and
- noise assessment for construction of the Scheme. In agreement with Wiltshire Council, Category A of BS 5228-1 has been assumed to derive noise limits. If any assessment is required relating to proposed traffic diversions, this will be undertaken using the methodology within the Calculation of Road Traffic Noise (CRTN), although this would be dependent upon traffic flow data being available.

Scoped out

- operational noise and vibration as the Scheme will not generate any additional noise or increased traffic;
- baseline noise surveys as no significant noise impacts on sensitive receptors are envisaged with the implementation of appropriate mitigation.

This noise and vibration assessment follows the methods within British Standard 'Code of practice for noise and vibration control on construction and open sites' (BS 5228 Parts 1 and Part 2) (BSI 2014).

Part 1 Noise, describes the calculation methodology to determine the impact from noise, including the assignment of significance. It lists various site equipment and activities and their sound levels, which have been used to determine the overall noise form certain activities. The number of items and the time the item is working has also been taken into account.

Part 2 Vibration provides a method to calculate vibration from certain activities. This is limited to activities where noticeable levels of vibration are expected and can be measured.

In determining the magnitude of an impact, guidance within the Design Manual for Roads and Bridges LA 111 Noise and Vibration (Highways England, 2020) has been utilised. When determining the magnitude of impact, LA 111 uses 'effect levels' that have been introduced into English noise policy by the Noise Policy Statement for England (Defra, 2010).The magnitude of impact is then considered along with sensitivity of receptor and any other relevant factors to determine the effect.

Appropriate assumptions (detailed in Chapter 6 'Noise and vibration') have been made to carry out a conservative noise and vibration assessment based on restrictions due to the COVID-19 pandemic, which has reduced movements via transportation noise sources in the UK. A desk-based review of the Scheme, surrounding land uses and noise-sensitive receptors was undertaken using aerial photography from Google Earth in order to gather information on the Scheme area. This approach aligns with the advice provided in the 'Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments', by the Association of Noise Consultants and the Institute of Acoustics.

Sensitivity of receptors

The classification of receptor sensitivity to noise and vibration in proximity to the construction works is shown in Table 4.4.

Table 4.4: Receptor sensitivity

Receptor sensitivity	Receptor type definition / example
Very High	Internationally designated areas. Special cases for noise or vibration sensitivity. Particular vibration sensitivity for receptors making use of highly vibration sensitive equipment, e.g. microscopy, nanotechnology laboratories.
High	Residential, educational, medical facilities, TV/music recording studios/recital rooms.
Medium	Hotel, community facility, places of worship.
Low	Commercial buildings (e.g. office), farms, retail.
Negligible	Farmland and Industrial installations.

Magnitude of impact - noise

The scale we have used for noise magnitude is presented in Table 4.5 where the 'effect levels' are Significant Observed Adverse Effect Level SOAEL and Lowest Observed Adverse Effect Level LOAEL (from Defra, 2010).

The SOAEL and LOAEL are defined in Table 4.5 and are in accordance with Highways England (2020). Defining the SOAEL and LOAEL requires knowledge of the existing noise levels at the sensitive receptors. It was agreed with Wiltshire Council that no noise survey was required for the Scheme, and therefore a threshold noise level associated with the lowest category (Category A) has been assigned as a conservative approach. As no noise surveys have been undertaken, the LOAEL has not been assigned but as indicated in Table 4.6 no noise level below the SOAEL can lead to a significant adverse impact, so the absence of any LOAEL is not considered to be a limiting factor or risk to the assessment.

Table 4.5: Magnitude of noise impact

Magnitude	Noise criteria
Major	Above or equal to "SOAEL + 5dB"
Moderate	Above or equal to SOAEL and below "SOAEL + 5dB"
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Table 4.6: Construction noise LOAEL and SOAEL values at residential receptors

Magnitude	Noise criteria	Threshold assigned, LAeq dB
Construction noise effect level	How effect level is defined	Threshold assigned, LAeq dB
LOAEL	Existing LAeq,T noise level for day, evening or night	Not possible to assign
SOAEL	Threshold level determined in accordance with BS 5228.	65

Magnitude of impact – vibrations

The scale we have used for vibration magnitude is presented in Table 4.7. For the human response to vibration, a value of LOAEL and SOAEL has been assigned, and this aligns with the values provided by Highways Agency (2020).

The British Standard "Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground borne vibration" (BS 7385-2:1993) provides guidance on vibration levels likely to result in cosmetic damage. Guideline values for transient vibration (i.e. a moving source of vibration), above which cosmetic damage could occur, are given in Table 4.8. The movement imposed in a building by ground motion will be greater at lower frequencies, and

hence the peak component of particle velocity (PPV) level required for potential damage is lower.

Table 4.7: Construction vibration magnitude and effect levels

Magnitude	Noise criteria	Threshold assigned, LAeq dB
Major	10	Vibration is likely to be intolerable for any more than a very brief exposure to this level.
Moderate	1.0 (SOAEL)	It is likely that vibration of this level in residential environments would cause complaint but can be tolerated if prior warning and explanation has been given to residents.
Minor	0.3 (LOAEL)	Vibration might just be perceptible in residential environments.
Negligible	0.14	Vibration might just be perceptible at sensitive locations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
	<0.14	Vibration is below levels of perception.

Table 4.8: Transient vibration guide values for cosmetic damage to buildings

Building	PPV in frequency range of predominant pulse (Threshold criteria)	
	4 Hz to 15 Hz	**15 Hz and above**
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
Unreinforced and heavy commercial buildings Residential or light commercial buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Note 1: Values referred to are at the base of the building.

Note 2: For un-reinforced or light framed structures and residential or light commercial buildings, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

BS 7385-2 states that the probability of building damage tends towards zero at 12.5 mm/s PPV, which can be halved for a conservative level of continuous vibration. These values have been rounded down to the integer for a structurally sound building, and threshold levels provided within Table 4.9. If a building is structurally unsound, then these values may be reduced; conservative reduction of 50% has been applied. It should be noted that BS 7385-2 states (para 7.5.2) “A building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive". BS 7385-2 also indicates that for continuous vibration the threshold is around half of a transient value.

Table 4.9: Vibration impact criteria for buildings (below which there is no risk of cosmetic damage)

Category of building	Impact Criteria (PPV at building foundation) Transient(a) vibration	Impact Criteria (PPV at building foundation) Continuous(b) vibration
Potentially vulnerable buildings(c)	6 mm/s	3 mm/s
Structurally sound buildings	12 mm/s	6 mm/s

(a) Transient vibration relative to building response such as impulsive vibration from percussive piling.

(b) Continuous vibration relative to building response such as vibrating rollers.

(c) BS7385 highlights that the criteria for aged buildings may need to be lower if the buildings are structurally unsound. The standard also notes that criteria should not be set lower simply because a building is important or historic (listed).

Assessment of significance – noise and vibration

The significance of effect is determined from the receptor's sensitivity and the magnitude of impact. An effect of moderate or above would be considered potentially significant as shown in Table 4.10. The final determination of whether an effect is significant will depend upon other contextual factors, such as duration of activity. For the purposes of this assessment, a significant effect would only be determined where a moderate or above potential effect is experienced by any noise sensitive receptor for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights; or,
- a total number of days exceeding 40 in any 6 consecutive months.

Table 4.10: Assessment of potentially significant effects from noise and vibration

Receptor sensitivity	Magnitude of impact			
	Negligible	Minor	Moderate	Major
Negligible	Negligible	Negligible	Negligible	Slight
Low	Negligible	Negligible	Slight	Moderate
Medium	Negligible	Slight	Moderate	Moderate
High	Slight	Slight	Moderate	Major
Very high	Slight	Moderate	Major	Major

Assumption and limitations

For the purposes of this assessment, standard working hours have been considered for the calculations; that is daytime (07:00−18:00) Monday to Friday. No work activity has been considered during the evening. If work is required

outside of these times/days, further assessment will be carried out during the detailed design stage.

The proposed activities will occur in a consecutive order and thus the assessment has considered that none of the activities would overlap. The calculations of construction noise have conservatively assumed a 50% ground absorption since the intervening ground surface is predominantly grass.

The assumed plant used for each construction phase is shown in Appendix D. The acoustic 'on-time', which is defined as the period of time that the equipment operates at full power, has been defined based upon experience of the staff undertaking the assessment. The sound power levels for the equipment stated in the plant and equipment lists have been derived either from manufacturer's data, measurements or the lists on noise levels stated in BS5228.

4.3.5 Recreation and access

Those issues scoped into the 'recreation and access assessment' are: - reduced flood risk to recreational and amenity assets, and tourist facilities;

- changes to recreation (cycling, fishing, walking etc), green belt, publicly accessible areas (e.g. Fisherton Recreation ground and its sport's field/playground) and amenity facilities (and links to health). Positive recreational outcomes resulting from the landscape and ecological design of the wetland habitat areas to enhance informal recreation and green infrastructure, designing the new river park in a manner that benefits recreation;
- changes to channel and bankside access within Scheme area;
- improved interface between recreation/leisure areas and the river through urban greening;
- changes to public access (public open land, public rights of way, permissive paths and other informal access routes) and associated recreational users, existing residents, tenants and businesses along the river corridors; and
- disruption to recreation (cycling, fishing, walking etc), publicly accessible areas (e.g. Fisherton Recreation ground and its sport's field/playground) and amenity facilities (and links to health) during construction of the Scheme.

Scoped out

- water based recreation including canoeing and water sports, which are not activities currently undertaken within the river corridor.

The assessment of impacts on recreation and access follows the assessment methodology outlined in Section 4.3.1.

A high-level quantitative assessment (with valuation where possible) has also been undertaken for recreation and amenity, as part of an Ecosystem Services Assessment (Appendix K). We have assessed the recreational value of new sites associated with the Scheme which may result in a recreational benefit and provide an associated welfare value (i.e. estimates of the wellbeing that individuals derive from visiting outdoor recreational sites).

We have used public consultation responses and the University of Exeter's Outdoor Recreation Valuation Tool (ORVal) to provide an indication of visitor numbers in some of the public open spaces within the Scheme area.

4.3.6 Landscape and visual amenity

Those issues scoped into the 'LVIA' are: -

- changes in the visual amenity of sensitive visual receptors (residents, users of public rights of way, public open space, public roads and railways, and workers) with views of the Scheme. Receptors will be assessed as amalgamated groups where sensitivity and likely operational impacts are similar;
- improvements to local landscape character areas from environmental enhancements and by re-connecting the River Avon with its floodplain;
- potential negative impacts of new flood defence/flow control structures on distinctive local and cultural landmarks in landscape (e.g. Lombardy Poplars along Ashley Road), cityscape and heritage landscape potentially affected by the works;
- changes in important landscape resources and landscape character from the loss of mature trees and vegetation in some Scheme areas with reference to arboricultural survey until replanted areas establish and mature;
- changes in views to and from Salisbury Cathedral and other publicly accessible areas;
- loss of trees and vegetation during construction;
- temporary changes in views within the study area affecting visual receptors (residents, users of public rights of way, public open space, public roads and railways, and workers) from construction plant and construction materials; and
- changes to landscape during construction from altering topography and associated vegetation and changes from new structures and modified/new river channel corridor on the baseline landscape and cityscape.

The Landscape and Visual Impact Assessment (LVIA) follows "Guidelines for Landscape and Visual Impact Assessment, Third Edition" (Landscape Institute and Institute of Environmental Management and Assessment 2013).

A review of aspects of national and local planning guidance and policy relevant to the landscape and visual amenity effects of the Scheme is included in the LVIA.

The assessment has been informed by a desk study undertaken in May 2020 and a site survey undertaken by a Chartered Landscape Architect on 8th September and 29th October 2020.

Photographs of the site which illustrate the local landscape character and visual amenity (presented in Figures 8.5 and 8.6 in Appendix E1) were taken with an Olympus E-10 digital SLR camera using a 14-42mm lens. These context photographs are provided for illustrative purposes only, they are not 'technical visualisations' and are not subject to the Landscape Institute Technical Guidance Note 06/10 (Visual Representation of Development Proposals).

Landscape assessment methodology

The assessment of impacts on landscape character is undertaken in four stages.

The first stage involves the collection of information about the characteristic features of the landscape, its topography, vegetation patterns, settlements, watercourses, land use, cultural aspects, landscape designations and existing pressures likely to lead to change. This information was collected through a review of existing character assessments at national, county and district scale as prepared by competent authorities, other relevant information and site surveys. It provides a baseline against which changes resulting from the proposals can be measured. Site surveys were undertaken on 8 September 2020 and 29 October 2020.

The second stage evaluates this information, breaking the landscape down into broadly homogenous local landscape character areas (LCA) specific to the study area, against which the potential impacts of the scheme are assessed. The local LCAs defined for the Scheme comprise the Ashley Road Open Space/Fisherton Recreation Ground (LCA 1), The Maltings/Central Car Park (LCA 2) and the Mill Stream (LCA3).

In the third stage of the landscape assessment, judgements are made on the sensitivity of each receptor (character type) and the magnitude of the impact on each receptor. Sensitivity is judged by considering the susceptibility of the receptor to the type of change arising from the specific proposal and the value attached to the receptor by society. Each character type is ranked for sensitivity in accordance with the criteria set out in Table 4.11.

Table 4.11: Landscape sensitivity criteria

Sensitivity	Criteria
Very High	Areas and/or features which have a particularly high value, by nature of their condition, high scenic qualities, strong characteristics such as pattern and land cover, cultural associations, and/or relative position and amenity including level of tranquillity. These are likely to be, but not necessarily, within a National Park, Area of Outstanding Natural Beauty, Registered Park and Garden or within a World Heritage Site.
High	Areas and/or features which are considered to be of high value by virtue of their positive characteristics such as pattern and land cover, sense of place or local or cultural associations and level of tranquillity. These areas will be of regional or local importance and are likely to be, but not necessarily, designated by the planning authority as being of landscape value. These may include Areas of Great Landscape Value, Conservation Areas and urban and rural parks.
Medium	Landscapes and/or features which retain a positive character such as pattern or land cover and a sense of place or local or cultural associations and a degree of tranquility. These areas are unlikely to be designated for their landscape value.

Sensitivity	Criteria
Low	Landscapes in fair to poor condition which have undergone change to the extent that they no longer have a distinctive local character such as pattern and/or land cover, or aesthetic quality, or they lack cultural associations or tranquility.

The magnitude of the impact on each receptor is judged by considering the scale of the impact, the geographical extent of the area that will be affected, the duration of the impact and its reversibility. This assessment considers whether the proposal fits into the landscape and to what extent it affects the landscape's distinctive quality, local diversity and character, whether it integrates with the natural landform or cuts through it against the grain, whether it removes or avoids features of landscape value, and whether it appears out of scale or inappropriate in its design.

The magnitude of the impacts is ranked in accordance with the criteria in Table 4.12.

Table 4.12: Magnitude of impact criteria for landscape assessment

Magnitude	Criteria
Major negative	Total loss or large-scale damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic conspicuous features and elements.
Moderate negative	Partial loss or noticeable damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic noticeable features and elements.
Minor negative	Slight loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.
Negligible	No noticeable loss, damage or alteration to existing character or features and elements.
Minor positive	Slight improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
Moderate positive	Partial or noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic and noticeable features and elements, or by the addition of new characteristic features.
Major positive	Large scale improvement of character by the restoration of features and elements, and/or the removal of uncharacteristic and conspicuous features and elements, or by the addition of new distinctive features.

Stage four considers the significance of the potential landscape effects during construction and during operation of the Scheme. The significance of effect is determined by cross-referencing the judgements about the sensitivity of the landscape receptors and the magnitude of the impacts in accordance with Table 4.3.

During operation, the significance of effects is reported in Year 1 following completion of construction and, in Year 15 in cases where any proposed mitigation planting will have established effectively and may have reduced any associated landscape impacts reported in Year 1.

Visual impact assessment methodology

The assessment of impacts on visual amenity is undertaken in three stages.

The first stage is to establish the area in which the Scheme may be visible, the different groups of people who may experience views of the Scheme, the viewpoints where they will be affected and the nature of the views at those points. A preliminary, desk-based identification is made of the potential visual receptors (i.e. people, either as individuals or as groups) that are likely to experience a change in view as a result of the Scheme, both during construction and on completion of the Scheme.

Potential visual receptors are defined as residents, users of recreational areas; Public Rights of Way and users of other areas of public access such as public open space and public sports grounds, users of public roads and railways, workers and public views from within valued landscapes. These receptors are then checked on site to determine whether they lie within areas from where the Scheme will theoretically be visible, known as the Zone of Theoretical Visibility (ZTV). The ZTV is defined on a map. In this case, the ZTV has been determined using map interpretation, Google Earth imagery, and visual envelope mapping on site. The ZTV and identified visual receptors are checked during a site survey to determine the nature of the view, which may be affected by aspects not accounted for by the ZTV such as screening caused by local landform, buildings or by woodland.

The second stage of the visual assessment is to systematically identify the likely impacts on the potential visual receptors. This is undertaken by assessing the extent of the difference between the baseline view and the view with the Scheme in place, considering several factors: whether the Scheme is central or peripheral to the view, what proportion of the view alters, the distance between the receptor and the Scheme, the sensitivity of the receptor to visual changes and how well the Scheme fits into the existing landscape character.

In this stage, judgements are made on the sensitivity of each receptor and the magnitude of the impact on each receptor. Sensitivity is judged by considering the susceptibility of the receptor to the type of change arising from the Scheme and the value attached to the view by people. Each visual receptor is ranked for sensitivity in accordance with the criteria set out in Table 4.13.

Visual impacts have been assessed from publicly accessible vantage points.

The magnitude of the impact on each receptor is judged by considering the scale of the impact, the geographical extent of the area influenced and the duration of the impact and its reversibility. How aesthetically appealing or

unappealing a view is a subjective matter and each viewer's opinion will differ depending on their personal preferences and cultural conditioning.

The magnitudes of the impacts are ranked in accordance with the criteria set out in Table 4.14.

Table 4.13: Sensitivity criteria for visual receptors

Sensitivity	Criteria
Very High	Private dwellings where viewers are familiar with the overall scene. Public views within areas of protected landscapes such as National Parks and Areas of Outstanding Natural Beauty.
High	Public Rights of Way and publicly accessible areas outside protected landscapes where viewers gain a longer duration of view due to slower speed of travel or are likely to experience the views frequently or for long periods.
Medium	Commercial premises, public facilities and roadside footways where the viewer may be familiar with the scene but holds it in less regard than viewers from residential properties or recreational Public Rights of Way.
Low	Surrounding road and rail networks where the viewer gains brief glimpses of the view at speed.

Table 4.14: Magnitude of impact criteria for visual assessment

Magnitude	Criteria
Major negative	Where the Scheme would cause a substantial deterioration in the existing view.
Moderate negative	Where the Scheme would cause a noticeable deterioration in the existing view.
Minor negative	Where the Scheme would cause a discernible deterioration in the existing view.
Negligible	No discernible deterioration or improvement in the existing view.
Minor positive	Where the Scheme would cause a discernible improvement in the existing view.
Moderate positive	Where the Scheme would cause a noticeable improvement in the existing view.
Major positive	Where the Scheme would cause a substantial improvement in the existing view.

The final stage of the visual assessment considers the significance of the potential visual effects during construction and during operation. The

significance of effect is determined by cross-referencing the judgements about the sensitivity of the visual receptors against the magnitude of the impacts in accordance with Table 4.3.

Again, during operation, the significance of impacts is reported in Year 1 and, where applicable, in Year 15.

Illustrative visualisations of the completed Scheme from three viewpoints are shown in Appendix E1 (Figures 8.7 to 8.9). These comprise artists impressions and are intended to convey the essence of what the Scheme will look like in context following completion and following the establishment of mitigation measures. The visualisations have been generated without the use of a 3D model and are based on specific viewpoints, accompanied by baseline photographs. As such, these are not technical visualisations as defined in the Landscape Institute Technical Guidance Note 06/19 (Visual Representation of Development Proposals), although they do comply with many of the principles therein. Each is accompanied by a baseline photograph which were taken with a Canon EOS 5D Mark II digital SLR camera using a fixed 50mm lens. One visualisation illustrates the proposed wetland at Fisherton Recreation Ground, and the other two illustrate the re-profiled River Avon corridor. The visualisation types, number and locations were selected and agreed in consultation with Wiltshire Council.

4.3.7 Ecology

Those issues scoped into the EcIA are: -

- changes to the interest features of the River Avon SAC from changes in flood flows, velocities, duration, frequency, water depths, silt dispersion/deposition and changes in morphology;
- changes to the interest features of national and local designated nature conservation sites (SSSIs, LNRs and CWS);
- improved connections to Avon Valley Nature Reserve;
- changes (habitat losses and gains) to terrestrial and wetland habitat, assessed through use of the Defra biodiversity metric including changes to area and condition of grassland (semi-improved and amenity grassland), damage to and loss of existing terrestrial habitats. Proposals for replanting trees with reference to landscape masterplan and beneficial impacts on wetland habitats of principal importance and changes to watercourses. Habitat restoration and habitat improvement including creation of wetland habitat and improved spaces for biodiversity;
- disturbance to and loss of terrestrial and wetland habitat including habitats of principal importance during the construction works;
- disturbance to protected and notable species including otters, water voles, great crested newts, invertebrates, badgers, reptiles, breeding birds, bats, invertebrates and macrophytes from habitat changes;
- changes to eels and fish in the River Avon and Summerlock Stream including removal of barriers to movement/migration and improved fish passage (e.g. from removal of Swimming Pool Hatches); and
- management of invasive species.

Scoped out

- Desmoulin whorl snail survey - it has been agreed with Natural England that no surveys will be undertaken for Desmoulin whorl snail (a qualifying interest features of the River Avon SAC) as it has been eradicated from this part of the catchment;
- UK Habitat Mapping classification (in agreement with Natural England and Wiltshire Council's Ecologist) and botanical surveys as there are no notable terrestrial habitat types present within the Scheme area; and
- invertebrate surveys as the data records indicate there are no particular terrestrial or aquatic invertebrate interests within the Scheme area.

The ecological impact assessment (EcIA) follows the guidelines published by the Chartered Institute of Ecology and Environmental management (CIEEM 2018).

The significance of likely effects was determined through a staged process, as follows:

- identification of the ecological features likely to be affected, and determination of their importance;
- identification of positive or negative impacts potentially affecting important ecological features and characterising extent, magnitude, duration, reversibility, timing and frequency;
- Identification of significant effects of impacts in the absence of any mitigation;
- formulation of appropriate mitigation to avoid, reduce or compensate; and
- assessment of the significance of residual effects following mitigation.

An impact is defined as ‘actions resulting in changes to an ecological feature'. For example, the construction activities of a development removing a hedgerow.’ An effect is defined as the ‘outcome to an ecological feature from an impact. For example, the effects on a dormouse population from loss of a hedgerow’ (CIEEM, 2018).

Determination of the importance of ecological features

Important ecological features are defined as ‘those that are considered to be important and potentially affected by the project. Ecological features can be important for a variety of reasons (e.g. quality and extent of designated sites or habitats, habitat / species rarity) (CIEEM, 2018). Determining the value of ecological features in the assessment relies heavily on professional judgement and includes consideration of factors such as size, conservation status and quality, as well as the policy and legal significance. Ecological value is measured against published selection criteria where available and with reference to published lists (e.g. the NERC Section 41).

The definitions presented in Table 4.15 have been used to classify the ecological value of features that may be affected by the Scheme, based on the CIEEM 2018 guidelines.

Table 4.15: Criteria for classifying the importance of ecological features

Value	Criteria
Very high	International importance e.g. Special Areas of Conservation (SAC).
High	National importance e.g. Sites of Special Scientific Interest (SSSI) or species whose UK population is endangered.
Medium	Regional/County importance e.g. habitats and/or species populations considered to be important within Wiltshire.
Low	District/Parish/Local importance e.g. habitats or species populations considered to be important within Salisbury or within approximately 2km of the Scheme boundary.
Negligible	Within the zone of influence only/no listed importance.

Impact assessment

The impact assessment process involves:

- identifying and characterising impacts and their effects;
- incorporating measures to avoid and mitigate negative impacts and effects;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects; and
- identifying opportunities for ecological enhancement.

In accordance with CIEEM (2018), we have assessed the effects with respect to the predicted baseline conditions expected to occur over the lifetime of the Scheme. The identification and prediction of the scale of these effects upon ecological features are made with reference to aspects of the ecological structure and function on which the features depend. These include available resources (such as food and water, shelter and roost sites, breeding sites and corridors for migration and dispersal), environmental processes (such as flooding, drought, eutrophication, erosion), ecological processes (such as population cycles, competition, predation and seasonal behaviour), human influences (such as the site's management regime) and other environmental influences (such as air quality, hydrology and water quality).

Characterisation of impacts likely to cause significant effects upon ecological features make reference to the following characteristics:

- positive or negative;
- extent and magnitude;
- duration;
- frequency and timing; and
- reversibility.

The magnitude (and character) of ecological impacts is defined using the criteria set out in Table 4.16.

Table 4.16: Impact magnitude of ecological receptors

Value	Criteria
High	A permanent or long-term effect on the extent/size or integrity of a site, habitat, species assemblage/community, population or group. If negative, this is likely to threaten its sustainability and its conservation status; if positive, this is likely to enhance the conservation status of the ecological receptor.
Medium	A long-term but reversible effect on the extent/size or integrity of a site, habitat, species assemblage/community, population or group. If negative, this is unlikely to threaten its sustainability; if positive, this is likely to be sustainable but is unlikely to enhance its conservation status.
Low	A short-term but reversible effect on the extent/size or integrity of a site, habitat, species assemblage/community, population or group that is within the range of variation normally experienced between years.
Negligible	A short-term but reversible effect on the extent/size or integrity of a site, habitat, species assemblage/community, population or group that is within the normal range of annual variation.

After assessing the impacts of the proposal, attempts have been made to avoid and mitigate ecological impacts. Once these have been finalised, we have assessed the residual impacts to determine the significance of their effects on ecological features.

Resultant significance levels

The CIEEM guidance defines an ecologically significant effect as 'an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’. An effect may be found not to be significant at the level at which the resource or feature was valued, but significant at a more local level. It also states that 'a significant effect is a positive or negative ecological effect that should be given weight in judging whether to authorise a project: it can influence whether permission is given or refused and, if given, whether the effect is important enough to warrant conditions, restrictions or further requirements such as monitoring'.

The significance of potential impacts on ecological features has been assessed using best practice guidance. Levels of significance are defined according to the criteria in Table 4.17.

Table 4.17: Definitions used to define the significance of ecological effects

Significance (negative or positive)	Definition
Major (significant at an international level)	Impact affecting the integrity of an ecological resource or receptor (ecosystem, habitat or population) of very high or international value.
Major (significant at a national level)	Impact affecting the integrity of an ecological resource of high or UK/national value or part of an international site which is of UK/national value.
Minor - can be significant at a parish/local level	Impact affecting the integrity of an ecological resource of low or parish/district value (e.g. if net loss of biodiversity, loss of conservation status of a species, loss in structure or function of a local designated site), or part of a resource of higher value that is important at a parish/district level.
Negligible	Impact not affecting the integrity of an ecological resource beyond the principal Scheme area.

4.3.8 Water and hydromorphology

Those issues scoped into the water and hydromorphology assessment are: -

- long-term modifications to watercourses; notably River Avon, Mill Stream and Summerlock Stream, and their geomorphology;
- reduction in flood risk;
- changes in flows and water levels (and associated impacts on ecology, navigation etc) with a particular focus on low flows;
- long-term changes to water quality from more naturally functioning river;
- changes to surface and groundwater bodies including the existing condition of the river bed and bank, the potential for new modifications (i.e. new defences) to conflict with those morphological measures that are in place, and any requirement for mitigation elsewhere in the relevant water bodies;
- opportunities for long-term improvements to water bodies through contributions to the Programme of Measures outlined in the South West River Basin District River Basin Management Plan;
- temporary changes to watercourses; notably River Avon, Mill Stream and Summerlock Stream, and their geomorphology;
- changes in flood risk during construction;
- changes to surface water and groundwater regime (with associated impacts on ecology) including groundwater contamination;

- potential for deterioration in water quality during the construction works, as a result of pollution incidents and sediment bound contaminants being mobilised into the water column or from increased suspended sediment, or from contaminants being mobilised in the made ground; and
- changes to surface and groundwater bodies including the existing condition of the river-bed and bank.

Scoped out

- detailed desk-based assessment for water contamination as the modified channel will be sealed where it passes contaminated areas/made ground so as to avoid the risk of leachates being released into the watercourses;
- sedimentation trapping and pollutant absorption (associated with run-off) as there will be minimal changes to and/or opportunities to influence run-off from the Scheme; and
- water quality monitoring post-construction (as agreed with Wiltshire Council's drainage engineer during scoping). However, water quality monitoring will be carried out in the river channels during construction.

The assessment of impacts on water and hydromorphology covers the 'scoped in' issues under the following headings:

- hydromorphology - the sensitivity of, and potential impacts upon, fluvial landforms associated with river systems, and the flow and sediment transport processes, which create and sustain them. Note for the purposes of the assessment in Chapter 10, hydromorphology focuses on fluvial morphology only;
- groundwater - potential impacts on the quality and quantity of surface waters that are fed by groundwater and on the groundwater system within the Avon catchment around Salisbury;
- flood risk - potential impacts on the flow of water above ground and the risk of flooding from all sources;
- surface water quality - potential impacts on the quality of the water from construction and operational runoff of pollutants, including both acute impacts from soluble pollutants and chronic impacts from sediment related pollutants, and from spillage events.

The assessment methodology classifies the sensitivity and value of receptors (Table 4.18), and the magnitude of impacts (Table 4.19) to determine their significance (Table 4.20).

Sensitivity of receptors

The sensitivity of receptors has been classified in accordance with the criteria in Table 4.18. As part of the assessment there are a number of potential effects that are risks rather than a certain consequence of the Scheme, such as accidental pollution, for example. The methodology takes into account that in the worst case, the consequence of these types of risk on relevant receptors could be high but the likelihood of the impact occurring would be expected to be low.

Table 4.18: Sensitivity criteria

Sensitivity	Receptor	Criteria
Very high	Surface water	Watercourse having a very high (or potential to achieve very high) classification shown in the South West River Basin Management Plan (RBMP) and/or international designation related to wet features (i.e. River Avon SAC which includes the River Avon, Summerlock Stream and Mill Stream within the Scheme area).
Very high	Groundwater	Principal aquifer providing a strategic and regionally important resource of high quality and/or provides primary support to a watercourse or site, including groundwater dependent terrestrial ecosystems (GWDTE), protected under international legislation - the Chalk Principal aquifer (including Source Protection Zone 1, SPZ1) within the Scheme area falls within this classification.
Very high	Flood risk	Essential infrastructure or highly vulnerable development (as defined in the NPPF flood risk vulnerability classification); essential transport infrastructure, essential utility infrastructure, wind turbines, emergency services stations and dispersal points required to be operational during a flood, basement dwelling, caravans and mobile homes, and installations requiring hazardous substances consent - none classified as very high within Scheme area.
Medium-High	Surface water	Watercourse having a high (or potential to achieve high) classification shown in a RBMP and / or national designation related to wet features (e.g. a riverine Site of Special Scientific Interest) - none classified as high within Scheme area.
Medium-High	Groundwater	Principal aquifer providing locally important resource or supporting a river ecosystem. Groundwater supports a GWDTE with a national conservation designation. SPZ2 or SPZ3 of a public water supply - the alluvium and River Terrace Deposits Secondary A aquifer falls within this classification.
Medium-High	Flood risk	More vulnerable development (as defined in the NPPF); hospitals, residential institutions, dwellings, non-residential uses for health services, landfill sites and sites used for holiday or short-let caravans/camping - surface water, fluvial and

Sensitivity	Receptor	Criteria
		groundwater flooding considered as high within the assessment.
Low	Surface water	Minor local watercourses not identified as a water body in the RBMP and no designated features - none classified as low within Scheme area
Low	Groundwater	An aquifer of poor water quality and/or very low permeability that make exploitation of the aquifer for supply unfeasible, or which provides support to a GWDTE of local importance - the Head Secondary undifferentiated aquifer falls within this classification.
Low	Flood risk	Water compatible development (as defined in the NPPF); flood control infrastructure, marine facilities (docks, marinas etc.), amenity open space and recreation facilities, and lifeguard/coastguard stations - none classified as low within the Scheme area.
Negligible	Surface water	Minor ephemeral drains and channels - these include the ditches within the Scheme area.
Negligible	Groundwater	Unproductive strata. No groundwater connection to local ecosystems or where changes to the groundwater regime are not expected to have an impact on local ecology - none classified as negligible within Scheme area.
Negligible	Flood risk	Water compatible development (as defined in the NPPF) - none classified as negligible within Scheme area.

Magnitude of impact

The magnitude of impact on the water environment has been assessed based on the degree of change created by the Scheme and the impact this will cause on the receptor. Table 4.19 summarises the magnitude assessment criteria.

Table 4.19: Magnitude of impact

Magnitude	Receptor	Criteria
High adverse	Surface water	Loss or extensive change to a fishery. Loss of regionally important public water supply. Loss or extensive change to an internationally designated nature conservation site. Reduction in water body classification.

Magnitude	Receptor	Criteria
High adverse	Groundwater	Loss of, or extensive change to, an aquifer. Loss of regionally important water supply. Loss of, or extensive change to GWDTE or baseflow contribution to protected surface water bodies. Reduction in water body classification. Loss or significant damage to major structures through subsidence or similar effects.
High adverse	Flood risk	Increase in peak flood level (> 100 mm).
Medium adverse	Surface water	Partial loss in productivity of a fishery. Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies. Contribution to reduction in water body classification.
Medium adverse	Groundwater	Partial loss or change to an aquifer. Degradation of regionally important public water supply or loss of significant commercial/ industrial/ agricultural supplies. Partial loss of the integrity of GWDTE. Contribution to reduction in water body classification. Damage to major structures through subsidence or similar effects or loss of minor structures.
Medium adverse	Flood risk	Increase in peak flood level (50-100 mm).
Low adverse	Surface water	Minor effects on water supplies and/or river quality.
Low adverse	Groundwater	Minor effects on an aquifer (flow, levels or quality), GWDTEs, abstractions and structures.
Low adverse	Flood risk	Increase in peak flood level (20-50 mm).
Negligible adverse	Surface water	Measurable but insignificant adverse effects on supplies or quality.
Negligible adverse	Groundwater	No measurable impact upon an aquifer and/or groundwater receptors.
Negligible adverse	Flood risk	Negligible increase to peak flood level (≤10 mm).

Magnitude	Receptor	Criteria
No change	Surface water	No loss or alteration of characteristics, features or elements; no observable impact in either direction.
No change	Groundwater	No loss or alteration of characteristics, features or elements; no observable impact in either direction.
No change	Flood risk	Due to the tolerance of hydraulic models used to assess flood risk impacts, it is often not possible to distinguish between No Change and Negligible impacts. Therefore, where model results are used to assess change in flood risk, Negligible is used where the model is predicting No Change.
Negligible beneficial	Surface water	Measurable but insignificant benefits on flow, supplies or quality.
Negligible beneficial	Groundwater	Slight measurable positive effect (e.g. increased recharge) upon an aquifer and/or groundwater receptor.
Negligible beneficial	Flood risk	Negligible reduction in peak flood level (≤ 10mm).
Low beneficial	Surface water	Minor improvements in surface water quality (e.g. through removal / mitigation of a poor-quality discharge).
Low beneficial	Groundwater	Reduction of groundwater hazards to existing structures. Reductions in waterlogging and groundwater flooding.
Low beneficial	Flood risk	Reduction in peak flood level (20-50 mm).
Medium beneficial	Surface water	Contribution to improvement in water body classification.
Medium beneficial	Groundwater	Contribution to improvement in water body classification. Improvement in water body CAMS (see Glossary) classification. Support to significant improvements in damaged GWDTE.
Medium beneficial	Flood risk	Reduction in peak flood level (50-100 mm).

Magnitude	Receptor	Criteria
High beneficial	Surface water	Removal of existing polluting discharge or removing the likelihood of polluting discharges occurring to a watercourse. Improvement in water body classification.
High beneficial	Groundwater	Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring. Recharge of an aquifer. Improvement in water body classification.
High beneficial	Flood risk	Reduction in peak flood level (>100 mm).

Significance of effect

The significance of the effect upon the water environment has been determined by taking into account the sensitivity of the receptor and the magnitude of the impact, as shown in Table 4.20. Where a range of significance levels are presented, the final assessment for each effect is based upon expert judgement.

Table 4.20: Matrix for the evaluation of significant effects on water receptors

Sensitivity	No Change in Magnitude	Negligible Magnitude	Low Magnitude	Medium Magnitude	High Magnitude
Negligible	No change	Negligible	Negligible or minor	Negligible or minor	Minor
Low	No change	Negligible or minor	Negligible or minor	Minor	Minor or moderate
Medium	No change	Negligible or minor	Minor	Moderate	Moderate or major
High	No change	Minor	Minor or moderate	Moderate or major	Major or substantial
Very High	No change	Minor	Moderate or major	Major or substantial	Substantial

In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached. The significance of residual effect is assessed after consideration of proposed mitigation that would be in place.

As defined in Section 4.3.1, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations. However,

for flood risk, national planning policy requires that no increase in flood risk occurs due to the Scheme. Therefore, any increase in flood risk to third parties due to the Scheme that is not of negligible magnitude would be considered to be significant and require mitigation.

4.3.9 Historic environment

Those issues scoped into the historic environment assessment are: -

- effects on settings of cultural heritage features including the Conservation Areas (Stratford Sub-Castle and Salisbury), and Listed Buildings (including the Grade 2 Listed Salisbury Generating Station); and
- potential changes to the cultural heritage value of the River Avon and the historic character of the Mill Stream.

Scoped out

- archaeological impacts on completion of Scheme as the Desk Based Assessment has not identified the presence of, or high potential for, any significant archaeological remains within the Scheme area (see below).

Chapter 11 'The historic environment' is informed by a cultural heritage desk-based assessment (Appendix I1) undertaken for the Scheme.

The archaeological potential of the Scheme is reviewed in detail within the cultural heritage desk-based assessment provided in Appendix I1. The potential for human archaeological remains within the Scheme area is not high, and archaeological impacts have been scoped out of this ES as agreed with the Wiltshire County Archaeologist. Nevertheless the opportunity is being taken to analyse cores from geotechnical investigations in the Ashley Road area in order to capture relevant geoarchaeological information, and a geophysical survey has also been undertaken at this location (see Appendix I2). We will combine the findings from these surveys with information on construction methods to identify appropriate precautionary mitigation measures that will be set out in an Archaeological Impact Assessment for construction. This will be discussed and agreed with the Wiltshire County Archaeologist. Such mitigation can reasonably be secured by a condition attached to any future planning consent.

Therefore, Chapter 11 'The historic environment' focuses on the impacts of the Scheme on above-ground designated assets (Listed Buildings and Conservation Areas), in accordance with the scoping opinion received from the Wiltshire Council's Conservation Officer (see Appendix B2 'Scoping opinion') and the relevant legislation and planning policy.

The assessment methodology follows the approach set out in the DMRB LA 106 Cultural Heritage Assessment and LA 104 Environmental Assessment (Highways England 2019).

Assessment of value (sensitivity)

The DMRB provides a methodology for the assessment of the value of cultural heritage assets. Use of this methodology in this assessment aligns with the guidance provided by the NPPF, Planning Practice Guidance (PPG), Managing Significance in Good Practice Advice Note 2: Decision-Taking in the Historic Environment (Historic England 2015a) and Good Practice Advice Note 3: The

Setting of Heritage Assets (Historic England 2015b). Conservation Principles (English Heritage 2008) also guided the assessment of value.

For the purposes of this assessment, the term 'value' has been employed, rather than 'significance' as used in the NPPF and local planning policy, to avoid confusion when describing effects that are significant or not later on in the assessment process.

Each cultural heritage asset is assigned a value based on professional judgement, guided by the criteria presented in Table 4.21.

Table 4.21: Assessing the value of cultural heritage assets

Value	Criteria
Very high	• World Heritage Sites (including buildings and those inscribed for their historic landscape qualities) • Assets of acknowledged international importance • Assets that can contribute significantly to acknowledged international research objectives • Extremely well-preserved historic landscapes with exceptional coherence, time-depth or other critical factors
High	• Scheduled Monuments (including standing remains) • Designated historic landscapes of outstanding interest • Undesignated assets of schedulable quality and importance • Assets that can contribute significantly to national research objectives • Grade I and II* Listed Buildings • Other Listed Buildings that can be shown to have exceptional qualities in their fabric or historical associations • Conservation Areas containing very important buildings • Undesignated structures of clear national importance • Undesignated landscapes of outstanding interest, high quality or importance and of demonstrable national value • Well-preserved historic landscapes, exhibiting considerable coherence, time-depth or other critical factors
Moderate	• Designated or undesignated assets that contribute to regional research objectives • Undesignated historic landscapes that would justify special historic landscape designations, or landscapes of regional value • Averagely well-preserved historic landscapes with reasonable coherence, time-depth or other critical factor • Grade II Listed Buildings

Value	Criteria
	• Conservation Areas containing buildings that contribute significantly to its historic character • Historic townscape or built-up areas with important historic integrity in their buildings, settings or built settings
Low	• Designated and undesignated assets of local importance • Robust undesignated historic landscapes and historic landscapes with importance to local interest groups • Historic landscapes whose value is limited by poor preservation and / or poor survival of contextual associations • Assets compromised by poor preservation and/or poor survival of contextual associations • Assets of limited value, but with potential to contribute to local research objectives • 'Locally Listed' buildings • Historic (unlisted) buildings of modest quality in their fabric or historical association • Historic townscape or built-up areas of limited historic integrity in their buildings, or built settings
Negligible	• Assets with very little or no surviving archaeological interest • Buildings of no archaeological or historical note, or buildings of an intrusive character • Landscapes with little or no significant historical interest

Magnitude of impact

Magnitude of impact is the degree of change that would be experienced by an asset and its setting as a result of the Scheme, as compared with a 'do nothing' situation. Magnitude of impact was assessed without reference to the value of the asset, and may include physical impacts upon the asset itself, or impacts upon its setting or amenity value. Assessment of magnitude with and without mitigation was based on professional judgement informed by the criteria set out in Table 4.22. Magnitude can be either negative or positive.

Table 4.22: Assessing the magnitude of impact

Magnitude	Factors in the assessment of magnitude of impact
Major	• change to most or all key archaeological materials, such that the resource is totally altered • change to key historic building elements, such that the resource is totally altered • change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or

Magnitude	Factors in the assessment of magnitude of impact
	change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit • comprehensive changes to setting
Moderate	• changes to many key archaeological materials, such that the resource is clearly modified • change to many key historic building elements, such that the resource is significantly modified • changes to the setting of a cultural heritage asset, such that it is significantly modified • changes to many key historic landscape elements, parcels or components, visual change to many key aspects of the historic landscape, noticeable differences in noise or sound quality, considerable changes to use or access; resulting in moderate changes to historic landscape character
Minor	• changes to key archaeological materials, such that the asset is slightly altered • change to key historic building elements, such that the asset is slightly different • change to setting of a cultural heritage asset, such that it is noticeably changed • changes to few key historic landscape elements, parcels or components, slight visual changes to few key aspects of historic landscape, limited changes to noise levels or sound quality; slight changes to use or access: resulting in limited changes to historic landscape character
Negligible	• very minor changes to archaeological materials, or setting • slight changes to historic buildings elements or setting that hardly affect it • very minor changes to key historic landscape elements, parcels or components, virtually unchanged visual effects, very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character

Significance of effect

Evaluation of the significance of effect on heritage assets has been determined by considering the value of the asset and the magnitude of the potential impact, and has followed the criteria shown in Table 4.3.

Impacts have been assessed to be temporary or permanent. Temporary impacts would be short-term and normally not last beyond the construction period; permanent impacts would be irreversible.

Cultural heritage is a non-renewable resource and requires mitigation, if impacts are irreversible, appropriate to the value of the asset.

4.3.10 Traffic and transport

Those issues scoped into the traffic and transport assessment are: -

- reduced flood risk to transport infrastructure;
- long-term changes to car parking facilities including overflow parking at Ashley Road and coach/car park at the Maltings;
- temporary changes to the road network from construction vehicle movements, likely volumes of material for import and disposal, and proposed routes of access for construction delivery vehicles, as well as hours of operation;
- disruption to cycleways and other public rights of way;
- temporary changes to car parking including overflow parking at Ashley Road and coach/car park at the Maltings;
- a detailed Construction and Environmental Management Plan (CEMP) with input by traffic planners, which will address the temporary impacts on the highways network of the construction phase of the Scheme and will detail how these impacts will be mitigated. This will include:
    - temporary relocation of Salisbury Coach Park to the Central Car Park while the River Park is under construction [this is no longer proposed as part of the Scheme and therefore not assessed in this ES].
    - reduction of car parking spaces on the Central Car Park site while the River Park is under construction
    - routing and timing of construction traffic
    - site management including wheel washing
    - a GG104 safety risk assessment and a profile of maximum daily vehicle movements disaggregated by vehicle type, for each week of the construction phase. If any movements are to occur during the peak hours, this will also be set out within the profile.

Scoped out

- Transport Assessment/Transport Statement including traffic modelling (in agreement with Highways England and Wiltshire Council) as the Scheme entails primarily the enhancement of the river corridor and construction of replacement bridges to carry the same level (or even slightly reduced levels of traffic); and
- traffic during operation of the Scheme - traffic required during operation will be very occasional and involve very few vehicles (thus unlikely to have a significant impact upon the highway network). Additionally, the Scheme proposals do not include facilities with the potential to attract large numbers of visitors.

The assessment of impacts on traffic and transport follows the broad assessment methodology outlined in Section 4.3.1. The traffic and transport assessment has assumed that A-roads and coach/bus services and car/coach parks have a medium value or sensitivity, based on professional judgement, and that B-roads or other minor roads have a low value.

Traffic surveys - Due to the COVID-19 pandemic, traffic surveys could not be undertaken. Therefore, the assessment is based on historic and available data provided by Wiltshire Council.

Based on the Institute of Environmental Assessment (IEA) Guidelines (1993), the potential impacts arising from changes in traffic volumes and composition are defined below as:

- severance - the perceived division that can occur within a community when it becomes separated by a major traffic artery. It may result from the difficulty of crossing a heavily trafficked existing road, for example as a result in an increase in Heavy Goods Vehicle (HGV) traffic;
- driver delay - can occur on the network due to the additional traffic generated by the development;
- pedestrian/cyclist/public transport user delay - changes in the volume, composition or speed of traffic may affect the ability of people to cross certain roads which could impact on pedestrians and cyclists. In addition, increases in traffic flows which lead to increased queuing would impact upon bus users waiting for buses and on-road cyclists where there are designated cycle lanes. In general terms, increases in traffic are likely to lead to greater increases in delay;
- amenity - broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic; and
- accidents and safety - increases in levels of road traffic can lead to an increase in the rate of recorded Personal Injury Accidents.

The impacts described in the traffic and transport chapter are based on these classifications. The likely environmental transport impacts of the Scheme are considered for both the construction and operational phases.

The significance level of each impact is based upon:

- the sensitivity of the affected receptor to these changes (as set out in Table 4.23 and based upon the IEA Guidelines); and
- The magnitude of the change due to the Scheme (as set out in Table 4.24, and also based upon the IEA Guidelines).

Table 4.23: Criteria for classifying the sensitivity of traffic and transport receptors

Sensitivity	Criteria
High	Sections of highway close to schools and colleges, or collision clusters Residential areas with poor / no pavements
Medium	Congested junctions, hospitals, community centres, conservation areas
Low	Public open space, nature conservation areas, residential areas with adequate pavements
Negligible	Areas of low sensitivity to traffic flows i.e. isolated sites or areas with a high standard road network

Table 4.24: Criteria for assessing the magnitude of impact

Impact	Major	Moderate	Minor	Negligible	No change
Severance	Change in total traffic or HGV flows over 90% compared to baseline	Change in total traffic or HGV flows of 60-90% compared to baseline	Change in total traffic or HGV flows of 30-60% compared to baseline	Change in total traffic or HGV flows of <30% compared to baseline	No change in HGV flows
Driver delay	A judgement based on the results of junction capacity assessment				
Pedestrian / cyclist/ public transport delay	A judgement based on the road links with two-way traffic flow exceeding 1,400 vehicles per hour in context of the individual characteristics			Two-way traffic flow <1,400 vehicles per hour	No change in vehicle flow
Amenity	A judgement based on the routes with >100% change in context of their individual characteristics			Change in total traffic or HGV flows <100%	No change in HGV flows
Accidents and safety	A judgement based on quantitative analysis				

The significance of the effect has been evaluated by combining the assessment of both sensitivity of receptor and magnitude of the potential impact as presented in Table 4.25 and informed by professional judgement. Significant effects are those that are large or moderate. Effects identified as slight or neutral are not considered significant.

Table 4.25: Assessment of significance of environmental effects and residual effects

Magnitude	High value/sensitivity	Medium value/sensitivity	Low value/sensitivity	Negligible value/sensitivity
Major	Large	Moderate/ large	Slight/ moderate	Slight
Moderate	Moderate/ large	Moderate	Slight	Neutral/ Slight
Minor	Slight/ moderate	Slight	Neutral/ Slight	Neutral/ Slight
Negligible	Slight	Neutral/ slight	Neutral/ slight	Neutral
No change	Moderate	Neutral	Neutral	Neutral

4.3.11 Sustainable use of land

Those issues scoped into the sustainable use of land assessment are: -

- restrictions to current and proposed land uses including open space, allotments (at Coldharbour Lane in the Ashley Road project area, and further north at Fisherton Farm), Network Rail land; and
- potential for the disturbance of contaminated sediments/made ground and land contamination, with links to associated risks to human health and aquatic life.

Scoped out

- land contamination during operation of the Scheme. The modified channel is being designed to be water-tight where it passes contaminated areas/made ground, thus ensuring that engineering measures are adequate to avoid the risk of leachates being released into the main river; and
- nutrient and soil resource surveys (which will be undertaken during the detailed design stage of the Scheme) and agricultural land quality surveys (which are not required as the Scheme does not pass through agricultural land).

Ground contamination

For soil contamination health receptors, the receptor sensitivity and magnitude of impact have not been defined, as it is assumed that the health effects would need to be mitigated down to a neutral level suitable for protection of human health and controlled waters, as defined by statutory guidelines; and/or health and safety law.

Soils, geology and land use

The assessment of impacts on soils, geology and land use follows the broad assessment methodology outlined in Section 4.3.1.

4.3.12 Air quality

Those issues scoped into the air quality assessment are: -

- qualitative air quality assessment (with consideration of Air Quality Management Areas) and dust assessment for construction to include:
- disruption to routes used by construction vehicles;
- changes in air pollution resulting from increased traffic emissions due to construction vehicles;
- changes resulting from construction traffic; and
- increased dust emissions from the excavations and from temporary storage areas.

Scoped out

- air quality during operation of the river corridor improvements as there is no mechanism for significant air quality effects to be caused;
- air quality dispersion modelling and air quality monitoring (as traffic flows are not anticipated to increase to a level that warrants further assessment); and
- baseline air quality. It is assumed that adequate data will be available from Wiltshire Council and it has been agreed with Wiltshire Council that no air quality surveys will be required.

The operation of the Scheme will result in minimal additional traffic movements, relating only to periodic inspection and maintenance. Operational impacts on air quality were therefore scoped out of this assessment.

This assessment therefore considers only those potential impacts generated during the construction phase of the Scheme. The full methodology for the air quality construction dust assessment is provided in Appendix L and summarised below.

The assessment of air quality impacts associated with the Scheme's construction phase has been undertaken following the Institute of Air Quality Management's (IAQM's) 'Guidance on the assessment of dust from demolition and construction activities v1.1' (IAQM, 2016). The guidance addresses the risks of dust impacts from four construction activities: demolition, earthworks, construction and trackout, and follows the following steps:

- Step 1: identification of need for a full assessment;
- Step 2: Assessment of risk on the basis of the scale and nature of the works (Step 2A - define potential dust emission magnitude) and the sensitivity of the area to dust impacts (Step 2B). These two factors are combined in Step 2C to determine the risk of dust impacts before the implementation of mitigation measures. Sensitive receptors have been identified (see Table 4.26) and counted to determine the overall sensitivity of the local area. These receptors can be either human or ecological and are chosen based on their sensitivity to dust soiling or deposition and/or exposure to PM10;
- Step 3: Site-specific mitigation. Once the level of risk has been ascertained, site-specific mitigation measures are selected proportionate to the outcomes of the assessment;

- Step 4: Determine significant effects. The approach in Step 4 of the IAQM dust assessment guidance was taken to determine the significance of effects with regard to dust emissions.

Table 4.26: Indicative examples of the sensitivity of different types of receptors

Sensitivity of Receptor	**Sensitivities of people and ecological receptors**	**Sensitivities of people**	**Sensitivities of ecological receptors**
	Dust soiling effects[1]	**Health effects of PM_{10}**[2]	**Ecological effects**[3]
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.	Residential properties, hospitals, schools and residential care homes.	Locations with an international or national designation and the designated features may be affected by dust soiling (e.g. SAC). Locations where there is a community of a particularly dust-sensitive species such as vascular species included in the Red Data list for Great Britain.
Medium	Parks, places of work.	Office and shop workers not occupationally exposed to PM_{10}.	Locations where there is a particularly important plant species, where dust sensitivity is uncertain or unknown. Locations with a national designation where the features may be affected by dust deposition (e.g. SSSIs).
Low	Playing fields, farmland, footpaths, short-term car parks and roads.	Public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition (e.g. local nature reserves).

1. People's expectations would vary depending on the existing dust deposition in the area.

2. This follows the Defra (2018) guidance as set out in Local Air Quality Management Technical Guidance 16. Notwithstanding the fact that the air quality objectives and limit values do not apply to people in the workplace, such people can be affected to exposure of PM10. However, they are considered to be less sensitive than the general public as a whole because those most sensitive to the effects of air pollution, such as young children are not normally workers. As such, workers have been included in the Medium sensitivity category.

3. Only if there are habitats that might be sensitive to dust.

Consideration has also been given to the potential impact on local air quality caused by emissions of nitrogen dioxide (NO_2) and PM_{10} from heavy goods vehicle (HGV) movements associated with the construction phase of the Scheme. The DMRB LA 105 guidance (Highways England et al. 2019) states that the impact of construction traffic on air quality should be assessed where construction activities are programmed to last for more than two years (less than this is unlikely to constitute a significant air quality effect). In addition to this, LA 105's scoping criteria for changes in traffic (in particular, HGV annual average daily traffic (AADT) flows (≥ 200)) has also been used to determine the requirement for a construction traffic assessment. Although the construction phase of the Scheme is likely to surpass two years, it is unlikely that the change in HGV AADT flows will be ≥ 200. As such, construction traffic impacts were scoped out of further assessment in agreement with Wiltshire Council.

4.3.13 Sustainability, carbon and climatic factors

This chapter outlines the sustainability and carbon footprint of the Scheme and the Environmental Action Plan and does not require any specific assessment methodology.

In agreement with the Planning Authority, the following issues were scoped out of consideration: -

- vulnerability of the Scheme to risks of major accidents and natural disasters threatening the environment (other than extreme flood events) as we are not aware of any potential hazards in and around the Scheme area; and
- climatic factors, carbon management and sustainability during operation of the Scheme as these issues have been considered and embedded into the design of the Scheme. It should be noted that the carbon footprint of the whole lifecycle of the Scheme has been appraised.

4.3.14 Cumulative effects and inter-relationships

Combined or 'cumulative' effects can be defined as 'impacts that result from the incremental changes caused by other past, present and reasonably foreseeable future actions together with the project' (Hyder, 1999).

Cumulative effects have been considered in Chapter 16 'Cumulative effects and inter-relationships' of this ES by:

- reviewing the likely major, moderate and minor impacts of the Scheme and assessing the potential for cumulative impacts that might arise from the combined work activities over the three-year construction period;
- assessing the implications of Phase 1 with future phases of the Salisbury River Park Master Plan;
- identifying other strategic, approved and likely development proposals in the Scheme area, particularly those that share some geographical and temporal footprint with the Scheme; and
- assessing the potential for any of these additional developments to have a significant impact on any of the receptors impacted by the Scheme and undertaking a qualitative assessment of the potential for the combined effects.

The significance of cumulative effects has been determined using the criteria in Table 4.27.

Table 4.27: General criteria for classifying the significance of cumulative impacts

Significance	Effect
Severe	Effects that the decision-maker must take into account as the receptor/resource is irretrievably compromised.
Major	Beneficial or adverse effects that may become decision-making issue.
Moderate	Effects that are unlikely to become issues on whether the project design should be selected, but where future work may be needed to improve on current performance (adverse) or where improvements take place that benefit a city or region
Minor	Effects that are locally significant.
Not significant	Effects that are beyond the current forecasting ability or are within the ability of the resource to absorb such change.

4.4 Uncertainties, difficulties and assumptions

The main sources of uncertainty with the Scheme and its appraisal process (including cumulative assessment) relate to:

- the design details, which will be developed further in consultation with key stakeholders during detailed design, following submission of the planning application;
- a number of uncertainties with respect to biodiversity including:
    - the habitats that might form within and adjacent to the new channel, which also need to be considered when trying to offset predicted losses of habitats with predicted habitat gains. There is difficulty in predicting precisely which habitats will form within Fisherton Recreation Ground and how habitats are likely to evolve over time;
    - assessing the effects of changes in ground levels and surface/groundwater levels on existing and proposed habitats, following Scheme completion;
    - a risk that following ecological survey work and vegetation clearance in advance of the main works, additional protected and invasive species may be identified in the proposed working area, particularly water voles that are highly active along the river corridor. There is a small area that we have not been able to survey for protected species at this stage due to access restrictions on Network Rail land;
- a review of alternative sites for the relocation of water voles has been undertaken and a Water Vole Mitigation Strategy is presented in Appendix F12. However, at this stage, a receptor site has not been secured. Surveys of water voles at alternative receptor sites will be carried out in Spring 2021

to determine their suitability, and this work will continue during the detailed design stage of the Scheme;

- suitability of and consenting for re-using materials excavated from the widened river corridor and wetland habitat areas for construction of flood embankments and ground raising in the Coach Park, as well as temporary storage of materials during the construction work; this will be confirmed following further ground investigations;
- there is potential during the works to encounter areas of further contamination/made ground and potential ground instability;
- there is potential for the mobilisation and movement of sediment within the watercourses, notably the Mill Stream during construction, which will require further consideration and management during detailed design;
- there is currently some uncertainty relating to groundwater flooding and the permeability of shallow below-ground layers, which will determine any requirement for measures to control shallow groundwater flow (e.g. drainage pumps); this issue will be confirmed following analysis of the results of the ground investigation carried out late in 2020;
- although a desk-based assessment suggests this is unlikely, there remains some potential during the works to encounter buried archaeological features;
- data used in the preparation of this ES includes the compilation of secondary information derived from a variety of sources. It is assumed that this data is accurate;
- a number of assumptions have been made (or uncertainties exist) with regard to the transport and traffic assessment, as follows:
    - it is assumed that the Construction Traffic Management Plan will restrict the movement of HGV during peak highway hours and they will only operate between 10:00 and 16:00 in accordance with Highways England guidance;
    - a precautionary assessment has been used to estimate the number of construction vehicles based on estimated construction trip generation figures provided by the contractor;
    - it has been assumed that the Scheme is the only active construction site located within the surrounding highway network within the construction timescale; and
    - it has been assumed that all staff will travel individually by private car before the identified morning (08:00-09:00) and shifts anticipated to finish before the weekday evening peak of 17:00-18:00. Two-way HGV movements have also been included within both peak periods;
    - no assessments of the local junctions have been undertaken for the traffic assessment and therefore it is unknown if the local network experiences any form of peak capacity queuing and delays. However, this uncertainty is fully addressed in Chapter 12;no swept path analysis or visibility splays have been undertaken as part of this EIA as it has been assumed that the current road network is suitable for construction vehicles to access

the proposed compound due to access being granted to the Central Coach Park;

- as the layout for the coach park area is to be determined as part of the detailed design stage in consultation with Wiltshire Council and interested parties, the number of spaces that will be lost is currently unknown. However, there will only be a small reduction in area compared with the existing coach park and any reduction in area will be kept to a minimum. It is anticipated that this can be accommodated without materially affecting the number of coaches that currently use the coach park.

- the timing of other developments is currently uncertain and has the potential for significant cumulative effects with the proposed Scheme (see Chapter 16 'Cumulative effects and inter-relationships');
- this ES was prepared during the global COVID-19 pandemic. While carrying out the EIA in 2020, there were significant and extensive restrictions in place in England on the movement of people and the activities that were permitted. This resulted in the following limitations:
    - during public consultation on the Scheme and associated EIA, we have not been able to meet face to face with stakeholders and run public exhibitions and events as normal (see Section 2.2.2);
    - our fisheries team was unable to carry out the planned electrofishing survey during 2020. We have therefore used available fisheries information to inform our assessment. Where there has been uncertainty in the baseline, we have assumed worst case for impact assessment purposes (i.e. assumed that fish spawn in all reaches and that all fish known to be present in the River Avon in Salisbury are present in all reaches within the Scheme area);
    - site surveys for noise were not undertaken due to travel restrictions, and because they were considered un-representative of normal baseline noise levels due to reduced human activity including reduced transportation noise.

5. Local community

5.1 Existing environment

The study area used for this chapter is shown on Figure 5.1 and comprises the Scheme area and an approximately 250m buffer zone.

Noise and vibration impacts on the local community are discussed in Chapter 6 'Noise and vibration'. Recreational and access issues are discussed in Chapter 7 'Recreation and access'.

5.1.1 Strategic overview

The vitality and continued viability of Salisbury's city centre as the main focus for development and retail in the region is of considerable economic importance, and there is evidence of a decline in some aspects of the city's performance (Salisbury City Council 2011). The potential of the Salisbury River Park to help revitalise the region is considered to be an important factor in addressing this decline, to which the Scheme will significantly contribute.

Wiltshire's Core Strategy (Wiltshire Council 2015) defines Salisbury as a Principal Settlement; a 'strategically important centre and the primary focus for development'. These settlements provide "significant levels of jobs and homes". Alongside its strategic role in providing residential and employment growth, Salisbury is regarded as an important tourist destination (see Section 5.1.2).

In both the Salisbury District Local Plan (Salisbury City Council 2011) and Wiltshire Core Strategy (Wiltshire Council 2015), the following issues relevant to the Scheme, emerge as key challenges for the city over the coming years:

- need to strengthen and boost the centre's economy and investor confidence by supporting appropriate development, maintaining its place as an important retail centre (including its mainstream multiple and independent retailers, and associated ambience) and maintaining the attractive appearance of the city to remain popular with visitors. The improved river corridor resulting from the completed Scheme will play an important role in meeting this challenge;
- constrained floorspace given the historic character of the city and extensive floodplain of the River Avon. These constraints have influenced the design of the wider Salisbury River Park Master Plan within a tightly constrained river corridor;
- in-commuting for retail purposes increases traffic generation and parking difficulties, which damage the city centre's environment. The completed Scheme will not increase traffic generation nor significantly affect parking availability (see Chapter 12 'Traffic and transport');
- undersupply of housing leading to a dormitory settlement with an ageing population, lack of viable workforce, anti-competitive investment environment, declining retail sector and out-commuting. The Scheme together with the wider Salisbury River Park Master Plan will help to encourage sustainable growth and employment development with improvements to green infrastructure in the city;
- adaptation to climate change, as significant areas of the city are vulnerable to flooding and climate change will increase the extent, severity and

frequency of flooding. The reduction in flood risk that the Scheme will provide will help areas of the city to adapt to climate change; and

- the Core Strategy makes provision for a strategic site in the Central Car Park for the regeneration of a mixed-use retail led development (Policy CS - CP2), incorporating an element of residential, office and leisure uses. The flood risk management measures proposed as part of the Scheme will support the development of this allocated site.

5.1.2 Local community

Local population

The two main settlements within the study area are at Ashley Road and in the Maltings and Central Car Park area. Within both areas, there are residential and commercial properties that lie within or adjacent to the Scheme footprint.

Salisbury had a population of approximately 41,682 in 2011 (2011 Census – UK National Statistics). Demographic data for Salisbury as a whole and the wards in which the Scheme will be located is summarised in an Equality Assessment (Jacobs 2020 - see Appendix C) produced for the Scheme.

The wards in which the Scheme will be located are:

- St Paul's – location of Ashley Road and the Maltings and Central Car Park area;
- St Francis and Stratford – location of Ashley Road study area; and
- St Edmund and Milford – location of the Maltings and Central Car Park area.

Salisbury is home to a higher proportion of the following protected characteristic groups:

- over 65 year olds within the Salisbury population overall and particularly in St Francis and Stratford wards. Population projections produced by the Wiltshire Intelligence Network indicate that between 2016 and 2026 there will be a significant increase in the elderly population in Salisbury; and
- people with long term illness or disability, which limits day to day activities by a little or a lot within the St Edmund and Milford, and St Francis and Stratford wards.

There are an estimated 378 properties (264 residential and 114 non-residential) in central Salisbury currently at medium or high flood risk meaning that each year they have a chance of flooding of 1% or higher (see Figure 1.1). The risk to these properties, which fall within the wards described above, is likely to increase in the future as a result of climate change. These communities (and the health of property occupants) are considered to have a very high value.

Community buildings/facilities

Community buildings and facilities within the study area include:

- schools (high value receptor):
    - Sarum St.Paul's Primary School located to the south-west of Fisherton Recreation Ground 30m from the Scheme area; and

    - South Wiltshire Grammar School located approximately 100m to the north of the Scheme area;
- allotments (low value receptor):
    - Coldharbour Lane Allotments to the north of Ashley Road and bordering the southern edge of the Scheme area. These allotments have a shop open to the public at weekends adjacent to some toilets, with informal public parking in front; and
    - Fisherton Farm Allotments bordering the northern edge of the Scheme area.
- Wiltshire Citizen's Advice (medium value receptor) located next to Five Rivers Leisure Centre approximately 130m to the north of the Scheme area;
- Dennis Marsh House Village Hall (high value receptor) located next to the Coldharbour Lane Allotments; approximately 30m to the south of the Scheme area;
- meeting room at Salisbury Fire Station (low value receptor; the fire station itself has been assigned a very high value - see Section 5.1.3) for use by community groups located approximately 20m to the south of the Scheme area;
- Salisbury Cathedral (high value receptor) located approximately 250m to the south of the Scheme area;
- Public toilets (medium value receptor)
    - located at the Central car park within the Scheme area; and
    - south-west of the Avon Approach Bridge, just outside of the Scheme area.
- Millstream Surgery (high value receptor) situated between the Mill Stream and the River Avon and immediately adjacent to the Scheme area;
- Salisbury walk-in centre (high value receptor) located adjacent to the Scheme area between the Mill Stream and the River Avon; and
- Rowlands Pharmacy (medium high value receptor) located adjacent to the Scheme area between the Mill Stream and the River Avon.

Other community assets such as playing fields, sport's grounds, open space and the Salisbury Five Rivers Leisure Centre are described in Chapter 7 'Recreation and access'. Car and coach parks for public use in the study area are discussed in Chapter 12 'Traffic and transport'.

5.1.3 Socio-economic

Salisbury is a medieval cathedral city and well renowned tourist destination due to the presence of Salisbury Cathedral and its associated historic heritage, its cafe and retail culture, leisure activities and its proximity to Stonehenge, which brings significant revenue to the city. Tourism plays an important role in the economy with at least 2.4 million tourism visits per annum in recent years and 'the range of small, specialist shops in the centre make a significant contribution to the diversity and appeal of Salisbury as a shopping destination' (Salisbury City Council 2011). However, tourism within Salisbury has been negatively impacted since the Novichok poison incidents that took place within The

Maltings in the study area in 2018, and more recently as a result of the 2020 COVID-19 pandemic.

Salisbury also plays a key role as the economic, social and leisure focus of the district, being its main employment centre, providing health facilities for the surrounding region, and offering residents and visitors an extensive range of entertainment and recreational facilities. Salisbury railway station provides easy access for visitors to the city and is the crossing point between the west of England main line and the Wessex main line making it a regional interchange (see Section 12.1).

The key businesses or organisations within the study area (see Figure 5.1) that have the potential to affect or be affected by the Scheme include:

Ashley Road:

- Salisbury Aerial Services;
- Salisbury (Ashley Road) Fire Station;
- Riverside Tennis Club - considered in Chapter 7 'Recreation and access' and therefore not considered further in this chapter;

The Maltings:

- Sainsbury's;
- Waitrose;
- Salisbury Job Centre;
- Sports Direct Gym;
- James Hay Partnership;
- SSE Salisbury Central;
- Rowland Pharmacy;
- Public houses including The Bishop's Mill, The Bridge Tap and The Kings Head Inn;
- Mill Stream Coach Park;
- Salisbury Walk-in Health Centre;
- Mill Stream Medical Centre;
- National Probation Service;
- Salisbury Playhouse;
- Summerlock House (Department of Work and Pensions); and
- City Hall.

The commercial buildings have been assigned a ‘medium value, with the exception of the medical/health centres, which have been assigned a high value.

5.1.3 Health

The health of those residing in Wiltshire is generally good and better than the national average (Wiltshire Council, 2020).

The Scheme could change baseline conditions that are relevant to considerations of human health in the following ways:

- flood risk – the existing flood risk in the study area is described in Section 1.3 and shown on Figure 1.1. A Flood Risk Assessment has been undertaken for the Scheme (see Chapter 10 'Water and hydromorphology'). Flood risk has both psychological and physical impacts on human health. The risk of flooding of properties and key infrastructure in Salisbury causes major stress for residents and commuters, with historic traffic disruption along the arterial routes into the city centre, and homes often cut off from emergency services;
- land use - there are Public Rights of Way (see Section 7.1.1), green spaces at Fisherton Recreation Ground and Ashley Road Open Space and other community facilities/initiatives (see Section 7.1.2) including allotment gardens in the study area, which provide opportunities for physical activity;
- changes to access, availability of walking and cycling routes, availability of parking, open green space, and community facilities can affect levels of physical activity and create difficulties for vulnerable groups such as the disabled and elderly;
- the current availability of the green spaces within the study area for walking and other outdoor activities has health benefits for the city's occupants. There are links between access to green space and mental and physical health improvement, which are dependent on the amount of exposure or exercise that people take in the natural environment. A number of studies have noted that people living in areas close to accessible green space have a higher propensity to take moderate exercise that leads to enhanced physical health (Environment Agency 2014). Additionally, a study by the University of East Anglia (UEA 2018) using data from 20 countries demonstrated that regular exposure to green spaces had wide-ranging physical and mental benefits. The study also reveals that exposure to green space reduces the risk of Type II diabetes, cardiovascular disease, premature death, preterm birth, stress, and high blood pressure. There is also evidence to show that exposure to nature reduces the experience of pain (Diette 2003), that areas of greater biodiversity provide greater health benefits (Lovell 2014) and group walks in nature are associated with lower depression (Marselle 2014), as cited in research by the Centre for Sustainable Healthcare (2016);
- modes of travel - any changes in modes of travel through disruption to roads, availability of parking, public rights of way and coach services (see Chapter 12 'Traffic and Transport') can affect traveller anxiety, and result in changes to physical activity, and associated obesity;
- noise levels – noise levels experienced by the local community are discussed in Chapter 6 'Noise and vibration';
- traffic flows, volumes and distribution – existing traffic flows and volumes are described in Chapter 11 'Traffic and Transport'. The Scheme will only have temporary effects on traffic flow, during construction, but this could result in some effects on community health, although most probably localised temporary effects e.g. increased anxiety and associated health effects for vehicle travellers, and a perceived increased danger of cycling and walking,

which could lead to their reduction and associated health effects (Hine, 1994);

- air quality – the baseline air quality in the study area is described in Chapter 14 'Air Quality' along with an assessment of the effects on the Scheme on air quality; and
- disturbance, during construction, of areas of potentially contaminated made ground which could lead to mobilisation of contaminants – this is discussed in Section 12.1.3.

5.1.4 Changes to local community in absence of Scheme

In the absence of the Scheme, local community assets, businesses, tourist assets and access routes for commuting and travelling in and around the city will continue to be vulnerable to flooding, which will have significant adverse effects on human health. These effects will be exacerbated by climate change, which is expected to increase the extent, severity and frequency of flooding. The increasing population growth in Salisbury city will place increasing strain on existing resources vulnerable to flooding.

5.2 Likely significant effects

5.2.1 During construction

Local population and community buildings/facilities

The Scheme will result in a range of social impacts on the residential areas and sensitive community assets in and alongside areas of major construction works for the new Summerlock Stream channel, wetland habitat creation, widened river channel and new flood defences. These effects, which may be more pronounced in protected characteristic groups (i.e. over 65 years and those with long-term illness or disability) will include elevated noise levels, elevated dust levels, changes to parking and access restrictions; all of which have been assessed elsewhere in this ES. Such changes may affect psychological and physiological health, as well as behaviour.

During construction of the Scheme, there will be some adverse impacts associated with temporary land-take (in addition to permanent land-take discussed in Section 5.2.2). In particular, a new flood wall will run through the end of one private garden adjacent to Ashley Road and Summerlock Bridge, bordering the right bank of Summerlock Stream. This will affect a single domestic garden during construction. This impact is considered to be **minor to moderate adverse** (based on a very high value receptor i.e. residential property, and a minor negative magnitude i.e. affecting a small area).

There will also be a temporary loss of one allotment on the north-eastern corner of Coldharbour Lane Allotments, adjacent to the new flood defence embankment. The new flood defence embankment will sever the informal parking and access to the allotment shop. This is considered to be a **minor adverse impact**, based on a low value receptor (i.e. allotments and allotment shop of district/parish importance) and minor negative magnitude.

The construction of the Scheme also presents opportunities for community involvement and participation (e.g. involving local people and schools to plant trees and shrubs to improve the environment where they live or attend school), which may help to improve community spirit and create a sense of ownership and belonging. This impact is considered to be a **minor to moderate beneficial** impact (based on high to very high value receptors i.e. schools and local community), and minor positive magnitude i.e. affecting a small area).

Socio-economics

During construction of the Scheme, there will be a temporary increase in labour (with up to 35 staff on site at peak periods), with associated impacts on local facilities, as it is expected that, if they are not resident locally, they will stay in local accommodation during the construction period and may eat in local restaurants, and visit local attractions at weekends. These are considered to be **minor beneficial impacts** based on a negligible to minor positive magnitude and medium value receptors (i.e. business income).

The Scheme will result in temporary disruption to some existing businesses and facilities in the Scheme area (notably Salisbury Fire Station, and catering establishments and retail premises adjacent to the River Avon in the Maltings and Central Car Park area, which are listed in Section 5.1.3) during the construction works. Such impacts will result from localised and temporary increases in noise, vibration, access and dust as a result of construction activities and from associated localised increases in vehicle movements due to the delivery of materials, machinery and site personnel. These impacts on businesses and associated visitor numbers are considered to be **minor adverse** (based on a medium value receptor i.e. commercial buildings and a minor negative magnitude i.e. affecting a small area). No significant impacts are envisaged on the other businesses/facilities in the study area.

The effects of increased construction traffic and additional coach movements (resulting from the temporary relocation of the coach park), particularly along Castle Street, during construction are discussed in Chapter 12 'Traffic and transport', with regard to commuters, which will indirectly impact on local businesses.

The Scheme is also likely to result in adverse impacts from disturbance to access to residents, visitors and businesses adjacent to the works as a result of vegetation clearance, construction activities and associated localised increases in vehicle movements due to the delivery of materials, machinery and site personnel throughout the construction period. There will also be disturbance to some commercial properties and businesses over which access will be required for construction. The significance of these impacts and associated mitigation of construction access issues are discussed in Chapter 7 'Recreation and access' and Chapter 12 ‘Traffic and transport’. The visual disturbance to the local community is assessed in Chapter 8 ‘Landscape and visual amenity’.

Health

During construction, potential temporary adverse effects on human health may result from the temporary loss of green infrastructure including recreational land, the temporary severance of footpaths and cycleways, and loss of access across 3.4ha of green space. These changes may temporarily reduce levels of physical activity, and result in changes to walking/cycling patterns associated

with access restrictions to pedestrian/ cycleways. Construction may also negatively affect health through the reduced opportunity for social contact and engagement during the temporary and partial closure of Fisherton Recreation Ground and Ashley Road Open Space. These short-term effects will generally last the duration of the required closure but could, for more vulnerable groups (e.g. elderly, those with health inequalities and those unemployed), have longer-term impacts on health e.g. reduced opportunity for social cohesion, with associated impacts on mental health. The indirect impacts on health of those walking, cycling and playing in the area is considered **minor adverse** as there may be some lost opportunities for social contact.

The significance of the direct impacts on recreational land and access and associated mitigation for these changes are considered in Chapter 7 'Recreation and access' and Chapter 12 'Traffic and transport' and are therefore not repeated here.

The Scheme will result in temporary increases in traffic flows along the A36, A30, Castle Road (A354), Churchill Way, Castle Street and Ashley Road and congestion resulting from the permanent closure of the Millstream Approach Bridge, which is discussed in Chapter 12 'Traffic and transport'. The loss of the existing bridge and the new location of the realigned bridge may increase anxiety in vehicle travellers, during construction and for a short time upon completion of the Scheme, until travellers become accustomed to its new location. As it is likely that there is a relationship between traffic growth and the reported decline in rates of walking and cycling, there is potential for changes in traffic conditions during construction of the Scheme to affect the behaviour of pedestrians and cyclists. The increased traffic flows from construction traffic along some of the roads used by pedestrians and cyclists may reduce the number of people walking and cycling along these routes with associated physical or psychological (e.g. reduced confidence and feeling unsafe) effects. Such effects may be more pronounced in vulnerable groups such as children, those with physical and/or learning difficulties, and the elderly. These temporary effects are considered to be **minor to moderate adverse** (based on very high value receptors and a minor negative magnitude).

The translocation (or replacement) of two memorial trees in the Ashley Road area may have **minor to moderate adverse impacts** (based on a very high value receptor and minor negative magnitude) on those who were involved with their planting. However, we have consulted the owners of the trees and obtained their agreement to their translocation or replacement. There is also an additional effect resulting from the direct loss of the public open space on recreational users, which is assessed separately in Chapter 6 'Recreation and access'.

5.2.2 During operation

Local population, health and community buildings/facilities

The Scheme once operational, will have a long-term reduction in the risk of flooding to approximately 378 residential and commercial properties, infrastructure and recreational assets, with associated beneficial impacts on the health of inhabitants, workers and visitors. The Scheme will reduce flood risk to some of the existing businesses that will be temporarily affected during

construction. The Scheme will also complement the objectives of the CAF and Wiltshire's Core Strategy through a reduction in flood risk and improving the green open spaces. These positive changes represent a **major beneficial impact** to the city (based on a major positive magnitude and very high value community receptors).

The Scheme will provide significant health and well-being benefits through the long-term reduction in flood risk to the local community, in particular to members of the community who are more vulnerable to the effects of flooding (e.g. elderly, children, less able). The Scheme will also provide a long-term reduction in flood risk to critical transport infrastructure (including the key arterial roads into the city centre such as the A36), that is required to link new developments with the commercial hub of Salisbury. The reduction in flood risk to critical infrastructure and to properties will significantly reduce stress and anxiety for business owners, property occupants, vehicle travellers and visitors, and is a **major beneficial impact** of the Scheme.

Other health benefits are assessed in other chapters of this ES and therefore are summarised here but not assigned a significance:

- integrating landscape and wildlife enhancements at Fisherton Recreation Ground; the improved recreational value and attractiveness of the recreation ground will enhance the experience of informal recreational activities, encouraging people to take more exercise while interacting with the natural environment and improved green space with associated health benefits;
- providing spaces to play (physical activity) for young people to undertake social participation and encouraging community/social networks through the provision of space for people to engage and communicate with one another, which is important for mental wellbeing (see Chapter 7 'Recreation and access'). Feedback from public consultation highlighted opportunities to improve the environment and facilities in the Scheme area (e.g. accessibility) for some protected groups including the disabled, which have been taken into account in the Scheme design i.e. the replacement play park will provide facilities for disabled children.
- segregating existing and diverted footpaths from cycleways to improve the health of pedestrians and cyclists and encourage a greater use of the public rights of way. In particular, the segregated routes may improve accessibility, willingness to use the PRoW, improve pedestrian comfort (with less potential for conflict) and benefit disabled and older people who are more affected by shared use routes.
- providing a more connected and improved commuting corridor for pedestrians and cyclists into the city, which will have a positive impact on improving the air quality of Salisbury. Active travel can result in a reduction of excessive road traffic noise to residents from commuters who live alongside the road network and provides a quiet corridor into the city therefore decreasing personal exposure to noise;
- increasing accessibility to the city centre and the employment market as well as ease of access to amenities and facilities in the city where people do not have to rely on public transport or a motor vehicle. The improved access will help increase mobility and thus provide greater opportunities for people to be physically active (see Chapter 7 'Recreation and access'); and

- the provision of new seating allows less mobile people to walk and take rests allowing them to use the area with confidence (see Chapter 7 'Recreation and access').

Additionally, the Scheme will help to provide educational benefits through the creation of new amenity features. The installation of new information boards will provide interpretation of the ecological, social, and historical significance of the river corridor for Salisbury that can help to educate and inspire all groups of people. The creation of new safe access points to the river will provide local schools (notably Sarum St Paul's Primary School) and other groups with opportunities for pond dipping and engagement with the river environment. These benefits are considered to be **minor to moderate beneficial** (based on high value receptors and a minor positive magnitude).

Upon completion of the Scheme, there will be some adverse impacts associated with land-take. In particular, the Scheme will result in partial loss of one garden, at a residential property next to Ashley Road. This impact is considered to be minor to moderate adverse (based on a very high value receptor i.e. residential property and a minor negative magnitude i.e. affecting a small area) but will be offset by the significant reduction in flood risk already assessed and the removal of a length of unsightly blockwork wall along river bank, resulting in an overall **nil impact.**

Socio-economics

The Scheme will reduce flood risk to existing tourist assets and businesses in the area and will improve flood resilience to support and enable wider regeneration proposals for brownfield sites within the city centre (with associated growth and employment opportunities).

Additionally, the improved appearance and desirability of the area resulting from an improved river corridor setting will support tourism, by increasing visitor numbers, attracting future investment and helping to retain existing businesses. The improved coach park location to welcome visitors to the city will provide a focal point for the city centre. These long-term changes will likely have beneficial impacts on tourism, shops and businesses in the study area but cannot be quantified at this stage.

The perception of changes in flood risk to built assets under certain flood events will require careful management and the completed Scheme will help influence and inform future investment, regeneration and redevelopment planned within the city as part of the wider Salisbury River Park Master Plan.

5.3 Mitigation

We have developed a construction methodology which is designed to minimise the disturbance to the local community resulting from early vegetation clearance works and the main construction works. The methodology includes the following measures:

- limiting use of equipment on site to defined working hours to minimise noise and light impacts i.e. 7.00am to 6.00pm Monday to Friday and 8.00am to 1.00pm on Saturdays. We will avoid construction activities on Sundays,

Public Holidays and during special events/festivals other than in emergency or other exceptional circumstances;

- we will continue to inform affected residents, the public and businesses of the nature and timing of construction activities through identified communications channels and means such as newsletters, where appropriate;
- working in accordance with an Environmental Action Plan (EAP) (Appendix N), leaving the site in as good or better a condition as it was before clearance activities and appointing an Environmental Clerk of Works (ECW) and arboriculturist, to ensure that there are no significant impacts on the environment;
- we will act on any concerns arising from the local community as a result of the main construction works through the appointment of a Community Liaison Officer who will provide specific feedback to the site management teams (Contractor, Site Supervisor and us), and identify responsibility for agreeing and instructing remedial actions;
- we will work with public transport providers and Millstream Coach Park to mitigate impacts on transport routes appropriately (see Chapter 12 'Traffic and transport');
- we will programme and phase the construction works to restrict impacts within any one area to the minimum time;
- the design of the flood defence wall located alongside and in a private garden will maintain their privacy and retain their existing stepped access into the watercourse;
- we will re-map Flood Zones following the completion of the Scheme, which could support properties/businesses in obtaining property insurance**;**
- we will translocate (or replace) two memorial trees; and
- we will create a new access and informal parking area for a few cars adjacent to Coldharbour Lane for use by the visitors to the allotment shop, which opens at weekends.

5.4 Residual effects

The residual effects on the local community are presented in Table 5.1.

Table 5.1: Residual impacts on local community

Receptor (value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
Local population (high to very high)	Reduced flood risk to properties, businesses, infrastructure and recreational assets once the Scheme is completed. Associated beneficial impacts on human	Major beneficial	Not applicable	Major beneficial - significant

Receptor (value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	health from reduced stress and anxiety.			
	Temporary increase in labour during construction with positive impacts on local facilities and tourism	Minor beneficial	Not applicable	Minor beneficial
	Construction within and permanent change to part of a domestic garden adjacent to Ashley Road.	Minor to moderate adverse	Continued consultation with affected residents. Design flood defence wall to maintain their privacy and to retain stepped access into the watercourse. Impacts will be offset by reduction in flood risk and the removal of a length of unsightly blockwork wall along river bank.	Minor adverse (construction) Nil impact (operation)
	Temporary effects on human health from the temporary loss of green infrastructure during construction	Minor adverse	Continued consultation with the public of the nature and timing of construction activities through identified communications channels. The temporary and permanent diversions to Public Rights of Way are discussed in Chapter 7.	Minor adverse
	Long-term educational benefits through the creation of amenity facilities	Minor to moderate beneficial	Not applicable	Minor beneficial

Receptor (value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	Opportunity for community involvement and participation during construction to improve community spirit	Minor to moderate beneficial (if public are involved)	Not applicable	Minor to moderate beneficial
	Loss of two memorial trees in the Ashley Road area	Minor to moderate adverse	Translocate (if possible) or replace trees	Minor adverse
Coldharbour Lane allotments (low)	Temporary loss of one allotment at the north-eastern end of the allotments Permanent loss of access and informal parking in front of allotment shop.	Minor adverse	Allotment holders to be informed of nature and timing of construction activities. Act on concerns. Creation of new access and informal parking area adjacent to Coldharbour Lane for use by visitors to the allotment shop.	Minor adverse
Existing businesses in the Maltings and Central Car Park area (medium)	Temporary disruption from localised noise and access disturbance during construction	Minor adverse	Adherence to defined working hours. Having representatives from the construction team available on-site. Working in accordance with EAP. Businesses to be informed of nature and timing of construction activities. Act on concerns from the local community.	Minor adverse [Note long-term major beneficial impact of reduced flood risk to some businesses – see below)

Receptor (value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
Vehicle travellers, pedestrians and cyclists along local roads (very high)	Increased anxiety / stress from loss of Millstream Approach Bridge and new realigned location, and changes in traffic conditions including temporary increases in construction traffic	Minor to moderate adverse	Adherence to defined working hours. Inform residents, the public and businesses of nature and timing of construction activities. Act on concerns from the community. Work in accordance with EAP. Work with public transport providers as necessary and Millstream Coach Park to mitigate impacts on transport routes. Programme and phase construction works to restrict impacts within any one area to minimum time.	Minor adverse

6. Noise and vibration

6.1 Existing environment

This chapter considers the assessment of impacts from noise and vibration expected from construction of the Scheme. The operational phase is not considered to have any negative noise or vibration impacts and was therefore scoped out of assessment. There are no elements of the Scheme that will generate noise once works have been completed.

The study area for noise and vibration considers the closest receptors that may be impacted from the construction and/or operation of the Scheme. For construction noise, a distance of 300m from the works generating noise is considered to be the furthest where impacts on sensitive receptors may be possible. Construction vibration impacts are considered within 100m of vibration generating activities, such as piling. This distance is based on professional judgement and experience of other similar schemes.

6.1.1 Noise sensitive receptors

Noise sensitive receptors have been identified for the Scheme using appropriate mapping and are defined as residential dwellings and other noise sensitive receptors (e.g. occupied buildings such as schools, offices and churches) lying at the closest distance to those construction activities likely to generate the most noise and vibration. Public amenity areas, such as Public Rights of Way (PRoW) and parks, would also be sensitive to noise and vibration, during use. However, as the closest PRoW and public open space will be closed or diverted during the construction works for safety reasons and these are used on a voluntary basis, these sites have not been considered as sensitive receptors for this assessment. The potential effect of closure of these sites on recreation and access are considered further in Chapter 7 ‘Recreation and public access'.

Ashley Road area - The existing noise environment near the Scheme in the Ashley Road area is likely to be dominated by traffic using local roads, notably Ashley Road to the south of this area and Coldharbour Lane to the west of this area.

There are no noise sensitive receptors within the Scheme area. The closest groups of noise sensitive receptors to the Scheme in the Ashley Road area are:

- residential receptors:
    - on the southern side of Ashley Road immediately south of the Scheme area, located approximately 25m from the proposed site compound;
    - on the northern side of Ashley Road approximately 50m to the west of the Scheme area;
    - on Coldharbour Lane located 50m to the west of the Scheme area;
    - on Hulse Road located approximately 43m to the east of the Scheme area;
- Studio Theatre Salisbury located on the southern side of Ashley Road immediately south of the Scheme area. This studio is located approximately 30m from the proposed site compound and 60m from the construction works;

- Sarum St Paul Primary School located 67m to the west of the Scheme area on Coldharbour Lane;
- the Riverside Tennis Club located on Coldharbour Lane, which lies approximately 50m north of the Scheme area; and
- the Five Rivers Leisure Centre lies approximately 100m to the north-east of the Scheme area on the left bank of the River Avon on Hulse Road.

Maltings and Central Car Park area - The existing noise climate in the Maltings and Central Car Park area is likely to be dominated by traffic on the Mill Stream Approach, traffic in the Millstream Coach Park and the Long Stay Central Car Park, traffic along Fisherton Street, Bridge Street and Silver Street and from the railway and A36 to the west of the Scheme area.

The closest groups of noise sensitive receptors to the Scheme in the Maltings and Central Car Park area includes:

- residential receptors and offices on Castle Street located to the north-east of Mill Stream Approach approximately 5-15m from the Scheme area;
- residential receptors to the west of Castle Street located approximately 27m from the Scheme area;
- a Community Centre, Medical Centre and Health Centre on the left bank of the River Avon located approximately 25-30m from the Scheme area.

The noise sensitive receptors which represent the areas where the most likely change in noise climate may occur are shown in Table 6.1 and their location is shown in Figure 6.1.

Table 6.1: Noise sensitive receptors

Note: Receptors R1 to R9 are located in the Ashley Road area and R10 to R21 are located in the Maltings and Central Car Park area.

Noise sensitive receptors	Address	Receptor sensitivity
R1. Residential Ashley Road East	1-10 Ashley Road	High
R2. Residential Ashley Road West	The Nock, Retreat, the Heaven, Homestead, 45-57, 33-41 Ashley Road	High
R3. Residential Coldharbour	5-19 Coldharbour Lane	High
R4. Sarum St. Paul Primary School	Westminster Road	High
R5. Residential Hulse Road	1-4, 53-67 Avon Riverside	High
R6. Residential Hulse Road Summerlock Bridge	Summerlock Bridge	High
R7. Studio Theatre	Ashley Road	Medium
R8. Five Rivers Leisure Centre	Hulse Road	Medium
R9. Riverside Tennis Club	Coldharbour Lane	Medium

Noise sensitive receptors	Address	Receptor sensitivity
R10. Offices Castle Street	137-141 Castle Street	Low
R11. Mill Stream Approach Offices (Warner House)	123 Caste Street	Low
R12. Mill Stream Approach Residential	1 to 10, 11-12, 14 to 21, Mill Stream Approach	High
R13. Residential Castle Street North	1-15 Hussey's Almshouses	High
R14. The Boulter- Community Rehabilitation Centre	Avon Approach	Medium
R15. Mill Stream Medical Centre	Avon Approach	High
R16. Heath Walk Centre	Avon Approach	High
R17. Residential Castle Street South	7-8 Caste Street	High
R18. Offices Cheviot House	69-73 Caste Street	Low
R19. Residential Ivy Place	11 Caste Street	High
R20. Residential at Summerlock Approach	Summerlock Approach	High
R21. Offices Bridge Street	At the Maltings	Low

6.1.2 Changes to noise in absence of Scheme

In the absence of the Scheme, the changes to the noise environment are anticipated to be limited. Proposed improvements in Salisbury by Wiltshire Council to reduce the use of private vehicles (including new cycling facilities and an electric car club vehicle) may help to reduce noise generated by traffic in the city centre.

6.2 Likely significant effects

Potential effects addressed by this noise assessment chapter include:

- temporary increases in noise or vibration from activities to noise-sensitive receptors during the construction of the scheme; and
- temporary increases in road traffic noise on the local road network due to construction traffic.

6.2.1 During construction

The construction works will increase noise and vibration levels as a result of construction plant, other construction-related vehicles and construction related activities (including piling and general earthworks).

Tables 6.2 and 6.3 present the construction activities considered for the calculations of construction noise and vibration in the Ashley Road area and in the Maltings and Central Car Park area. The tables present the worst case 'representative' sensitive

receptors and distances to the construction works considered for the calculations of noise and vibration.

These construction activities are listed based on location and do not reflect the sequencing of the construction programme.

Table 6.2: Construction activities and sensitive receptor distance to works - Ashley Road

Representative noise sensitive receptors	Receptor sensitivity	Distance from sensitive receptor to construction activity in metres (m)														
		1.Site Compound	2.Site Compound Operational	3.Site Clearance	4.Embankment	5.Sheet Pile Walls (augured)	6.Formwork Reinforcement & Concrete	7.New Flood Wall Coldharbour Lane	8.In-filling	9.Flow Control Structure	10.Earth Works (new channel connection)	11.New Culvert	12.Landscaping	13.New flood wall sheet pile at Summerlock	14.New footbridge to the north	15. New foorbridge to the south
R1. Residential Ashley Road East	High	25	25	60	30	30	30	210	182	182	182	182	190	88	400	88
R2. Residential Ashley Road West	High	135	135	60	30	30	30	87	37	37	57	57	60	312	276	240
R3. Residential Coldharbour Road	High	293	293	50	26	26	26	129	194	194	200	200	160	465	200	367
R4. Sarum St. Paul School	High	330	330	67	60	60	60	194	275	275	275	275	170	573	180	396
R5. Residential Hulse Road	High	70	70	110	43	43	43	270	250	250	246	246	220	35	360	60
R6. Residential Hulse Road Summerlock Bridge	High	80	80	120	53	53	53	324	270	270	260	260	230	15	480	120
R7. Studio Theatre	Medium	35	35	70	35	35	35	262	303	303	313	313	237	237	400	96
R8. Five Rivers Leisure Centre	Medium	100	100	100	148	148	148	116	147	147	137	137	130	218	140	100
R9. Tennis Club	Medium	400	400	67	30	30	30	220	320	320	320	320	300	600	160	445

Table 6.3: Construction activities and sensitive receptor distance to works - Maltings and Central Car Park area.

Representative noise sensitive receptors	Receptor sensitivity	Distance from sensitive receptor to construction activity in metres (m)																		
		1.Site Compound	2.Site Compound Operational	3.Site Clearance	4.Earth works (right bank)	5.Earth works (left bank)	6.Removal of Swimming Pool gate (Millstream Approach)	7.Reprofiling of channel bed (Millstream Approach)	8.New Culverts (Summerlock)	9.Culverts Avon Approach Bridge	10.In-channel works Millstream	11.Removal of Hatches (at the Maltings)	12.New low-level flood embankment (Waitrose Culvert)	13.Infilling low level embankment (west) bank River Avon	14.New Flood Wall (Summerlock)	15.Demolition Millstream (Approach Bridge)	16.Piling Millstream Approach Bridge	17.Millstream Approach Bridge Construction	18.Landscaping	19. New retaining wall
R10. Offices Castle Street	Low	125	125	40	152	149	44	44	233	266	200	n/a	90	233	n/a	84	84	84	200	84
R11. Mill Stream Approach Offices	Low	65	65	30	120	115	37	37	208	209	132	n/a	80	208	n/a	63	63	63	173	63
R12. Mill Stream Approach Residential	High	47	47	60	105	100	50	50	200	183	105	n/a	104	200	n/a	69	69	69	92	63

R13. Residential Castle Street	High	50	50	60	100	94	63	63	190	167	73	n/a	116	190	n/a	78	78	78	95	78
R14. Community Rehabilitation Centre	Medium	33	33	30	73	38	140	140	150	74	16	n/a	162	150	n/a	107	107	107	40	107
R15. Mill Stream Medical Centre	High	80	80	30	85	38	160	160	155	41	16	n/a	192	155	n/a	143	143	143	35	143
R16. Heath Walk Centre	High	90	90	30	119	58	170	170	160	27	16	n/a	220	160	n/a	172	172	172	35	172
R17. Residential Castle Street South	High	50	50	70	89	90	100	100	160	139	20	n/a	140	190	n/a	102	102	102	60	102
R18. Offices Cheviot House	Low	76	76	70	115	80	145	145	160	99	16	n/a	170	180	n/a	145	145	145	60	145
R19. Residential 11 Ivy Place	High	76	76	70	100	70	160	160	160	78	16	n/a	179	170	n/a	158	158	158	60	158
R20. Residential at Summerlock Approach	High	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	17	n/a	n/a	n/a	n/a	n/a
R21.-Offices Bridge Street	Low	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Construction noise
The calculation methodology set out in BS 5228-1 has been employed to estimate the noise level from each of the proposed construction activities at the closest representative noise sensitive receptors shown in Tables 6.2 and 6.3.

All construction works are currently expected to be undertaken during normal daytime hours and therefore this assessment has focussed on the daytime period only. It is further assumed that the activities described would be undertaken consecutively rather than concurrently, as many follow on from a previous activity. A ground cover of 50% absorptive material (e.g. grass/soft ground) between the construction works and the sensitive receptors has been assumed. There has been no account made for the possible screening effects on any items of plant, either by natural features or other items of plant. The plant assumed for each construction phase is listed in Appendix D1.

Appendix D2 presents the calculated noise level at the location of the closest sensitive receptors to each construction activity. Construction noise levels calculated to be above the daytime construction noise limit are indicated in red text and are summarised below.

The noise limit used for this assessment is 65 dB $L_{Aeq\ T}$.

Ashley Road - Residential receptors in R1/R2 on Ashley Road, R3 Coldharbour, R5 Hulse Road and R7 Studio Theatre and R9 Riverside Tennis Club are all likely to experience noise levels above the 65 dB limit from one or more construction activities. The impacts on these receptors are expected to range from **slight adverse to major adverse effects** during the construction period, dependent on the construction activity being undertaken (based on medium and high sensitivity receptors and a magnitude ranging from negligible to major adverse).

R4 (Sarum St. Paul School) and R8 (Five Rivers Leisure Centre) would experience predicted noise levels below the SOAEL of 65dB(A) (see Appendix D2) and will therefore experience **slight adverse effects** (based on medium sensitivity receptors and negligible magnitude) during the construction period.

The noise sensitive receptors experiencing the highest noise levels during the noisiest construction phase are described below:

- activity 1 (site compound set up): a moderate magnitude has been predicted at receptors R1 and R7 where the BS5228-1 threshold level is exceeded by less than 5dB. For these high and medium sensitivity receptors this results in a **moderate adverse effect**;
- activity 2 (site compound operation): a moderate magnitude has been predicted at receptor R1 where the BS5228-1 threshold level is exceeded by less than 5dB. For this high sensitivity receptor this results in a **moderate adverse** effect;
- activity 3 (site clearance): a moderate magnitude has been predicted at receptor R3 where the BS5228-1 threshold level is exceeded by less than 5dB. For this high sensitivity receptor this results in a **moderate adverse effect**;
- activity 4 (embankment construction): a major magnitude is predicted at R3 (residential receptors on Coldharbour Lane) where the BS5228-1 threshold level is exceeded by more than 5dB. For this high sensitivity receptor this results in a **major adverse effect**. A moderate magnitude has been predicted at receptors R1, R2, R5, R7 and R9 during activity 4 where the BS5228-1 threshold level is

exceeded by less than 5dB. This results in a **moderate adverse effect** for these high and medium sensitivity receptors;

- activities 5 (sheet pile walls) and 6 (formwork and concrete): a moderate magnitude has been predicted at receptors R1, R2, R3, R7 and R9. For these high and medium sensitivity receptors this results in a **moderate adverse** effect**;**
- activity 7 (new flood wall close to Coldharbour Lane): the predicted noise level would exceed the SOAEL only at receptor R2 and a moderate magnitude has been predicted where the BS5228-1 threshold level is exceeded by less than 5dB. This would result in a **moderate adverse** effect;
- activities 8 (in-filling), 9 (flow control structure) and 10 (earth-works): the predicted noise level would exceed the SOAEL only at receptor R2 and a moderate magnitude has been predicted where the BS5228-1 threshold level is exceeded by less than 5dB. This would result in a **moderate adverse** effect; and
- activity 13 (new flood wall - sheet pile - at Summerlock Bridge): a major magnitude is predicted at Receptors R5 and R6 where the BS5228-1 threshold level is exceeded by more than 5dB. For this high sensitivity receptor this results in a **major adverse effect.**

In order to determine whether these moderate and one major adverse effects are significant, the duration of the activities was examined to understand if they exceed either 10 or more days in any 15 consecutive days or, or a total number of days exceeding 40 in any six consecutive months. All the activities listed above have the potential to exceed the 10 days in 15 consecutive days, and for these reasons, any moderate or major adverse effects need to be considered significant. The contractor will therefore consider specific mitigation measures to reduce the identified significant noise impacts. This will allow the impacts to be minimised, with reduced construction noise levels arising from the activities.

Maltings and Central Car Park area - All receptors are likely to experience noise levels above the 65 dB limit from one or more construction activities, resulting in **negligible to major adverse effects** during the construction period, dependent on the construction activity being undertaken (based on low to high sensitivity receptors and a magnitude ranging from negligible to major adverse).

The potentially significant effects identified at all thirteen receptors (see Appendix D2) are summarised below:

- activity 10 (in-channel works Mill Steam) is predicted to result in the highest noise levels. A major magnitude is predicted at receptors R14, R15, R16, R17, R18 and R19 where the BS5228-1 threshold level is exceeded by more than 5dB. A moderate magnitude of construction noise is predicted at receptors R13 where the BS5228-1 threshold level is exceeded by less than 5dB.
- for the high sensitivity receptors R15, R16, R17 and R19, the predicted major magnitude of construction noise will result in a **major adverse** effect. For the medium and low sensitivity receptors R14 and R18, the predicted major magnitude of construction noise will result in a **moderate adverse** effect. For the high sensitivity receptor R13, the predicted moderate magnitude of construction noise will result in a **moderate adverse** effect.

- activity 1 (site compound set up) and activity 2 (site compound operation): a moderate magnitude has been predicted at receptors R12 (high sensitivity) and R14 (medium sensitivity). This results in a **moderate adverse** effect;
- activity 3 (site clearance): a major magnitude of impact is predicted at receptors R11, R14, R15 and R16, for the medium and high sensitivity of receptors R14, R15 and R16 this results in a **moderate adverse** effect and for the low sensitivity of receptor R11 in a **slight adverse** (not significant) effect;
- activity 4 (earth works right bank): a moderate magnitude has been predicted at receptors R14 and R20. For these medium and high sensitivity receptors this results in a **moderate adverse** effect;
- activity 5 (earth works left bank): a moderate magnitude has been predicted at receptor R16, where the BS5220-1 threshold level is exceeded by less than 5dB. A major magnitude is predicted at receptors R14 and R15, where the BS5228-1 threshold level is exceeded by more than 5dB. This results in a **moderate adverse** effect for receptors R14 and R16 and a **major adverse** effect for receptor R15;
- activity 6 (removal of Swimming Pool Gate): a moderate magnitude of change, where the BS5228 threshold of 65dB is predicted to be exceeded by less than 5dB, is predicted at receptor R12. For this high sensitivity receptor this results in a **moderate adverse** effect. A moderate magnitude has been predicted at receptors R10 and R11. For the low sensitivity receptors R10 and R11, this results in a slight adverse effect and for the high sensitive receptor R12 in a **moderate adverse** effect. For all the other receptors the predicted noise levels are below the SOAEL. This would indicate a magnitude of impact of minor, which for receptors high or medium value would be a slight effect and for low value receptors would be negligible which are both not significant;
- activity 7 (reprofiling of channel bed -Mill Stream Approach): predicted noise levels exceed the BS5228-1 threshold level by less than 5dB at high sensitivity receptors R10, R12 and R13. This moderate magnitude of change results in a **moderate adverse** effect. A major magnitude of change is predicted at low sensitivity receptors R10 and R11, where the BS5228-1 threshold level is exceeded by more than 5dB. This a major magnitude of change also results in a **moderate adverse** effect;
- activity 9 (Culvert Avon approach bridge): a moderate magnitude of impact has been predicted at high sensitivity receptors R15 and R16. This represent a **moderate adverse** effect for both the receptors;
- activity 11 (removal of hatches at the Maltings): a major magnitude of impact is predicted at the low sensitivity receptor R21 which results in a **moderate adverse** effect;
- activity 14 (new flood wall-Summerlock): a moderate magnitude of impact is predicted at the high sensitivity receptor R20, which results in a **moderate adverse** effect.

Again, to determine whether or not the moderate and major adverse effects are significant, the duration of the activities was examined. All the activities listed above have the potential to exceed the 10 days in 15 consecutive days, and for these reasons the moderate and major adverse effects need to be considered significant.

The contractor will therefore consider specific mitigation measures to reduce the identified significant noise impacts. This will allow the impacts to be minimised, with reduced construction noise levels arising from the activities.

Construction vibration

The construction activity that could generate noticeable levels of vibration is vibratory compaction and piling. The method of piling that has been selected for most of the scheme is Continuous Flight Auger (CFA), which presses the piles into the ground and does not generate significant levels of vibration. However, vibratory piling is selected for activity 13, which has the potential to result in vibration at nearby receptors.

The vibratory compaction will be used in activities 1, 8, 11 and 13 for Ashley Road and in activities 1, 4, 5, 7, 9, 10 and 12 for the Central Car Park area.

The results from the calculations to determine the potential for significant effects are shown in Table 6.4 and Table 6.5. Predictions have been made to demonstrate levels of vibration with a 50% chance of exceedance and also 5% of exceedance. The detailed calculations and assumed parameters are shown in Appendix D1.

Table 6.4: Estimated vibration level at representative vibration sensitive receptors - Ashley Road

Representative vibration sensitive receptors	**Calculated Vibration level (mm/s)**[1]			
	1.Site Compound set-up (vibratory compaction)	**8.In-fiiling (vibratory compaction)**	**11.New Culvert (vibratory compaction)**	**13.Sheet piling (vibratory)**
R1. Residential Ashley Road east	0.5/1.2	-	-	-
R2. Residential Ashley Road West	-	0.3/0.8	0.2/0.4	-
R5. Residential Hulse Road	0.1/0.3	-	-	0.6/2/6
R6. Residential Hulse Road Summerlock Bridge	0.1/0.3	-	-	1.8/7.9
R7. Studio Theatre	0.3/0.8	-	-	0.3/1.5
R8. Five Rivers Leisure Centre	0.1/0.3	-	-	-

[1] PPV predictions are provided for a 50% probability of exceedance / 5% probability of exceedance

Table 6.5: Estimated vibration level at representative vibration sensitive receptors – Maltings and Central Car Park area

Vibration sensitive receptors	Vibratory compaction - Calculated Vibration level (mm/s)[1]						
	1.Site Compound	4.Earth works (right bank)	5.Earth works (left bank)	7.Reprofiling of channel bed - Millstream Approach)	9.Culverts Avon Approach Bridge	10.In-channel works Millstream	12.New low-level flood embankment (Waitrose culvert)
R10. Offices Castle Street	-	-	-	0.2/0.6	-	-	0.1/0.2
R11.Mill Stream Approach Offices	0.1/0.4	-	-	0.3/0.8	-	-	0.1/0.2
R12.Mill Stream Approach Residential	0.2	-	-	0.2/0.5	-	-	-
R13.Residential Castle Street	0.2	-	0.1	0.1/0.4	-	0.1/0.3	-
R14.Community Rehabilitation Centre	0.3/0.9	0.1/0.3	0.3/0.7	-	0.1/0.3	0.8/2.1	-
R15.Mill Stream Medical Centre	0.1/0.3	0.1/0.3	0.3/0.7	-	0.2/0.7	0.8/2.1	-
R16.Heath Walk Centre	0.1/0.2	-	0.2/0.4	-	0.4/1.1	0.8/2.1	-
R17.Residential Castle Street South	0.2/0.5	0.1/0.3	0.1/0.2	-	0.1/0.2	0.6/1.6	-
R18.Offices Cheviot House	0.1/0.3	-	0.1/0.3	-	0.1/0.3	0.8/2.1	-
R19. Residential Ivy Place	0.1/0.3	-	0.1/0.3	-	-	0.8/2.1	-

[1] PPV predictions are provided for a 50% probability of exceedance / 5% probability of exceedance

Ashley Road - Human response: The magnitude of impact is moderate adverse at receptor R5a for activity 13. Receptor R5a has a high value and the moderate adverse impact will have moderate adverse effect.

The impact of vibratory sheet piling at receptors R5 and R7 is likely to be minor, as there is a 50% chance of vibration during piling exceeding 0.3 mm/s, although there is a 5% chance that vibration may exceed 1 mm/s PPV at these receptors. These are high sensitivity receptors, and the most likely minor adverse levels of vibration will have a **slight adverse** effect, which is considered to be not significant

The magnitude of impact is minor or negligible at all receptors during vibratory compaction, with a 5% chance of 1 mm/s being exceeded at R1 for the activity 1 (site compound) indicating a moderate magnitude. Receptors 1 to 7 have a high or medium value and the minor adverse impacts will have a **slight adverse** effect, which is considered to be not significant.

Structural Impacts: At receptor 5b there is a 5% chance that the vibration activities would result in PPV above the value of 6mm/s given in Table 4.11 for possible cosmetic damage to a (structurally sound) building. As such vibration mitigation measures should be considered during this activity. There is no risk of damage to the remaining vibration sensitive receptors in the vicinity of this activity as the predicted PPV are below the value of 6mm/s.

Central Car Park - Human response: The magnitude of the impact is predicted to be minor or negligible for most receptors and activities. For receptors of high or medium value, these impacts would be of **slight effect**, which is not considered to be significant.

There is a 5% chance of exceedance of 1 mm/s at receptor R16 during activity 1 (culverts) and at receptors R14, R15, R16, R17, R18 and R19 during activity 10 (in channel works) indicating a moderate magnitude. For receptors of high or medium value, these impacts would be of **moderate effect**, which would be considered to be significant.

Structural Impacts: There is no risk of damage to buildings at Central Car Park vibration receptors as the predicted PPV are well below the value of 6mm/s for possible cosmetic damage to a (structurally sound) building.

Road traffic noise during construction

Construction traffic has the potential to affect sensitive receptors throughout the construction programme. Noise effects that may arise due to construction traffic flows have been assessed based on traffic information, as described in Chapter 12 'Traffic and transport'. The traffic data used for the assessment of construction traffic noise is provided in Table 6.6.

The roads that will be used by construction traffic will be Churchill Way North (A36) and Castle Road for the Ashley Road area; and Churchill Way North (A36), Castle Street and Millstream Approach for the Maltings and Central Car Park area. The predicted road traffic noise levels for these road links are presented in Table 6.8 and Table 6.9 and have been derived using the criteria set out in the assessment methodology. The significance of effect has been defined assuming that affected receptors will be residential or equivalent, i.e. high sensitivity.

The calculated change in BNLs resulting from additional construction traffic during the construction period indicates that the worst case increase in road traffic noise will

be +0.4 dB on Millstream Approach. This is a negligible magnitude of impact resulting in a **slight adverse effect** (based on high sensitivity receptors). For all other routes, the calculated change in BNL is of less than 1dB. This is a negligible magnitude of impact, also resulting in a **slight adverse effect, which is not considered to be significant**.

Table 6.6: Traffic Data for Construction Traffic Noise Assessment 2022

Link	**Do-Minimum 2022 AAWT18 – 06:00 – 00:00**			**During Construction 2022 AAWT18 – 06:00 – 00:00**		
	Flow (veh)	**%HGV**	**Speed Kph**	**Flow (veh)**	**%HGV**	**Speed Kph**
Churchill Way North (A36)	31168	5.9	64.0	31263	5.9	64.4
Castle Road	20087	4.3	48.3	20115	4.3	48.3
Castle Street	10666	2.4	39.0	10733	2.5	39.0
Millstream Approach	3298	2.3	16.0	3364	2.7	16.0

Table 6.7: Traffic Data for Construction Traffic Noise Assessment 2023

Link	**Do-Minimum 2023 AAWT18 – 06:00 – 00:00**			**During Construction 2023 AAWT18 – 06:00 – 00:00**		
	Flow (veh)	**%HGV**	**Speed Kph**	**Flow (veh)**	**%HGV**	**Speed Kph**
Churchill Way North (A36)	31721	5.9	64.0	31816	5.8	64.0
Castle Road	20443	4.3	48.0	20471	4.2	48.0
Castle Street	10855	2.4	39.0	10922	2.5	39.0
Millstream Approach	3356	2.3	16.0	3423	2.7	16.0

Table 6.8: Construction Traffic Noise Effects 2022

Road link	2022 Baseline Basic Noise Level (BNL) LA10,18h dB	2022 Baseline and Construction BNL LA10,18h dB	Difference dB	Magnitude of Impact	Significance of Effect
Churchill Way North (A36)	74.5	74.5	0	Negligible	Slight
Castle Road	70.7	70.7	0	Negligible	Slight
Churchill Way North (A36)	74.5	74.5	0	Negligible	Slight
Castle Street	66.5	66.6	+0.1	Negligible	Slight
Millstream Approach	61.9	62.3	+0.4	Negligible	Slight

Table 6.9: Construction Traffic Noise Effects 2023

Road link	2023 Baseline Basic Noise Level (BNL) LA10,18h dB	2023 Baseline and Construction BNL LA10,18h dB	Difference dB	Magnitude of Impact	Significance of Effect
Churchill Way North (A36)	74.6	74.6	0	Negligible	Slight
Castle Road	70.8	70.8	0	Negligible	Slight
Castle Street	66.6	66.7	+0.1	Negligible	Slight
Millstream Approach	61.9	62.3	+0.4	Negligible	Slight

6.2.2 During operation

Operational noise and vibration was scoped out of further assessment (see Section 4.3.4).

6.3 Mitigation

The use of Best Practicable Means (BPM) (as defined in Section 72 of the Control of Pollution Act 1974) is recommended during construction in order to reduce construction noise levels. Where practicable the control measures set out in BS 5228 Parts 1 and 2 will be implemented. These will include:

- programming and phasing the works over a number of stages to restrict impacts within any one area to the minimum time;
- keeping local residents and property owners fully informed about the nature and timing of the works, including traffic controls, via such means as newsletters or individual contact, where appropriate;
- having a representative available on site during working hours to answer queries or address any concerns expressed;
- careful selection of equipment, for example any compressors brought to site will be super-silenced or sound reduced models fitted with acoustic enclosures or any pneumatic tools will be fitted with silencers or mufflers, wherever practicable;
- all plant and equipment will be properly maintained and operated in accordance with manufacturers' recommendations and in such a manner as to avoid causing excessive noise;
- equipment will be shut down when not in use for a period longer than five minutes;
- provision of temporary noise barriers.

Noise and vibration monitoring and control strategy

A noise and vibration monitoring and control strategy will be agreed with Wiltshire Council before the start of construction. This would include both general best practice such as the use of noise screens, and more specific control measures that could include:

- generators for site power could have noise dampening casing and silencers of exhausts. The construction contractor may also explore the use of modular generator systems with multiple smaller generators which are linked in series and switch on when needed and off when demand drops, thereby reducing noise emissions;
- temporary barriers between source and receptors during the use of concrete breakers; and
- advance notification of particularly noise or vibration generating activities to affected receptors though community liaison. In particular, vibration generating activities occurring in close proximity to The Boat House Public House.

6.4 Residual effects

The assessment has not quantified the effect of noise mitigation on the residual impacts from noise and vibration during the construction phases since the mitigation measures for construction noise and vibration can be very variable and site specific (therefore in Table 6.8 the residual impacts are unchanged from the predicted impacts). However, it is expected that noise mitigation will be implemented at all

times during the construction period by the contractor. This will allow the impacts to be minimised, with reduced construction noise levels arising from the activities.

The use of temporary noise screens can, if positioned effectively, provide noise reductions between 5 and 10 dB. Some activities will be controlled to some extent by the use of these, but this may not be practicable in all instances. For such noise attenuation to occur, it would typically require no line of sight between the receptor and noise source. There are a number of other variables which determine the actual attenuation that would result for individual receivers (e.g. noise spectrum content of the plant, whether plant is mobile or stationary, ground conditions, material of screens).

It is anticipated that with careful planning and the utilisation of Best Practicable Means on site during the construction activities, the works should be capable of being undertaken without the need to recourse to property Noise Insulation or Temporary Rehousing measures.

The residual effects on noise and vibration are presented in Table 6.10.

Impacts which are unlikely to be completely mitigated are those during activity 4 (embankment construction) and activity 10 (in-channel works Mill Stream).

At the locations listed above the effect would be reduced from major moderate adverse to moderate adverse significance but still resulting in significant residual effects. However, these would be of temporary nature and limited during the time of the construction period. Therefore, the residual effects are only expected during the noisiest activities at these receptors. Once the construction phase is completed the impacts would be completely removed.

Table 6.10: Residual impacts on noise and vibration

Receptor (value)	Description of Potential Impact	Significance of Predicted Impact			Mitigation Measures	Significance of Residual Impact		
		Noise	Vibration	Construction traffic		Noise	Vibration	Construction traffic
R1. Residential Ashley Road East (high)	Elevated noise and/or vibration levels during the construction phase of the Scheme. These impacts are of temporary nature and limited to the duration of the works.	Moderate adverse	Slight adverse	Slight adverse	Best Practicable Means (BPM) under Section 72 of Control of Pollution Act 1974 (HMSO, 1974) Good practice under BS 5228 Part 1: Noise and Part 2: Vibration (BSI, 2014) Noise and vibration monitoring and control strategy agreed with Wiltshire Council	Moderate adverse - significant	Slight adverse	Slight adverse
R2. Residential Ashley Road West (high)		Moderate adverse	Slight adverse	Slight adverse		Moderate adverse - significant	Slight adverse	Slight adverse
R3. Residential Coldharbour (high)		Major adverse	Slight adverse	Slight adverse		Major adverse - significant	Slight adverse	Slight adverse
R4. Sarum St. Paul School (high)		Slight adverse	Slight adverse	Slight adverse		Slight adverse	Slight adverse	Slight adverse
R5. Residential Hulse Road (high)		Moderate adverse	Slight adverse	Slight adverse		Moderate adverse - significant	Slight adverse	Slight adverse
R5a.Residential Hulse Road Summerlock Bridge		Major adverse	Moderate adverse	Slight adverse		Major adverse - significant	Moderate adverse - significant	Slight adverse
R7. Studio Theatre (medium)		Moderate adverse	Slight adverse	Slight adverse		Moderate adverse - significant	Slight adverse	Slight adverse

Receptor (value)	Description of Potential Impact	Significance of Predicted Impact			Mitigation Measures	Significance of Residual Impact		
		Noise	Vibration	Construction traffic		Noise	Vibration	Construction traffic
R8. Five Rivers Leisure Centre (medium)		Slight adverse	Negligible	Slight adverse		Slight adverse	Negligible	Slight adverse
R9. Tennis Club (medium)		Moderate adverse	Negligible	Slight adverse		Moderate adverse - significant	Negligible	Slight adverse
R10. Offices Castle Street (low)		Moderate adverse	Negligible	Slight adverse		Moderate adverse - significant	Negligible	Slight adverse
R11. Mill Stream Approach Offices (low)		Moderate adverse	Slight adverse	Slight adverse		Moderate adverse - significant	Slight adverse	Slight adverse
R12. Mill Stream Approach Residential (high)		Moderate adverse	Slight adverse	Slight adverse		Moderate adverse - significant	Slight adverse	Slight adverse
R13. Residential Castle Street (high)		Moderate adverse	Slight adverse	Slight adverse		Moderate adverse - significant	Slight adverse	Slight adverse
R14. Community Rehabilitation Centre (medium)		Moderate adverse	Moderate adverse	Slight adverse		Moderate adverse - significant	Moderate adverse - significant	Slight adverse

Receptor (value)	Description of Potential Impact	Significance of Predicted Impact			Mitigation Measures	Significance of Residual Impact		
		Noise	Vibration	Construction traffic		Noise	Vibration	Construction traffic
R15. Mill Stream Medical Centre (high)		Major adverse	Moderate adverse	Slight adverse		Major adverse - significant	Moderate adverse - significant	Slight adverse
R16. Heath Walk Centre (high)		Major adverse	Moderate adverse	Slight adverse		Major adverse - significant	Moderate adverse - significant	Slight adverse
R17. Residential Castle Street South (high)		Major adverse	moderate adverse	Slight adverse		Major adverse - significant	Moderate adverse - significant	Slight adverse
R18. Offices Cheviot House (low)		Moderate adverse	Moderate adverse	Slight adverse		Moderate adverse - significant	Moderate adverse - significant	Slight adverse
R19. Residential Ivy Place (high)		Major adverse	Moderate adverse	Slight adverse		Major adverse - significant	Moderate adverse - significant	Slight adverse
R20. Residential at Summerlock Approach (high)		Moderate adverse	Slight adverse	Slight adverse		Moderate adverse - significant	Slight adverse	Slight adverse
R21. Offices Bridge Street (low)		Moderate adverse	Slight adverse	Slight adverse		Moderate adverse - significant	Slight adverse	Slight adverse

7 Recreation and access

7.1 Existing environment

The study area is shown on Figure 7.1 and comprises the Scheme area and a 250m buffer zone.

7.1.1 Public access

Public rights of way and cycleways are shown on Figure 7.1.

The PRoWs (considered to be medium value receptors i.e. of regional/county importance) located within the Scheme area are shown in Table 7.1.

Table 7.1: PRoWs within the Scheme area

Location	Footpath	Description
Fisherton Recreation Ground	SALS 9	Within the Scheme area, this footpath runs from east of the Fisherton Farm Allotments through Fisherton Recreation Ground to Coldharbour Lane and then runs eastwards along the northern boundary of Coldharbour Lane Allotments to Summerlock Stream at Ashley Road.
Ashley Road Open Space	SALS 10	Footpath that runs from Summerlock Bridge around the northern perimeter of Ashley Road Open Space along the right bank of the River Avon to Ashley Road within the Scheme area.
The Maltings and Central Car Park area	SALS 50	Footpath runs south from Ashley Road along the right bank of the River Avon and enters the Maltings and Central Car Park area at its northern boundary with the railway, continues south along the right bank of the river to terminate at its junction with Millstream Approach.
The Maltings and Central Car Park area	SALS 58A	Footpath starts to the south-east of the Millstream Coach Park and runs along the right bank of the Mill Stream in a southerly direction to the Avon Approach Bridge.
The Maltings and Central Car Park area	SALS 58	Continuing from the southern end of SALS58A, this footpath runs south from the Avon Approach Bridge along the right bank of the Mill Stream to the southern end of The Maltings at St Thomas Square.

The findings of a questionnaire issued as part of the public consultation on the Scheme between November 2020 and January 2021, found that within the Maltings and Central Car Park area, around two thirds of people (answering the

questionnaire) use the riverside footpaths and cycleways on a regular basis (ranging from daily to 1-3 times a week). These routes are used throughout the day, with the majority of respondent's peak time of use being in the late morning and afternoon.

There are also cycleways and informal footpaths within the Scheme area including:

- National Cycle Network (NCN) Route 45, which runs as a mainly traffic-free route along the right bank of the River Avon in the Scheme area from the timber river bridge adjacent to Ashley Road Open Space southwards to Swimming Pool Gate at the northern end of the Central Car Park. At this point, it crosses to the left bank of the River Avon and continues south to the Avon Approach Bridge where it runs along Avon Approach to Castle Street and exits the Scheme area. This is considered to be a high value receptor i.e. of national importance.
- Two traffic-free cycle routes (not on the NCN) form spurs off NCN 45. One runs west along the right bank of the River Avon from the timber bridge on the northern boundary of Ashley Road Open Space and then turns south to run along the southern boundary of Fisherton Recreation Ground to terminate at the junction with Coldharbour Lane. The other runs south along the right bank of the Millstream from Swimming Pool Gate to Millstream Approach. These informal cycle routes are considered to be low value receptors i.e. of district/parish importance.
- Informal footpaths (low value receptors i.e. of district/parish importance):
    - an unsurfaced desire line route crossing Fisherton Recreation Ground from the junction of the Coldharbour allotments access track and Coldharbour Lane in a northerly direction to the northern boundary of the recreation ground where it joins a gravel/exposed footpath route, which runs north-west to join SALS9 at the eastern side of Fisherton Farm Allotments;
    - an unsurfaced desire line route running along the eastern edge of Fisherton Recreation Ground from the northern corner of Coldharbour allotments to the northern boundary of the recreation ground where it joins the same gravel/exposed footpath route described above, which runs north-west to join SALS9 at the eastern side of Fisherton Farm Allotments;
    - a gravel surfaced riverside route running along the right bank of the River Avon from the Avon Valley Local Nature Reserve to the north, along the north-western boundary of Fisherton Recreation Ground and Ashley Road play park to the Summerlock Stream; and
    - an unsurfaced desire line route crossing Ashley Road Open Space in a north-easterly direction from adjacent to the Salisbury Fire Station to the timber bridge over the River Avon.

There are footways (i.e. paths alongside highways) in the study area which provide access to the riverside walk on Ashley Road and across Millstream Approach Bridge and Mill Stream Approach.

7.1.2 Recreational use of study area

A variety of recreational interests are represented in the study area (see Figure 7.1), which form part of Salisbury's green infrastructure network including:

- Fisherton Recreation Ground and Ashley Road Open Space (Ashley Green), which are the largest areas of informal leisure use and public open space in the study area.

  Fisherton Recreation Ground, which borders the northern boundary of Coldharbour Lane and Coldharbour Lane allotments lies within the Scheme area where a flood defence embankment and new channel/wetland habitat will be constructed. The recreation ground comprises an area of open amenity grassland, a children's formal play area and a multi-use games area. An estimation of visitor numbers is not available for this area. The recreation ground also includes a concrete cricket wicket, which is understood through consultation with Salisbury City Council to be rarely used**.** The temporary football pitch at Fisherton Recreation Ground was removed by Salisbury City Council in Summer 2020.

  Ashley Road Open Space, which borders the northern boundary of Ashley Road lies within the Scheme area where the new flood defence embankment will be constructed. The green is a popular venue, used occasionally for fun fairs, car boot sales (by Ashley Road Fire Station) and starting points for running and cycling races. The Outdoor Recreation Valuation (ORVal) tool (University of Exeter 2018) estimates that this area of open space has 81,907 visitors annually.

  The findings of a questionnaire prepared for public consultation on the Scheme found that around two thirds of people (answering the questionnaire) use Fisherton Recreation Ground and Ashley Road Open Space for walking and dog walking. The other top uses of the area include nature watching and cycling, respectively. People access these areas throughout the day, with the afternoon and late morning being the most popular times to use the open space and play facilities in the area.
- Avon Valley Nature Reserve is located immediately north-east of Fisherton Recreation Ground. The ORVal tool estimates that this reserve has 208,689 visitors annually. As this reserve is located outside of the Scheme area, it is not considered further in this assessment with regard to recreation;
- walking (including dog-walking) and cycling;
- angling (fly fishing and coarse fishing) by Salisbury and District Angling Club within the northern section of the study area;
- a children's formal play area to the south-east of the Maltings and Central Car Park area. As this play area is located outside of the Scheme area, it is not considered further in this assessment with regard to recreation;
- Salisbury Five Rivers Leisure Centre borders the northern edge of the Scheme area on the left bank of the River Avon. As this leisure centre is located outside of the Scheme area, it is not considered further in this assessment with regard to recreation;
- Riverside Tennis Club in the Scheme area adjacent to the Fisherton Farm allotments; and

- Queen Elizabeth Gardens which are located approximately 200m to the south-west of the Scheme area. As these gardens are located outside of the Scheme area, they are not considered further in this assessment with regard to recreation.

The areas of public open space within the Scheme area are considered to be of low value i.e. of district/parish importance.

Allotment gardens within the study area are discussed in Chapter 5 'Local Community'.

7.1.3 Changes to recreation and access in absence of the Scheme

In the absence of the Scheme, recreational facilities and formal and informal areas of public access will continue to be vulnerable to flooding. These effects will be exacerbated by climate change, which will increase the extent, severity and frequency of flooding.

In the absence of the Scheme, draft proposals by Salisbury Greenspace Partnership for Radial Greenway 1 'St Peters Place to City Centre' may continue, resulting in the construction of an off-road footpath and cycle within the Ashley Road area of the Scheme. This would link a development of 1250 new homes currently under construction at St Peter's Place with Ashley Road Open Space.

7.2 Likely significant effects

7.2.1 During construction

Public access

The construction of the Scheme will result in temporary disruption to public footpaths and cycleways and existing access across areas of public open space. This will include the closure and re-routing of some public footpaths and cyclepaths within parts of the Scheme area (see Figure 7.2). Impacts are assessed in Table 7.2 on the assumption that all affected routes will be closed and diverted throughout the construction period. It may be possible, however, to provide local diversions through the construction site if the Contractor considers this to be safe and practicable.

Users of the five public footpaths in the Scheme area will also be temporarily affected by noise and visual disruption from construction activities, which are discussed in other chapters.

Construction will result in temporary changes to walking/cycling routes for a duration of approximately 20 months in the Ashley Road area between February 2022 and October 2023 and for approximately 16 months in the Maltings and Central Car Park area between June 2022 and October 2023. This may also increase walking/cycling distances to existing destinations when the existing footpaths (e.g. across the existing Millstream Approach Bridge) are closed during construction. Such changes may affect the physical and mental health of footpath users and cyclists, which are discussed in Chapter 4 'Local community'.

Table 7.2: Impacts on PRoW, informal paths and cycleways during construction

Receptor	Description of effects	Proposed diversion route	Significance of effects
SALS 9 Public footpath across Fisherton Recreation Ground.	Temporary diversion of 565m of existing footpath to facilitate construction of new flood defence embankment, new channel and new wetland habitat area. Period: Approximately 20 months.	South-west along Ashley Road from Summerlock Bridge, then north along Coldharbour Lane and then north-east along north-western boundary of Fisherton Recreation Ground. Length of temporary diversion route: 646m.	Minor adverse - moderate adverse (based on moderate negative magnitude).
SALS 10 Public footpath on shared-use route around northern perimeter of Ashley Road Open Space.	Temporary diversion of 259m to facilitate construction of new flood defence embankment. Period: months - this footpath will be closed for a minimal time within the 20 month construction period in the Ashley Road area.	No diversion route to east end of SALS10 is assumed possible as this is located within the construction site. To access Five Rivers Leisure Centre: east along Ashley Road, then north-west along Hulse Road. Length of temporary diversion route: 200m.	Minor adverse - moderate adverse (based on moderate negative magnitude).
SALS 50.	Temporary diversion of 284m to facilitate construction of widened River Avon corridor including replacement Swimming Pool Gate bridge. Period: 16 months.	North-east along Nelson Road then south along Castle Street then west along Millstream Approach. Length of temporary diversion route: 434m.	Minor adverse - moderate adverse (based on moderate negative magnitude).
SALS 58A.	Temporary diversion of 126m to facilitate construction of in-channel works in Millstream.	West to River Avon then south along existing access road then south-east along Avon Approach.	Minor adverse - moderate adverse (based on moderate

Receptor	Description of effects	Proposed diversion route	Significance of effects
	Period: 3 months.	Length of temporary diversion route: 201m	negative magnitude).
SALS 58.	Temporary diversion of 227m (from Avon Approach to north end of The Maltings) to facilitate construction of in-channel works in Millstream. Period: 3 months.	South-west through Avon Approach car park and then south through public open space to The Maltings. Length of temporary diversion route: 242m.	Minor adverse - moderate adverse (based on moderate negative magnitude).
Informal footpaths including the riverside path at Fisherton Recreation Ground.	Temporary closure to facilitate construction of new flood defence embankment, new channel and new wetland habitat area. Period: 20 months.	None proposed, however local diversions through or around the construction site may be possible.	Minor adverse (based on moderate negative magnitude).
National Cycle Network Route 45 - Ashley Road Open Space.	Temporary diversion of 160m length between Ashley Road and crossing on Hulse Road to facilitate construction of new flood defence embankment. Period: 20 months.	East along Ashley Road, then north-west along Hulse Road. Length of temporary diversion route: 195m.	Moderate adverse (based on moderate negative magnitude).
National Cycle Network Route 45 - The Maltings.	Temporary diversion of 586m length to facilitate construction of widened River Avon corridor including replacement Swimming Pool Gate bridge. Period: 16 months.	North-east along Nelson Road then south along Castle Street to Millstream Approach. Length of temporary diversion route: 614m.	Moderate adverse (based on moderate negative magnitude).
Informal cycle route - Ashley Road / Fisherton	Temporary closure of 358m length to facilitate construction of new flood defence embankment, new	None proposed, however local diversions through or around the	Minor adverse (based on moderate

Receptor	Description of effects	Proposed diversion route	Significance of effects
Recreation Ground.	channel and new wetland habitat area. Period: 20 months.	construction site may be possible.	negative magnitude).
Informal cycle route - Swimming Pool Gate to Millstream Approach.	Temporary closure of 51m length to facilitate construction of widened River Avon corridor including replacing Swimming Pool Gate bridge. Period: 16 months.	None proposed, however local diversions through or around the construction site may be possible.	Minor adverse (based on moderate negative magnitude).

Recreational use of Scheme area

Public access to and recreational use of areas of public open space will be reduced over the summers of 2022 and 2023.

The Scheme will result in over 4ha of public open space being unusable throughout most of the two-year construction period of the Scheme, resulting in direct **minor to moderate adverse impacts** on recreational users (based on low value amenity receptors and a major negative magnitude). This will affect:

- Fisherton Recreation Ground – it is assumed that the whole of the recreation ground (2.7ha) will be temporarily closed for nearly two years during construction including associated amenities such as the children's play area and multi-games area; and
- Ashley Road Open Space – it is assumed that the whole of the open space (1.7ha) will be temporarily closed for nearly two years during construction of the Scheme but some parts of this open space (including public rights of way will be opened sooner).

The Scheme will not have any direct impacts on the Riverside Tennis Club.

7.2.2 During operation

Public access

The overall Scheme once operational, will provide a long-term reduction in the risk of flooding to a variety of amenity assets (including PRoW, public access land and recreation grounds). This represents **minor beneficial to moderate beneficial impacts** (based on a moderate positive magnitude and low to high value receptors). The associated health and well-being benefits to recreational users is considered in Chapter 5 'Local Community'.

The Scheme will: retain all existing public footpaths and cycle routes within the Scheme area (on new alignments in some instances); provide improvements in terms of upgraded footpath surfacing and the provision of new segregated footpaths and cycle tracks instead of the existing shared-use routes; improve

signage; and provide new lengths of footpath at Ashley Road Open Space, Fisherton Recreation Ground and the Maltings.

The new and improved footpaths and cycle routes will link with the existing network and allowance has been made to accommodate potential future proposals (e.g. the Radial Greenway 1 'St Peters Place to City Centre' and the Wiltshire Cycle Network) into the Scheme design. Several of these footpaths and cycleways will cross new bridges over the new wetland area at Ashley Road and at Swimming Pool Gate and over a new footbridge approximately 70m to the south of the existing Millstream Approach Bridge. These improvements to the green infrastructure of the city are considered to be direct **minor beneficial impacts** of the Scheme (based on medium value receptors and minor positive magnitude). During public consultation on the final Scheme between November 2020 and January 2021, the majority of respondents (over two thirds) confirmed that the Scheme will encourage them to use the pedestrian and cycle routes through the area more often (with associated beneficial health impacts discussed in Chapter 5 'Local Community').

There will also be an increase in the number of new obstructions (e.g. ramps over new flood defence embankments) across some existing public footpaths and cycleways in the Scheme area. The amount of flat amenity grassland will be reduced in both Fisherton Recreation Ground and Ashley Road Open Space as a result of the construction of the flood embankment and wetland habitat area. All footpath ramps will be designed to comply with disabled access design requirements and all cycleways will be designed to comply with current best practice guidance (Local Transport Note 1/20, Cycle infrastructure design). These are considered to be **minor adverse impacts** (based on medium value receptors and minor negative magnitude) with the effects more notable for less mobile users or pushchair users.

Table 7.3 assesses the impacts of the Scheme on individual PRoW, informal paths and cycleways and Figure 7.2 shows the proposed permanent diversions of the PRoW.

Table 7.3: Impacts on PRoW, informal paths and cycleways during operation

Receptor	Description of effects	Proposed diversion route	Significance of effects
SALS 9 Public footpath across Fisherton Recreation Ground.	Permanent diversion of 565m (287m of which is shared-use footpath / cycleway or on-road) because of new flood defence embankment, new channel and new wetland habitat. New diverted route to comprise a pedestrian only, off-road route 518m	From its eastern junction with Ashley Road adjacent to the road bridge over the Summerlock Stream, the diversion route will ramp up and over the proposed flood embankment to the north of Ashley Road, turn left adjacent to the River Avon to follow a new route which will run around the western edge of a	Minor beneficial (based on minor positive magnitude). New footpath will be slightly shorter, fully off-road, segregated for pedestrian use only with improved surfacing and visual amenity. Ramp may inconvenience some users but will enable disabled/ pushchair access along bound

Receptor	Description of effects	Proposed diversion route	Significance of effects
	long, 420m of which will have an improved bound surface, to incorporate a 1:20 gradient ramped access over a flood embankment.	new wetland habitat to the northern corner of Fisherton Recreation Ground. At this point, the diversion route will join an existing informal footpath which runs in a north-westerly direction for approximately 110m to adjoin the existing SALS9 route.	surfaced section of footpath.
SALS 10 Public footpath on shared-use route around northern perimeter of Ashley Road Open Space.	Existing route between footbridge and Ashley Road to be retained but changed from shared cycle and pedestrian use to pedestrian only use.	No diversion required.	Minor beneficial (based on minor positive magnitude). Segregated footpath and cycle routes will reduce risk of conflict between users.
SALS 50	No operational impacts.	No diversion required	Nil
SALS 58A	No operational impacts.	No diversion required	Nil
SALS 58	No operational impacts.	No diversion required	Nil
Informal footpaths including the riverside path at Fisherton Recreation Ground	Access along informal footpath routes will be reinstated, albeit with minor realignment in places and access over flood embankments via ramps required in two locations. New informal routes on two boardwalks will be created through	Minor localised realignments on routes to avoid new wetland or access ramps over embankments.	Minor beneficial impacts. Local realignments and ramps offset by beneficial impacts from surfacing improvements.

Receptor	Description of effects	Proposed diversion route	Significance of effects
	the new wetland area. The riverside path will be partially changed to boardwalk with the surface of the remaining length improved. The route across Ashley Road Open Space from the fire station to the existing footbridge will be provided with a bound surface.		
National Cycle Network Route 45 - Ashley Road Open Space	Permanent diversion of 95m length of cycleway currently on shared-use cycleway and pedestrian route between Ashley Road and existing footbridge. Shared use route to be changed to pedestrian only use. New diverted cycle route to comprise segregated cycleway between Ashley Road and existing footbridge and. To incorporate a 1:20 gradient ramped access over a flood embankment.	The permanent diversion, which will be 104m in length will cross Ashley Road Open Space as a segregated cycle track set back from the River Avon by up to 35m to enable the retention of 3 mature willow trees. This will increase cycling distances by approximately 9m and will result in an elevation change as a ramp will be required over the new flood defence embankment.	Minor to moderate adverse (based on minor negative magnitude). Diversion is less direct and will not follow the River Avon and therefore may be less visually appealing. Ramp may inconvenience some users. Segregated footpath and cycle routes will reduce risk of conflict between users.
National Cycle Network	Permanent diversion of 138m section from	South-east from Swimming Pool Gate on segregated cycle	Minor to moderate adverse (based on

Receptor	Description of effects	Proposed diversion route	Significance of effects
Route 45 - The Maltings	Swimming Pool Gate bridge to south-west corner of coach park.	track on right bank of Millstream to cross Milllstream Approach via a toucan crossing, then around the east and south side of the coach park to rejoin the existing route. The 156m long diversion will increase the route by 18m.	minor negative magnitude). Slightly less direct route. Toucan crossing will make road crossing safer.
Informal cycle route - Ashley Road / Fisherton Recreation Ground	Permanent diversion of 358m length of cycleway between footbridge (to the Five Rivers Leisure Centre) and Coldharbour Lane to a new segregated cycle track along a similar alignment.	The permanent cycleway diversion will run as a segregated cycle track west from the footbridge and around the northern boundary of the Ashley Road allotment site to join Coldharbour Lane. Length 368m. It will incorporate a bridge crossing of the realigned Summerlock Stream and a 1:20 gradient ramp over the new flood embankment.	Minor beneficial (based on minor positive magnitude). Diversion will have an improved bound surface and improved geometry. Segregated footpath and cycle routes will reduce risk of conflict between users. Ramp may inconvenience some users.
Informal cycle route - Swimming Pool Gate to Millstream Approach	To be incorporated within diverted route of NCN 45.	No diversion required.	Minor beneficial (based on minor positive magnitude). Route will be upgraded to segregated cycle track.

Recreational use of Scheme area

The long-term reduction in flood risk to recreational assets has been assessed under ‘Public access’ and is therefore not repeated in this sub-section.

The recreational value of some parts of the Scheme area will be improved in the long-term, through the creation of a more attractive and diverse landscape (which is discussed further in Chapter 8 ‘Landscape and visual amenity). There

will be long-term improvements to informal recreation, amenity, public realm and green infrastructure for recreational users resulting from the creation of new wetland habitat at Fisherton Recreation Ground and the widened River Avon corridor. These comprise

- creation of a picnic area adjacent to the new wetland habitat at Fisherton Recreation Ground;
- creation of three shingle beaches; adjacent to the new wetland habitat area at Fisherton Recreation Ground, adjacent to the existing Summerlock Channel at Ashley Road Open Space and a shingle beach with stepping stones approximately 40m north of the Avon Approach Bridge in the Maltings and Central Car Park area. While it is an objective of the Scheme to encourage more pedestrian and cycle use of the newly created River Park, we have designed the improved river corridor to set aside spaces for undisturbed habitat where access will be discouraged;
- new river viewing platforms along the River Avon adjacent to Fisherton Recreation Ground and Ashley Road Open Space;
- installation of two benches in the Ashley Road area plus an information board to provide background to the Scheme and describe the new wetland habitat;
- an 'improved' replacement play area in Ashley Road Open Space for a multi-user culture, which will be well designed and provide a more stimulating play space than the existing play space at Fisherton Recreation Ground. The play area will encourage cross-generational interaction, provide facilities for the disabled and broaden notions of play to include visual and sensorial experiences alongside physical activity;
- creation of a new pocket park with seating and an information point at the confluence of the Mill Stream and River Avon, just to the north of the existing Millstream Approach Bridge;
- creation of a multi-use games area and informal recreational area with space for a 7-a-side football pitch at Fisherton Recreation Ground; and
- creation of a linear public amenity space along the right bank of the widened River Avon corridor in The Maltings.

These changes, which will contribute to urban greening and provide an improved interface between recreational areas and the river environment are considered to be direct **minor beneficial impacts of** the Scheme (based on low value receptors and moderate positive magnitude). These recreational and amenity benefits have also been valued in a high-level quantitative assessment carried out as part of the Ecosystem Services Assessment provided in Appendix K.

The widened River Avon corridor will also provide future opportunities for the installation of public art, during future phases of the Salisbury River Park Master Plan.

Following the presentation of three alternative design options for the Ashley Road area at a public information event in 2019, we selected the most publicly favoured option, which maximises the amount of available land for amenity purposes while retaining areas of wetland habitat and tree planting (but on a

smaller scale). However, there will still be a permanent reduction of level open space (amenity grassland) at Fisherton Recreation Ground and Ashley Road Open Space from the existing 4.4ha to 2.2ha, with the introduction of the new flood embankment (0.9ha), proposed wetland and wet woodland habitat (0.9ha) and relocated and improved play park (0.1ha).This may change the future use of the land for leisure activities and public events including fun fairs and car boot sales. The cricket wicket at Fisherton Recreation Ground will also be permanently lost; however there is evidence to suggest this amenity facility is currently not used.

7.3 Mitigation

The following mitigation measures will be applied during the construction period:

- the public, landowners, businesses and recreational users affected by the Scheme will continue to be consulted during the construction;
- works will be undertaken in accordance with the EAP (see Appendix N);
- we will take care to ensure that phasing of the works will not affect all access points to the River Avon corridor in the Maltings and Central Car Park area simultaneously. Any alternative access will be signed;
- minimise the duration of footpath and cycleway closures as much as possible, particularly SALS10 footpath within Ashley Road Open Space that links Ashley Road to the Five Rivers Leisure Centre.
- mitigation measures relating to the PRoW will be detailed in a Construction Traffic Management Plan (Outline CTMP in Appendix P1 will be updated during the detailed design stage of the Scheme). We will include the following measures in the CTMP:
    - continue to work with Wiltshire Council PRoW officer to pre-agree appropriate closure/diversion routes for footpaths and cycle paths with the identification of appropriate alternative routes to accommodate users of the footpaths and strategic cycling corridor, and provide signage prior to closures/diversion. We will re-open footpaths and cycle paths as soon as there is no longer any safety risk to the public;
    - temporary diversions will be within acceptable distance thresholds for users and aligned with desire lines. Where interfacing with routes, hoardings will enclose the work area to contain construction activities. Where hoarding will need to encroach onto the existing footpath to provide working space for construction activities, a general minimum footpath width of 2m will be maintained;
    - inform the local community of the nature and duration of the temporary footpath/cycleway closures (and diversions) and alternative provisions of access through signage and webpage updates. Where temporary diversions involve shared use paths, some routes will be coordinated to avoid conflicts for pedestrians;
    - ensure that construction materials and soil are swept off any affected footpaths and cycleways;

- maintain signage adjacent to the public open spaces, to inform the local community of the works taking place and access restrictions;
- fence off areas of land within and adjacent to our working area to prohibit recreational users but will seek to maintain existing public access to as much land as possible. We will also seek to open areas in winter, where practical, if this can be done safely; and

- where possible, access along the PRoW where they cross the works area will be managed through very localised diversions managed by banksmen, with users segregated from the works area via rope fencing. During detailed design, further consideration will be given to avoiding temporary disturbance to PRoW in the Ashley Road area (where very short term and localised diversions are required) during late morning and afternoon where possible, which are understood to be the most popular times to use the open space.

7.4 Residual effects

The residual effects on recreation and access are presented in Table 7.4.

Table 7.4: Residual impacts on recreation and access

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
Recreational users (low to high)	Temporary partial loss of existing access across existing areas of public open space as well as temporary closure of up to five public footpaths and part of NCN 45 and informal paths during construction with associated increases in walking/cycling distances.	Minor adverse to minor - moderate adverse	Measures detailed in a CTMP will include: • informing (and pre-agreeing) local community of closures/diversions • re-open paths as soon as there is no longer a safety risk • any diversions will be within acceptable distance thresholds and aligned with desire lines, and hoardings to enclose works area • construction materials swept off affected paths • continued liaison with affected	Minor adverse

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
			landowners, tenants, businesses and recreational users	
Pedestrians and cyclists (low)	Temporary closure of 4.5ha of public access land/open space during construction	Minor adverse to moderate adverse	Signage will be maintained adjacent to the public open spaces, to inform the local community of the works taking place and access restrictions.	Minor adverse
	Permanent change in use of some public access land /open space	Minor adverse	Enrichment of public open space by introduction of new amenity features and habitats.	Minor beneficial
	Permanent new and improved footpaths and cycleways with greater connectivity to city centre	Minor beneficial	No mitigation required	Minor beneficial
	Permanent new ramps and elevation changes to some public footpaths and cycleways	Minor adverse	Compliance with best practice design guidance including our 'Access for All' design guide, which encourages the development of inclusive access in the external environment for a wide range of users. New ramps will be compliant with the Equality Act 2010.	Minor adverse
Recreational users (low to high)	Permanent reduced flood risk to recreational assets	Moderate beneficial	No mitigation required	Moderate beneficial - significant

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	(including PRoW, public access land, parks, recreation grounds)			
Recreational users (low)	Permanent new amenity facilities including picnic areas, shingle beaches, river viewing platforms, benches, replacement play area, new pocket park and linear public amenity space along River Avon corridor in The Maltings.	Minor beneficial	No mitigation required	Minor beneficial

8 Landscape and visual amenity

8.1 Existing environment

The study area for the landscape and visual impact assessment (LVIA) includes the Scheme area and a 300m buffer zone which includes the extent of the wider surrounding landscape which the Scheme may affect. This includes the extent of local landscape character areas (LCA) likely to be affected either directly or indirectly and the area within which visual impacts from the Scheme are likely to be experienced.

Three local LCAs have been defined for this assessment, each of which have a landscape character distinct from the others. These comprise Ashley Road Open Space/Fisherton Recreation Ground (LCA1), the Maltings and Central Car Park (LCA2) and the Mill Stream (LCA3). The LCAs are described in more detail in Section 8.1.1 and are shown on the baseline Landscape Character plans (Figures 8.1 and 8.2) in Appendix E1.

The area within which visual impacts are likely to be experienced is referred to as the Zone of Theoretical Visibility (ZTV) and is shown on the Visual Amenity plans (Figures 8.3 and 8.4) in Appendix E1. The ZTV is more extensive than the affected LCA.

There are no landscape designations applicable to the study area. The Ashley Road area is wholly located within the Stratford-sub-Castle Conservation Area. The eastern part of the Maltings and Central Car Park and the Mill Stream areas are located within the City of Salisbury Conservation Area, including the River Avon channel but excluding the main car park to the west of this.

There are several Tree Preservation Orders (TPO) present within the study area, located on the east bank of the River Avon at Ashley Road and on the east bank of the Mill Stream in the Maltings and Central Car Park area.

There are a number of public rights of way, informal footpaths and cycle routes (including National Cycle Network Route 45) which run through the study area. The impacts of the Scheme on the visual amenity of people using these access routes are assessed in this chapter. The impacts of the Scheme on the public use of these access routes are assessed in Chapter 7 ‘Recreation and access’.

The Conservation Areas, TPOs and access routes are shown on the baseline Landscape Character plans (Figures 8.1 and 8.2) and the Visual Amenity plans (Figures 8.3 and 8.4) in Appendix E1.

8.1.1 Landscape character

National, county, district and city level landscape character assessments

The study area falls within National Character Area (NCA) 132: Salisbury Plain and West Wiltshire Downs. Salisbury is the main urban area within the NCA, which is identified as ‘Salisbury, an ecclesiastical centre since the early medieval period and now a tourist and local administration centre, with a well-preserved historic core, and a cathedral whose spire has long been a feature in the surrounding landscape.’

Two environmental opportunities, of relevance to the Scheme are identified within the NCA:

- Statement of Environmental Opportunity (SEO) 1: Protect, manage and enhance the landscape of large areas of calcareous chalk grassland, and develop network connectivity, supporting internationally important and designated semi-natural habitats and species assemblages – from birds to bumblebees – and thus support biodiversity;
    - considering the historical significance of boundaries in the context of re-creating network connectivity and wildlife corridors in the interests of biodiversity, and seeking to have any new boundary features consistent with the current landscape.
- SEO 2: Protect, manage and enhance the (Hampshire) River Avon system, working in partnership notably with the regional farming community to improve the habitat for flora and fauna and improving biodiversity, developing the scope for climate regulation and for regulation of water flow and water quality:
    - working with local groups, such as the Harnham Water Meadows Trust, south of Salisbury, protecting and enhancing traditional flood management systems, and their watermeadows and earthworks, looking for scope to extend them, and working to ensure that communities learn from such work;
    - monitoring chalk streams in the light of climate change and working with partners, for example the Wessex Chalk Streams Project, on the protection of water flow;
    - seeking to improve riparian tree cover where possible on a site-specific basis, exploring the benefits to landowners that may encourage them to foster shading of the river in order to assist in climate regulation and aid biodiversity;
    - working with those delivering under the Water Framework Directive, specifically in the interests of improving and safeguarding the water and ecological quality of the chalk streams; and
    - working to maintain the River Avon SAC and its biodiversity of flora and fauna, and contributing to the network of Natura 2000 sites.

At a county level, the Wiltshire LCA (Wiltshire County Council, LUC 2005) locates the Scheme within ‘Landscape Character Type 5: Chalk River Valley’ at the county scale but at a local scale differentiates the Ashley Road Open Space and Fisherton Recreation Ground area as located within ‘Type 5D Upper Avon Chalk River Valley’ and the Maltings and Central Car Park area as located within ‘Urban Area’. Key characteristics of the ‘Chalk River Valley’ pertinent to the Scheme include:

- hedgerows and hedgerow trees add to the lush and enclosed feel of the valleys;
- riparian woodland, lines of poplar along ditches and willow pollards;
- diverse mosaic of land cover and habitats includes meadow, fen and wet woodland on valley floor; and
- clear fast flowing chalk rivers and stream and key habitat.

With regard to biodiversity, '*The spring fed streams and rivers, which incise the chalk upland are rich in plant and animal communities, deriving, in part, from the high-quality of the base-rich water which is naturally clear and fast flowing. The rivers irrigate the valley floodplains to create a rich mosaic of associated wetland habitats including water meadows, damp pasture, wet woodland and fens. The high ecological importance of the Chalk River Valley Landscape Type is reflected in the number of SSSI within the Type…. Substantial proportions of the River Kennet, River Avon System and River Till SSSIs lie within the type and the international significance of the River Avon and River Kennet and Lambourn Floodplain are indicated by their designation as SACs. The River Avon has over 180 species of aquatic plant recorded plus one of the most diverse fish faunas in Britain*'.

In terms of settlement and built character *'The river valleys contain a concentration of settlement, following a very distinctive pattern... The settlements include ... the major settlements of Warminster and Salisbury. The latter has a major influence on the type as, apart from the Kennet, all the Chalk River Valleys converge at Salisbury. Views of the cathedral are characteristic of area 5B: Lower Avon Chalk River Valley in particular. Building materials show a rich vernacular tradition with frequent red brick, sometimes combined in intricate chequerboard patterns with flint, chalk, render plus timber frame and weatherboard and thatch or clay tile roofs*'.

The 'Type 5D: Upper Avon Chalk River Valley' is described as follows: '*The sheltered and enclosed valley with its intricate pattern of small pastoral fields, woodlands and scattered villages contrasts strongly with the open, simple landscape of the downs. The area has a rich ecology with the River Avon (SAC), wet woodlands, commercial poplar plantations, hanging valley side woodlands linked by full hedgerows and hedgerow trees, plus meadows*'.

At a district level, the Ashley Road Open Space and Fisherton Recreation Ground area lies at the southern extent of the 'A2 Upper Avon Narrow Chalk River Valley' landscape character area as defined in the Salisbury District Landscape Character Assessment (SDC 2008), which is part of the South Wiltshire Landscape Character Assessment 2008. The Maltings and Central Car Park area is not included within the boundary of this landscape character area. Key characteristics of this predominantly rural landscape character area are defined in the assessment but few of these characteristics pertain to the Ashley Road area due to its sub-urban surrounding environment. Relevant key characteristics are limited to:

- rich ecology throughout, both within the river and within wet woodlands along the corridor;
- long history of settlement apparent.

The overall condition of the landscape character area is considered to be good due to the rich biodiversity within the river and adjacent riparian woodlands. Key landscape changes which may be of relevance to the Ashley Road area include:

- agricultural intensification leading to a gradual drainage and improvement of permanent pasture on the floodplain and loss of riparian vegetation;
- potential visually intrusive new modern development along the valley sides.

The overall management strategy for the landscape character area should be to conserve the strong sense of tranquillity, predominantly rural character and intimate, small scale pattern throughout. There are also opportunities for restoration and

replanting of hedgerows, hedgerow trees and waterside meadows. Specific management objectives which may be of relevance to the Ashley Road area include:

- conserve views across and along the valley corridor;
- protect the nature conservation value of the River Avon; and
- conserve the strong sense of tranquillity and predominantly rural character throughout.

The Salisbury District Settlement Setting Assessment (2008) was commissioned alongside the Salisbury District Landscape Character Assessment. This report assesses the areas around Salisbury and Wilton which form the setting of these settlements. Of relevance to the Scheme proposals, the report states *"The river systems that wind through the area are a particular feature, including the River Avon and its tributaries. The floodplains are considered to be of landscape and ecological importance and the valleys are also of historic importance, particularly where remnants of the water meadow system still exist". Paragraph 3.8.3 states that the River Avon valley is "considered to be of outstanding landscape and ecological importance".*

Figure 3.8 (Special Qualities to be Safeguarded) shows the River Avon corridor (including the Ashley Road area) as a *'Green finger / Corridor' and as "Distinctive and supportive landscape".* Paragraph 3.8.12 explains that *"Green fingers or corridors are the widths of countryside or green space, usually with public access, penetrating from the open countryside into the urban fabric. They provide the settings for open approaches into the city, access for pedestrians and cyclists out into the countryside, corridors for wildlife, and an important landscape setting to some edges of the settlements."* Paragraph 3.8.13 goes on to say *"The River Avon is an especially important green finger/corridor passing through the heart of Salisbury. Part of it, the water meadows, forms an intrinsic element of the city's historic core. This green finger/corridor, amongst others, comprises a number of qualities that form critical elements in defining both historic settlements and their intrinsic setting".*

The assessment makes development capacity recommendations for the setting of Salisbury which, in relation to the Scheme area, include:

- ensure that any new development respects the scale, setting and form of the existing settlement and appropriate design and mitigation measures are put in place to accommodate new development with significant adverse effects on the landscape and townscape;
- a distinctive feature within both settlements is the intrinsic relationship they possess with their river valley setting, including 'green fingers/corridors' that provide links between the settlement core and the open countryside. Rural river valley landscapes protrude into the heart of the settlements, in most cases complementing and/or enhancing their character; providing the foreground of many key views to the historic core. The green fingers/corridors need to be conserved and managed to ensure new development will not impose unacceptable adverse effects on the character of the landscape, or the way that it is perceived, and without compromising the values attached to it;
- conserve the 'human scale' of Salisbury and enhance ease of travel within the settlement by foot and bicycle; particularly between the suburbs and the historic core. Ensure peripheral development is easily accessed via coherent, direct,

attractive, safe, comfortable and legible footpaths and cycle paths, which link into the existing greenspace (including 'green fingers/corridors') and public footpath / cycle path network;

- the rural river valley landscape, including areas of water meadows beside watercourses, combine to form an important visual and historical setting to the urban form of [Salisbury]…any new development and/or change proposed should be accommodated without having unacceptable adverse effects on the character of these special rural river valley landscapes;
- ensure all new developments adhere to the set of place-making principles and standards of good urban design as established by CABE and English Partnerships, to ensure a strong identity and sense of place. These include connectivity, development grain, mixed use, quality public realm, legibility, robustness and visual delight;
- conserve key views that strongly contribute to memorable and distinctive approaches to Salisbury. Resist new development that disrupts key views to important landmarks and features within Salisbury and its setting; and
- maintain and enhance community allotment gardens, which provide valuable green spaces and community assets.

Figure 3.5 (Visual Assessment) of the Setting Assessment shows the Ashley Road area located within an area of townscape/countryside interface with "level views, countryside or river valley foreground, and a generally soft, well integrated settlement edge". Figure 3.7 (Townscape and Landscape Role and Function) identifies the Ashley Road area as 'Supportive Townscape / Landscape" which "support the historic cores and areas distinctive to the settlements [i.e. Salisbury]. They provide the backdrop and ambience and bolster the sense of place of the settlements and their approaches." Figure 3.7 identifies the Central Car Park area as "Weak Townscape / Landscape" which "detract from the distinctive and special character of the settlements and their setting. These may include routes, edges, built elements or districts, or degraded landscapes that contribute to an area of weak townscape / landscape".

Figure 3.5 also identifies a 'key elevated panoramic view to Salisbury' from Old Sarum within which the Ashley Road Open Space area lies along the view alignment between Old Sarum and Salisbury Cathedral. This view is also identified as a 'key fixed view' in the City of Salisbury Conservation Area Appraisal and Management Plan (Wiltshire Council, adopted 2014), which states of this and other strategic views: *'These views are highly sensitive to change and are of national significance. All development within these view corridors should be the subject of a full Landscape Impact Assessment; to assess their impact on the cultural, aesthetic and historic character of these internationally celebrated views*'.

The Ashley Road area is located within the southern limit of the Stratford-sub-Castle Conservation Area, which appears to have been designated to preserve the wider setting of the scheduled Old Sarum hillfort and Stratford-sub-Castle village by preventing urban sprawl to the west and south. There is no current Conservation Area Appraisal or Management Plan for the asset.

The City of Salisbury Conservation Area Appraisal and Management Plan identifies the eastern part of the Maltings and Central Car Park area (from the River Avon

eastwards) and the Mill Stream as located within ‘Character Area 6: Mill stream and riverside’. The Ashley Road area is not covered by this plan.

Key characteristics of ‘Character Area 6: Mill stream and riverside’ comprise:

- both the river and mill stream link a number of character areas together and form an important pivotal role in the Conservation Area;
- views from the west bank of the river across to the rear gardens (and garden outbuildings) of Castle Street (and to a lesser extent The Close, at the southern end of the character area) are particularly important to the character of these buildings backing onto these, largely domestic spaces which run down to the riverside. These private spaces are sensitive to change given their public role of providing a setting for the mostly statutory listed buildings fronting Castle Street;
- to the northern section of the riverside, mature trees form an important part of the character of the Conservation Area and screen modern development to Castle Street from views across the former cattle market area;
- the southern section is also dominated by mature trees particularly where this part of the character area links with the water meadows to the south which includes Queen Elizabeth Gardens (to the west) and the mature rear gardens of The Close;
- access to and enjoyment of the riverside is an important part of the character of this part of the city.

The Conservation Area Appraisal and Management Plan also states of the Central Car Park: *'At present central car park is a sea of undulating tarmac with a covered car park and superstore to the south and bordered on the west by the railway line and the east by the River Avon. The site is conveniently located within a footpath network as well as having access from a number of directions. It provides a significant amount of car and coach car parking for the city but is an unattractive and unfriendly space for the pedestrian. It is not possible to walk along the banks of the river without trespassing on to car parking territory*'.

Local landscape character

As referred to above, three broadly homogenous LCAs within the Scheme area have been defined for the assessment, following a review of existing landscape assessments and site survey work. These LCAs are illustrated on the baseline Landscape Character plans (Figures 8.1 and 8.2) in Appendix E1 and are described below. Photographs of the site which illustrate the context of the local landscape character are presented in Figures 8.5 and 8.6 in Appendix E1.

Landscape Character Area 1 (LCA1): Ashley Road Open Space and Fisherton Recreation Ground

Plate 1: Fisherton Recreation Ground and Ashley Road Open Space (© Bluesky International Limited)

LCA1 comprises the southern end of the visually cohesive green approach to Salisbury along the River Avon valley and marks the point at which the river corridor passes from a rural into a strongly urban context LCA1 comprises two irregularly shaped, flat areas of public open space primarily consisting of managed amenity grassland situated in the floodplain between the right bank of the River Avon and Ashley Road. These areas are interconnected by a narrower area of grassland on which is located a children's play area. The northern and eastern boundary of the LCA is formed by the River Avon, the western boundary is formed by a hedge beyond which lies a large area of allotments, and the southern boundary is formed by Coldharbour Lane and Ashley Road, residential areas and Coldharbour Lane allotments. The boundary between Coldharbour Lane allotments and LCA1 comprises a trimmed privet hedge alongside the access track on the western side of the allotments and a mixed native species hedge along the north-eastern side of the allotments.

Distinctive landscape features include the River Avon, the Summerlock Stream (which bisects the LCA), approximately nine mature native black poplars adjacent to the River Avon, as well as several specimen trees in Ashley Road Open Space. The northern riparian boundary supports a strip of native trees and shrubs growing adjacent to a former drainage ditch which supports marginal wetland plant species. Historically used as water meadows, the areas are now used for recreational purposes including dog walking, informal games including football, use of a multi-games area and a play area, and simply enjoying fresh air and a natural, outdoor environment. Ashley Road Open Space is also used infrequently to hold events such as car boot sales. As well as several public and informal footpaths and cycleways (including National Cycle Network Route 45), a riverside path follows the River Avon along the northern edge of Fisherton Recreation Ground and continues past the

allotments to link up with the Avon Valley Nature Reserve. Levels of tranquillity are reasonably high in this traffic-free semi-rural park land setting.

LCA1 has elements of high landscape value, such as the river channels and large mature trees and elements of high cultural value, principally for its public access routes and recreational use. A number of Lombardy poplars have been planted adjacent to the access track to the Coldharbour Lane allotments. These have some historic resonance in so much as some of John Constable's paintings of the Salisbury area feature some of the first poplars planted in this country in the early 19th century. Due to these elements, the LCA is deemed to be of high landscape sensitivity (see Table 4.11 in Chapter 4 of this ES).

Landscape Character Area 2 (LCA2): The Maltings and Central Car Park

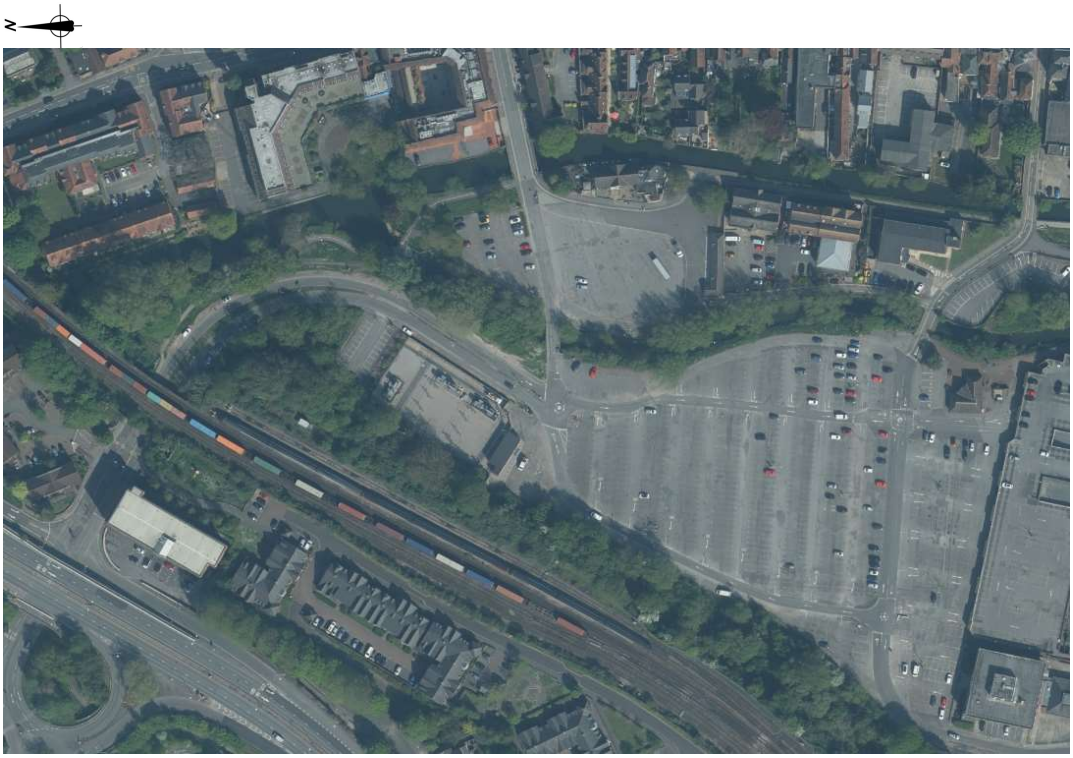


Plate 2: The Maltings and Central Car Park (90º rotated view, north to left of page) (© Bluesky International Limited)

LCA2 comprises a flat, largely open area of tarmac car and coach parking bisected by a sinuous length of the River Avon corridor, to the east of which are located NHS and other healthcare buildings and a currently disused public house. As a surface car park, it is identified in the Salisbury District Settlement Setting Assessment as a significant area of "weak townscape". Its overall character is distinctly urban and utilitarian, although it does contain some elements of landscape value. The eastern boundary is formed by the Mill Stream (LCA3), the western boundary is formed by a railway embankment and line and the southern boundary by commercial development, principally a Sainsbury's supermarket and shops associated with an area called The Maltings. Distinctive landscape features of value are limited to the River Avon, an area of open space supporting a number of mature trees and access routes at the northern end of the LCA and bands of native trees and shrubs growing along the river corridor and on the railway embankment. The River Avon is not a

visible feature within the area, being hidden from open sight in many places by artificial revetments and unmanaged riparian vegetation, but there is a small area of open space at the northern end of the river channel adjacent to the head of the Mill stream which has some seating overlooking the river. Distant views of the spires of Salisbury Cathedral and the United Reformed Church on Fisherton Street are available from certain locations within the LCA. Detracting features include the large extents of tarmac present in the Central Car Park and the Coach Park. Historically used as water meadows, current land use is limited to parking and public health provision. Several lengths of public footpath run through the LCA, as well as National Cycle Network Route 45, generally running adjacent to the River Avon and Mill Stream corridors. Levels of tranquillity are generally low due to the amount of traffic within the LCA.

Although LCA2 contains a few elements of high landscape value such as the river channels and large mature trees, and has some cultural value arising from its public access routes and the fact that part of it lies within a Conservation Area, its natural landscape condition has been subject to significant detrimental change over most of its area. Due to the negative influence of this change, the LCA is deemed to be of medium landscape sensitivity (see Table 4.11 in Chapter 4 of this ES).

Landscape Character Area 3 (LCA3): The Mill Stream

Plate 3: The Mill Stream (90o rotated view, north to left of page) (© Bluesky International Limited)

LCA3 comprises the Mill Stream, presumed to be an artificial water course constructed in or before the 13th century to supply water to power the mills at the downstream end of the channel at the Maltings. It comprises a reasonably wide, shallow watercourse which is retained within vertical revetments over its full length between its offtake from the River Avon at Swimming Pool Gate to its confluence again with the River Avon south of the Maltings adjacent to Fisherton Street. The channel supports limited areas of marginal and aquatic vegetation in places, self-sown shrubs have established on its edges and mature trees in gardens and areas of public space frequently line its route. Its western boundary is formed by a public footpath and associated metal railings which run between the Mill Stream and the adjacent areas of LCA2 (comprising the coach park, NHS buildings and the play area adjacent to the Maltings). Its eastern boundary is formed predominantly by commercial buildings between the Maltings and Avon Approach, by residential gardens and properties between Avon Approach and Mill Stream Approach and a commercial building between Mill Stream Approach and Swimming Pool Gate. The footpath running along the western edge of the Mill Stream is well used and offers a tranquil and generally attractive route for pedestrian use.

LCA3 contains elements of high landscape value, such as the channel itself and the large mature trees along its banks, and has significant cultural value arising from its public access routes and historical significance. Due to these factors, the LCA is deemed to be of high landscape sensitivity (see Table 4.11 in Chapter 4 of this ES).

8.1.2 Visual amenity

As indicated by the ZTV (see baseline Visual Amenity plan, Figures 8.3 and 8.4 in Appendix E1), visibility of the Scheme area is largely restricted to the immediate boundaries of the sites by surrounding vegetation, buildings and the railway embankment on the western edge of the Central Car Park. Limited more distant views in and out of the Scheme area to and from areas of higher ground are afforded at Ashley Road Open Space and Fisherton Recreation Ground but at a distance that significant effects on the visual amenity of receptors in these areas are discounted.

A range of visual receptor types have been identified within the ZTV, comprising the people within the study area who will potentially be affected by changes in views and visual amenity. These include users of public footpaths and the National Cycle Network Route 45 within and adjacent to the Scheme area, recreational users of areas of public open space and associated facilities, residents within private properties and users of commercial properties surrounding the Scheme area, and users of the adjacent road network.

The visual receptors identified, their sensitivity to change, their existing view and the proposed works which will affect existing views are described below and identified on the Visual Amenity plans (Figures 8.3 and 8.4) in Appendix E1.

Photographs from a number of viewpoints which illustrate the context of the visual receptors' existing views are presented in Figures 8.5 and 8.6 in Appendix E1.

The Scheme is located within the view corridor from Old Sarum to Salisbury Cathedral, which is identified as a 'key elevated panoramic view to Salisbury' from Old Sarum in Figure 3.5 of the Salisbury District Settlement Setting Assessment (2008). This view was sketched by JMW Turner in 1795 from 'Old Sarum Entrenchment' and is considered significant and highly sensitive to change. The distance from Old Sarum to the Ashley Road area is over 1.5km and over 1.9km to the Maltings and Central Car Park area and Millstream site.

From examination of photographs of the view from Old Sarum towards Salisbury available online (for example, Figure 2 of the City of Salisbury Conservation Area Management Plan as reproduced in Plate 4 below), the Ashley Road site is screened from view by existing buildings and trees except for a very limited glimpse of the houses on the eastern end of Ashley Road. The arc of this view is about 1°. At this distance, the houses are unlikely to be clearly visible without the aid of binoculars.

In photographs of the view from Old Sarum with a magnified focal length (e.g. Plate 4), the roofs of the buildings to the south of the Central Car Park (including Sainsbury's and the Salisbury Playhouse) are visible but the site of the Scheme in the Maltings, Central Car Park and Millstream site are not, being screened from view by existing buildings, mature trees and infrastructure, including the A36 and railway, both of which are on embankment adjacent to the site. It is therefore considered that the proposed works within the Maltings, Central Car Park and Millstream, including tree removal works, will not be visible from Old Sarum during either construction or operation.

In conclusion, due to the very limited visibility of the site from Old Sarum, it is considered unlikely that the Scheme will result in any significant effect on the view from Old Sarum towards Salisbury Cathedral. Potential effects of the Ashley Road works on the view from Old Sarum are reported in Table 8.1 but potential effects of the Central Car Park and Maltings works are not considered further in this assessment.

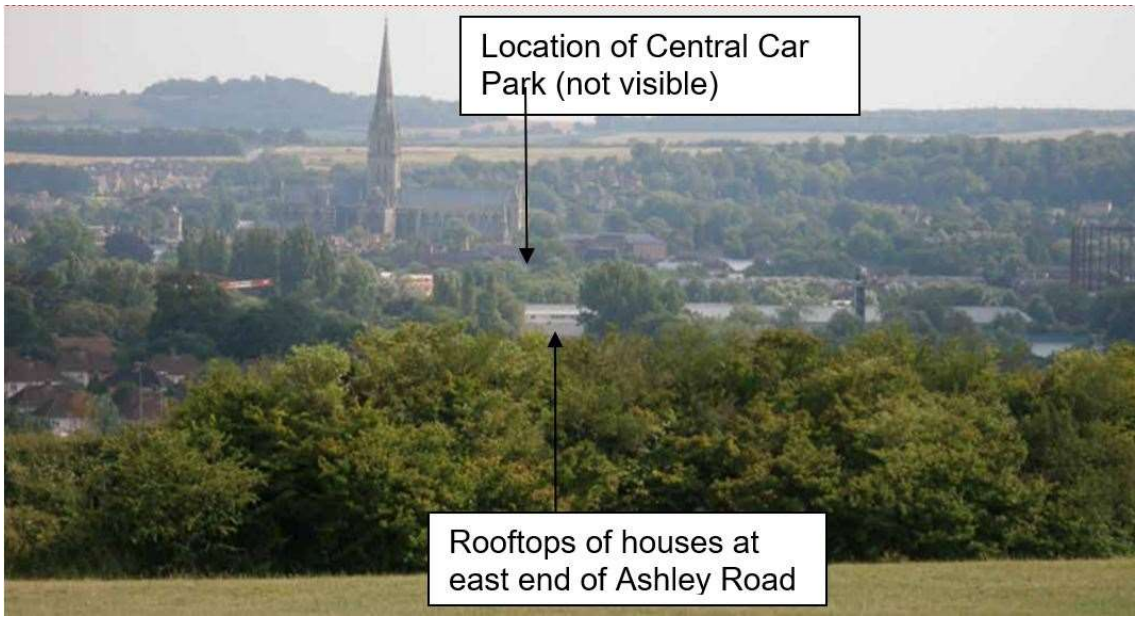


Plate 4:The view from Old Sarum towards Salisbury Cathedral (as shown in Figure 2 of the City of Salisbury Conservation Area Appraisal and Management Plan, 2014).

Note this photograph was taken using a telephoto lens at high focal length (the specific focal length is unknown) and therefore does not present an accurate visual representation of the unaided human view from Old Sarum.

8.1.3 Changes to landscape and visual amenity in absence of Scheme

In the absence of the Scheme, the effects of climate change on the future baseline landscape of the Scheme area may include:

- continued and widespread flooding of the Scheme area due to increased frequency of heavy rainfall during winter months;
- adverse effects on some vegetation within the Scheme area due to reduced rainfall and increased evapotranspiration during summer months; and
- changes in biodiversity and the balance of some species, as a consequence of new climatic conditions with subtle changes in vegetation.

Overall it is considered that the future baseline landscape and visual amenity of the Scheme has a low vulnerability to current climate change predictions. Although the nature of the Scheme area has the potential to change in the future through variations in biodiversity (e.g. where vegetation cover has not reached its successional climax and where a limited number of existing trees are already showing signs of decline), the character of the amenity grassland in the Ashley Road area and the character of the river corridor would remain broadly intact. Unless

some of the mature trees in the Scheme area, which have been assessed to have limited predicted lifespan are replaced (notably ash and common alder), some landscape elements will be lost and there will be fewer distinctive landscape features.

Should the Scheme not be implemented and the Scheme area be subject to a similar management regime to that which currently exists, the landscape character of the Scheme area is likely to remain relatively unchanged, as the existing land cover would not alter significantly.

8.2 Likely significant effects

This section assesses the likely effects of the Scheme (as described in Chapter 3 Scheme description) on the baseline landscape character and visual amenity of identified receptors.

The Landscape Masterplans, which illustrate the Scheme proposals and environmental mitigation and enhancement measures, are presented in Appendix E2.

Illustrative visualisations of the Scheme from three viewpoints are presented in Figures 8.7, 8.8 and 8.9 in Appendix E1.

8.2.1 During construction

Landscape impacts

The landscape assessment considers the changes to the landscape character of the site, with reference to the construction period, as far as understood at present. The final project duration and construction methodology will depend on the details of the enabling and/or utility works, proposed phasing and traffic management/diversions.

The following generic landscape impacts are likely to occur during the construction phase:

- physical disturbance of landscape elements and disturbance to tranquillity through noise and visual intrusion arising from topsoil stripping, groundworks, earthworks, construction activities and plant, vehicle movements, construction compounds, material stockpiles and treatment areas, and movements of materials;
- removal of a number of existing landscape elements including:
    - trees (in particular along the banks of the River Avon through the Central Car Park). The majority of affected trees lie within either the Stratford-sub-Castle or Salisbury Conservation Area although no TPOs will be affected by the proposed works;
    - a limited length of hedgerow (Coldharbour Lane allotments), and
    - an area of amenity grassland (Ashley Road Open Space and Fisherton Recreation Ground);
- excavation and re-profiling of existing topography to create the new Summerlock channel and associated wetland in LCA1 and the realigned and widened River Avon channel in LCA2;

- construction of new infrastructure features (new flood defence embankment, flood wall and associated features in LCA1, new footpaths, cycle tracks and associated bridges (LCA1 and LCA2), a replacement vehicular bridge (LCA2); channel and floodway culverts and offtake structures (LCA1 and LCA2); ground raising (LCA2, west end of replacement vehicular bridge and coach park);
- importation and placement of materials required to construct marginal berms (LCA1, LCA2, LCA3);
- disrupted recreational use of the site due to temporary public access restrictions, construction works and the presence of construction plant and signage, affecting public footpaths and the cycleway network and the recreational use of public open spaces (LCA1, LCA2 and LCA3); and
- localised impacts on soils and drainage through the presence of construction works (LCA1 and LCA2).

The potential effects of these impacts on the landscape resource of each of the identified Landscape Character Areas are assessed below.

Landscape impacts on LCA1

The construction of the proposed flood defence embankment and flood walls, new Summerlock channel and wetland and new footpath and cycle infrastructure is likely to result in widespread negative impacts on the landscape resource of LCA1 over the period within the main works are carried out (summer and autumn of 2022). These impacts will be caused by the removal of trees, grass cover and other vegetation, excavation and movement of topsoil and subsoil, the infilling of a short section of the Summerlock Stream and excavation of a new channel some 300m long, the presence of large machinery, temporary fencing, access tracks, bridges, portacabins and other features required to construct the works and loss of tranquillity, access and use of the public areas of open space.

Some 18 trees will need to be removed to enable the works; these include 10 planted Lombardy poplars by the Coldharbour Lane allotments and two small memorial trees which have cultural and community value. The two memorial trees will be translocated to another location (or replaced if this is not possible). Two of the 18 trees are assessed as Category B and 16 assessed as Category C quality in the tree survey (Appendix G). Other trees including the mature black poplars by the River Avon will require remedial works (pollarding or canopy reduction) to mitigate the potential impacts of adjacent works upon them. No trees protected by TPOs will be affected by the works.

Approximately 30m of the existing hedgerow around the northern edge of the Coldharbour Lane allotments will need to be removed. Some reduction in width of the hedgerow may also be required. The combined area of hedge to be removed and reduced is approximately 260m^2.

Up to 3.4ha of the existing amenity grassland will be removed to enable construction and the use of the public open space and associated access routes will be curtailed or cease.

The Scheme is likely to result in temporary **moderate to major adverse effects** (based on high sensitivity and major negative magnitude) on the landscape character of LCA1 during construction.

Landscape impacts on LCA2

The construction of the proposed re-profiling of the River Avon channel over a 250m length, the replacement of the Mill Stream Approach Bridge and the construction of the floodway culvert, and new footpath and cycle infrastructure is likely to result in widespread negative impacts on the limited landscape resource of LCA2 over the period within the main works are carried out (spring to winter 2023). These impacts will be caused by the removal of trees and other vegetation, excavation and movement of soil and other materials, works within the River Avon over a distance of approximately 240m, the presence of large machinery, temporary fencing, access tracks, bridges, portacabins and other features required to construct the works, loss of tranquillity and disrupted use of the adjacent access routes. Approximately 67 trees along the River Avon and 19 trees along the eastern toe of the railway embankment will need to be removed to enable the works. These generally comprise self-sown native tree groups. Of these 86 trees, 56 are assessed as Category B and 30 assessed as Category C quality in the tree survey.

The use of the small area of public open space adjacent to Swimming Pool Gate and the pedestrian and cycle access routes running through the LCA will be curtailed or cease.

The Scheme is likely to result in temporary **minor to moderate adverse effects** (based on medium sensitivity and moderate negative magnitude) on the landscape character of LCA2, during construction.

Landscape impacts on LCA3

The construction of the proposed marginal berms within the Mill Stream channel over 400m length is likely to result in localised and short-term negative impacts on the landscape resource of LCA3 when the works are carried out (summer 2023). Some in-channel vegetation and self-sown scrub adjacent to the channel is likely to require removal to enable construction of the berms.

The Scheme is likely to result in temporary **minor to moderate adverse effects** (based on high sensitivity and minor negative magnitude) on the landscape character of LCA3, during construction.

Visual impacts

The visual impact assessment considers the effects of the changes to the visual amenity of the identified visual receptors, with reference to the construction and operational periods. The final project duration and construction methodology will depend on the details of the enabling and/or utility works, proposed phasing and traffic management/diversions.

The following impacts on visual receptors with views of the Scheme are likely to be experienced during the construction phase:

- visual intrusion and obstruction of views within and over the construction sites due to the presence of large construction plant and construction vehicles and their movements, construction compounds and material stockpiles, heavy goods vehicles delivering materials, excavations and earthworks, lighting, fencing, temporary works, personnel in high visibility clothing and traffic management;
- reduced visibility and disruption of views over the construction sites as a result of temporary access restrictions to public footpaths and publicly accessible areas;

- hedgerow, tree and scrub vegetation removal will change the nature of existing views and reduce visual screening, opening up views over the construction sites from adjacent receptors;
- within the Central Car Park and Mill Stream Coach Park, tree removal along the course of the River Avon will open up views of the spire of Salisbury Cathedral presently screened by this vegetation;
- the excavation of the new Summerlock channel and wetland will remove extensive areas of amenity grassland and create large areas of bare earth, which are likely to degrade existing views until the proposed vegetation cover (marginal vegetation, wet woodland, wet grassland) become established.

The potential effects of these impacts on the visual amenity of identified receptors during construction are reported in Tables 8.1 and 8.2.

8.2.2 During operation

Landscape impacts

The following generic landscape impacts have been identified as likely during the operational phase.

- changes in the landscape character and land use as existing areas of amenity grassland (LCA1) and tarmac hardstanding (LCA2) are replaced with new and widened watercourses and associated riparian habitats which will significantly increase the presence and visibility of these more natural features within their environs;
- changes in landscape character and land use as existing areas of amenity grassland (LCA1) and tarmac hardstanding (LCA2) are changed to accommodate potentially unsympathetic infrastructure features including new flood defences and associated structures (LCA1), new channel and floodway culverts and offtake structures (LCA1 and LCA2); new pedestrian and cycle access routes and associated bridges, barriers and signage (LCA1 and LCA2), the realigned and widened Mill Stream Approach Bridge (LCA2) and ground raising (LCA2);
- changes to the existing topography resulting from the new Summerlock channel and associated wetland in LCA1 and the realigned River Avon channel in LCA2;
- superficial changes to the character of the Mill Stream arising from the new marginal berms (LCA3) which are likely to provide benefits in terms of visual and ecological resources once these become vegetated;
- enriched and improved recreational and educational use and appreciation of the site due to the creation of and improved access to new and varied habitats and naturalistic features (LCA1 and LCA2), the improved and extended public footpath and cycleway network (LCA1 and LCA2), an improved play park (LCA1) and a new pocket park (LCA2); and
- changes to the landscape settings of Stratford-sub-Castle and City of Salisbury Conservation Areas.

The potential effects of these impacts on the landscape resource of each of the identified LCAs are assessed below:

Landscape impacts on LCA1

The proposed flood defence embankment and flood wall and associated features (including culvert and offtake structures) and the new footpath and cycle track network and associated features (including barriers and signage) will form potentially detracting artificial elements within this semi-rural amenity parkland landscape and within part of the Stratford-sub-Castle Conservation Area. There are, however, existing public access routes and brick walls present within and on the periphery of the LCA which form a precedent and will reduce the incongruity of similar new features and the access improvements will aid accessibility of the area for recreational use by the local community. The flood embankment will be up to 1.3m high and will serve to increase the sense of enclosure around the areas of public open space, although the 1:10 gradient riverside slopes will soften this effect.

The new Summerlock channel, wetland, boardwalks, picnic area, wet grassland and wet woodland will enrich and enliven the present character of Fisherton Recreation Ground and provide new features of interest and educational value for local residents and children at the adjacent primary school. The excavation of the new Summerlock channel and wetland will locally engender a sense of place which will reflect to some extent both the natural floodplain landscape and the medieval landscape of water meadows that preceded its current land use. New tree planting (including the replacement of six Lombardy poplars, new roadside specimen tree planting along Ashley Road and within the open space and wet woodland planting) will also serve to enrich and soften the character of LCA1. The new Summerlock channel and associated habitats will help restore the natural character of LCA1 and improve the connectivity of this floodplain landscape with the River Avon. Although Ashley Road area is considered to contribute little to the value of the Stratford-sub-Castle Conservation Area in terms of aesthetic value, the proposed habitat creation and landscape enrichment measures within LCA1 will serve to enhance the wider setting of this Conservation Area and compensate for the adverse effects arising from the detracting elements of the Scheme within LCA1.

In Year 1 of operation, following completion of the construction works but before newly planted trees and hedgerow have established, the Scheme is likely to result in **minor to moderate adverse effects** on the landscape character of LCA1 (based on high sensitivity and minor negative magnitude).

In Year 15 of operation, when trees and hedgerow have established, the Scheme is likely to result in long-term **moderate beneficial effects** on the landscape character of LCA1 (based on high sensitivity and moderate positive magnitude).

Landscape impacts on LCA2

The proposed re-profiling and widening of the River Avon channel and the establishment of the associated habitats (gravel beds, rock weirs, aquatic and marginal vegetation, bands of native tree and shrub planting, wet grassland over 250m length), new tree, new hedge and shrub amenity planting and the new network of footpaths along the river corridor is likely to substantially enhance the existing character of LCA2. The replacement Mill Stream Approach Bridge, floodway offtake structure and new footpath and cycle infrastructure will form potentially detracting artificial elements within this riverside landscape, but existing bridges, public access routes and revetment walls present within the LCA form a precedent and will reduce the incongruity of similar new features and the access improvements will aid

accessibility of the area for recreational use by the local community. With regard to Character Area 6 of the Salisbury Conservation Area, the Scheme will not affect the mature trees at the north end of the character area that are considered to form an important part of the character of the area and the proposals will positively contribute the enhancement of the landscape setting and public realm within the Conservation Area as well as improve access to and enjoyment of the riverside.

In Year 1 of operation, following completion of the construction works but before newly planted trees and shrubs have established, the Scheme is likely to result in minor adverse effects on the landscape character of LCA2 (based on medium sensitivity and minor negative magnitude).

In Year 15 of operation, when trees and shrubs have established, the Scheme is likely to result in long-term **minor –to moderate beneficial effects** on the landscape character of LCA2 (based on medium sensitivity and moderate positive magnitude).

Landscape impacts on LCA3

The proposed marginal berms within the Mill Stream channel are likely to provide benefits in terms of visual and ecological resources once these become vegetated with marginal species. The narrowing of the channel is likely to reduce sedimentation of the channel bed which, in conjunction with the proposed removal of rubble from the channel, will improve the condition of the watercourse as a landscape feature.

In Year 1 of operation, following completion of the construction works but before newly planted trees and shrubs have established, the Scheme is likely to result in a **nil impact** on the landscape character of LCA3 (based on high sensitivity and negligible magnitude).

In Year 15 of operation, when trees and shrubs have established, the Scheme is likely to result in long-term **minor to moderate beneficial effects** on the landscape character of LCA3 (based on high sensitivity and minor positive magnitude).

Visual impacts

The following generic impacts on visual receptors with views of the Scheme have been identified as likely during the operation phase:

- visual intrusion and obstruction of views resulting from the introduction of the flood defence embankment, flood wall and associated features (including ramps, culvert headwalls, fall protection barriers) in LCA1;
- visual intrusion resulting from the introduction of the new pedestrian and cycle access routes and associated features (including bridges, surfacing, barriers and signage) (LCA1 and LCA2), the replacement Mill Stream Approach Bridge (LCA2), and a floodway offtake structure (LCA2);
- visual enrichment and enhancement of views resulting from the introduction of the new Summerlock channel and wetland (LCA1) and the widening and reprofiling of the River Avon channel (LCA2) and associated wetland and terrestrial habitats, including aquatic and marginal vegetation, bands of native tree and shrub planting, wet grassland, rock weirs, shingle beaches and new tree, hedge and shrub amenity planting;
- visual enrichment and enhancement of views resulting from the introduction of the new marginal vegetated berms in the Mill Stream and improved water quality within the channel; and

- the areas within the Central Car Park and car and coach park on the eastern wide of the River Avon from which views of the full height of the Cathedral spire are possible will be reduced by the widened River Avon corridor and associated tree planting. The raising of the coach park by approximately 0.5m may locally ameliorate this adverse effect to a degree. The proposed Scheme will create new key views of the Cathedral spire from the proposed footbridge across the River Avon adjacent to the south end of the coach park and the replacement Mill Stream Approach Bridge which should be capitalised upon during detailed design stage.

The potential effects of these impacts on the visual amenity of identified receptors during operation are reported in Tables 8.1 and 8.2.

Tables 8.1 and 8.2 state the magnitude and significance of impact for each visual receptor during construction, in Year 1 (the year of opening when planting and seeding has been implemented but have not yet established) and in Year 15 (when planting has grown to the point where it effectively fulfils its landscape purpose). This assessment takes into consideration the mitigation measures embedded within the Scheme design described in Section 8.3.

Photographs from a number of viewpoints which illustrate the general context of existing views are included in Figures 8.5 and 8.6 in Appendix E1. Illustrative visualisations of the completed Scheme from the following three visualisation viewpoints are included in Figures 8.7 to 8.9 in Appendix E1:

- Viewpoint 1: View north-east towards new Summerlock channel and wetland in Fisherton Recreation Ground;
- Viewpoint 2: View south-west along the River Avon corridor, facing downstream from Swimming Pool Gate bridge;
- Viewpoint 3: View down River Avon corridor from adjacent to west side of existing Mill Stream Approach Bridge.

These illustrative visualisations comprise artist's impressions that convey the essence of what the Scheme is likely to look like in context.

Table 8.1: Visual Impact Assessment at Ashley Road Open Space and Fisherton Recreation Ground - significance of effects during construction and operation

Locations of visual receptors are shown on Figures 8.3 and 8.4 in Appendix E1.

Illustrative Visualisation Viewpoints 1 to 3 are shown on Figures 8.7 to 8.9 in Appendix E1.

Note: Distance (m) refers to approximate distance from receptor to nearest and furthest visible scheme element in metres.

Receptor	Sensitivity	Distance (m)	Arc of view	Changes to view as a result of the Scheme	Magnitude of impact and significance of effect during construction	Magnitude of impact and significance of effect during operation Year 1	Magnitude of impact and significance of effect during operation Year 15
View from Old Sarum	Very High	1500+	Up to 1o	Existing view is limited to glimpsed view of roofs of Nos. 1-4 Ashley Road. Potential for temporary views of construction plant during construction and planted trees along Ashley Road during operation.	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)
Public footpath SALS9 From Summerlock Bridge to n-w end of site (length of 570m)	High	0-90	Up to 180o	Assumed diversion along Ashley Road and Coldharbour Lane during construction. On completion, realigned route adjacent to new Summerlock channel and wetland will enhance views. Ramp over flood bank may detract from views.	Moderate negative magnitude Moderate adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Moderate positive magnitude Moderate beneficial effect (Significant)

Public footpath SALS10 From Ashley Road to Summerlock Stream (length of 265m)	High	0-25	Up to 180o	Assumed diversion along Ashley Road and/or Douglas Haig Road during construction. On completion, embankment and tree planting will partially screen Ashley Road and built environment, adjacent cycle track may detract from visual amenity.	Moderate negative magnitude Moderate adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
Informal footpath A (length of 200m)	High	0-90	Up to 180o	Assumed closure during construction. On completion, route will follow realigned SALS9 route adjacent to new Summerlock channel and wetland which will enhance views.	Major negative magnitude Moderate adverse – major adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
Informal footpath B (length of 255m)	High	0-100	Up to 180o	Assumed closure during construction. On completion, route will run adjacent to new Summerlock channel and wetland which will enhance views.	Major negative magnitude Moderate adverse – major adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
Informal footpath C (length of 100m)	High	0-80	Up to 180o	Assumed closure during construction. On completion, embankment and tree planting will partially screen Ashley Road and built environment, cycle track may detract from visual amenity.	Major negative magnitude Moderate adverse – major adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)

Cycle route (NCN Route 45) (length of 115m)	High	0-200	Up to 180o	Assumed diversion via Douglas Haig Road during construction. On completion, embankment and tree planting will partially screen Ashley Road and built environment, new cycle track may detract from visual amenity.	Moderate negative magnitude Moderate adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
Cycle route (local route A) (length of 355m)	High	0-200	Up to 180o	Assumed diversion via Ashley Road and/or Douglas Haig Road during construction. On completion, embankment and tree planting will partially screen Ashley Road and built environment, new cycle track and ramp may detract from visual amenity.	Moderate negative magnitude Moderate adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
Ashley Road Open Space (1.7 Ha)	High	0-200	Up to 180o	Assumed closure during construction. On completion, embankment and tree planting will partially screen Ashley Road and built environment, cycle track and ramp may detract from visual amenity.	Major negative magnitude Moderate adverse – major adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
Fisherton Recreation Ground (2.6 Ha)	High	0-190	Up to 180o	Assumed closure during construction. On completion, embankment and tree planting will partially screen Ashley Road and built environment, Summerlock channel and wetland will enrich visual amenity and interest.	Major negative magnitude Moderate adverse – major adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Moderate positive magnitude Moderate beneficial effect (Significant)

Ashley Play Area (0.25 Ha)	High	0-90	Up to 180o	Closure during construction. On completion, views within and from relocated play area likely to be enhanced by hedge and tree planting and embankment which will partially screen Ashley Road and built environment.	Major negative magnitude Moderate adverse – major adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
11 nr. Even nos. 4-24 Butts Road (private properties)	Very High	90-160	Up to 10o	Oblique views to east to limited southern area of Ashley Road Open Space.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)
2 nr. 49-51 Hulse Road (private properties)	Very High	40-270	Up to 30o	Oblique views to east from first floor to Ashley Road Open Space. Tree planting and pollarded willow will enhance views in time, cycle track and embankment will detract.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
10 nr. 63-72 Douglas Haig Road (private properties)	Very High	30-240	Up to 110o	Direct but partially screened views to east to Ashley Road Open Space. Tree planting and pollarded willow will enhance views in time, embankment will help screen Ashley Road and built environment behind.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)

8 nr. 1-10 Ashley Road (private properties)	Very High	15-120	Up to 160o	Direct open views to east to Ashley Road Open Space. Tree planting and pollarded willow will enhance views in time.	Moderate negative magnitude Moderate adverse – major adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
8 nr. 102-116 Ashley Road (private properties)	Very High	14-120	Up to 45o	Direct to oblique open views to north-west to Ashley Road Open Space.	Moderate negative magnitude Moderate adverse – major adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)
1 nr. 'Retreat' on Ashley Road (private properties)	Very High	5-260	Up to 180o	Direct, open and wide angled views to north and west of flood wall and embankment in Ashley Road Open Space.	Major negative magnitude Moderate adverse – major adverse effect (Significant)	Moderate negative magnitude Moderate adverse – major adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)
2 nr. 19-20 Kingsland Road (private properties)	Very High	85	Up to 10o	Oblique, views to north-west from first floor to Fisherton Recreation Ground.	Minor negative magnitude Minor adverse - moderate	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)

					adverse effect (not significant)		
8 nr. 5-19 Coldharbour Lane (private properties)	Very High	25-215	Up to 140o	Direct to oblique partially screened views from first floor to north-west to Fisherton Recreation Ground. Summerlock wetland will enhance views in time, embankment may detract but will not reduce visibility over the open space from first floor.	Moderate negative magnitude Moderate adverse – major adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
2 nr. 174 and 176 Devizes Road (private properties)	Very High	225-350	Up to 30o	Direct, elevated, distant and partially screened views to north-east to western end of Fisherton Recreation Ground. Trees along Coldharbour Lane will increase screening in time.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)
8 nr. Odd nos. 1-15 Palmer Road (private properties)	Very High	190-340	Up to 25o	Oblique, elevated, distant and partially screened views to north-east to western end of Fisherton Recreation Ground. Trees along Coldharbour Lane will increase screening in time.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)
8 nr. Odd nos. 41-55 Palmer Road (private properties)	Very High	175-320	Up to 20o	Direct to oblique, elevated, distant and partially screened views to north-east to western end of Fisherton Recreation Ground. Trees	Minor negative magnitude Minor adverse - moderate	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)

				along Coldharbour Lane will increase screening in time.	adverse effect (not significant)		
20 nr. Even nos. 198-238 Devizes Road (private properties)	Very High	245-395	Up to 20o	Direct to oblique, elevated, distant and partially screened views to north-east to western end of Fisherton Recreation Ground. Trees along Coldharbour Lane will increase screening in time.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)
Studio Theatre, Ashley Road	Medium	25-140	Up to 95o	Direct open views to east to Ashley Road Open Space. Tree planting and pollarded willow will enhance views in time.	Moderate negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
Fire Station, Ashley Road	Medium	25-140	Up to 150o	Direct open views to east to Ashley Road Open Space. Tree planting will enhance views in time.	Moderate negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
Salisbury and South Wilts Scout Hall, Coldharbour Lane	Medium	25-100	Up to 20o	Oblique, narrow angled, partially screened views from north-west to Fisherton Recreation Ground. Summerlock wetland will enhance views in time, embankment may	Minor negative magnitude	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)

				detract but will not reduce visibility over the open space from first floor.	Minor adverse effect (not significant)		
Ashley Road Allotments, Coldharbour Lane	Medium	0-100	Up to 180o	Direct, open to partially screened views from northern part of allotments to adjacent works. Existing hedges and trees to be retained will provide substantial screening during operation but Lombardy poplars will be lost and users of adjacent cycle and footpath ramp may cause some visual intrusion.	Moderate negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)
Sarum St Paul's Primary School, Coldharbour Lane	Medium	15-175	Up to 110o	Views substantially screened by ivy covered fence along Coldharbour Lane. Direct to oblique views to western end of flood embankment in Fisherton Recreation Ground. Views over open space from north end of playground will be impeded.	Moderate negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)
Riverside Tennis Club, Coldharbour Lane	Medium	15-175	Up to 120o	Direct open views to western end of flood embankment in Fisherton Recreation Ground. Views over open space from grounds will be impeded but longer views to riparian treeline will be preserved.	Moderate negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)

Ashley Road	Low	5-125	Up to 170o	Direct open views to east to Ashley Road Open Space. Tree planting will enhance views in time.	Moderate negative magnitude Minor adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
Coldharbour Lane	Low	5-165	Up to 170o	Direct open views of flood embankment in Fisherton Recreation Ground. Views over open space from grounds will be impeded but longer views to riparian treeline will be preserved.	Moderate negative magnitude Minor adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)

Table 8.2: Visual Impact Assessment at the Maltings and Central Car Park area and the Mill Stream - significance of effects during construction and operation

Receptor	**Sensitivity**	**Distance (m)**	**Arc of view**	**Changes to view as a result of the Scheme**	**Magnitude of impact and significance of effect during construction**	**Magnitude of impact and significance of effect during operation Year 1**	**Magnitude of impact and significance of effect during operation Year 15**
Public footpath SALS50 From railway bridge over R.	High	0-90	Up to 180o	Assumed diversion along Nelson Road, Castle Street and Mill Stream Approach during construction (R. Avon works). On completion, route over reprofiled	Moderate negative magnitude Moderate adverse effect	Minor negative magnitude Minor adverse - moderate	Minor positive magnitude Minor beneficial - moderate

Avon to Mill Stream Approach (length of 225m)				River Avon and through pocket park will enhance views. Adjacent cycle track may detract from views to a degree.	(Significant)	adverse effect (not significant)	beneficial effect (not significant)
Public footpath SALS58A Adjacent to Mill Stream (length of 122m)	High	5-50	Up to 180o	Assumed diversion west to River Avon then south along existing access road then south-east along Avon Approach during construction (Mill Stream works). On completion, vegetated berms and improved watercourse will enhance views.	Moderate negative magnitude Moderate adverse effect (Significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
Public footpath SALS58 Adjacent to Mill Stream (length of 130m)	High	5-50	Up to 180o	Assumed diversion south-west through Avon Approach car park and then south through public open space to The Maltings during construction (Mill Stream works). On completion, vegetated berms and improved watercourse will enhance views.	Moderate negative magnitude Moderate adverse effect (Significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
Cycle route (NCN Route 45) From railway bridge over R Avon to Avon Approach (length of 400m)	High	0-100	Up to 180o	Assumed diversion via Nelson Road then south along Castle Street to Avon Approach during construction. On completion, route over and along reprofiled River Avon and through pocket park will enhance views. Section to east of coach park may detract from views to a degree.	Moderate negative magnitude Moderate adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)

Cycle route (local route B) From Swimming Pool gate to Mill Stream Approach (length of 50m)	High	0-50	Up to 180o	Assumed local diversion or short closure during construction. On completion, route through pocket park will enhance views.	Moderate negative magnitude Moderate adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
Park and play area to north of the Maltings (0.25 Ha)	High	0-50	Up to 180o	Direct, open views of works in Mill Stream and Library channel infilling. Assumed partial closure during construction. On completion, infilled Library channel will unify area and enhance views.	Moderate negative magnitude Moderate adverse – major adverse effect (Significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
The Maltings (length of 140m)	High	0-80	Up to 180o	Direct, open views of works in Mill Stream. Assumed local diversion during construction (Mill Stream works). On completion, vegetated berms and improved watercourse will enhance views.	Moderate negative magnitude Moderate adverse effect (Significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
10 nr. 73-82 Archer's Court (private properties)	Very High	60-150	Up to 30o	Oblique and partially screened views to south to Swimming Pool Gate and Mill Stream berms.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)

3 nr. 138, 140 and 142 Castle Street (private properties)	Very High	95-140	Up to 15o	Direct, narrow angled views to and Mill Stream Approach bridge replacement works.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)
2 nr. 11 and 12 Mill Stream Approach (private properties)	Very High	5-90	Up to 50o	Direct to oblique, partially to well screened views to west to River Avon, coach park raising and Mill Stream works. Reprofiled River Avon, pocket park and vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
3 nr. 4,7 and 8 Avon View (private properties)	Very High	5-90	Up to 50o	Direct to oblique, open to partially screened views to west to River Avon, coach park raising and Mill Stream works. Reprofiled River Avon, and vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)
3 nr. 76-78 Castle Street (private properties)	Very High	5-20	Up to 90o	Direct open views from ends of gardens only, very limited to no views from houses, west to Mill Stream works. Vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)

2 nr. 11 Ivy Place and 73 Cheviot House (private properties)	Very High	5-20	Up to 90o	Direct elevated views from east facing windows on first and second floors, west to Mill Stream works. Vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
2 nr. 47 and 48 Castle Street (private properties)	Very High	25-50	Up to 25o	Oblique, partially screened views from, west and south-west to Mill Stream works. Vegetated berms in Mill Stream unlikely to be visible.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)
1 nr. 'Becketts (private properties)	Very High	5-30	Up to 120o	Direct elevated views from north facing windows on first and second floors, to Mill Stream works. Vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial - moderate beneficial effect (not significant)
1 nr. 4 The Maltings (private properties)	Very High	5-20	Up to 90o	Oblique elevated views from west facing windows on first and second floors, west to Mill Stream works. Vegetated berms in Mill Stream unlikely to be visible.	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)
3 nr.	Very High	50-60	Up to 30o	Direct, open views from west facing windows, west to channel narrowing and tree works in R. Avon.	Minor negative magnitude	Minor negative magnitude	Negligible magnitude

14-16 Bridge Street (private properties)				Vegetated berm may enhance views in the longer term.	Minor adverse - moderate adverse effect (not significant)	Minor adverse - moderate adverse effect (not significant)	Nil impact (not significant)
1 nr. 141 Castle Street (currently disused)	Medium	45-100	Up to 60o	Direct, partially screened views to south to Swimming Pool Gate and Mill Stream Approach. Reprofiled R. Avon, pocket park and vegetated Mill Stream berms will enhance views in longer term.	Moderate negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
1 nr. Warner House, Castle Street	Medium	10-150	Up to 125o	Direct, partially screened views from 3 floors of this office building to south to Swimming Pool Gate and Mill Stream Approach. Reprofiled R. Avon, pocket park and vegetated Mill Stream berms will enhance views in longer term.	Moderate negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
1 nr. The Boathouse PH (currently disused)	Medium	10-90	Up to 160o	Direct, open views from pub and garden to west to coach park raising works and R. Avon, to east to Mill Stream works. Reprofiled R. Avon, pocket park and vegetated Mill Stream berms will enhance views in longer term, raised coach park may detract from views.	Moderate negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)

1 nr. The George and Dragon Inn PH	Medium	5-90	Up to 50o	Direct to oblique, open views to west to River Avon, coach park raising and Mill Stream works. Reprofiled River Avon, and vegetated berms in Mill Stream may enhance views in the longer term.	Moderate negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)
1 nr. The Avon Brewery Inn PH	Medium	5-20	Up to 90o	Direct partially screened view from pub garden only, west to Mill Stream works. Vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
1 nr. Auction Sale Room	Medium	5-20	Up to 90o	Direct elevated views from upper storey windows, west to Mill Stream works. Vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
3 nr. NHS Health Centre buildings	Medium	8-50	Up to 90o	Direct, open and elevated views from these 2 and 3 storey buildings, west to R. Avon works and east to Mill Stream works. Reprofiled R. Avon corridor and vegetated berms in Mill Stream will enhance views in the longer term.	Moderate negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
1 nr.	Medium	7-70	Up to 150o	Direct, open and elevated views from this 3 storey office block and	Minor negative magnitude	Negligible magnitude	Minor positive magnitude

Riverside House and Tesco Metro				Tesco (on groundfloor), west to Mill Stream works and Library channel infill works. Vegetated berms in Mill Stream may enhance views in the longer term.	Minor adverse effect (not significant)	Nil impact (not significant)	Minor beneficial effect (not significant)
1 nr. Riverside House	Medium	7-70	Up to 150o	Direct, open and elevated views from this 3 storey office block, west to Mill Stream works and Library channel infill works. Vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
1 nr. Library	Medium	7-30	Up to 150o	Direct, open and elevated views from this 3 storey building, west to Mill Stream works. Vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
1 nr. 4 Market Walk	Medium	7-30	Up to 150o	Direct, open and elevated views from this 2 storey building, west to Mill Stream works. Vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
1 nr. (unknown)	Medium	10-25	Up to 40o	Direct, partially screened and elevated views from this 2 storey building, west to Mill Stream works. Vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Minor positive magnitude Minor beneficial effect (not significant)

1 nr. Cote Brasserie	Medium	10-25	Up to 40o	Direct, narrow angled views from west facing windows, west to Mill Stream works. Vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)
14 nr. Nos. 3-26 The Maltings	Medium	5-60	Up to 150o	Direct, open views from east and north facing windows of Mill Stream works and Library channel infilling. Vegetated berms in Mill Stream may enhance views in the longer term.	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)
1 nr. The Rocketship Bookshop	Medium	50	Up to 20o	Oblique, open views from north facing windows, west to short-term channel narrowing and tree works in R. Avon.	Minor negative magnitude Minor adverse effect (not significant)	Negligible magnitude Nil impact (not significant)	Negligible magnitude Nil impact (not significant)
1 nr. The King's Head Inn PH	Medium	40	Up to 25o	Oblique to direct, open views from north facing windows, west to short-term channel narrowing and tree works in R. Avon. Vegetated berms in R. Avon may enhance views in the longer term.	Minor negative magnitude Minor adverse effect (not significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)
1 nr. The British Heart Foundation Shop	Medium	30-45	Up to 20o	Oblique, narrow angled view north to short-term channel narrowing and tree works in R. Avon.	Minor negative magnitude Minor adverse effect (not significant)	Minor negative magnitude Minor adverse - moderate	Negligible magnitude Nil impact (not significant)

						adverse effect (not significant)	
1 nr. The Bridge Tap PH	Medium	7-40	Up to 90o	Oblique, open views north to short-term channel narrowing and tree works in R. Avon.	Minor negative magnitude Minor adverse effect (not significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)
1 nr. The Bishops Mill PH	Medium	5-15	Up to 115o	Oblique to direct, open views west from pub garden to short-term channel narrowing and tree works in R. Avon.	Minor negative magnitude Minor adverse effect (not significant)	Minor negative magnitude Minor adverse - moderate adverse effect (not significant)	Negligible magnitude Nil impact (not significant)
Central Car Park (2 ha)	Medium	5-100+	Up to 180o	Direct, open views east from car park to R. Avon works. Partial closure likely during construction. Reprofiling of R. Avon will enhance eastward views in the longer term.	Moderate negative magnitude Minor adverse - moderate adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
Coach Park (2 ha)	Medium	0-100+	Up to 180o	Direct, open views west from car park to R. Avon works. Full closure likely during construction. Reprofiling of R Avon will enhance westward views in the longer term.	Major negative magnitude Moderate adverse effect (Significant)	Minor negative magnitude Minor adverse effect (not significant)	Minor positive magnitude Minor beneficial effect (not significant)

Mill Stream Approach	Low	0-100+	Up to 180o	Direct, open views from road to R. Avon works. Closure unlikely during construction. Reprofiling of R Avon, new bridge and pocket park will enhance views in the longer term.	Moderate negative magnitude Minor adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Minor positive magnitude Minor beneficial effect (not significant)
Avon Approach	Low	0-100+	Up to 180o	Direct, open views north from road to R. Avon works. Closure unlikely during construction. Reprofiling of R. Avon will enhance views in the longer term.	Minor negative magnitude Minor adverse effect (not significant)	Minor negative magnitude Minor adverse effect (not significant)	Minor positive magnitude Minor beneficial effect (not significant)

8.3 Mitigation

Where the Scheme has the potential for adverse landscape or visual impacts, primary and secondary mitigation measures will be implemented as part of the Scheme to avoid, reduce, remedy or compensate for these impacts; as follows:

- primary mitigation seeks to prevent negative impacts and maximise positive impacts through integral design; and.
- secondary mitigation deals with negative impacts unavoidable by primary mitigation, through mitigation components such as cladding, planting and screening.

The application of mitigation commences early in the design process and is iterative, in that measures are taken throughout the design process, wherever feasible, to adjust the design to minimise adverse impacts and maximise beneficial impacts.

The primary mitigation measures that have been implemented include:

- the design of the new Summerlock channel and wetland and reprofiled River Avon corridor have been developed to accord with pre-existing natural topographical and geomorphological conditions as far as is practicable so that these features reflect a more natural form, profile and natural hydrological functioning than is the case at present. These wetland elements and associated habitats will not only mitigate but will provide significant enhancement to the existing landscape and visual amenity resources in both LCA1 and LCA2.
- the alignment and location of the flood defence embankment in LCA1 have been designed to maximise the available floodplain area, minimise the loss of amenity space and existing vegetation whilst reducing flood risk to the local community. The alignment of the embankment has been redesigned at the east end to retain the existing trees adjacent to Coldharbour Lane and at the west end to avoid removal of the existing weeping willow adjacent to Ashley Road.
- the flood wall around the north end of the Ashley Road allotments has been designed to minimise its footprint to avoid impacting the native black poplar trees along the bank of the River Avon and to minimise loss of the hedge and allotment space on the southern side.
- the flood wall linking Summerlock Bridge to the flood embankment to the north on the west bank of the Summerlock Stream will include removal of the existing 25m long concrete block river revetment and incorporate a vegetated marginal berm at its base, which will provide landscape, visual and biodiversity enhancement of this section of the Summerlock Stream.
- the existing concrete revetment wall on the east bank of the Summerlock Stream immediately downstream of its offtake from the River Avon will be removed and replaced with a sloped earth embankment with a vegetated marginal berm at its base and an area of shingle beach that will provide further landscape, visual and biodiversity enhancement of this section of the Summerlock Stream.
- existing ditches have been retained and incorporated into the wetland design where feasible.

- care has been taken to retain and enhance areas of public open space and public access provision wherever possible throughout the Scheme area, thereby improving community access to the enhanced amenity spaces within this section of the River Avon corridor.

Despite these primary mitigation measures, the proposed flood defences and extended and improved public access facilities will unavoidably give rise to adverse landscape and visual impacts as a result of the necessity for built structures and features such as flood embankments, flood walls, culvert headwalls, retaining walls, ramps, pedestrian and cycle bridges and barriers, hard surfacing and signage. The construction of these features will require the removal of some landscape elements including trees, grassland and marginal vegetation within affected watercourses.

The severity of these adverse landscape and visual impacts has been ameliorated by the application of the following secondary mitigation measures:

- the horizontal and vertical profiles of the flood embankment in LCA1 have been softened with the use of gently graded side slopes with flowing geometry and a rounded profile to better integrate the embankment into the receiving landscape. The embankment will be topsoiled with site-won topsoil and seeded with either an amenity grass seed mix which will integrate it into the existing amenity grassland present, or, if fertility levels in the topsoil are sufficiently low (to be determined during detailed design), it may be seeded with a species-rich meadow seed mix. The latter would provide visual interest as well as biodiversity benefit which would provide further landscape enrichment to the environs;
- the proposed new lengths of footpath and cycle track within LCA1 and LCA2 will be surfaced with either resin-bound gravel or asphalt (to be determined during detailed design). During consultation, stakeholders expressed a preference for resin-bound gravel, particularly within LCA1 on the basis that it will provide a more natural and visually less intrusive finish than asphalt;
- the offtake structure for the new Summerlock channel will comprise reinforced concrete walls and base. To reduce the visual impact of this structure within the natural riparian location, it will be clad with natural stone which is historically commonly used for structures within the Avon such as the locally sourced Chicksgrove limestone;
- the flood wall linking Summerlock Bridge to the flood defence embankment to the north and the headwalls and wingwalls of the adjacent culvert under the flood embankment will be clad in red brick, where exposed, to reflect the historic use of red brick in the local built environment;
- removed trees will be replaced with new tree planting where practicable as shown on the Landscape Masterplan, including 33 new specimen trees in LCA1 (to include the replacement of six Lombardy poplars in Fisherton Recreation Ground and the replacement or translocation of two memorial trees) and 47 new specimen trees in LCA2. In addition, planting proposals include native wet woodland (approximately 1,450m2) in LCA1 and tree and shrub planting (approximately 2,070 m2) trees in LCA2, native hedgerow (125m in LCA1, 345m in LCA2), native shrub planting (650m2 in LCA2), amenity shrub planting (900m2 in LCA2) and marginal wetland habitat creation (1,070m2 in LCA1, 1,600m2 in LCA2 and 1,160m2 in LCA3). The wet woodland planting in LCA1 will include approximately 325 trees as well as additional shrub species and the tree and

shrub planting in LCA2 will include approximately 230 trees as well as shrub species. Over a period of up to 25 years after planting, the numbers of trees within these planting plots will gradually be reduced as the trees are intermittently thinned out to promote a balanced woodland structure. Planting proposals will be confirmed during detailed design stage;

- exposed elements of the proposed steel beam pedestrian and cycle bridges in LCA1 such as soffits will be clad in timber to reduce visual intrusion and lend them a more rural appearance. Bridges will be fitted with vertical timber railings to match the existing bridge which spans the River Avon between Ashley Road Open Space and the Five Rivers Leisure Centre grounds;
- exposed elements of the proposed steel beam pedestrian and cycle bridge in LCA2 (at Swimming Pool Gate) such as soffits will be painted in an appropriate colour to reduce visual intrusion and lend them a more urban appearance. The bridge and the adjacent retaining wall along the west side of the reprofiled River Avon channel will be fitted with painted steel parapets and rails (o provide a consistent unified appearance. As suggested by stakeholders during consultation, there may be an opportunity during detailed design stage to design bespoke parapets or other elements with the involvement of an artist and the local community which could be used emblematically throughout the wider River Park to help engender a unique sense of place. The use of similar parapets on both the replacement Mill Stream Approach Bridge and the proposed footbridge which will span the River Avon adjacent to the south end of the coach park to further amplify a sense of place will be considered in the detailed design stage. The decks of all bridges will be surfaced with finishes that continue or at least complement the existing surfaces on the adjacent sections of footpath and/or cycleway. The use of 3D to develop the design details of bridge elements will be considered during detailed design and involve a landscape architect.
- retained areas of existing grassland disturbed during construction and areas of exposed earth such as new embankments will be topsoiled and seeded with appropriate grass and/or wildflower meadow seed mixes; and
- street furniture, including seating and bins, will be specifically selected during detailed design to coordinate with the street furniture portfolio used by Salisbury District Council elsewhere in the city. The potential for integrating design elements or emblems which reflect the design of the bridges will be considered during the detailed design stage. Signage will be consistent with the Wayfaring Strategy currently being developed by Wiltshire Council.

The mitigation measures described above have been developed in consultation with a landscape stakeholder group and are reflected in the Landscape Masterplans presented in Appendix E2.

8.4 Residual effects

The residual effects on landscape and visual amenity are presented in Tables 8.3, 8.4 and 8.5.

8.4.1 Landscape character

As set out in the landscape impacts in Section 8.2, following the implementation and establishment of the proposed secondary mitigation measures described in Section 8.3, the following residual effects on the landscape resource are likely to remain:

Table 8.3: Residual impacts on landscape

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
LCA1 (high)	Change to landscape character	Minor adverse – moderate adverse	As section 8.3	Moderate beneficial
LCA2 (medium)	Change to landscape character	Minor adverse	As section 8.3	Minor beneficial - moderate beneficial
LCA3 (high)	Change to landscape character	Negligible	As section 8.3	Minor beneficial - moderate beneficial

8.4.1 Visual amenity

As set out in the visual impacts in Section 8.2, following the implementation and establishment of the proposed secondary mitigation measures described in Section 8.3, the following residual effects (reported in Tables 8.1 and 8.2 as Operational Year 15 effects) on the visual amenity resource are likely to remain:

Table 8.4: Residual impacts on visual amenity: Ashley Road area

Receptor	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
SALS 9 SALS10 Footpath A Footpath B Footpath C Cycleway NCN Cycleway local	Change to visual amenity	Minor adverse – moderate adverse	As section 8.3	Moderate beneficial (SALS 9) Minor beneficial – moderate beneficial (others)

Receptor	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
Ashley Road Open Space	Change to visual amenity	Minor adverse – moderate adverse	As section 8.3	Minor beneficial - moderate beneficial
Fisherton Recreation Ground	Change to visual amenity	Minor adverse – moderate adverse	As section 8.3	Moderate beneficial
Private properties (nr.)	Change to visual amenity	Major adverse – moderate adverse (1)	As section 8.3	Major adverse – moderate adverse (0)
		Minor adverse – moderate adverse (44)		Minor adverse – moderate adverse (1)
		Nil impact (43)		Nil impact (49)
		Minor beneficial – moderate beneficial (0)		Minor adverse – moderate adverse (38)
Commercial / community properties (nr.)	Change to visual amenity	Minor adverse (5)	As section 8.3	Minor adverse (1)
		Nil impact (1)		Nil impact (3)
		Minor beneficial (0)		Minor beneficial (2)
Roads (nr.)	Change to visual amenity	Minor adverse (2)	As section 8.3	Minor adverse (0)
		Nil impact (0)		Nil impact (1)

Receptor	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
		Minor beneficial (0)		Minor beneficial (1)

Table 8.5: Residual impacts on visual amenity: The Maltings, Central Car Park and the Mill Stream

Receptor	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
SALS 50 SALS58 Cycleway NCN Cycleway local	Change to visual amenity	Minor adverse – moderate adverse	As section 8.3	Minor beneficial – moderate beneficial
SALS 58A SALS58	Change to visual amenity	Nil impact	As section 8.3	Minor beneficial – moderate beneficial
Park and play area north of Maltings	Change to visual amenity	Minor adverse – moderate adverse	As section 8.3	Minor beneficial - moderate beneficial
The Maltings	Change to visual amenity	Nil impact	As section 8.3	Minor beneficial - moderate beneficial
Private properties (nr.)	Change to visual amenity	Minor adverse – moderate adverse (6)	As section 8.3	Minor adverse – moderate adverse (0)
		Nil impact (24)		Nil impact (22)
		Minor beneficial – moderate beneficial (0)		Minor beneficial – moderate beneficial (8)
Commercial / community properties	Change to visual amenity	Minor adverse (9)	As section 8.3	Minor adverse (0)

Receptor	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
(nr.)				
		Nil impact (10)		Nil impact (9)
		Minor beneficial (0)		Minor beneficial (10)
Roads (nr.)	Change to visual amenity	Minor adverse (2)	As section 8.3	Minor adverse (0)
Car and coach parks	Change to visual amenity	Minor adverse (2)	As section 8.3	Minor beneficial (2)
Roads (nr.)	Change to visual amenity	Minor adverse (2)	As section 8.3	Minor beneficial (2)

9 Flora and fauna

9.1 Existing environment

For designated features the study area is defined as the Scheme Area (see Figure 1.2) plus a buffer of:

- 2km for statutory international, national and local designations; and
- 0.5m for non-statutory local designations

The study area for non-designated ecological receptors is the Scheme area plus additional areas with potential to be affected by the Scheme, which varies according to the habitats and protected/notable species.

The study area follows the course of the River Avon and associated channels for approximately 2.5km through the urban centre of Salisbury.

9.1.1 Designated conservation sites

The designated nature conservation sites are shown on Figure 9.1.

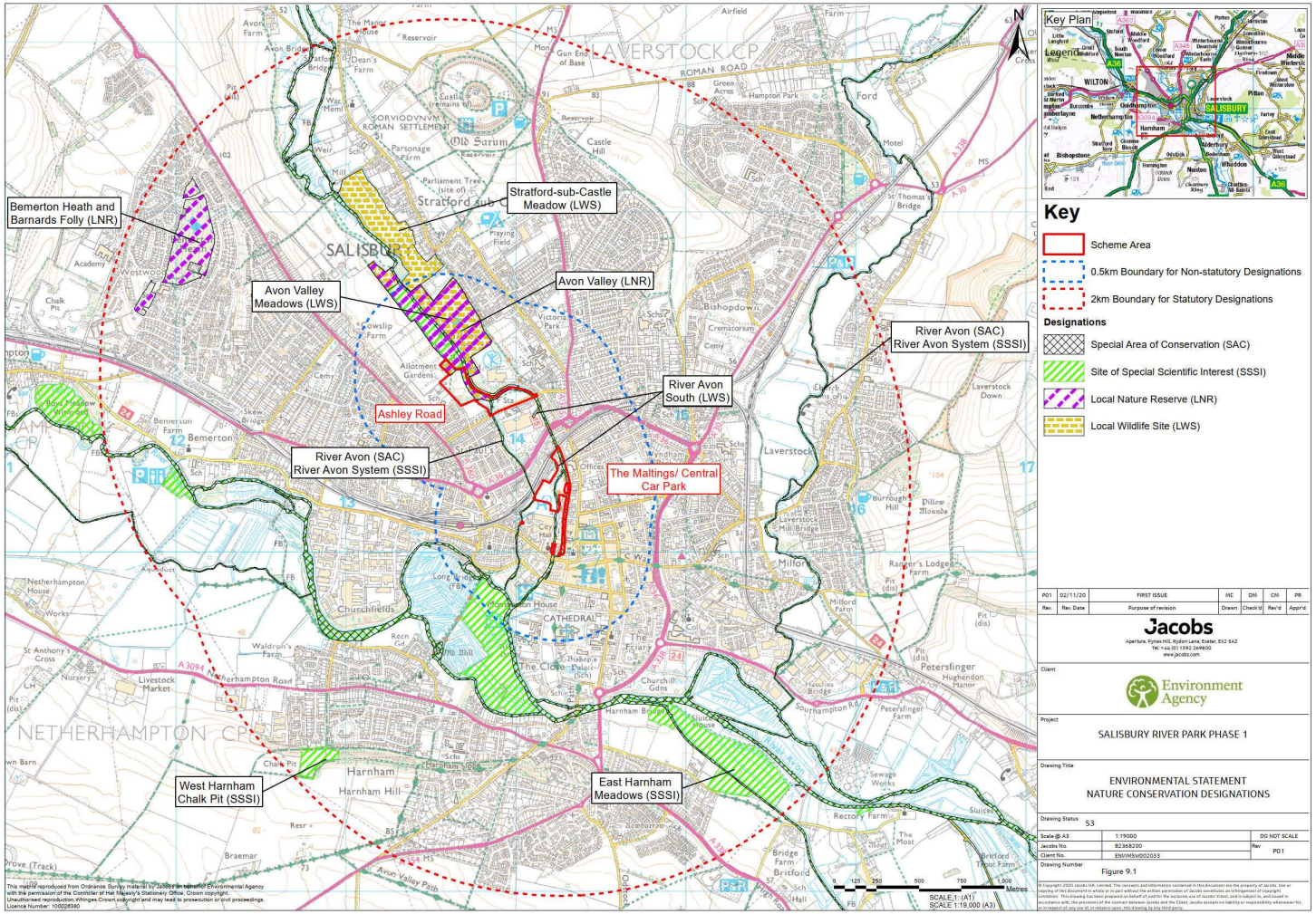


Figure 9.1: Designated nature conservation sites in study area

Statutory designated sites

- There is one international designated conservation site within the study area; the **River Avon Special Area of Conservation (SAC)** - this SAC encompasses the River Avon, Summerlock Stream and Mill Stream within the study area. This site has been appraised as having a **very high** (international) ecological importance and supports a large, lowland river system with a mosaic of habitats that support a diverse freshwater ecological community. The River Avon SAC is notified for its qualifying habitat 'watercourses of plain montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachian* vegetation' and its qualifying species Desmoulin's whorl snail *Vertigo moulinsiana*, bullhead *Cottus gobio*, brook lamprey *Lampetra planeri*, sea lamprey *Petromyzon marinus* and Atlantic salmon *Salmo salar*.

  It has been confirmed by Natural England that Desmoulin's whorl snail is absent from this part of the catchment. Environment Agency records indicate the nearest record of sea lamprey is approximately 40km downstream near Christchurch. These qualifying interest features of the SAC are therefore not considered further in this assessment.

- **River Avon System Site of Special Scientific Interest (SSSI)** - within the Scheme area the boundary of the SSSI is the same as the River Avon SAC, but extends to include an area of wet woodland to the north of the Ashley Road area. This site comprises the River Avon and its tributaries, which support rich and varied chalk stream wildlife communities including floating vegetation of water crowfoot *Ranunculus spp*. of plain and submountainous rivers and the same qualifying species as the SAC. This SSSI has been appraised as having a **high** (national) ecological importance

- **East Harnham Meadows SSSI** - which lies at its nearest point approximately 925m to the south-east of the Scheme area, is an area of botanically rich, neutral grassland lying within the floodplain of the River Avon near the centre of Salisbury. The complex of small pastures, criss-crossed with ditches and bordered by the River Avon and its channels, was formerly under water meadow management. A variety of different habitats are present, all of which are sensitive to changes in the water table and hence the water level in the River Avon and its channels. This SSSI has been appraised as having a **high** (national) ecological importance.

- **West Harnham Chalk Pit SSSI** - lies approximately 1.8km to the south-west of the Scheme area. This is a disused quarry, with a high and impressive north-facing rock wall, which provides good and important exposures of chalk. The site is of great stratigraphic importance in the Campanian (Chalk) of Wiltshire and has national ecological importance. However, as there is no pathway for the Scheme to impact this SSSI, this site is not considered further in this ES.

- **Avon Valley Local Nature Reserve (LNR)** - lies along the northern edge of the Ashley Road area within the Scheme area and comprises the River Avon, rough grassland, mature trees and wet woodland. The LNR is assessed as having a **medium** (regional/county) ecological importance.

- **Bemerton Heath and Barnards Folly LNR** - lies approximately 1.5km to the north-west of the Scheme area. This site consists of mixed woodland, of which a third of the canopy is larch, with the rest a variety of broad-leaved species. assessed as having a medium (regional/county) ecological importance. However,

as there is no pathway for the Scheme to impact this SSSI, this site is not considered further in this ES.

Non-statutory designated sites

- **Avon Valley Meadows Local Wildlife Site (LWS)** - is part of the Avon Valley Meadows LNR and comprises a series of water-meadows, grassland and scrub habitats as well as a small area of wet woodland. This designation lies partly within the Scheme area at the northern end of the Ashley Road area. This site has been appraised as having a **medium** (regional/county) ecological importance.
- **River Avon South LWS** - is a short section of watercourse located between the Ashley Road area and the Maltings and Central Car Park area. This site has been assessed as **low** (district/parish/local) ecological importance.
- **Stratford-sub-Castle Meadow LWS** - is located 0.5km north-west (upstream) of the Scheme area and comprises a series of former water-meadows in the Avon valley. This site has been assessed as **medium** (regional/county) ecological importance.

9.1.2 Habitats

Habitats within the Scheme area are described in the Preliminary Ecological Appraisal Report (Jacobs 2019) (Appendix F1) and are summarised in this sub-section. Figure 9.2a and b shows the habitat types as classified under the Phase 1 methodology.

There are several Habitats of Principal Importance (under the Natural Environment and Rural Communities Act 2006) within the Scheme boundary, that could be affected by the Scheme. Figure 9.3 shows these habitats within the Scheme area. These are:

- **Hedgerows -** There is one hedgerow bordering Fisherton Farm allotments to the north-west of the Ashley Road area of **low** (district/parish/local) ecological importance. This hedgerow is species-poor, intact and supports a number of semi-mature trees. There is also a hedgerow adjacent to Coldharbour Lane allotments but this hedgerow is not considered a Habitat of Principal Importance (negligible - no listed importance) as it is dominated by a non-native species throughout its length. All hedgerows may however support nesting birds. These hedgerows do not meet the definition of important hedgerows as defined by the Hedgerow Regulations (1997).
- **Lowland mixed deciduous woodland** - This habitat has been recorded between Fisherton Recreation Ground and the River Avon in the Ashley Road area and between the Central Car Park and the railway embankment in the Maltings and Central Car Park area. This habitat is considered to be of **low** (district/parish/local) importance;
- **Rivers** - The River Avon and its tributaries flow in a southerly direction through the study area. At the northern end of the Scheme boundary, the River Avon is wide and deep with evidence of hard revetment and vegetated banks. South of Ashley Road by Swimming Pool Gate (a water control structure), the Mill Stream flows off the main River Avon channel. The Mill Stream reach is heavily modified, with artificial vertical banks and with a shallow flat riverbed. The River Avon in the Maltings and Central Car Park downstream of Swimming Pool Gate has mostly soft vegetated banks, with some hard revetment in localised areas. The channel

is narrow and shallow compared to the reach upstream. The Summerlock Stream is a small tributary which flows off the River Avon through hatches north of Ashley Road. This watercourse is predominantly heavily modified as it flows south through Salisbury centre. The stream re-joins the main River Avon south of Queen Elizabeth Gardens.

All sections of the River Avon, Summerlock Stream and Mill Stream within the Scheme area have **very high** (international) ecological importance as they are within the River Avon SAC (refer to Section 9.1.1). Fish are considered in Section 9.1.3, while fishing as a recreational activity is covered in Chapter 7 'Recreation and Access'.

- **Wet woodland** - This woodland, which occurs on poorly drained or seasonally wet soils is located adjacent to the River Avon at the northern end of Fisherton Recreation Ground. This habitat is within the River Avon System SSSI so has been previously assessed in Section 9.1.1 and appraised as having a **high** (national) ecological importance.

In addition to these Habitats of Principal Importance, there are a number of other habitats of lower value that could be affected by the Scheme:

- **Amenity grassland** - Amenity grassland is the dominant habitat at Fisherton Recreation Ground and Ashley Road Open Space in the northern part of the Scheme area and co-dominates with scrub in the Maltings and Central Car Park area. This habitat is considered to be of negligible (no listed importance) biodiversity value as amenity grassland supports few species.
- **Scrub** - Areas of dense continuous and scattered scrub are found throughout the study area. The scrub provides suitable habitat for breeding birds. It is considered to be of low (district/parish/local) ecological importance.
- **Semi-improved neutral grassland** - This grassland was recorded within the Ashley Road area, running adjacent to the River Avon, and is assessed as having low (district/parish/local) ecological importance.
- **Tall ruderal** - This habitat was predominantly recorded on banks adjacent to watercourses and in the corners of field boundaries throughout the Scheme area. Areas of tall ruderal vegetation have the potential to support reptiles and invertebrates. It is assessed as having low (district/parish/local) ecological importance.

These habitats, which are not Habitats of Principal Importance, have all been identified to be of low or negligible value and are not considered further in this ES except in the biodiversity calculator (Section 9.2.2), as it is considered that any identified impacts on these features will not be significant.

A tree survey has been undertaken in accordance with the recommendations of BS5837:2012 that records details of existing trees in and adjacent to the Scheme (see Appendix G1). The study area supports a number of early-mature and mature trees. In particular two groups of trees consisting of mature black poplars *Populus nigra* in the Ashley Road area were considered of district value for nature conservation, as well as having suitable habitat features for roosting bats and visual amenity value in a public open space. Additionally, a number of individual crack willow *Salix fragilis*, weeping willow *Salix babylonica x alba = S. x sepulcralis* and common lime *Tilia x europaea* trees, were noted as being of **high** value.

Several individual younger trees and tree groups were deemed less significant in the local landscape. In particular, a line of young Norway maple *Acer platanoides*,

London plane *Platanus occidentalis x orientalis = P. x hispanica* trees and Lombardy poplar *Populus nigra 'Italica'* trees, groups of grey willow *Salix cinereal* and hazel *Corylus avellana* trees and a false acacia *Robinia pseudoacacia* which are considered of **negligible** (no listed importance) ecological importance.

In the Maltings and Central Car Park area, to the south-east of the railway line and north-west of the car park approach road there is a group of trees which predominantly comprise early mature to mature specimens. They are a mixed group made up of sycamore *Acer pseudoplatanus*, black poplar, lime, silver maple *Acer saccharinum*, hornbeam *Carpinus betulus*, grey willow *Salix cinerea*, beech *Fagus sylvatica* and crack willow. The black poplar and lime are of high value.

A second group consists of riverside trees that follow the river to the east of the long stay car park. There is a mixed age range, but the majority are either early mature or mature trees. The species mix comprises cherries *Prunus sp*., grey willow, false acacia, silver birch *Betula pendula*, alder *Alnus glutinosa*, crack willow, walnut *Juglans regia*, plane tree *Platanus x hispanica*, white poplar *Populus alba* and ash *Fraxinus excelsior*. This group of trees are generally of moderate importance.

A third group are found to the west of the car park and forms the boundary between the car park and the railway line. It is a mix of age groups and species and provides screening between the railway line and car park. The group is of moderate importance. The species include silver birch, ash, black poplar, cherry, crack willow, elder *Sambucus nigra* and whitebeam *Sorbus aria*. Many of the trees have occurred through natural regeneration.

9.1.3 Protected and notable species

A summary of the protected and notable species potentially affected by the Scheme is provided below (note that although some of the species are protected by law, the value of these species within the sites has been assessed in relation to their biodiversity value in the wider area).

- **Amphibians** - No records of great crested newt *Triturus cristatus* have been found within 500m of the study area within the last ten years. One waterbody was identified within 250m of the Scheme area during the Ecological Appraisal (Jacobs 2019) which had a poor Habitat Suitability Index for great crested newt. This species is not considered further in this ES. Several toads *Bufo bufo* and frog *Rana temporaria* were recorded under reptile refugia during a reptile survey. Common toad is considered of **low** (district/parish/local) ecological importance.
- **Birds -** a Waterways Breeding Bird Survey and a Kingfisher survey were undertaken in 2020 (Jacobs 2020 - Appendix F4):
    - a kingfisher *Alcedo atthis* survey was undertaken which was modelled on the River Corridor Surveys methodology (National Rivers Authority 1992), where watercourses are divided into reaches of length 500m and attributes relevant to kingfisher recorded. The surveyed reaches did not support habitat suitable for nesting kingfisher and therefore breeding kingfishers are not considered further. Habitat suitable for foraging was found throughout the Scheme area, especially reaches with clear water and overhanging branches. An incidental sighting of a single foraging kingfisher was recorded during other ecological surveys, in July and September 2020 along the River Avon on the northern boundary of Fisherton Recreation Ground. Kingfisher are assessed as having **high** (national) ecological importance.

- Waterways Breeding Bird survey (WBBS) consisting of a walkover of watercourses within 500m of the Scheme to record the presence of grey wagtail *Motacilla cinerea* and any Schedule 1 bird species (except kingfisher) was undertaken in 2020, modelled on the WBBS (British Trust for Ornithology 2018).

  The survey recorded grey wagtail *Motacilla cinerea* in several locations along the River Avon and tributaries, and Cetti's warbler *Cettia cetti* in wet woodland in the Avon Valley LNR, north of Fisherton Recreation Ground, and within Fisherton Recreation Ground. The surveys confirmed that grey wagtail bred in the area during 2020 and use the watercourses through the study area to forage. Cetti's warbler were heard consistently in the Avon Valley LNR, singing from dense wet woodland in at least four locations during the WBBS. Grey wagtail is listed as red on the Birds of Conservation Concern list 4. Breeding birds, including grey wagtail are considered of **low** (district/parish/local) ecological importance.

- **Freshwater macro-invertebrates**. We have monitored macro-invertebrate communities at two sites within 2.5km of the study area in the main River Avon; at a site approximately 2.5km upstream of the Ashley Road area at Stratford-Sub-Castle and a site approximately 2.5km downstream at Harnham Bridge. Three species of conservation interest were identified as Regionally notable or higher; the mayfly nymph *Baetis buceratu*s, the cased caddisfly *Brachycentrus subnubilus* and the flatworm *Planaria torva*. None of the records indicate any macro-invertebrate species listed under current legislation, IUCN Red List or Species of Principal Importance. Therefore, it is considered macro-invertebrates are of **low** (District/Parish/Local) importance.
- **Aquatic macrophytes**. Macrophytes have been monitored at Stratford-Sub-Castle, approximately 2.5km upstream of Ashley Road since 2012. In 2020, we also carried out surveys of macrophytes including water crowfoot communities within and around the Scheme area (Jacobs 2020 - Appendix F9). No Species of Principal Importance have been identified within the Scheme area. However, water crowfoot communities were identified in the River Avon and Mill Stream in the Maltings and Central Car Park area and the Summerlock Stream in the Ashley Road area. Water crowfoot communities were absent from the reach surveyed in the River Avon at Fisherton Recreation Ground.

  Watercourses of plain montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachian* vegetation are a qualifying feature of the River Avon SAC. It is therefore considered macrophytes are of **high** (national) importance.
- **Mammals**. Species of relevance to the works are badger *Meles meles*, several species of bats, otter *Lutra lutra* and water vole *Arvicola amphibius*:
  - **Badger**. There are no records of badger within 1km of the Scheme area within the last ten years. No badger setts or field signs were recorded within the accessible land within the Scheme area. Suitable habitat along the rail embankment north of the Central Car Park was not surveyed due to access restrictions. Badger is considered to be of **low** (district/parish/local) value.
  - **Bats**. There are numerous records for bats within 2km of the Scheme area, of which there are five records of bats foraging within the Ashley Road area for noctule *Nyctalus noctule*, Daubenton *Myotis daubentonii*,

common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus* and myotis sp.

Extensive bat surveys have been carried out in 2020 to identify trees and bridges within the Scheme area with potential to serve as roosting sites, and bat transects and passive detector surveys have been undertaken to understand the level of bat activity in the study area.

Ground based tree assessment (Jacobs 2020). Potential roost features were found in 17 trees within the Scheme area. Secondary surveys of these trees found two trees to be of high potential and nine of moderate bat roost potential, with another two trees identified during the survey of moderate bat roost potential. No evidence of bats was found during the surveys.

Secondary bat survey. Preliminary bat roost inspections were conducted on 12 bridges within the Scheme area. Of these, two bridges were identified as having high roost potential, three bridges were of moderate roost potential, three bridges were of low to negligible potential, and the remaining four bridges of unknown roosting potential as they could not be surveyed due to access restrictions.

One dusk emergence survey was conducted at Millstream Approach Road Bridge, which is to be demolished as part of the works (and re-constructed on an alignment further north), which concluded that the bridge was of negligible potential. Secondary endoscope surveys were completed on trees, which found no evidence of roosting bats in any trees surveyed. Bats are considered of **medium** (regional/county) ecological importance.

Bat Transect and Passive Bat Detector survey (Kingfisher Ecology 2020). Transect surveys found that bats are foraging and commuting along the extent of the River Avon Corridor both within the city and out to the surrounding rural landscape of Salisbury. During the surveys**,** feeding activity was both observed and recorded, together with social calling from bats particularly pipistrelle species.

The majority of bat activity was concentrated to the north and to the south of the city centre. However, there was moderate bat activity along the river corridor within the centre of the city**,** which was predominantly common and soprano pipistrelle foraging, feeding and commuting.

Noctule activity was concentrated to the north of the city at Fisherton Recreation Ground. Noctule activity was observed at height where the bats were foraging and feeding at approximately 30-45 minutes after dusk suggesting a noctule roost within close proximity of Fisherton Recreation Ground.

Myotis activity was present along the river corridor to the south of the city from Elizabeth Gardens to Fisherton Street and to the north of the city from Fisherton Recreation Ground to the Maltings Central Car Park with brandts, daubenton's, natterers and whiskered bats recorded.

Low numbers of brown long-eared bats and serotine bats were recorded**,** particularly within the Ashley Road area.

Bats in designated sites. Bats are not qualifying features of any of the designated sites within the 2km study area. As a 30km buffer is often used for bats that are qualifying species of SACs, both Chilmark Quarries SAC (16km west of the Scheme area) and Mottisfont Bats SAC (17km east of the Scheme area) were also considered. However, these sites were screened out from further assessment as their qualifying features (greater and lesser horseshoe, barbastelle and Bechstein's bats) were not recorded in bat transect or passive bat detector surveys within the Scheme area, and studies have shown that slower broad-winged species such as barbastelle, greater and lesser horseshoe bats, and Myotis sp. tend to avoid artificial light, and therefore may avoid the centre of a city.

- **Otter**. Field signs of otter were only recorded within the Maltings and Central Car Park area, with three spraints found during the survey in September 2020 and incidental spraint found during a bat survey. No otter holts or laying up sites were recorded. The ecological value of otter is considered to be **medium** (regional/county) importance.
- **Water vole**. Water vole signs including, latrines, dropping piles, burrows, footprints and feeding piles were found within and adjacent to the River Avon in the Ashley Road area and the Maltings and Central Car Park area. Only six latrines were encountered across the whole Scheme area over two surveys undertaken in October 2019 and June 2020, within the Scheme area.

  A low water vole population size was estimated within survey sections that were confirmed to support water voles. There were no sections where latrines were in numbers consistent with a medium or high population. Water vole is considered to be of **medium** (regional/county) ecological importance.

- **Reptiles**. There are no recorded records of reptiles within 1km of the study area within the last 10 years and a survey in 2020 within the Scheme area recorded no signs of reptiles. However there is anecdotal report of a grass snake swimming in River Avon. Reptiles are not considered further in this ES.

9.1.4 Fish and eels

Records of fish populations from watercourses within a 2km buffer of the Scheme have been obtained from our fisheries team and the WBSRC. The river, streams and connecting ditches within the Scheme area are known to support good populations of fish, including the following priority species: European eel *Anguilla anguilla* (identified in WSBRC dataset), brown trout *Salmo trutta*, barbel *Barbus barbus* and Atlantic salmon *Salmo salar*.

The watercourses in Salisbury are known to be of particularly high importance for Atlantic salmon populations with vital spawning habitats in the study area. Atlantic Salmon is a species whose conservation requires the designation of SACs, is a Species of Principal Conservation Importance as listed in Section 41 of the NERC Act 2006 and is a UK Biodiversity Action Plan Species. Atlantic salmon are typically unaffected by the introduction of genetic stock of non-native origin. **Atlantic salmon** is valued as of **high** (national) importance.

The Hampshire Avon salmon redd count report (Environment Agency 2012), which records redd counts across 19.5km of the Upper River Avon, indicates favourable habitat throughout Salisbury (upstream and downstream of the Scheme.

Our records also indicate the presence of brook lamprey *Lampetra planeri* in the River Avon. Brook lamprey is a species whose conservation requires the designation of SACs but is considered of Least Concern in the IUCN Red List (IUCN 2020). The Avon represents the southern part of the UK range of brook lamprey. The main river provides clean gravels for spawning and silt beds for juveniles. **Brook lamprey** is considered of **high** (national) importance.

Brown/sea trout *S.trutta* and bullhead *Cottus gobio* have been recorded in the River Avon. Bullhead is a species whose conservation requires the designation of SACs. Brown/sea trout are Species of Principal Conservation Importance as listed in Section 41 of the NERC Act 2006 and are a UK Biodiversity Action Plan Species. Both species are classed as of Least Concern in the IUCN Red List (IUCN, 2020). **Brown/sea trout** is considered of **medium** (regional/county) importance. **Bullhead**, whilst common nationally, is an importance component of the fish community on the River Avon and is considered of **high** (national) importance.

Records indicate European eel in the River Avon. This species is protected under the Eels Regulations (England and Wales, 2009) and is critically endangered (IUCN 2020). **European eel** is considered of **high** (national) importance.

Atlantic salmon, European eel and sea trout are migratory species, and as such are able to move through the catchments where the Scheme is proposed.

Among the records were also a number of **other coarse fish species**, including grayling *Thymallus thymallus*, pike *Esox Lucius*, minnow *Phoxinus phoxinus* and 3-spined stickleback *Gasterosteus aculeatus*. All coarse fish species not protected under current legislation (as described above) are considered of **low** (District/Parish/Local) importance.

Juvenile salmonid and coarse fish surveys within the River Avon system (Environment Agency 2019) surveyed 21 sites throughout the River Avon from Upavon downstream to Christchurch. Although none of the sites surveyed lie within the footprint of the Scheme, a site immediately upstream at Stratford Sub-Castle (approximately 2.5km from study area) had a total of 42 Atlantic salmon and 8 brown trout recorded, with sites further upstream indicating the presence of European eel. Approximately 1.5km downstream of the Scheme area in the city centre, 12 Atlantic salmon, 18 brown trout and 1 European eel were identified, indicating the importance of the River Avon as a migration route for Atlantic salmon, brown trout and eel.

A walkover of the Scheme was carried out by Jacobs in 2020 for the purposes of surveying macrophytes and geomorphology of the River Avon and its tributaries. Habitat notes were made as part of the survey and provide further evidence of the presence and availability of spawning habitat for Atlantic salmon, brook lamprey and bullhead. Sections of the River Avon, Summerlock Stream and Mill Stream in Salisbury were identified as optimum habitat for these species with fast flowing riffles/runs and clean gravel substrates. These were localised in some reaches and prevalent throughout in others. In the Ashley Road area, sub-optimal habitat was identified in the River Avon for these species as the channel was deep, slow flowing with overlying silt and silt dominated substrates.

9.1.5 Invasive species

Populations of four invasive or potentially invasive non-native plant species were recorded during an invasive species survey, of which one is legally controlled

- **Nuttall's waterweed** *Elodea nuttallii*. Nuttall's waterweed was recorded from the right bank of the River Avon to the north of the A36 flyover,

The other species were:

- **Giant bramble** *Rubus armeniacus* was recorded along watercourses throughout the Scheme area, with extensive dense stands along the River Avon;
- **Butterfly-bush** *Buddleja davidii*, was recorded from along the embankment of the railway and retaining walls of the River Avon within the Scheme area; and
- **Wilson's honeysuckle** *Lonicera nitida* was recorded as planted shrubs in the Fisherton Recreation Ground.

  These three species comprised small populations, pose less of a risk to native biodiversity and do not require specific control measures.

An American mink *Neovison vison* was recorded in the River Nadder, to the south of the Scheme area in September 2020. It is assumed that mink is likely to be widespread within the area.

Due to the fact that invasive plant species are undesirable within the Scheme area and there is a legal obligation to avoid spreading these species, they are assessed as having a **medium** (regional/county) negative importance.

9.1.6 Changes to flora and fauna in absence of Scheme

In the absence of the Scheme, the floodplain in the study area (and associated riverine habitats) is likely to continue relatively unchanged. The managed nature of the River Avon and associated streams mean that they are unlikely to change course within the floodplain.

There is no reason to anticipate any significant changes to terrestrial or aquatic ecology in the Scheme area.

9.2 Likely significant effects

9.2.1 During construction

Designated Conservation Sites

Statutory international and national sites

- **River Avon SAC** - During construction, there will be an estimated loss of approximately 0.02ha of in-channel sub-optimal habitat in the footprint of the infilled section of Summerlock Channel and from the new culvert on the Summerlock Stream under the flood embankment, as well as temporary effects from physical damage during construction. . This will affect less than 0.006% of the total SAC habitat (i.e. within and outside the Scheme area).

  A Habitat Regulations Assessment (HRA) has been prepared to fulfil the requirements of the Habitats and Species Regulations 2017 (as amended) and is provided in Appendix J. The HRA assesses the possible impacts from changes to habitat, flow regime, disturbance, silt mobilisation, channel morphology and natural function on the River Avon SAC. The Stage 1 Screening identified that works have the potential for Likely Significant Effect on the qualifying feature 'Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation' and qualifying fish species (Atlantic salmon, bullhead, brook lamprey). A Stage 2 Appropriate Assessment was subsequently undertaken and has concluded that the Scheme will not adversely affect the River Avon SAC with the implementation of mitigation measures. Natural England has confirmed their full support for the Scheme.

- **River Avon System Site of SSSI** - This SSSI will be directly impacted by the proposed Scheme, where a new channel from the River Avon will be constructed and wetland habitat created at Fisherton Recreation Ground, as well as indirectly. The impacts on the watercourses within this SSSI are considered under Rivers in Table 9.1 and not repeated here.

  The potential impact to wet woodland within this designation, will be assessed under habitats in Table 9.1.

- **East Harnham Meadows SSSI** - Works are proposed to the River Avon and Mill Stream channel and banks approximately 1.7km (by river) upstream of this designation. There is a **negligible** risk of the changes in water levels within the upstream Scheme area, impacting this downstream wetland habitat. There may be a potential increase in silt and pollutants entering the watercourse. However, protection measures will be in place as described later, therefore impacts are considered to be minimal. It is therefore considered that the construction of the Scheme will have a **negligible** impact on the SSSI.

Statutory local designated sites

- **Avon Valley LNR** - A small part of the southern end of this LNR will be directly impacted by the proposed Scheme, where a new channel from the River Avon will be constructed and wetland habitat created at Fisherton Recreation Ground. The impacts on the River Avon, wet woodland, lowland mixed deciduous woodland and mature trees within this LNR are considered in Table 9.1 and not repeated here. Impacts on other habitats within this designation are considered to be **negligible** (based on a low ecological importance and minor negative magnitude).

Non-statutory designated sites

- **Avon Valley Meadows LWS** - There will be direct impacts on the LWS as the southern end of this designation is within the area where a new offtake channel from the River Avon will be constructed and new wetland habitat created. Indirect impacts to protected fauna species from noise, lighting and an increase in disturbance will also occur.

  The impacts on the River Avon, lowland mixed deciduous woodland and mature trees within this designation are considered in Table 9.1 and not repeated here. Impacts on other habitats within this designation are considered to be **negligible** (based on a low ecological importance and minor negative magnitude).

- **River Avon South LWS** - There will be no direct or indirect impacts on this site, which is located approximately 60m from the Scheme area, between the Ashley Road area and Maltings and Central Car Park area. Therefore impacts are considered to be **negligible** (based on a low ecological importance and negligible magnitude).

- **Stratford-sub-Castle Meadow LWS** - This site will not be directly or indirectly impacted, as it is located just within 0.5km of the Scheme area, upstream of where works are proposed, therefore impacts are considered to be **negligible** (based on a medium ecological importance and negligible magnitude).

Habitats

The potential impacts on each of the key habitats during the construction phase are presented in Table 9.1. Note that habitats not of Principal Importance and identified to be of low or negligible value are not considered in this section. Habitats, which are permanently removed or altered due to the Scheme, are considered in Table 9.3 in Section 9.2.2, even where the changes themselves are due to the construction of the Scheme rather than operation, in order to consider all such changes in one place.

Table 9.1: Impacts on habitats during construction

Receptor (value)	**Locations**	**Description of effects**	**Significance of effects (before mitigation)**
Rivers (within River Avon SAC, River Avon System SSSI and Avon Valley LNR) (very high)	River Avon and its tributaries (Summerlock Stream and Mill Stream) run through Scheme area	All watercourses in the Scheme area will be directly and indirectly impacted during construction. Direct impacts during construction include the temporary loss of in-channel, marginal and bank habitat (with associated impacts on characteristic species) and habitat fragmentation from: - installation of coffer dams to enable construction of new offtake channel from the River Avon adjacent to Fisherton Recreation Ground and above Swimming Pool Gate to enable the temporary diversion of water down the Mill Stream (to dry the River Avon channel and enable widening and removal/ construction of bridges) - physical damage due to presence of machinery in the channel to enable modification to the existing River Avon (e.g. at junction with new channel adjacent to Fisherton Recreation Ground, from construction of widened River Avon channel in the Maltings and Central Car Park area and from modifications to the Mill Stream). - removal of two sluice structures along the River Avon structures to improve fish passage, reprofiling of the channel bed and new rock weirs for fish passage - removal of Millstream Approach Bridge - construction of new vehicular and footbridges across new channel and widened channel These changes may temporarily impact the structure and function of riparian habitat within the watercourses.	Major negative (National) - significant

Receptor (value)	Locations	Description of effects	Significance of effects (before mitigation)
		Indirect temporary negative impacts may affect the water quality of the watercourses and result from - changes in flow, velocities and increases in suspended sediment and silt movement. During the temporary diversion of flows down the Mill Stream, there is potential for sediment movement and a potential 'slug' of sediment to move downstream and accumulate at downstream structures. - accidental release of pollutants from construction activities.	
Lowland Mixed Deciduous Woodland (within Avon Valley LNR and Avon Valley Meadows LWS) (low)	Two locations within the Ashley Road area and one to the west of the Maltings and Central Car Park area	The mixed deciduous woodland at Ashley Road will not be impacted by the Scheme. Woodland within the Maltings and Central Car Park will be impacted by a culverted floodway, which may require the felling of approximately 19 trees.	Minor negative (parish/ district) - not significant
Wet woodland (within Avon Valley SSSI and Avon Valley LNR) (high)	Located to the north of the Ashley Road site	Indirect impacts from works immediately south of the wet woodland which may reduce water levels temporarily whilst in construction.	Negligible
Hedgerow (by Fisherton Farm allotments) (low)	A species-poor, intact hedgerow, bordering Fisherton Farm allotments, north- of Ashley Road	No impact to this hedgerow are expected during construction	Negligible
Trees	There will be a loss of up to 110 established trees in as a result of the Scheme (shown on drawings in Appendix G2). Trees have value for both biodiversity and landscape. Impacts on trees, which will be felled or otherwise affected are covered in Chapter 8 'Landscape and		

Receptor (value)	Locations	Description of effects	Significance of effects (before mitigation)
	visual amenity'. Impacts relating to their value as habitat for protected and notable species are discussed in the section below.		

Protected and notable species

The potential impacts on protected and notable species during the construction phase are presented in Table 9.2.

Table 9.2: Impacts on protected and notable species during construction

Receptor (value)	Locations	Description of effects	Significance of effects (before mitigation)
Amphibians (low)	Within the Ashley Road site	There may be direct negative impacts (mortality) on individuals during the removal of vegetation; and indirect impacts on toads from a reduction in foraging in the short term.	Negligible
Badger (low)	Badger is not known to be present but not all locations have been surveyed so absence is not confirmed	It is considered that a sett not regularly used (i.e. not a main sett), could be present on the railway embankment in the Maltings and Central Car Park area in the footprint of the floodway. Direct impacts (mortality or injury) may occur during construction through collisions with vehicles or plant and pathways regularly used by badger may be blocked by construction fencing or earth works. Increased noise and light levels during construction could potentially cause disturbance. A sett may require permanent or temporary closure or be disturbed	Minor negative (parish/ district) - not significant
Bats (medium)	Along River Avon, Summerlock Stream and Mill Stream	No bat roosts will be lost from the construction of the scheme. Within the Ashley Road area, the large poplars (of which five have moderate suitability for roosting bats and one has high suitability) and two willows (both of which have moderate suitability) will require pruning in order to be retained - see Figure 2 in Appendix F6 (Tree T02, T03, T04, T05, T06, T33 (poplars); T07 and T10 (willows)). Depending on the pruning required some suitable roosting features may be lost.	Minor negative (parish/ district) - not significant unless bat roosts are found during pre-construction inspections

		Additionally two trees with moderate potential for bat roosts will require felling as part of the Scheme, located within the Maltings and Central Car Park area; one to the east of Swimming Pool Gate and the second tree within broadleaved woodland on the rail embankment (Trees T12 and T21 in Appendix F6). Construction activities (artificial lighting) could impact on bats. Slower broad-winged species (long-eared bat, barbastelle, greater and lesser horseshoe and Myotis sp. Bats), will tend to avoid artificially lit up areas. This may affect bats through reducing their foraging area. However, other bat species (noctule, serotine and pipistrelle bats) will exploit artificial light sources due to the increased insect concentrations.	of affected trees.
Birds (including grey wagtail and kingfisher) (breeding birds - low; kingfisher - high)	Along River Avon and tributaries	Vegetation removal, including tree/scrub removal will result in direct physical damage to, and loss of, habitats that may support breeding birds including grey wagtail and foraging habitat for birds including kingfisher. Increased noise and the presence of construction machinery/personnel may also disturb breeding and foraging birds. These impacts will result in a negative, direct, temporary impact.	Minor negative (parish/ district) - not significant
Freshwater macro-invertebrates (low)	All in-channel habitats of River Avon and its tributaries	Aquatic macro-invertebrates may be killed by the physical construction of in-channel works to riverbanks and beds, any dewatering of in-channel areas and through declines in physicochemical water conditions. This may result in a temporary, localised negative impact. Habitat loss/fragmentation during construction (assessed under 'Rivers') will result in direct loss or injury of macro-invertebrates. Additionally any dewatering of watercourses to allow the insertion or extension of in-channel structures will break hydrological connectivity for macro-invertebrates. This may result in a temporary, localised negative impact. Run-off from construction areas will affect aquatic macro-invertebrate communities	Minor negative (parish/ district) - not significant

		through a reduction in sensitive species. Water pollution may be in the form of pollutants from vehicles and machinery (spills etc.) and increases in sedimentation (and turbidity) from earthworks/changes to channel structure. This may result in a temporary, localised negative impact. Changes to hydrology e.g. construction related discharges and any dewatering will influence the flow type/habitat of the watercourses which could impact macro-invertebrate communities. This may result in a temporary, localised negative impact.	
Otter (medium)	All in-channel habitats of River Avon and its tributaries	Construction activities (noise, vibration and artificial lighting) will impact upon the watercourses in the Scheme area, and therefore potentially disturb otters and their resting sites. Fish stocks may be indirectly impacted by the works through pollution, silt and vibration during construction, which may indirectly impact the otters' food resource.	Minor negative (parish/ district) - not significant
Water Vole (medium)	Along River Avon in the Ashley Road area and the Maltings and Central Car Park area	Water vole is known to be present in low numbers along the River Avon. They may be present in other watercourses within the Scheme area, but were not recorded as part of the surveys undertaken in 2020. The construction works will destroy river habitat suitable for foraging water vole through direct physical damage and have the potential to injure or kill individuals that may be present. In the Ashley Road area, the proposed works have potential to injure, kill and/or disturb water voles, as they have been recorded along the River Avon with a potential that submerged water vole burrows may be present.The works will directly impact water vole through the destruction of potential foraging areas, with a permanent loss of approximately 20m of suitable habitat and a temporary loss of approximately 30m of suitable habitat. In the Maltings and Central Car Park area, the works will directly impact water vole	Minor negative (parish/ district) - significant

		through the destruction of four known active burrows and a temporary loss of approximately 410m of suitable water vole foraging habitat. There is also potential for negative, indirect, temporary impacts from noise, vibration and lighting during construction causing disturbance to this species.	
Macrophytes Water crowfoot (*Ranunculus spp*.) communities (high) Other macrophyte species (low)	All in-channel habitats of River Avon and its tributaries	Any in-channel works have the potential for direct loss of macrophyte communities resulting in a permanent, localised impact. Freshwater habitats capable of supporting macrophyte communities may be lost or fragmented as a result of in-channel modification of bed and bank structures, or the construction of culverts and bridge infrastructure. Habitat fragmentation is likely where dewatering is required for constructing in-channel structures. Reducing connectivity in and around structures will reduce dispersal of seedbank as longitudinal connectivity is interrupted. Physical modification of in-channel habitat during construction may result in changes to flow, substrate and depth which has the potential to temporarily impact on local macrophyte communities. Run-off from construction areas may temporarily impact on local macrophyte communities. Water pollution may be in the form of pollutants from vehicles and machinery (spills etc.) and increases in sedimentation (and turbidity) from earthworks/changes to channel structure. Changes to hydrology e.g. construction related discharges and any dewatering will influence the flow type/habitat of the watercourses with potential temporary, localised impacts on macrophytes.	Major negative - significant for water crowfoot Minor negative for other macrophyte species
Atlantic salmon, bullhead, brook lamprey, European eel (High: National)	All in-channel habitats of River Avon and its tributaries	Potential for injury or mortality of freshwater fish species during the construction of any in-channel works or percussive piling in riparian areas resulting in temporary, localised impact.	Major negative - significant for Atlantic salmon, bullhead,

Brown/sea trout, (Medium: Regional) Coarse fish species (Low: District/Parish/ Local)		Freshwater habitats capable of supporting fish may be lost or fragmented as a result of in-channel modification of bed and bank structures (such as infilling of section of Summerlock Stream), or the construction of culverts and bridge infrastructure. Habitat fragmentation is likely where dewatering is required for constructing in-channel structures. Physical modification of in-channel habitat during construction may result in changes to flow, substrate, depth, channel cover, banks, which has the potential to impact fish communities. Temporary, localised negative impact. Removal of bank and bed habitat during construction will affect water quality; increasing sedimentation from the riparian zone and increasing turbidity of the freshwater environment. Fish populations are sensitive to sedimentation, affecting respiration and prey availability. Pollution from surrounding run-off from construction sites and machinery (spills etc.) could also enter watercourses and reduce water quality resulting in temporary, localised negative impacts. Changes to hydrology e.g. construction related discharges and dewatering to allow modification of the watercourse will influence the flow type/habitat of the watercourses and the fish communities. This may have temporary, localised impacts. Construction activities undertaken within the channel and adjacent riparian zones has the potential to disturb both resident and migratory fish species. Light and vibration can create behavioural and physical avoidance of construction areas, preventing migration through the disturbed area and reducing feeding and spawning behaviours. These changes may have temporary, localised effects.	brook lamprey, European eel Major negative - significant for brown/sea trout Minor negative for coarse fish species

Invasive Species

No works are proposed along the River Avon upstream of the Ashley Road area where Nuttall's waterweed (a legally controlled INNS species) was recorded and there will therefore be **negligible** direct impacts on this species during construction.

Of the other invasive species, which are not legally controlled, giant bramble, butterfly bush and Wilson's honeysuckle are recorded where works are proposed in the Ashley Road and the Maltings and Central Car Park areas. These species may spread if existing populations are disturbed during construction.

The works to the banks and bed of watercourses are also likely to provide suitable habitat for invasive plant species to colonise, which could spread from plant material upstream.

These impacts are considered to be **minor negative** (based on a medium ecological importance and minor negative magnitude) and not significant.

9.2.2 During operation

The Scheme will provide a significantly improved environment for wildlife during operation. The Scheme will provide new channels and wetland habitats at Fisherton Recreation Ground and improved watercourses through the Maltings and Central Car Park area comprising a widened River Avon corridor and improved Mill Stream. An outline Landscape Habitat Management Plan has been produced and will be developed further as part of the detailed design, setting out the relevant maintenance regime to ensure that the beneficial consequences of the Scheme are sustained.

The creation of a new channel at Fisherton Recreation Ground, with its associated wetland and enhanced habitat will create a more attractive environment, which will encourage people to use the existing and new walkways, improving access to nature (see Chapter 7 'Recreation and public access') and having indirect impacts on health and the well-being of the local community using the river corridor (Chapter 5 'Local community').

Designated Conservation Sites

Statutory sites

The Scheme has been carefully designed to reduce negative impacts to the internationally and nationally designated sites and to make a positive contribution to restoring the qualifying habitat of the SAC and to benefit the qualifying fish species. The key design elements are:

- An overall 14% net gain in SAC and SSSI habitat within the footprint of the Scheme, with a two-stage channel being constructed within the River Avon and Mill Stream in the Maltings and Central Car Park area. This will enable re-naturalisation of the watercourses and widening of the River Avon corridor to enable more natural flood management and improve lateral connectivity and diversity in bank structure, which will benefit qualifying SAC species through habitat diversity. Tree planting in riparian areas will not only offset the tree felling required to construct the Scheme but enhance riparian habitats and by providing a source of woody debris. This will directly contribute to achieving the Conservation Objectives of the River Avon SAC by helping to 'Restore the presence of coarse woody debris within the structure of the river channel'.
- The new offtake channel at Fisherton Recreation Ground has been designed to re-create a typical chalk stream habitat totalling an estimated 0.36ha of new

riverine and riparian habitat features. This will directly contribute to restoring the extent of the qualifying habitat within the SAC, as well as restoring more natural fluvial processes, benefitting macro-invertebrate and fish communities.

- Channel connectivity (catchment migration routes) will be enhanced along the River Avon in central Salisbury via the removal of Swimming Pool Gate, a known obstruction to fish migration, with a series of rock weirs that will improve connectivity for both designated and non-designated species. The replacement of Swimming Pool Gate with a passive weir structure to improve fish passage will alter the division of flow between the river and the mill channel, allowing more water to be diverted down the main channel. The risk of additional deposition of fine sediment within the Mill Stream will be mitigated by introducing marginal berms to create a low flow channel.
- Within the new wetland area at Fisherton Recreation Ground, channels will be designed to facilitate fish passage during low flows and maintain sediment continuity by maintaining connection to the main channel. A range of instream, marginal and riparian enhancements will be introduced to generate new heterogenous habitat to benefit a range of species, including salmonids and water crowfoot communities.

  The scheme design and addition of the new channel at Fisherton Recreation Ground provides appropriate mitigation to negate risks on qualifying features of the River Avon SAC.

  The design for the new wetland area to the north of Ashley Road includes specific measures to ensure suitable flow conveyance providing sediment transport through the system, whilst maintaining suitable habitat for juvenile lamprey species which require silt beds for development. The channel will be designed with specific widths and depths and meanders to encourage flow diversity and sediment transport (riffles, runs) and deposition (pools, marginal areas) to enhance habitat diversity without negative impacts (substantial increased sediment deposition) during low flow periods. Maintenance of the movement of sediment at very low flows is also considered through additional design aspects, including (alternate) berms, marginal planting, bed reprofiling and flow deflectors.
- **River Avon SAC** - The HRA (Appendix J) including Appropriate Assessment assessed impacts on the integrity of the River Avon SAC during operation of the Scheme. The HRA assesses the possible impacts from changes to habitat, shading, flow regime, disturbance, silt mobilisation, channel morphology and natural function on the River Avon SAC. It has been concluded that adverse effects on the integrity of the SAC can be avoided through sensitive design and the implementation of various mitigation measures. Natural England has confirmed their full support for the Scheme.

  The new offtake channel for the Summerlock Stream at Fisherton Recreation Ground has been designed to re-create a typical chalk stream habitat with an estimated 320m of new channel and 0.36ha of new riverine and riparian habitat features. This will directly contribute to restoring the extent of the qualifying habitat within the SAC (benefitting SAC features and the distinctive features supported by the habitat including water voles and otters), as well as restoring the extent and pattern of in-channel and riparian habitats to that characteristic of natural fluvial processes.
- **River Avon System SSSI** - As described under the SAC above, there will be beneficial impacts to this designation as newly created and enhanced habitats

(wider riparian banks and shallow berms) start to mature and diversify (**minor positive**). The Scheme will provide a 14% increase in channel habitat, which is will form an extension to the existing SSSI.

Removal of sluice gates, and the replacement of Swimming Pool Gate with a rock weir design aims to reduce the impoundment and improve fish passage along the River Avon and Mill stream. This will improve longitudinal connectivity and natural function. Wider riparian banks along the River Avon and shallow berms either side of the Mill Stream within the Maltings and Central Car Park area, will improve habitat (foraging, cover and lateral connectivity of the watercourse) for a variety of species, thus improving biodiversity.

- **East Harnham Meadows SSSI** - this site will not be directly or indirectly impacted by operational impacts from the Scheme. Combined water flow coming from the River Avon and Mill stream will not change. Therefore, impacts will be **negligible**.
- **Avon Valley LNR** - There will be beneficial impacts to this designation as newly created habitats and enhanced habitats (wetlands, watercourses) start to mature and diversify leading to **minor positive impacts** in the long-term (not significant).

Non-statutory sites

- **Avon Valley Meadows LWS** - There will be beneficial impacts to this designation as newly created habitats and enhanced habitats (wet woodland, marginal berms, wetland habitat, scrub and broadleaved woodland) start to mature and diversify (**minor positive** - not significant).
- **River Avon South LWS** - Although within the Scheme boundary, there will be no direct impacts on habitats within this site and no indirect operational impacts (negligible) are expected from changes in flood flows, velocities, water depths and dispersion/deposition from upstream.
- **Stratford-sub-Castle Meadow LWS** - No direct or indirect operational impacts (**negligible**) are expected as this is some distance upstream of the Scheme area.

Habitats

The Scheme incorporates the creation of diverse wetland habitat, wet woodland, marginal berms, scrub and broadleaved woodland, as an integral part of the design, to benefit biodiversity.

The Scheme will provide improved habitats compared to the baseline. In particular, Fisherton Recreation Ground will be significantly improved, with a new main channel and two subsidiary channels, marginal berms and wetland habitat including wet woodland, connected to the River Avon through the lowering of ground levels.

Naturalisation of the River Avon including improvements to lateral and longitudinal connectivity will encourage habitat and species diversity and fish passage within the catchment.

The Mill Stream is currently a highly artificial, over-wide channel, which will have its flow lowered and the width reduced by introducing shallow berms either side of the channel. Naturalisation of marginal areas will encourage habitat diversity. Some existing areas of hard standing that currently comprise part of the Central Car Park and Millstream Coach Park in the Maltings and Central Car Park area will become part of the widened multi-staged channel of the River Avon.

The creation of these improved habitats will in the long term have potential to support a variety of protected species including bats, water vole, otter, invertebrates and birds.

The design of the Scheme has ensured that some valuable habitats within the Scheme area are retained. The most significant examples are the two groups of trees consisting of mature black poplar and weeping willow, and areas of riparian vegetation within the Ashley Road area.

Additionally, we have assessed the relative value of the overall habitats lost and created due to construction of the Scheme using a Biodiversity Metric tool (Defra Biodiversity Impact Assessment Metric Calculation Tool v2.0). The Biodiversity Metric provides a way of measuring and accounting for biodiversity losses and gains resulting from development or land management change.

It considers each habitat type's value, condition, size and connectivity to provide an overall numeric value for the defined study area, allowing comparison of the baseline value before development and the new value after development (i.e. biodiversity net gain or loss). The metric does not override existing law or policy that protects important sites and species.

Calculations have been carried out based on the proposed design and implementation of the Scheme and information on existing habitats within the site has been derived from Phase 1 habitat mapping (see Appendix F1). The habitat mapping was overlain onto the Scheme area to predict the potential habitat changes due to the Scheme.

Table 9.3 summarises the predicted habitat changes within the Scheme area both for habitats of principal importance and for other habitats.

Table 9.3: Summary results of the Defra Biodiversity Metric 2.0 calculation for habitats

Linear habitats	**Length pre - construction (m)**	**Length post-construction (m)**	**Net change - length (m)**
Native species-rich hedgerow with trees	0	445	+445
River	1500	1776	+276
Habitat areas	**Area pre-construction (ha) within Scheme area**	**Area post – construction (ha) within Scheme area**	**Net change in area (ha)**
Grassland - Lowland meadows	0.00	0.56	+0.56
Grassland - Modified grassland	0.00	0.72	+0.72
Grassland - Other neutral grassland	0.08	0.00	-0.08
Grassland - Other neutral grassland	0.03	0.00	-0.03

Heathland and shrub - Hawthorn scrub	0.08	0.00	-0.08
Urban - Allotments	0.17	0.17	0.00
Urban - Amenity grassland	4.05	2.38	-1.67
Urban - Artificial unvegetated, unsealed surface	0.00	0.01	+0.01
Urban - Built linear features	0.05	0.00	-0.05
Urban - Developed land; sealed surface	0.76	0.89	+0.13
Urban - Introduced shrub	0.00	0.14	+0.14
Urban - Vacant/derelict land/ bare ground	0.04	0.00	-0.04
Lakes - Ditches	0.04	0.00	-0.04
Wetland - Fens (upland and lowland)	0.00	0.14	+0.14
Woodland and forest - Other woodland; broadleaved	0.00	0.05	+0.05
Woodland and forest - Wet woodland	0.13	0.24	+0.11

In Table 9.3, habitats which are cleared prior to construction but then re-instated in the same place afterwards are included in both the “Loss” and “Gain” columns. In the case of woodland, these areas show as a loss of woodland and a gain of plantation, reflecting the long time needed for newly-planted woodland to be of similar ecological value to mature woodland. Areas of amenity grassland where wetland habitats are to be created are also included in the Loss column. Areas which are not cleared but are retained unaltered, are not included in either column.

The Scheme will replace predominantly amenity grassland in an urban setting with significantly improved habitats in the longer term. The metric estimates that the Scheme will provide a 14% net gain in *'nationally important'* river habitat i.e. SSSI (potentially designated internationally important) and a 1.4% net gain of terrestrial habitat. It should be noted that the calculator assumes a large loss of amenity grassland (i.e. complete removal of low value terrestrial habitat) but in reality, the loss will only be temporary and this grassland will actually be reinstated upon completion. Additionally the Scheme will create 445m of new native species-rich hedgerow with trees within the Maltings and Central Car Park area, which equates to a high net gain for hedgerows. However, a percentage net-gain cannot be calculated for hedgerows within the metric as there is no native hedgerow present

pre-Scheme (to be used as the baseline) that is going to be impacted. Approximately 30m of a non-native ornamental hedgerow will be removed but this was not considered in the biodiversity calculator (nor included in Table 9.3) and scores no biodiversity units in the calculator. The combined area of hedge to be removed and reduced is approximately 260m^2

Protected and notable species

The potential impacts on protected and notable species during the operational phase are presented in Table 9.4.

Table 9.4: Impacts on protected and notable species during operation

Ecological feature (value)	Locations	Potential impacts during operation	Likely Significant effect (before mitigation)
Amphibians (Common toad) (low)	Within the Ashley Road site	The new established wetland habitat at Fisherton Recreation Ground will provide potential breeding and foraging sites for common amphibian species.	Negligible
Badger (low)	Badger is not known to be present but not all locations have been surveyed so absence is not confirmed	No impacts are predicted.	Negligible
Bats (medium)	No roosts along River Avon and tributaries	Increased foraging opportunities over new wetland areas, with a likely increase in winged invertebrates. The widened river corridor will be improved for bats with shrub and tree planting. Additional planting will buffer the noise and light from the nearby roads and developments, and in time may create potential roosting features for bats.	Minor positive (parish/district) - not significant
Birds - Kingfisher (high)	Along River Avon and tributaries	The Mill Stream in the Maltings and Central Car Park area will provide enhanced foraging habitat for kingfisher, as flows are reduced and the depth of the water increased, which will improve passage for fish. The River Avon in the Maltings and Central Car Park area may also provide limited enhanced foraging habitat, although it is considered that the water levels may be too low.	Negligible

Birds - Waterway Breeding Birds (low)	Along River Avon and tributaries	Wetland habitats and marginal berms will increase waterside nesting and foraging opportunities for waterway bird species, in particular grey wagtail. Once new areas of scrub and wetland habitats become established within the Ashley Road site, this may provide additional nesting and foraging opportunities for Cetti's warbler and other bird species. The additional planting along the River Avon in the Maltings and Central Car Park area would buffer the noise and light from nearby roads and developments, which will have positive benefits for birds, and would also create additional roosting and nesting habitat.	Negligible
Fish (Atlantic salmon, bullhead, brook lamprey, European eel - high Brown/sea trout - medium Coarse fish species - low)	All in-channel habitats of River Avon and its tributaries	Changes to hydrology: Changes to flow regime from the removal of Swimming Pool Gate will reduce water levels upstream by approximately 0.2m and has the potential to cause changes to sediment deposition. Habitat is sub-optimal at this location (coarse substrates smothered with silt) and removal of the impoundment will restore natural functioning and silt transport more typical of a chalk river system.	Major positive - significant for Atlantic salmon, bullhead, brook lamprey, European eel, brown/sea trout Minor positive for coarse fish species
Fish (Atlantic salmon, bullhead, brook lamprey, European eel - high Brown/sea trout - medium Coarse fish species - low)	All in-channel habitats of River Avon and its tributaries	Positive impact from increased channel connectivity through removal of barriers to fish passage and exposure of clean gravels (spawning habitat) through changes to silt transport; a long-term, localised impact.	Major positive - significant for Atlantic salmon, bullhead, brook lamprey, European eel, brown/sea trout Minor positive for coarse fish species
Fish (Atlantic salmon,	All in-channel habitats of River Avon	Recreational use of the river corridor by the public may result in disturbance of banks and riparian areas which has the potential to impact lateral	Negligible

bullhead, brook lamprey, European eel - high Brown/sea trout - medium Coarse fish species - low)	and its tributaries	connectivity and in-stream habitats; a long-term, localised impact.	
Freshwater macro-invertebrates (low)	All in-channel habitats of River Avon and its tributaries	Changes to flow regime from the removal of Swimming Pool Gate will lower water levels upstream by approximately 0.2m. Changes to flow regime and sediment transport on removal of the impoundment will enhance habitat heterogeneity and restore natural functioning more typical of a chalk river system. Positive impact on macro-invertebrates from increased channel connectivity and improved in-channel and marginal habitat resulting in long-term, localised impacts.	Minor positive
Macrophytes (Water crowfoot (*Ranunculus spp*.) communities - high Other macrophyte species - low)	All in-channel habitats of River Avon and its tributaries	Changes to flow regime from the removal of Swimming Pool Gate will lower water levels upstream by 0.2m. Changes to flow regime and sediment transport on removal of the impoundment will enhance habitat heterogeneity and restore natural functioning more typical of a chalk river system. Positive impact from increased channel connectivity and improved in-channel and marginal habitat. Long-term, localised impact. Recreational use of the river corridor by the public may result in disturbance of banks and riparian areas which has the potential to impact lateral connectivity and in-stream habitats. Long-term, localised impact.	Major positive - significant for water crowfoot Minor positive for other macrophyte species
Otter (medium)	Along River Avon and tributaries	The new channel and associated wetland habitats at Fisherton Recreation Ground may provide cover and foraging opportunities for otter once fully established. Additional planting along the River Avon would buffer noise and light from nearby roads and developments, which would have positive benefit for otter, providing commuting routes that are further buffered from anthropogenic activity.	Negligible

		The vegetated berms either side of the Mill Stream may also have the same effect, by encouraging otter use.	
Water Vole (medium)	Along River Avon in the Ashley Road area and the Maltings and Central Car Park area	The new channel and wetland creation area with backwater features and ephemeral streams at Fisherton Recreation Ground will potentially provide high quality foraging habitat for water voles. Based on the likely water depths within the new channel and ephemeral backwaters, the new channel/wetland area is unlikely to provide burrowing opportunities. The widened River Avon corridor and wider riparian vegetation berms will provide an important food resource for water voles once established. However, this may be influenced by an increase in recreational activity and disturbance (including dogs). The greater vegetative cover within the two-stage channel, combined with an increase in population may increase predation by cats (and foxes) on water voles.	Minor positive (parish/district) - not significant

Invasive species

Legally controlled Nuttall's waterweed was recorded on the River Avon to the north of the A36 flyover. This species is likely limited by flow rate and channel bed substrate, which indicates its presence in the dredged/canalised part of the Avon. Any habitat creation which encourages slow-flowing or standing water and soft sediments, may support Nuttall's waterweed. If it were to occur, it is considered to be a **significant minor negative impact** (based on a medium ecological importance and medium negative magnitude), should the species be encouraged to spread downstream.

The new wetland habitat at Fisherton Recreation Ground may also favour aquatic invasive species as habitats are establishing.

These are considered to be **negligible impacts** as this invasive species, which could be encouraged to spread as a result of the Scheme, is already present downstream of the Scheme area.

9.3 Mitigation

9.3.1 Generic mitigation measures

We will implement the following generic mitigation measures throughout the Scheme:

- An ecologist acting as an Ecological Clerk of Works will supervise vegetation clearance works and the main construction works, and will provide advice on specific ecological issues if and when they arise (for example, if new protected species or valued habitats are discovered during the works).
- Standard site procedures, including adherence to regulatory requirements and good practice advice, e.g. the former Pollution Prevention Guidelines 5: Works and maintenance in or near water and CIRIA guidance), will be used for any works near or in water to ensure no pollutants, including silt, enter aquatic environments.
- Contractors will use existing access tracks, roads and haul roads as far as possible, and decompaction measures will be implemented, where appropriate.
- As soon as construction works are completed, disturbed habitats in temporary working areas will be returned to their original condition or better as quickly as possible to minimise loss of key floral species and colonisation by invasive plants.
- British Standard 5837:2012 guidelines will be followed when working close to trees and shrubs and appropriate root protection zones will be demarcated and protected with suitable barriers or other measures as appropriate during construction (see tree protection plans in Appendix G).

9.3.2 Specific mitigation measures for the River Avon SAC and the River Avon System SSSI

Habitat improvements

A five year monitoring plan will be developed with Natural England prior to construction of the Scheme to monitor changes to the qualifying features of the SAC within the Scheme area and the success of the newly created wetland habitat adjacent to the SAC. To inform the plan, an annual walkover survey will be undertaken. The monitoring plan will include triggers for action, should they be needed.

Habitat fragmentation

Construction activities have been designed to minimise any impacts on the continuity of the River Avon SAC. This includes maintaining channel connectivity (by establishing a new channel on Summerlock Stream before infilling the existing) and restricting works to daylight hours where possible.

Where possible, we will be re-establishing habitats in the same locations as they are currently, which increases the chances of successful regeneration. Comparing Figure 9.4 with the existing Habitats of Principal Importance in Figure 9.3 shows which habitats will be replaced in situ and which will be created in new areas.

Increased recreational use

Impacts from recreational use will be mitigated through the provision of specific ‘focussed’ areas for access to the new channel, new wetland area and to the widened river corridor. This includes designated dipping platforms and a shingle beach to draw public access away from the natural margins along the River Avon at Fisherton Recreation Ground. Areas which will be maintained as a wildlife corridor and the locations of any access points to the river will be agreed with Natural England to ensure that there are no adverse impacts from disturbance to the newly improved river corridor.

Toxic contamination via pollution incidents

An Environmental Action Plan (EAP) (see Appendix G) and Construction Traffic Management Plan (CTMP) (see Appendix P1) will include all measures agreed with Natural England to mitigate the identified effects of the Scheme on the SAC and to ensure overall environmental protection and management during the works. Individual method statements will be prepared by the Contractor that will outline working practices that target specific elements of construction work. These will include measures to ensure that any pollution risk is minimised.

In addition, the works will be undertaken in accordance with best practice (e.g. the former Pollution Prevention Guidelines 5: Works and maintenance in or near water) to reduce the risk of contamination of the watercourse arising through pollution incidents from plant and machinery; and to reduce the likelihood of silt deposition into the watercourse during the construction phase.

Contractors will take part in toolbox talks prior to commencement on site to ensure best working practices around water and the site's ecological sensitives are understood, so the risk of pollution incidents is minimised.

All works will be restricted to defined working areas and works compounds and material storage areas will be sited on hard-standing and/or avoid areas of known ecological interest.

Fuels and lubricants for vehicles will be held at designated 'compound areas' with drainage management and spill containment measures. Biodegradable fuels will be used during the works.

Physical damage

Where auguring for reinforced concrete piles is to take place at Millstream Approach Bridge and immediately to the south at the location of the proposed new footbridge, piling methods will be specified during detailed design (in discussion and agreement with Natural England and our fisheries team) to avoid any adverse effects on qualifying fish species, including physical harm and behavioural disturbance.

In-channel works will be minimised where water crowfoot communities have been recorded to reduce the risks of physical damage (and removal) and disturbance of the accumulated seed bank in sediments, and to maintain connectivity to populations upstream which will repopulate through natural drift.

Siltation, smothering, turbidity

During construction and excavation of the scheme, the Scheme will be undertaken in accordance with a Soil Management Plan, which will follow Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites and require haul routes and working areas to be stripped of both topsoil and subsoil down to a firm base and the soils stored appropriately for re-use, with method statements in place to protect the watercourses from water quality issues.

The creation of wet woodland within the new area of habitat at Ashley Road, will link up to the wetland to the north of this site and provide some continuity. Monitoring of water levels will be undertaken within woodland before and during construction to confirm there are no impacts to the SSSI/SAC, with a contingency plan in place if the woodland is considered to be at risk in the event of any sustained change.

9.3.3 Protected and notable species

Mitigation measures specific to certain species and species groups are summarised below.

Amphibians - As part of vegetation clearance phased strimming will be undertaken in areas of dense vegetation. This would require an initial cut above ground level, then to be left overnight or searched/walked through to check for presence of toads (and frogs).

All potentially suitable hibernacula that need to be removed as part of the Scheme will be dismantled by hand and checked for amphibians, by an experienced ecologist. We will move any amphibians found off-site to a pre-determined 'safe' water body or refuge. If great crested newt is found, all work must stop immediately and the ECW consulted.

Birds - All vegetation suitable for breeding birds including kingfishers, grey wagtail and Cetti's warbler will be removed before the start of the works, outside of the bird breeding season (March – August). The reduction in vegetation should naturally encourage species to build nests outside of the Scheme area. If breeding birds, or nests (including the beginnings of a nest) are found during the works, all work in the vicinity must stop immediately and the ECW will be consulted. Wild bird's nests being used or being built, regardless of the species conservation status, are protected from being damaged or destroyed.

A pre-construction survey will be conducted in spring 2022 at the Ashley Road area and in spring 2023 at the Maltings and Central Car Park area, to determine if any new nests have been established within, or adjacent to the Scheme. The ECW will supervise works to ensure nests are not accidently damaged or destroyed, applying a 'no-works' buffer to allow the young to fledge naturally without impediment prior to removal of a nest. The buffer distance will be determined by the ECW on site, based on species and site conditions.

Artificial nest boxes suitable for grey wagtail will be installed under the new Millstream Approach Bridge.

Badger - Due to the highly mobile nature of the species, and that areas of private land were not surveyed, a pre-construction survey for badgers should be undertaken by an experienced ecologist at least two weeks before the start of construction of the Scheme to ensure that there are no setts within 30m of the works or access routes at the railway embankment north of Central Car Park.

During works, any excavations should be covered or fenced to deter badgers or other mammals from entering or fitted with a plank to provide an exit route. Should any potential setts be discovered during construction, works should cease and advice sort from an experienced ecologist.

Bats - Mitigation is required to ameliorate the potential negative impacts of the proposed Scheme on the local bat population, as follows:

- The two moderate bat trees within the Maltings and Central Car Park area that need to be removed and the eight trees in the Ashley Road area with suitable bat roosting features that are to be impacted by pruning works (seven moderate roosting suitability and one high roosting suitability) will require a pre-works internal check, to confirm there are no bats present. Pruning works and removal of these trees can be undertaken at any time prior to the works commencing. If any signs of bat roosts are identified, further surveys will be required and a Protected Species Mitigation licence may be necessary.
- Prior to works, a construction site lighting plan will need to be agreed with an experienced ecologist to avoid impacts to foraging bats, as the compound sites and some construction areas (e.g. Millsteam Approach Bridge areas) will require temporary lighting. Construction phase lighting will need to be directional and

avoid light spill on to adjacent retained vegetation (as well as avoiding impacts on residential receptors). The majority of the work will be in the summer months and night-time working will be minimal (except around the Millsteam Approach Bridge construction areas).

- Noise mitigation is not thought to be required but should the use of noisy plant, generators or piling be needed in close proximity to sensitive features where bats could be impacted, the contractor will have to put in place measures to reduce this impact, which will be detailed in a Noise and Vibration Monitoring and Control Strategy (see Section 6.3).
- In the design of the Scheme there are opportunities for integrating measures that would enhance habitats for bats. Bat boxes/bricks will be installed on trees and bridges at ten suitable locations along the river corridor to create additional roosting opportunities for the local bat population. The locations of the roost enhancements (see Appendix F6) will predominantly be concentrated to the south and to the north of Salisbury and along the river corridor through the Central Carpark. The location of the bat boxes has been determined based on the species records and roost site preference for each of the bat species identified to be present along the river corridor.

Otter - A pre-construction survey will be undertaken in suitable aquatic habitat within the Scheme boundary in spring 2022 to ensure no new otter holts or laying up sites are present within and adjacent to the works areas. During any vegetation clearance adjacent to suitable habitats, an ecologist will be present. Works will stop immediately if any otters are disturbed and appropriate advice sought. During the works, any deep excavations should either be fenced off at the end of the day or fitted with a mammal ladder (scaffold plank or similar), to provide an exit route for any animals that may become trapped.

Water Vole Ashley Road site - as water voles have been recorded along the stretch of River Avon in the Ashley Road area and the habitat is suitable for water vole, with a potential that submerged water vole burrows may be present,, water vole displacement in line with the water vole mitigation handbook (Dean et al, 2016) will be undertaken to ensure no water voles are present during the proposed works. Displacement will be undertaken in the footprint around the proposed installation of the viewing platforms and new Summerlock offtake channel, plus an additional 5m buffer, to ensure no water vole is present during the works.

A water vole method statement (Appendix F12) has been produced, which details the options available to mitigate impacts on water vole, which will be agreed with Natural England and the County Ecologist during the detailed design stage of the Scheme.

Water Vole Maltings site - Due to the length of bank on the River Avon to be widened and burrows directly impacted, there is lack of immediate habitat for water voles to be displaced into. The relocation of water voles by a trapping and translocation approach is therefore required within the Maltings and Central Car Park area. A water vole method statement (Appendix F12) has been produced, which details the options available to mitigate impacts on water vole. Various receptor sites are being considered for the translocation of water voles. The chosen water vole receptor site will be dependent on further survey of water voles and mink at the alternative sites in Spring 2021 and population size of the water vole population within the surveyed receptor sites in 2021.

An assessment of the mink population will be undertaken in the wider area where a receptor site is proposed. If numbers are such that it is considered mink are a threat to translocated water voles, they will be trapped and removed from the immediate area.

Access to survey for protected species on a small area of Network Rail owned land in the footprint of a culverted floodway has not been possible at the time of writing the ES. Mitigation may need to be developed for this area following further surveys in 2022.

9.3.4 Aquatic receptors: fish, macrophytes, macro-invertebrates

Construction

- The Construction Environment Management Plan will include pollution prevention (including incident response) details consistent with the best practice Pollution Prevention Guidelines.
- Restricting in-channel works to summer months (**July to end of October**) will protect the salmon migration season (October to December) and the salmon spawning/egg development (November to April) and bullhead (March to June) spawning season. Should any piling be needed adjacent to the channel outside of these months, a specific risk assessment will be produced to ensure that there is no impact on salmonid reproduction.
- Ensuring works are predominantly undertaken during daylight hours will enable a large proportion of any 24-hour period for the movement of Atlantic salmon and other fish species.
- Rescue of fish prior to any dewatering works will remove direct mortality impacts as a pathway to effect.
- In-channel construction will minimise the working width to mitigate for habitat loss and fragmentation.

Operation

- The Landscape Habitat Management Plan that will be developed further at detailed design will be followed, to ensure that target habitat features are developed and sustained in the long term.
- Increased public use of the area, including the proposed new wetland, will be controlled through signage that directs people to the targeted access areas and away from areas reserved for wildlife. Signage will improve knowledge and raise awareness of the importance of the River Avon SAC and its ecological community.
- Implementation of information boards around the site, and programmes to educate members of the public including links with local schools to educate children, will create long-term benefits to ensure the River Avon SAC is conserved.

9.3.5 Invasive species

Monitoring of post-construction habitats will continue for three years after the Scheme's completion, to detect any colonisation by Nuttall's waterweed and trigger eradication measures.

Standard biosecurity measures will be undertaken during construction of the Scheme for butterfly bush and Wilson’s honeysuckle, which are located within the construction footprint. These measures will include briefing all contractors on the

potential pathways for introducing invasive species, ensuring staff are aware of what the species look like (and issues associated with them) and ensuring that mitigation procedures are implemented (e.g. cleaning footwear before arriving and leaving the site and ensuring vehicles are clean). Additionally, as there are only small populations of these species, we will remove them in the course of works, uprooting plants and disposing of them appropriately.Giant bramble is more invasive locally, and we will seek to eradicate and control the spread of this species during construction and as part of on-going delivery of the Habitat Management Plan for the Scheme.

9.4 Residual effects

The residual effects on the flora and fauna are presented in Tables 9.5 (designated conservation sites), 9.6 (habitats) and 9.7 (protected and notable species).

Table 9.5: Residual impacts on designated conservation sites

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
River Avon SAC (very high)	There will be an estimated loss of approximately 0.02ha of in-channel sub-optimal habitat. Possible impacts from a number of pressures including changes to habitat, flow regime, disturbance, channel morphology, natural function and temporary silt dispersion/deposition (the latter is likely to be the most important). This will affect less than 0.006% of the total SAC habitat (i.e. within and outside the Scheme area).	Minor negative	Follow Soil Management Plan, in line with Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Haul routes and working areas to be stripped of topsoil and subsoil to a firm base and the soils stored appropriately for re-use. Method statements in place to protect watercourses from water quality issues. We will use best practice for any works near or in water to ensure no pollutants, including silt, enter aquatic environments.	Negligible
	The Scheme has been carefully designed to avoid or reduce any effects on the qualifying feature 'Water courses of plain to montane levels with *Ranunculion fluitantis* and	Minor positive	No mitigation required	Minor positive

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	Callitricho-Batrachion vegetation' and qualifying fish species during the construction phase. The new offtake channel at Fisherton Recreation Ground has been designed to re-create a typical chalk stream habitat with an estimated 320m of new channel and 0.36ha of new riverine and riparian habitat features, with a positive contribution towards meeting the conservation objectives of the River Avon SAC, conserving and helping to restore its qualifying features. The Scheme will improve species richness and diversity within the River Avon corridor.			
River Avon System SSSI (high)	Potential indirect negative impacts from noise, lighting, an increase in disturbance, a change in flow and silt mobilisation and pollutants from construction activities on flora and fauna. The removal of sluice structures, reprofiling of channel beds and rock weirs will be a negative impact in the short term.	Minor negative	Follow Soil Management Plan, in line with Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Haul routes and working areas to be stripped of topsoil and subsoil to a firm base and the soils stored appropriately for re-use. Method statements in place to protect watercourses from water quality issues. We will use best practice for any works near or in water to ensure no pollutants,	Negligible

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
			including silt, enter aquatic environments.	
	However, as newly created and enhanced habitats (wider riparian banks and shallow berms) start to mature and diversify, and as naturalisation of the water courses will improve lateral connectivity, with beneficial impacts for the diverse fish community, macro-invertebrate, otter, water vole and birds, thus improving biodiversity. The Scheme will provide a 14% increase in channel habitat, which will form an extension to the existing SSSI. The creation of new SSSI habitat within the new main and secondary channels at Fisherton Recreation Ground and the widened River Avon channel corridor have been assessed under 'habitat'.	Minor positive	No mitigation required	Minor positive
East Harnham Meadows SSSI (high)	Upstream low flow water levels reduced by up to 0.5m, may impact sensitive wetland habitat, with a potential increase in silt and pollutants entering the water course.	Negligible	No specific mitigation is proposed as the Scheme has been designed to avoid any impacts. We will use best practice for any works near or in water to ensure no pollutants, including silt, enter aquatic environments.	Negligible
Avon Valley LNR (medium)	The southern end of this designation is within the works area where a new offtake channel from the River Avon and new wetland habitat is proposed. Indirect impacts to protected fauna species from	Minor positive	No mitigation required. Felled trees will be replaced in accordance with planting plans. Areas	Minor positive

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	noise, lighting and an increase in disturbance may occur. Newly created and enhanced habitats (wet woodland, marginal berms, wetland habitat, scrub and woodland) will provide diversity as they start to mature.		of trees which cannot be replanted on site will be included in the mitigation for woodland (see below). Retained trees will be protected in line with BS 5837:2012.	
Avon Valley Meadows LWS (low)	The southern end of this designation is within the works area where a new offtake channel from the River Avon and new wetland habitat is proposed. Indirect impacts to protected fauna species from noise, lighting and an increase in disturbance may occur. Newly created and enhanced habitats (wet woodland, marginal berms, wetland habitat, scrub and woodland) will provide diversity as they start to mature.	Minor positive	Decompaction measures will be implemented, where appropriate. Felled trees will be replaced in accordance with planting plans. Areas of trees which cannot be replanted on site will be included in the mitigation for woodland (see below). Retained trees will be protected in line with BS 5837:2012.	Minor positive
River Avon South LWS (low)	No impacts are predicted.	Negligible	N/A	Negligible
Stratford-sub-Castle Meadow LWS (low)	No impacts are predicted.	Negligible	N/A	Negligible

Table 9.6: Residual impacts on habitats

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
Hedgerow - native species-rich with trees (low)	No impact to hedgerow bordering Fisherton Farm allotments in the Ashley Road area.	Negligible	No mitigation required	Negligible
Hedgerow - native species-rich with trees (low)	Creation of 445m of hedgerow within the Maltings and Central Car Park. In the long term, this will provide refuge, foraging and nesting opportunities for a range of species.	Minor positive - significant (operation)	No mitigation required	Minor positive - significant
Lowland Mixed Deciduous Woodland (low)	No impacts to woodland within the Ashley Road site. Minimal loss of woodland within the Maltings and Central Car Park area from construction from construction, which may require the felling of approximately 19 trees.	Minor negative	Contractors will use existing access tracks, roads and haul roads as far as possible, and decompaction measures will be implemented, where appropriate. Felled trees will be replaced. Retained trees - specifically including those in parts of Ashley Road area and the Maltings and Central Car Park area of high value - will be protected in line with BS 5837:2012.	Negligible
Rivers (very high)	All water courses have the potential to be directly or indirectly impacted during construction. Direct impacts during construction include the temporary loss of in-channel, habitat from the removal of sluice structures and Millstream Approach Bridge, reprofiling of the channel bed	Major negative (construction)	We will use best practice deliver for any works near or in water to ensure no pollutants enter aquatic environments.	Minor negative - not significant

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	and new rock weirs for fish passage, construction of new vehicular and footbridges across new and widened channel, infilling the top end of Summerlock Stream and putting in a new water control structure, will be a negative impact in the short term. Indirect negative impacts could be from a change in flow, silt, low flows and pollutants on the flora and fauna. During the temporary diversion of flows down the Mill Stream, there is potential for sediment movement to move downstream and accumulate at downstream structures.			
	Removal of sluice structures, reprofiling of the channel bed, improvements to fish passage and re-naturalisation of the River Avon corridor upon completion of the Scheme. The creation of the new main and secondary channels at Fisherton Recreation Ground and the widened River Avon channel corridor will result in a net gain of 276m of river habitat, which is a 14% increase in river habitat, which will form part of the River Avon System SSSI. Within Mill Stream, any impacts of low flows will be reduced from introduction of berms along both banks. Naturalisation of marginal	Major positive - significant (operation)	No mitigation required	Major positive - significant

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	areas will encourage habitat diversity.			
Trees	Significant loss of trees from construction – impact and mitigation are covered in Chapter 7 'Landscape and visual amenity'.			
Wet woodland (high)	Indirect impacts from works immediately south of the wet woodland which may reduce water levels temporarily whilst in construction. The creation of wet woodland within the new area of habitat at Ashley Road, will link up to the wetland to the north of this site and provide some continuity. In the long term this new habitat will provide a valuable habitat for a variety of protected species which include bats, otters, invertebrates and birds.	Negligible	Monitoring of water levels within woodland before and during construction to ensure there are no significant changes.	Negligible
Overall biodiversity gains and losses within Scheme area	A net gain (14%) in rivers and streams resulting from Scheme implementation (as concluded from Defra's Biodiversity Impact Assessment Metric Calculation Tool v2.0), a net gain in terrestrial habitat of 1.4% and an increase in hedgerow of 445m.	N/A – calculation includes effect of mitigation	Mitigation for all above habitat types.	Assessed under habitat types.

Table 9.7: Residual impacts on protected and notable species

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
Amphibians (Common toad) (low)	Direct mortality during the removal of vegetation and indirect impacts from a reduction in foraging habitat.	Negligible	Phased strimming will be undertaken in areas of dense vegetation.	No significant impact.

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	New habitat will provide potential breeding and foraging sites. Maintenance of wetland habitat during operation.		All potentially suitable hibernacula will be dismantled by hand.	
Badger (low)	Potential loss or disturbance of a sett (if found to be present within 30m of proposed works). Mortality or injury may occur during construction. Disturbance from noise, lighting and vibration.	Minor negative	If badger signs are found, an appropriate badger mitigation strategy will be developed. During works, any excavations will be covered or fenced to deter badgers or other mammals from entering or fitted with a plank to provide an exit route.	Negligible
Bats (medium)	Loss of two moderate trees that may support bat roosts and potential loss of suitable roosting features on eight trees requiring pruning. Indirect impacts on foraging areas from construction lighting.	Minor negative	Undertake a pre-works internal survey of nine moderate and one high suitability roosting trees to be impacted If any signs of bat roosts are identified, further survey and licencing may be required. A construction site lighting scheme should be agreed that avoids impacts to foraging bats. If any high noise activities need to take place close to sensitive features where bats could be impacted; the contractor will take	Negligible

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
			measures to reduce this impact.	
	Increased hunting opportunities over new habitat creation areas. Planting will improve the river corridor for bats, with a potential increase in winged invertebrates, and buffering from noise and nearby light sources.	Minor positive (operation)	No mitigation required.	Minor positive
Birds – Kingfisher (high)	Temporary loss of foraging habitat through increased noise and disturbance. Potential perches to be lost by proposed construction works. New habitats and enhancement of water courses may increase foraging opportunities.	Minor negative	Vegetation overhanging watercourses that may act as kingfisher perch sites will be retained.	Negligible
Birds - Waterway Breeding Bird (grey wagtail - low) and other nesting species	Direct damage/loss of breeding and foraging habitat through the loss of vegetation. Increased noise and disturbance during construction. New habitats will increase nesting and foraging opportunities. Reduced anthropogenic disturbance by new vegetation buffering noise and light. Maintenance of habitats during operation may disturb nesting birds.	Minor negative	Vegetation suitable for breeding birds will be removed before the start of the works, outside of the normal bird breeding season (March – August). The exceptions are certain areas where removal needs to be delayed to protect other species. Here an ecologist will monitor any nesting activity and advise on what construction activities can and cannot take place	Negligible

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
			Artificial nest boxes will be incorporated into the new Mill Approach bridge design for grey wagtail. population in the vicinity of the recreation ground.	
Freshwater macro-invertebrates (low)	Direct mortality from construction activities. Habitat loss/fragmentation, water pollution, dewatering, increases in sediment and changes to hydrology during construction may result in direct loss or injury.	Minor negative (construction)	All good working practices including CEMP and Pollution prevention Guidelines. Maintaining channel connectivity where possible. Working width in-channel minimised.	Negligible
	Changes to hydrology, disturbance but overall long-term habitat improvement.	Minor positive (operation)	No mitigation required	Minor positive
Fish (low) Atlantic salmon, bullhead, brook lamprey, brown/sea trout, European eel and other coarse fish species	Direct mortality, habitat loss/fragmentation, water pollution, changes to hydrology, disturbance/light/vibrations during construction.	Major negative - significant for Atlantic salmon, bullhead, brook lamprey, European eel and brown/sea trout. Minor negative for other coarse fish species	All good working practices including CEMP and Pollution prevention Guidelines. Timing of in-channel works (July to end of October). Specific risk assessment for any piling activities. Works undertaken predominantly during daylight hours.	Minor negative

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
			Rescue of fish prior to any dewatering works. Maintaining channel connectivity where possible.	
	Changes to hydrology but overall improvement to fish passage upon completion of the Scheme	Major positive - significant for Atlantic salmon, bullhead, brook lamprey, European eel, brown/sea trout Minor positive for coarse fish species	No mitigation required	Major positive - significant for Atlantic salmon, bullhead, brook lamprey, European eel, brown/sea trout Minor positive for coarse fish species
	Increased channel connectivity through removal of barriers to fish passage upon completion of scheme	Major positive - significant for Atlantic salmon, bullhead, brook lamprey, European eel, brown/sea trout Minor positive for coarse fish species	No mitigation required	Major positive - significant for Atlantic salmon, bullhead, brook lamprey, European eel, brown/sea trout Minor positive for coarse fish species
	Recreational use of the river corridor by the public has the potential to impact lateral	Negligible	No mitigation required	Negligible

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	connectivity of the river corridor by disturbance of banks and riparian areas			
Invasive plant species (medium)	Disturbance and potential spread of Nuttall's waterweed during construction. Creation of habitats that's may increase the incidence of Nuttall's waterweed and other aquatic invasive species.	Minor negative	Mitigation plan to be agreed. Removal of Nuttall's waterweed within the Scheme boundary and adjacent to it. Monitoring of habitats post-construction to detect any colonisation and trigger eradication measures.	Negligible
	Disturbance and potential spread of giant bramble, butterfly bush and Wilson's honeysuckle	Minor negative	Biosecurity measures during construction. Eradication of existing populations where possible, including on-going works to manage Giant bramble detailed in a Habitat Management Plan.	Minor positive
Macrophytes (high)	In channel construction works may cause direct mortality, habitat loss/fragmentation, water pollution and changes to hydrology. Additionally, disturbance to the banks and riparian areas by the public has the potential to disturb habitats and connectivity.	Major negative for water crowfoot Minor negative for other macrophyte species (construction)	All good working practices including CEMP and Pollution prevention Guidelines. Maintaining channel connectivity where possible. Working width in-channel minimised	Minor negative for water crowfoot. Negligible for other macrophyte species

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
Macrophytes (high)	Changes in flow will improve in channel and marginal habitat	Major positive - for water crowfoot Minor positive for other macrophyte species (operation)	No mitigation required	Major positive - for water crowfoot Minor positive for other macrophyte species (operation)
Otter (medium)	Potential impact to food resource and general disturbance from noise, artificial lighting and vibration during construction. Increased and enhanced habitat available for foraging and resting once vegetation fully established. Additional planting would buffer nearby noise and light and reduce anthropogenic activity. Maintenance of habitats during operation may disturb otters.	Minor negative	Pre-construction survey to ensure no new otter holts or laying up sites are present within and adjacent to the works areas. During any vegetation clearance adjacent to suitable habitats, an Ecological Clerk of Works will be present. Works will stop immediately if any otters are disturbed and appropriate advice sought. During the works, any deep excavations should either be fenced off at the end of the day or fitted with a means of escape.	Negligible
Water vole (medium)	Potential damage or destruction of supporting habitats and active burrows. Indirect impacts from noise, artificial lighting and vibration	Minor negative (construction)	Ashley Road site - Undertake water vole displacement under licence	Negligible

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	during construction. Indirect impacts from pollution and silt. Mink predation may increase Enhanced watercourses will provide important food resource and burrowing opportunities and new habitats will provide high quality foraging habitat. Maintenance of newly created habitats may disturb water voles. Potential increase in disturbance from recreational activity (including dogs) and predation by cats (and foxes).	Minor positive (operation)	where works are proposed. The Maltings and Central Car Park area - Relocation of water voles by a trapping and translocation approach will be undertaken under licence.	

10 Water and hydromorphology

10.1 Existing environment

10.1.1 Study area

The study area for the water environment has been defined using a 1km buffer around the Scheme area (Figure 10.1). Upstream and downstream waterbodies that extend beyond this study area are also considered in the Water Environment Regulations compliance assessment in Section 10.1.5.

10.1.2 Hydromorphology

The study area encompasses the River Avon, Summerlock Stream, Mill Stream and River Nadder, although the latter river does not flow through the Scheme area. These watercourses are not designated as heavily modified hydrologically, although most reaches are heavily constrained by development and are substantially altered from their natural condition (further details follow).

Catchment context

The River Avon (also called East Avon or Hampshire Avon) rises 5km east of Devizes in Wiltshire in the Vale of Pewsey. The river receives a significant proportion of its flow from chalk aquifers beneath Salisbury Plain and flows generally southwards to the English Channel approximately 77km from the study area. The main tributaries of the River Avon within the study area are the Bourne (to the east) and the Wylye and Nadder (to the west).

The catchment is characterised by open chalk downland with steep scarp slopes, sheltered valleys, chalk hills, ridges and limestone plateaux. These significant variations in the topography have a strong influence on the rivers' responses to rainfall. The upper Avon catchment is typified by the undulating, chalk downlands of Salisbury Plain, which are cut by steep combes and river valleys. The lower catchment is characterised by rolling farmland and the New Forest. The main watercourses have wide floodplains and flow through farmland, woodland, scrub and open heathland.

Geomorphology

The River Avon has historically been dredged, over-widened and impounded in many places due to past river management, which has led to a reduction in the river's geomorphological processes. Such changes have damaged vegetation communities, caused the siltation of gravels and disconnected the watercourse from its floodplain (Hamersley and Wheeldon, 2009; Halcrow and GeoData, 2009), exerting pressure on its SAC status. Adjustment of the fluvial system to the introduction of weirs and sluices, re-sectioning, straightening and deepening, bank and channel reinforcement and other engineering practices has contributed to local ecological diversity, but has also significantly contributed to ecological decline, particularly since the mid-1940's. In recent years, substantial effort has been invested in rehabilitating the river to correct past engineering and channel management modifications.

Sediment inputs to the river system are predominantly fine material derived from diffuse catchment sources and bank erosion and, as a result, the main channel-adjustment processes are associated with the accumulation of silts in marginal berms. The gravel bed morphology is significant in the life cycles of fish, invertebrates and vegetation communities characteristic of chalk stream

environments. Very few active natural sources of coarse sediment are found within the Avon catchment today and the post-glacial hydrological conditions under which the streams were formed are no longer present. Consequently, where the river has been modified, there is very little capacity for natural recovery of features associated with in-stream gravels (Halcrow and GeoData, 2009).

Whilst transport and deposition of fine material is common in channels within the Scheme area, transport of coarser sediments tends to only be found at unnatural discontinuities in gradient where localised stream power is sufficiently high, such as at sluices and weirs (including at Swimming Pool Gate and at the downstream end of the Mill Stream) or where large woody material impinges on flows. Low stream power combined with the backwater effects from impoundment and relatively high availability of fine materials in the system, means that gravels can be at risk of smothering by fine sediment. This poses risks to ecological communities that rely on the availability of clean coarse sediments. Chemical armouring may also occur from the precipitation of calcium carbonate adding a calcareous concretion around coarser deposits. Where smothering is sustained, coarser sand and calcareous concretion particles may become compacted within the bed matrix under a surface layer of gravels and contribute to armouring through physical sorting processes. These factors can, in combination, present further limitations to the mobility of coarse gravels within the Avon and lessen the ecological viability of the system (Halcrow and GeoData, 2009).

Within channel reaches in the study area, there is very little evidence of active morphological processes beyond the accumulation and deposition of fine material at channel margins and on the riverbed. In-stream morphological diversity tends to be low and therefore, channel and marginal vegetation, where present, play a key role in generating local areas of clean gravel substrate. The movement of larger material is likely to be confined to local movement of gravels at Swimming Pool Gate and downstream of the sluice and fish pass at the base of the Mill Stream.

Many banks within Salisbury are revetted, but nevertheless bank erosion is present at several locations. It is considered likely that most of this erosion is due to bankside access by people rather than from fluvial processes. It is possible that some ingress of fine sediment eroded from these locations may accumulate in-channel in the impounded reach above Swimming Pool Gate.

The hydromorphology of the watercourses within the study area were characterised during a walkover in 2020 as follows:

Avon to Ashley Road Bridge

Artificially-straightened and deepened reach with substantial marginal woody debris mattresses to encourage berm formation and instream woody debris in upper reach. Bed not visible but morphology likely to be relatively uniform with in-channel flow variability generated by woody debris. Gabion revetment in Blackwell hatches area on right bank but banks otherwise relatively natural – poaching of banks evident at several locations with local ingress of fines. Heavily wooded left bank with branches hanging into river margins.

Avon from Ashley Road to Swimming Pool Gate

Start of urbanised section. Bed not visible but uniform morphology presumed with multiple, mostly hard, artificial revetments present along the majority of the reach. Relatively slow flow in low gradient reach running to Swimming Pool Gate and the Mill Stream. Deposition of fine material over underlying gravels likely, particularly due

to impoundments at end of Mill Stream and Swimming Pool Gate. Some cleansing of gravels likely in immediate vicinity of undershot sluice at Swimming Pool Gate.

Avon from Swimming Pool Gate to River Nadder

Artificially straightened and re-sectioned channel through urban Salisbury. Gravel substrate visible in accessible reaches with established in-stream vegetation. Hard revetments evident in most areas, though some areas without bank protection remain. Instream vegetation established within gravel providing some diversity in flow conditions. Otherwise, bed morphology appeared uniform.

Mill Stream from Swimming Pool Gate to River Avon

Artificial mill channel with bank predominantly comprising hard revetment along entire length. Shallow flow and extensive growth of in-stream vegetation. Some evidence of deposition of fine material over gravel bed but instream flow and velocity variation resulting from denser areas of vegetation tended to show cleaner gravels. Uniform bed morphology throughout with little encroachment of marginal material into the channel. Cleaner gravels believed to exist downstream of lower mill sluices and fish pass at junction with the River Avon.

Summerlock Stream

Extensively modified stream running from an offtake (Blackwell Hatches) in the north to the confluence with the River Nadder. Revetments present along much of length, although none evident in comparatively unmodified stretch downstream of culvert beneath A36 and railway line. Clean gravels visible in most accessible reaches with instream flow diversity around established vegetation. Little visible evidence of deposition of fine material in lengths viewed.

10.1.3 Groundwater

Geological Setting

As described in Section 13.1.1, the solid strata underlying the study area comprises the Newhaven Chalk Formation (Newhaven Chalk) and the Seaford Chalk Formation (Seaford Chalk). Based on the British Geological Survey digital geological mapping (https://www.bgs.ac.uk : Geology of Britain viewer), the younger Newhaven Chalk (which regionally is up to 55-70m thick) lies beneath the Maltings and Central Car Park area, but thins to the north and east, such that it is possibly absent beneath the northern part of the Fisherton Recreation Ground.

Previous studies have indicated that the solid strata is typically at about 8-10m below the surface (see Jacobs 2020), covered by a sequence of superficial deposits. These comprise: made ground (beneath the Maltings and Central Car Park area); alluvium (comprising both cohesive, less permeable clays and silts and more permeable sands and gravels); head deposits (absent beneath the Maltings and Central Car Park area) and gravels of the River Terrace Deposits (RTD).

Preliminary borehole logs from ground investigations carried out for the Scheme in December 2020 show broadly similar results. In the Ashley Road area, the ground investigations recorded generally 1-2m of alluvium overlying RTD, with the chalk bedrock 6-7m below ground level (BGL). In the Maltings and Central Car Park area, the ground investigations recorded generally 1-1.5m alluvium overlying RTD, with the chalk bedrock again 6-7mBGL. There is no clear distinction between cohesive and more permeable alluvium, with the more permeable material, if present, tending to grade into the underlying RTD gravels.

Hydrogeology

Groundwater occurs beneath the site in both superficial deposits of alluvium and RTD and in the underlying chalk. The permeable superficial deposits are likely to be in direct hydraulic continuity with chalk. The hydraulic connectivity with surface waters is dependent upon the lateral extent, permeability and thickness of cohesive alluvium that occurs across the floodplain. Where cohesive alluvium lies above more permeable superficial deposits, as may occur across the valley floor, these may confine underlying groundwater. However, given there are gravel river beds identified in most reaches of the River Avon and the Mill Stream through the study area, it is likely that there is good connectivity between groundwater and river waters. A summary description of both solid and superficial strata (excluding made ground), together with their hydrogeological characteristics is provided in Table 10.1.

Table 10.1: Aquifer properties and designations

Unit	Typical lithology	Typical thickness 1	Aquifer designation
Alluvium (cohesive)	Soft to firm silty clay	0.8- 2.3m	Secondary A aquifer
Head (Ashley Road area only)	Flinty gravels, clays and silts	Not known, variable	Secondary undifferentiated
Alluvium (gravels)	Loose to medium dense sandy gravel, laterally impersistent	Not well defined 2-3m	Secondary A aquifer
River Terrace Deposits	Sands and gravels	Not well defined Up to 5m?	Secondary A aquifer
Newhaven Chalk	Soft to medium hard, smooth white chalks with numerous marl seams and flint bands	Up to 55-70m	Principal aquifer
Seaford Chalk	Firm white chalk with conspicuous semi-continuous flint seams.	Up to 60-70m	Principal aquifer

Note 1: Typical thickness taken from Geotechnical Desk Study (Jacobs 2020) and probably more representative of the Maltings/ CCP area due to availability of historic ground investigation information.

Aquifer designations, determined by the Environment Agency, are as follows:

Principal aquifers are "layers of rock or drift deposits that have high intergranular and / or fracture permeability – meaning they usually provide a high level of water storage. They may support water supply and / or river base flow on a strategic scale.

Secondary A aquifers are "permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers".

The Secondary (undifferentiated) aquifer designations is assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

Groundwater flow and levels

Groundwater levels from previous studies have been summarised in a Geotechnical Desk Study (Jacobs 2020). This indicates that, in the Maltings and Central Car Park area, groundwater levels range between 1.01 and 2.87m below ground level (mbgl) in the granular alluvium and 1.47 to 2.87mbgl in the chalk. Groundwater in the granular alluvium was identified as being at least partly confined by the overlying cohesive alluvium in this area. This suggests that the river (and associated "shallow" groundwater) could be perched above groundwater levels through this part of the Scheme.

Groundwater flood susceptibility mapping (see Flood Risk Assessment for Scheme - Jacobs 2020) suggests groundwater levels in the Ashley Road area are between 0.025 and 5mbgl. Groundwater emergence in these areas is therefore possible and also suggests a more direct linkage between groundwater and river waters. In these areas, there may be losses to groundwater from river flow when groundwater levels are low and there is a downward hydraulic head. Such losses would be particularly sensitive during periods of low river flow.

The flood susceptibility mapping also suggests that there is a negligible risk of groundwater flooding through the Maltings and Central Car Park area, due to the relatively impermeable cohesive alluvium.

Preliminary results from the latest phase of local ground investigations recorded groundwater level data between 11 December 2020 and 18 February 2021. Overall, the range of variation in groundwater level is similar for the three main strata (alluvium, RTD and chalk). However, there are differences in recorded ranges for both alluvium and RTD between the Ashley Road area and the Maltings and Central Car Park area (although there are fewer monitoring points in the alluvium):

- Ashley Road area - groundwater levels between 0.1 to -1.27mBGL, with a range of variation between 0.72 to 1.05m; the greatest range observed in alluvium;
- Maltings and Central Car Park area - groundwater levels between 0.55 to -1.98mBGL, with a range of variation between 0.64 to 1.43m; the greatest range observed in RTD.

Based on the limited initial groundwater level data available, the upper chalk and RTD appear to be in continuity, with no significant differences in levels or range observed to date. This includes in boreholes with dual installations (all in the Maltings and Central Car Park area). In two boreholes with dual installations in the alluvium and RTD (both in Maltings and Central Car Park area), identical groundwater level readings have been recorded in both installations.

In the Ashley Road area, generally similar groundwater levels have been recorded across the three main strata (alluvium, RTD and chalk). There are some slight indications of higher levels in the RTD than the overlying alluvium, possibly indicating slight confinement by cohesive alluvium. No indications of significant confined groundwater pressures were observed.

In the Maltings and Central Car Park area, generally similar groundwater levels have been recorded across the three main strata (alluvium, RTD and chalk). There is a slight indication of an upward gradient in the chalk in some places, but no indication of significant confined groundwater pressures. This may simply reflect regional groundwater discharge towards the River Avon. One borehole suggests possible perched water in made ground deposits. There are no other indications of different groundwater levels in made ground, but only a few data points are available.

Ongoing data collection (see further investigations and monitoring in Section 10.3) will further improve understanding of groundwater levels and will be used to develop the detailed design of the Scheme, including developing a greater understanding of hydraulic connectivity between river waters and groundwater through the length of the Scheme.

Data on regional groundwater flow directions is not readily available, although old hydrogeological mapping (Hydrogeological Map of Hampshire and the Isle of Wight; Institute of Geological Sciences/ Southern Water Authority, 1979) suggests that regional groundwater flow is broadly north to south. The groundwater contours also indicate flow inward within the Avon valley, suggesting regional groundwater discharge toward the Avon. Groundwater flow directions may be locally influenced by large abstractions (see below), and there may be some seasonal variations, depending upon recharge patterns across the wider extent of the aquifer.

Groundwater abstractions

Information on licensed groundwater and surface water abstractions have been obtained from Envirocheck and is provided in Appendix H1.

Of particular note are two licenses for public water supply (PWS) abstractions. One of these (licence no 13/43/022/G/079; NGR 413500 130800) is located approximately 200m to the south-west of Fisherton Recreation Ground and its source protection zone (SPZ 1) extends across the site (see Figure 10.1). Abstraction from this PWS may have the effect of lowering groundwater levels beneath the site, although it is understood that this source is not currently in use. The other identified PWS abstraction (license no 13/43/021/G/208; NGR 414600 130700) may no longer be operative (to be confirmed). There is a SPZ at this location too, although the SPZ for this abstraction is not evident on available mapping (magic.defra.gov.uk).

Groundwater quality and aquifer vulnerability

Groundwater level and quality data were collected as part of previous ground investigations (unrelated to the Scheme) and reported in Supplementary Ground Investigation Report, Detailed Risk Assessment and Remediation Strategy (Card Geotechnics Ltd 2016). These identified contamination in groundwater within the Made Ground and Alluvium in the Scheme area. It is also recognised in the Geotechnical Desk Study (Jacobs, 2020) that there is potential for leaching of contaminants from contaminated soils in some locations. Potential leachable contaminants identified include metals, polyaromatic hydrocarbons and petroleum hydrocarbons.

Further information on contamination is provided in Chapter 13 'Sustainable use of land'.

Groundwater vulnerability mapping (magic.defra.gov.uk) suggests that much of the study area is classified as medium to high vulnerability, with some areas of high vulnerability to the west of Fisherton Recreation Ground.

In the wider catchment, the chalk aquifer is vulnerable to water quality impacts from nutrients and pollutants derived from agriculture. Water quality is discussed in Section 10.1.4.

Summary conceptual site model

- groundwater occurs in both shallow superficial deposits and in the underlying Chalk Principal Aquifer. The granular superficial deposits are likely to be in hydraulic continuity with the underlying Chalk;

- groundwater flow is broadly north to south and toward the centre of the Avon valley and may locally provide baseflow to the River Avon;
- groundwater is likely to be encountered at shallow depth beneath both sites. Cohesive alluvium may confine groundwater in underlying granular aquifer, although it is likely, particularly in the Ashley Road area, that there is hydraulic continuity between river channels and groundwater. High groundwater may help sustain water dependent habitats;
- there may be water losses from the river to groundwater during periods of low flow/low groundwater through some reaches;
- the SPZ1 of a PWS extends beneath the Ashley Road area of the Scheme; and
- the superficial and underlying chalk aquifer are vulnerable to contamination at the surface.

10.1.4 Water Quality

The River Avon has a predominantly rural catchment and flood waters can be nutrient rich with high levels of phosphates being recorded, from both agricultural and sewage sources. The study area falls entirely within a large Nitrate Vulnerable Zone which extends for 121,782ha. There are a few discharges from light industrial premises in the study area and the streams are likely to receive runoff from local roads.

The tributaries and main stem of the Avon act as net sinks for total reactive phosphorus (TRP), but only low concentrations of TRP are found in the Chalk groundwater. It is believed that phosphorus precipitates out as a result of elevated calcium carbonate in the groundwater system before reaching the aquifer.

Water quality in the River Avon in the Scheme area is classified (in the River Basin Management Plan) as moderate, principally driven by unfavourable concentrations of phosphate and certain trace chemicals. Other water quality parameters (pH, ammonia, BOD and dissolved oxygen) are classified as high quality. Groundwater quality of the gravel aquifer has not been classified.

10.1.4 Water Environment Regulations

The Water Environment (Water Framework Directive) Regulations (2017) require all natural water bodies to attain Good or High Status/Potential. The South-West River Basin Management Plan (RBMP) outlines actions that are required to enable natural (not heavily modified) waterbodies in the region to achieve Good Ecological Status.

Compliance assessment

To comply with the Regulations, any new scheme must not be likely to cause deterioration in a water body's status or potential, or contribute to failure to achieve a 'Good' condition. (If this cannot be concluded the scheme requires evidence that there are reasons of over-riding public/societal interest, there is no feasible alternative solution and all reasonable mitigation measures have been employed.)

We have assessed compliance of the Scheme with the Regulations in Appendix H2, and the outcome is summarised below.

The waterbodies that are located within the study area and are potentially impacted by the Scheme are shown in Table 10.2. These water bodies have been assessed with respect to the following:

- baseline understanding of WFD quality elements in the context of the RBMP;

- potential impacts of the scheme on waterbody quality elements; and
- compliance against the objectives of the Regulations.

Table 10.2: Waterbodies potentially affected by Scheme

Name	ID	Type	Overall Status or Potential
Fluvial			
Hampshire Avon (Upper) d/s Nine Mile River confl	GB108043022352	River – not designated artificial or heavily modified	Moderate
Hampshire Avon (Lower)	GB108043015840	River – not designated artificial or heavily modified	Moderate
Groundwater			
Upper Hampshire Avon	GB40801G806900	Groundwater	Poor

As shown in Table 10.2, all of the water bodies are below 'Good' condition.

The Regulations also require that the environmental objectives of other water-related designations are met, and those relevant to the study area are:

- Nitrate Vulnerable Zone;
- SAC designation;
- Drinking Water Protected Area.

10.1.5 Flood risk

Fluvial

The current medium or high flood risk areas in the centre of Salisbury (meaning that each year they have a chance of flooding of 1% or higher) is shown on Figure **10.2**, together with the projected flood risk with the Scheme in place.

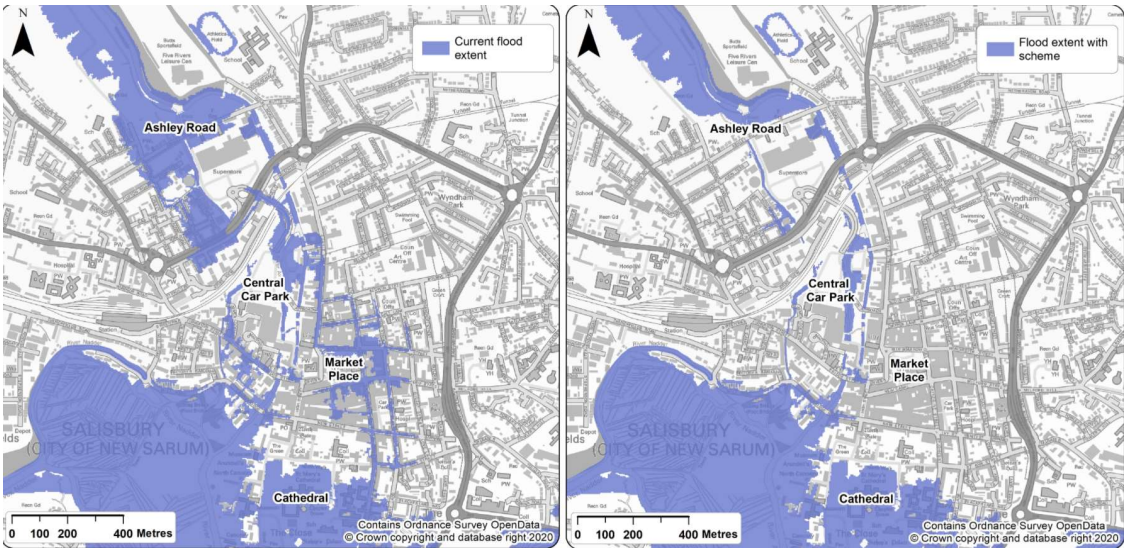


Figure 10.2: Current flood risk in the centre of Salisbury and flood risk with the Scheme in place

The catchment has a long history of flooding. The most significant event in recent years occurred in Salisbury in winter 2013/14 with flooding to at least 15 properties in Salisbury from a combination of fluvial, groundwater and surface water sources.

For the Hampshire Avon at Salisbury, the existing mechanism of flooding is complicated and is influenced by active management of a number of flow control structures, which alter the flow splits between the multiple watercourses in Salisbury. Flooding typically occurs when the channel capacity is exceeded following prolonged rainfall on the permeable upstream catchment of the River Avon. Also, permeable tertiary/alluvial deposits and anecdotal evidence suggests that floodwater can pass onto and across the floodplain without first **overflowing** the river banks (for example in the cathedral area).

During current flood conditions the main areas at risk are near to the Summerlock Stream (downstream of Ashley Road), the city centre, Fisherton Street and the cathedral area.

Surface water

There is some reported history of surface water flooding in Salisbury, although flooding is typically less extensive, and less well-documented than from fluvial and groundwater sources. Surface water flood mapping for Salisbury indicates that flow routes typically occur within the river corridors or along roads, although there are some low-lying areas which are subject to ponding. The surface water drainage network within Salisbury allows water to be drained below ground in small to moderate rainfall events but would become overwhelmed during more extreme rainfall. In some locations it is possible that high river levels would reduce the ability of the sub-surface system to drain.

Sewers

There is very little history of sewer flooding in Salisbury and where incidents have occurred, they have been localised and likely a result of blockage or localised infrastructure failure. Such incidents are typically resolved quickly and do not impact on flood risk in the wider area. There is no evidence of an under-capacity issue within the sewerage network in Salisbury.

Groundwater

Historical (Card Geotechnics 2013) and the 2020 ground investigations and groundwater flood susceptibility mapping (Wiltshire County Council Strategic Flood Risk Assessment Explorer) suggests groundwater levels at both sites are close to the surface. These shallow groundwater levels result from proximity to the River Avon (and associated groundwater occurring in shallow superficial deposits of granular Alluvium and River Terrace Deposits). Furthermore, the regional groundwater flows toward the River Avon valley are such that levels in the chalk (which are likely to be in hydraulic continuity with the superficial deposits) support this shallow groundwater regime.

On this basis there is an existing potential for groundwater flooding through, for example, the inundation of basements and impacts on buried services (including surcharging of sewer networks). In some areas (e.g. Ashley Road) flood susceptibility mapping suggests there may be potential for groundwater to emerge at the surface. This may be constrained by the presence of impermeable cohesive layers of alluvium close to the surface. A number of reports identify the historic occurrence of groundwater flooding in the Salisbury area (see Table 4.1 of the Flood Risk Assessment in Appendix H3) with groundwater flooding events having been reported in Winter 2000/2001, 2002/2003, 2012 and 2013/14. Reports of groundwater flooding, particularly those associated with permeable superficial deposits within river valleys, are often unreliable as such records may be obscured by ongoing fluvial flood events.

On this basis, the baseline risk of groundwater flooding is considered as moderate to high, although there appear to be no specific flood receptors that have been identified by historic events.

10.1.6 Changes to water environment in absence of Scheme

In the absence of the Scheme, fluvial flood risk will continue to increase in the centre of Salisbury with increased overflows from the constrained and artificially altered watercourses (with associated impacts on people and property, as well as water quality). There will be continued sediment inputs to the river system in the Scheme area.

Fish passage within the channels will continue to be restricted by in-channel controls and barriers.

10.2 Likely significant effects

10.2.1 During construction

This section assesses the significance of potential impacts likely to occur during construction, that are specific to individual water receptors within the study area. The potential impacts on fluvial geomorphology, groundwater, surface water quality and flood risk are discussed below and then summarised in Table 10.3.

Geomorphology

The key potential geomorphological impacts from construction activity are as follows:

- increased mobilisation of fine sediments within channels;
- altered flow distribution and consequent change to seasonal sediment transport and deposition of fine material during the works; and

- temporary new pathways for ingress of fine material from construction activity, stockpiles and soil during rainfall events.

The main geomorphological impacts during construction are likely to be limited to changes in the mobilisation and transport of fine sediment. Movement of coarse bed material and widespread geomorphological change due to any temporary construction measures is not anticipated (with the exception of works to create the new fish pass and weir on the River Avon where material introduced to the steps will form a new bed).

A significant change in flow distribution will be created during construction by (i) use of a cofferdam which will divert water from the River Avon to the Mill Stream (ii) diversion of additional flow through Summerlock Stream channel to reduce pressure on the Mill Stream and (iii) establishing a new Summerlock Stream channel. The increase in flows in these two watercourses may result in increased movement of fine sediment beyond seasonal norms. As the cofferdam will be in place during the summer when flows are likely to be low, the risk of additional erosion of bank material has been assessed as low. The new Summerlock Stream channel will be designed and constructed, and the flow implemented, to avoid erosion.

The potential to impact local fisheries and designated features of the SAC have been assessed as part of a HRA and WER assessment for the Scheme (Appendices J and H2 respectively) and the impacts are summarised in Chapter 9 'Flora and fauna'. The impacts of altered flow distribution on invertebrates and macrophytes is also covered in the WER assessment. Given that loss of existing morphology will occur during construction of the fish pass, geomorphological impacts on the River Avon have been assessed as **major adverse** (based on a very high sensitivity receptor and medium adverse magnitude).

The risks linked to additional sediment ingress to Summerlock Stream downstream of the works during construction has been assessed as low and morphological change is likely to be limited. The potential for loss of natural bed material is also assessed as low. However, given that there is a risk of additional fine sediment ingress during the works (which may indirectly impact local fisheries), geomorphological impacts on Summerlock Stream have been assessed as **major adverse** (based on a very high sensitivity receptor and medium adverse magnitude). It should be noted that mitigation measures will be in place during construction to manage this risk.

As with the River Avon and Summerlock Stream, the key geomorphological impacts on the Mill Stream from construction activity are linked to the movement of fine material. The construction of channel narrowing features has the potential to temporarily increase local fine sediment loads (with associated indirect impacts on local fisheries). As a result, impacts on this watercourse have been assessed as **major adverse** (based on a very high sensitivity receptor and medium negative magnitude). As above, mitigation measures will be used during construction to manage this risk.

Groundwater

During construction, changes in the groundwater flow regime may occur as a result of dewatering, installing piling and other sub-structures or temporary changes to the local recharge regime. These are most likely to affect the shallow groundwater regime in the superficial deposits, although given hydraulic continuity with the chalk there may also be some (perhaps lesser) impacts on the deeper aquifer. Such impacts might affect water dependent ecosystems and/or local baseflow to rivers,

streams and other watercourses. Although it is considered that impacts will be sufficiently localised not to significantly impact baseflow to the River Avon SAC and River Avon System SSSI, there may be some influence upon shallow groundwater within the Avon Valley Local Nature Reserve.

On this basis, the effect on shallow groundwater within the superficial aquifer is determined to be **moderate adverse** (based on a high sensitivity receptor i.e. the shallow aquifer and a medium adverse magnitude).

Where excavations penetrate existing less permeable surficial deposits (such as cohesive alluvium) river bed permeability will increase. This could enhance the potential for river losses to ground (given a downward hydraulic head) and potentially impact the low flow regime of the river. Such effects, particularly for the Summerlock Stream (but also including potential pathways created by the removal of existing structures) need further consideration during detailed design. These impacts could commence at construction stage, but potentially could also extend into the longer-term. Such impacts are most likely to occur (and be of significant magnitude) within the new excavations associated with the Summerlock Stream, although similar impacts may occur along the Avon downstream of the Mill Stream divergence. It is recognised that losses to groundwater can impact surface water quality and the surface flow, particularly during low flow. However, for the purposes of this assessment these impacts are assigned under surface water quality. The magnitude of impact on the Summerlock Stream and River Avon is considered as medium negative, resulting in a **major adverse effect** on surface water quality and **low negative effect** on Mill Stream (where there is little/no change to the bed, but which might be affected by upstream low - flow losses) resulting in a moderate adverse effect.

Changes in groundwater level may also potentially impact structures (where groundwater pressures are reduced or where fine materials are removed from the superficial aquifers by dewatering). However it is not expected that dewatering will be of sufficient scale or duration to significantly affect local groundwater pressures or mobilise fine sediment material, and on this basis this impact is considered to represent **no change**.

Changes in the shallow groundwater flow regime may mobilise existing contamination (although evidence suggests such contamination is very localised). Piling may also open up downward pathways, which could allow near surface contamination to penetrate into both the shallow aquifer and the underlying Chalk.

There may be risks associated with accidental spillage (e.g. of fuels and lubricants from mobile plant, from storage/ stockpiling of materials that may allow downward leaching of potentially harmful substances) during the construction process.

These risks to groundwater quality are considered to potentially impact both the shallow groundwater and the underlying Chalk and are considered to be of medium adverse magnitude. When combined with the Chalk aquifer and nearby groundwater public water supply (of very high importance) this leads to a **major adverse** effect.

Water quality

There is the potential during construction for accidental spillages of vehicle/machine fuels and oils, cement and other construction materials to result in surface water pollution, with the greatest risk being where construction works take place within or immediately adjacent to a watercourse. Should a pollution incident occur, these direct effects are considered to be **major adverse** (based on a very high sensitivity receptor and medium adverse magnitude).

There will likely be a potential increase in silt laden water from excavations associated with bridge construction works. It has been assumed that such effects are **major adverse** (based on a very high value receptor and medium adverse magnitude).

Flood Risk

Surface water flooding

During construction there will be a need to permanently relocate several of the existing surface water outfalls in the Central Car Park area as the new widened channel is constructed. Whilst these are being reconstructed the sub-surface drainage system will temporarily be unable to discharge to the river, which may result in water backing up in the drainage system and flowing overland. All of the surface water outfalls identified in this area drain only areas of hardstanding adjacent to the channel so the effects will be localised and are only likely to adversely impact car parking areas, with surface water draining overland to the river instead.

Car parking areas are not specifically categorised under the NPPF but have been considered 'less vulnerable' for the purposes of this assessment and are therefore considered to have a low sensitivity. The magnitude of impact is considered to be moderate adverse. The effects of this are therefore considered to be **minor adverse**.

Sewers

There will be **no change** to sewer flood risk during construction of the scheme.

Fluvial flooding

During construction, temporary works will be required in the channel to divert flows away from the area under construction. During high flows, without mitigation, this may result in the channel capacity being exceeded in watercourses receiving diverted flows resulting in flooding to nearby receptors. Additionally, construction of upstream works, without downstream capacity improvements being completed, may also result in flooding. The receptors affected are considered to have a medium-high sensitivity and the magnitude of impact would be moderate or high adverse, depending on location. The effects of this are therefore considered to be **moderate to major adverse**, in the absence of mitigation**.**

Groundwater

During construction, temporary piling (e.g. as used for coffer dams) and other sub-surface structures may impede or divert shallow groundwater flow with a potential change in both groundwater flow and level potentially causing upgradient water logging/ groundwater flooding. These **minor to moderate adverse** effects on groundwater flooding (based on a low-medium adverse magnitude and high sensitivity receptor) are likely to be localised and impact primarily the shallow groundwater regime.

Where groundwater levels are confined and piezometric levels at or near surface, removal of near-surface impermeable soils may open upward pathways for confined groundwater, potentially leading to its emergence at the surface. Initial evidence from the 2020 ground investigations in the Scheme area suggest some areas of slightly confined groundwater but no occurrence of high confined groundwater pressures have been recorded. The presence of low permeability, potentially confining layers has been proved, but generally groundwater appears to be in continuity between the three main strata (alluvium, RTD and chalk).

However, the period of groundwater level observation currently available is limited and until further data is available (on-going at the time of writing), including during periods of high water levels, the potential effect of low permeability superficial strata cannot be fully assessed. Consequently, at this stage it is assumed that there may be potential groundwater flood risk receptors and that such impacts may be **moderate or major adverse** (based on a medium adverse magnitude and high sensitivity receptor).

Table 10.3: Effects of construction on hydromorphology, surface water quality and flood risk

Receptor	Attribute	Description of effects	Sensitivity	Magnitude	Significance of effects (before mitigation)
River Avon	Geomorphology	Increased erosion (channel bed and banks) with sediment input to channel	Very high	Medium	Major adverse
		Smothering of bed substrate and depositional features	Very high	Medium	Major adverse
		Degradation of morphological features	Very high	Medium	Major adverse
		Loss of a length of natural bank and bed	Very high	Medium	Major adverse
	Surface water quality (inc WFD)	Measurable (but temporary) shift from baseline water quality due to pollution and silt laden water	Very high	Medium	Major adverse
		Deterioration of water quality status	Very high	Medium	Major adverse
		Decline in river ecosystem health and loss of aquatic species	Very high	Medium	Major adverse
		Disturbance and release of phosphate load in bed sediment	Very high	Medium	Major adverse
		Increased low flow losses	Very high	Medium	Major adverse
Summerlock Stream	Geomorphology	Increased erosion (channel bed and banks) with sediment	Very high	Medium	Major adverse

		input to downstream channel & smothering of bed substrate and depositional features Degradation of morphological features Loss of a length of natural bank and bed	Very high Very high	Low Low	Moderate adverse Moderate adverse
	Surface Water Quality	Measurable (but temporary) shift from baseline water quality due to pollution and silt laden water Decline in river ecosystem health and loss of aquatic species Increased low flow losses	Very high Very high Very high	Low Low Medium	Moderate adverse Moderate adverse Major adverse
Mill Stream	Geomorphology	Increased erosion (channel bed and banks) with sediment input to channel Smothering of bed substrate and depositional features Degradation of morphological features	Very high Very high Very high	Low Medium Low	Moderate adverse Major adverse Moderate adverse
	Surface Water Quality	Measurable (but temporary) shift from baseline water quality due to pollution and silt laden water Decline in river ecosystem health and loss of aquatic species Increased low flow losses	Very high Very high Very high	Low Low Low	Moderate adverse Moderate adverse Moderate adverse

Chalk Groundwater	Water resources/ supplies	Accidental spillage impacting water quality to nearby PWS Piling creating downward pathways for contaminated groundwater/ surface water Temporary changes to the local recharge regime as a result of soil removal or compaction	Very high	Medium	Major adverse
Shallow Groundwater (superficial deposits)	Support to water dependent ecosystems and/or river baseflow	Temporary changes in shallow groundwater levels/ flows remobilising existing contaminants Local dewatering leading to reduction in groundwater levels impacting water supported habitats Changes to the local recharge regime as a result of soil removal or compaction Potential impact on structures due to groundwater lowering	High	Medium	Moderate adverse
Flood Risk	Surface water flooding	Potential localised reduction in drainage capacity as outfalls are relocated	Low	Medium	Minor adverse

	Sewer flooding	None	n/a	Nil	Nil
	Fluvial flooding	Capacity exceedance of watercourses during flood events resulting from diversion of flows during construction	Medium - High	Medium - High	Moderate to Major adverse
	Groundwater flooding	Impedance/ diversion of groundwater flow causing upgradient water logging/ groundwater flooding Removal of near surface impermeable soils opening upward pathways for groundwater	High High	Medium Medium	Moderate or Major adverse Moderate or Major adverse

10.2.2 During operation

The potential impacts on fluvial geomorphology, groundwater, surface water quality and flood risk during operation are discussed below and then summarised in Table 10.4.

Geomorphology

On the whole, operational impacts are likely to be beneficial to the geomorphology of the impacted channels: key potential beneficial geomorphological impacts from operation of the Scheme are as follows:

- greater morphological diversity in newly created Summerlock Stream offtake channel with increased channel-floodplain connectivity working with local natural processes;
- increased flow variability and morphological diversity in Mill Stream created by channel narrowing with better conveyance of fine sediment through this channel; and
- increased flow variability, clean flints/gravels and morphological diversity in newly constructed fish pass steps in the River Avon.

The introduction of a passive weir to replace the undershot sluice at the Swimming Pool Gate may increase the risk of deposition of fine sediment in reaches of the River Avon upstream from this structure. This additional risk is judged to be low adverse in magnitude in the overall context of the wider improvements offered by the Scheme, which are themselves considered to be medium beneficial in magnitude. Further details of the extent of existing deposition and the extent to which additional sedimentation may occur during operation of the Scheme will be explored at detailed design. The risk of displacement of any material used to form the substrate of the newly-created fish pass steps and consequent potential changes in localised flow

and erosion patterns will be managed by using techniques to appropriately size the material at detailed design. In the meantime, when balancing the adverse and beneficial changes that are expected, the overall geomorphological changes in the River Avon have been assessed as low magnitude beneficial resulting in **moderate beneficial impacts**.

Benefits linked to re-engineering the Mill Stream to create a narrower, self-sustaining low flow channel have been assessed as medium magnitude for a very high sensitivity receptor resulting in **major beneficial impacts**.

Creation of a more natural geomorphological regime in the new section of Summerlock Stream has also been assessed as medium magnitude resulting in **major beneficial** impacts.

Groundwater

Through the Maltings and Central Car Park area, the Scheme design and proposed new permanent structures are unlikely to have any significant long-term impact on groundwater flows or levels (although there may be minor lowering of groundwater levels due to improved flood flow conveyance). On this basis, the magnitude of impact is assessed as no change and the significance of effect, **no change**.

The introduction of the new flood defence embankment at Fisherton Recreation Ground and Ashley Road Open Space may have an impact on local groundwater levels (plus groundwater flooding as described below). In addition, proposed soil removal, landscaping and habitat creation in the Fisherton Recreation Ground may lead to the removal of superficial cohesive alluvium deposits. This could open potential upward pathways for groundwater (leading to groundwater flooding as described below) and, where groundwater levels are permanently high, lead to long term saturation of the ground in the habitat creation area (the proposed wetland habitat creation is discussed in Chapter 9 'Flora and fauna).

Initial evidence from the 2020 ground investigations in the Scheme area has suggested continuity between the three main strata (alluvium, RTD and chalk) and has not indicated significant confined groundwater pressures. However, the period of groundwater level observation currently available is limited (ongoing at time of writing this ES) and further local groundwater data will be used during the detailed design stage of the Scheme to confirm the extent to which such impacts might occur. However, at worst such impacts are considered to be **minor adverse** (based on a low adverse magnitude and high importance superficial aquifer).

Changes within the floodplain across Fisherton Recreation Ground and in Ashley Road Open Space may impact the recharge regime to underlying groundwater, both to the shallow aquifer, and by assumed hydraulic connection to the underlying Chalk aquifer. Whilst removal of cohesive alluvium may reduce some protection (in water quality terms) to the underlying aquifer, the Scheme will not be introducing poorer quality water so this impact is considered **negligible**. Potentially, local recharge may be enhanced, although this a not considered a significant benefit. Overall, the impact on the underlying Chalk aquifer (and associated public water supply) is considered to be **negligible**.

Water Quality

Following completion of the Scheme, potential beneficial effects on water quality are anticipated associated with:

- a reduced probability of urban flooding and associated water contamination;
- an associated increase in a more natural floodplain;

- a more diverse flow associated with reduced impoundment (above the divergence of the Mill Stream and River Avon) and with more natural and heterogeneous chalk stream flow characteristics.

These impacts are considered to be **moderate beneficial** (based on a very high sensitivity receptor and low magnitude of impact).

Should changes in river-bed permeability (see 'construction effects') remain in the long term, possible losses of flow to groundwater may continue with associated impacts on river low flows and hence river water quality. The timescale for return to a state similar to that prior to the introduction of the scheme is unknown however, adopting the precautionary principle, the impacts post construction are assumed to be the same as during construction. Hence the magnitude of impact on the Summerlock Stream and River Avon is considered as medium negative, resulting in a **major adverse effect** on surface water quality and low negative impact on Mill Stream resulting in a moderate adverse effect. As for construction, these impacts are assigned to water quality.

Flood Risk

Surface water flooding

Following completion of the Scheme, there will be a reduction in fluvial flows, in flood conditions, along the Summerlock Stream between Ashley Road and the A36 and in the Waitrose culvert, resulting in reduced flood levels at surface water outfalls. This may improve surface water drainage although the magnitude of impact is likely to be low beneficial. Receptors impacted would be of medium to high sensitivity and the impact would therefore be **minor to moderate beneficial**.

For areas where the channel is being widened, and fluvial water levels in flood conditions increased, the drainage outfalls will be relocated and flaps installed, if necessary, to maintain drainage provision. The impact of this is therefore considered **negligible.**

Sewer flooding

There will be **no change** to sewer flood risk during operation of the Scheme.

Fluvial flooding

The new flood defences will have a beneficial impact on fluvial flood risk to areas adjacent to Ashley Road and the Summerlock Stream, Fisherton Street and the city centre. The magnitude of impact is considered to be high beneficial, with medium to high sensitivity of receptors, resulting in a **moderate to major beneficial** impact overall.

The only area which may be subject to an adverse impact is Water Lane (including the footway and adjacent properties), where hydraulic modelling results show a potential small localised increase in flood depths under the climate change scenario (subject to further investigation into flood mechanisms at detailed design stage - the conditions in the hydraulic model are not considered to be fully representative of real-life conditions). Receptor sensitivity at this location is medium-high with a moderate adverse magnitude of impact at the receptors due to ponding (although the extent and depth of ponding shown by the model is likely to be an over-estimate). Potential impacts at this location are therefore currently considered to be **minor to moderate adverse.**

Groundwater flooding

Groundwater flooding potential resulting from operation of the Scheme depends upon the relationship (interface) between river water levels (during flood events) and groundwater. This is primarily driven by the degree of hydraulic connectivity between river water and groundwater and the relative levels (relative head) between surface and groundwater bodies.

Through the Maltings and Central Car Park area, the Scheme design focusses on increased conveyance of flood waters and a widened River Avon channel. Where river levels remain the same (or are perhaps reduced in level) there will be no changes to the surface water/groundwater interface and hence no change to potential impacts. On this basis the significance of effect in this area is **no change**.

The new flood defence embankment through Fisherton Recreation Ground and Ashley Road Open Space may change the permeability characteristics of the underlying superficial deposits. During flood events, there is potential for seepage beneath the embankment and in turn an increase in groundwater levels due to higher imposed head between surface water and groundwater.

Initial evidence from the 2020 ground investigations in the Scheme area have suggested continuity between the three main strata (alluvium, RTD and chalk) and has not indicated significant confined groundwater pressures. However, the period of groundwater level observation currently available is limited and until further data is available (on-going at the time of writing), including during periods of high water levels, the potential effect of low permeability superficial strata and the potential for rising groundwater and associated flooding cannot be fully assessed. At this stage it is considered It is probable this will be a relatively localised effect (and occur only during flood events) of **minor to moderate adverse** nature (based on at least low-medium adverse magnitude and the high importance of the shallow superficial aquifer with respect to groundwater flooding) (subject to confirmation of local groundwater levels by ground investigation).

Table 10.4: Impacts during operation on flood risk, hydromorphology and surface water quality

Receptor	Attribute	Description of effects	Importance	Magnitude	Significance of effects (before mitigation)
River Avon	Geomorphology	Improved variability in sediment transport and flow type Improved bedforms and channel characteristics Improved morphological diversity and geomorphic behaviour	Very high	Medium beneficial	Moderate beneficial overall
		Risk of increased sedimentation above Swimming Pool, Gate	Very high	Low adverse	

	Surface Water Quality	Long-term changes to water quality from more naturally functioning river (Contributing to improvement measures outlined in the South West River Basin Management Plan) Increased low flow losses	Very high Very high	Low beneficial Medium adverse	Moderate beneficial Major adverse
Summerlock Stream	Geomorphology	Improved flow variability and morphological diversity Improved variability in sediment transport and flow type Improved bedforms and channel characteristics	Very high	Medium beneficial	Major beneficial
	Surface Water Quality	Long-term changes to water quality from more naturally functioning river Increased low flow losses	Very high Very high	Low beneficial Medium adverse	Moderate beneficial Major adverse
Mill Stream	Geomorphology	Improved flow variability and morphological diversity	Very high	Medium beneficial	Major beneficial
	Surface Water Quality	Long-term changes to water quality from more naturally functioning river Increased low flow losses	Very high Very high	Low beneficial Low adverse	Moderate beneficial Moderate adverse
Chalk Groundwater	Water resources/ supplies	Permanent change in local recharge characteristics from the Avon valley to the underlying Chalk aquifer (including across the SPZ)	Very high	No change	Negligible
Shallow Groundwater	Support to water dependent ecosystems	Changes to the local recharge regime as a result of soil removal, compaction or	High	Low adverse	Minor adverse

(superficial deposits)	and/or river baseflow	introduction of flood embankments Ground saturation following soil removal Constraints to groundwater flow by subsurface structures beneath flood embankments Improved conveyance of river flood flows			
Flood Risk	Surface water flooding	Reduction in flood levels at surface water outfalls on the Summerlock Stream and Waitrose Culvert Increase in flood levels at surface water outfalls in Central Car Park site (to be relocated and flapped)	Medium to High Low	Low beneficial Negligible	Minor to moderate beneficial Negligible
	Sewer flooding	None	n/a	Nil	Nil
	Fluvial flooding	Reduction in fluvial flood risk to Ashley Road, Summerlock Stream, Fisherton Street and city centre areas Potential increase in flood risk to the floodway and properties in Water Lane (climate change event only)	Medium to High Medium to High	High beneficial Moderate adverse	Moderate to major beneficial Minor to moderate adverse
	Groundwater flooding	Potential for seepage beneath embankment through Fisherton Recreation Ground during flood events and increased groundwater levels due to higher imposed surface water head and recharge	High	Low to medium	Minor - Moderate adverse

10.2.3 Water Environment Regulations compliance

The regulatory compliance assessment (Appendix H2) has concluded that the Scheme will have the following local and temporary impacts on waterbody quality

elements during and construction, which here includes the reinstatement of flow to the point where a new equilibrium establishes in the new and modified channel reaches. The works are unlikely to cause deterioration to the water body status (following mitigation - see Section 10.3):

- potential increase in suspended sediment concentrations (and consequent reduction in dissolved oxygen) and release of materials into the water column from construction of embankments, backwaters and two stage channel features;
- increased sedimentation (as discussed in the above sections under 'geomorphology');
- compaction of the floodplain from plant tracking across the site, which can change permeability of the substrate, interrupt hydrology of both the riparian zone substrate and the area's surface, and increase erosion potential; and
- disturbance to fish, invertebrates and macrophytes due to increased suspended sediment and disturbance/removal of existing habitat.

These impacts are likely to be confined to: the channel and floodplain at the areas of in-channel work plus the downstream channel; floodplain areas that have new features (e.g. defences) or construction compounds and haul routes.

Once operational the new channel forms and improved riparian and floodplain areas will improve the water body's hydromorphological and ecological conditions.

10.3 Mitigation

Construction phase risks to surface water and groundwater quality will be effectively avoided through adherence to best practice measures (for example as detailed in former pollution prevention guidelines PPG1 General guide to the prevention of pollution, PPG5 Works & maintenance in or near water, PPG21 Pollution incident response planning, PPG23 Maintenance of structures over water and CIRIA Report 156: Control of water pollution from construction sites – a guide to good practice). In particular:

- a pollution response plan will include communication lines and responses to any silt-related incidents;
- a Surface Water Management Plan will include measures to minimise site runoff as agreed with our internal technical specialists. This will include considerations of the risk of silt generation from 'just in time' stockpile areas from rainfall/flood events, and of leachate generation from excavated materials, and required mitigation measures such as the use of impermeable bases, flood bunds, and temporary covering of exposed material;
- further investigation and groundwater risk assessment/remediation strategy to address potential risk to groundwater quality from contamination in soils/groundwater within the Scheme area (see Chapter 13 'Sustainable use of land');
- specific toolbox talks will be given about the risks of water pollution and suitable controls, including those below;
- the short-term risks from hydrocarbon/chemical spills during construction will be minimised by restricting the refuelling of vehicles and machinery to designated areas which do not drain to ground or watercourses, and by storing all fuels, oils, hydraulic fluids and chemicals within secondary containment (e.g. drip-trays or bunds) at least 10m away from riverbanks;

- all contractors will register for Flood Warnings and ensure that no equipment or potentially polluting materials are left at risk of flooding. Works within the floodplain will take account of weather and flood forecasts, and no vehicles, plant or materials will be stored in areas of high risk when there is the potential for flooding;
- floodplain excavation will, as far as possible, proceed from points away from the river towards the river, thus maintaining a vegetated buffer that will reduce the risk of soil runoff. We will ensure that soil exposed by vegetation stripping and excavation, including soil stockpiles is protected against erosion and runoff into any adjacent drainage system;
- all water from the site will be appropriately treated to reduce silt prior to any discharge into the river. Any such discharge will be subject to an independent Environment Agency permit (Flood Risk Activity Permit);
- dewatering (including both groundwater and from within coffer dams) will be subject to appropriate management controls and permits;
- implementation of dissolved oxygen monitoring during in-channel; works during warmer weather periods;
- landscape planting of each the excavated areas will be carried out as soon as is practicable to minimise the period of bare soil and to encourage stabilisation by re-vegetation;
- the modified channels will be allowed to revegetate before flow is actively directed down them.

In addition, further investigations and assessments will be carried out as part of detailed design, and will be used to modify or add to the mitigation measures above before any construction. These investigations will include:

- ground investigations and high resolution groundwater monitoring (ideally from groundwater level loggers in some boreholes) to determine groundwater levels and determine optimum design for sub-surface structures and for the development of habitat areas - these investigations are being undertaken at the time of writing;
- monitoring of river levels (in addition to the groundwater monitoring) to develop a greater understanding of hydraulic connectivity between river waters and groundwater through the length of the Scheme;
- the potential for increased losses to groundwater will be subject to further investigation and methods to address such losses (such as temporary/ permanent channel lining) subject to consideration/confirmation during final design
- sediment assessment of where, when and how accumulated sediment in the River Avon and Mill Stream needs to be managed to inform mitigation. The assessment will aim to establish sediment quantities in different reaches, the integrity of each sediment store and the levels of priority substances (if any) and phosphate;
- a Piling Risk Assessment will be undertaken to understand the risks, if any, of the works leading to movement of contamination as a result of these works.

Mitigation measures for the identified operational impacts will include monitoring during and after construction to determine any significant effects on water quality and levels. Measures may also be needed to manage potential groundwater flooding

and/or seepage associated with flood defences in the Ashley Road area. This is one of the factors to be investigated through the ground investigations which are underway at the time of writing. Where required, groundwater drainage (potentially including pumping from sumps) will be installed to manage groundwater levels to the dry side of flood embankments.

For flood risk, potential construction-phase impacts to surface water drainage during relocation of outfalls will be mitigated through timing of works, to avoid these particular tasks taking place when significant rainfall is forecast. Construction-phase impacts on fluvial flood risk will be mitigated through construction sequencing and implementation of an emergency response plan in the event of a significant flood event being forecast. This will be covered in more detail in a Flood Risk Activity Permit to be obtained for the Scheme.

The potential for adverse fluvial flood risk impacts at Water Lane during operation of the Scheme will be investigated further at detailed design stage to confirm the flood mechanisms at this location and the magnitude of any impact. If mitigation is required, this could entail raised kerbing, local drainage improvements or other similar measures.

10.4 Residual effects

The residual effects on water and hydromorphology are presented in Table 10.5.

Table 10.5: Residual impacts on water and hydromorphology

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
River Avon, Summerlock Stream, Mill Stream (very high)	Temporary increased erosion resulting in sediment input to channel, smothering of downstream bed and degradation of morphological features	Major adverse	Pre-works sediment analysis to identify if its contaminated and to inform management decisions Best practice measures across all construction sites and compounds Pollution response plan (including Flood Warning response actions) Surface Water Management Plan to control site drainage,	Negligible

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
			dewatering and in-channel works Stabilise / vegetate new bank and in-channel features before restoring flow	
River Avon, Summerlock Stream, Mill Stream (very high)	Improved variability in sediment transport and flow type, improved bedforms and channel characteristics, improved morphological diversity and geomorphic behaviour	Moderate (Avon) to major beneficial	Mostly not required Low adverse risk of increased sedimentation above Swimming Pool Gate will be further investigated to establish how to reduce the risk through detailed design	Moderate (Avon) to major beneficial - significant
All Surface Water quality (very high)	Potential contamination by construction materials Temporary, no more than medium magnitude	Moderate to major adverse	Adhere to best practice for construction site / compound management	Negligible
All Surface Water quality (very high)	Long-term changes to water quality from more naturally functioning river Permanent, low magnitude	Moderate beneficial	Not required	Moderate beneficial - significant
Chalk Groundwater (very high)	Accidental contamination of water supply during construction (by spillage, piling,	Major adverse	Adhere to best practice for construction site / compound management	Negligible

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	ground disturbance)		Piling Risk Assessment to identify any additional precautions needed	
Chalk groundwater (very high)	Permanent change in local recharge of aquifer	Negligible	Not required	Negligible
Shallow Groundwater (superficial deposits) (high)	Temporary changes in levels/flows and recharge regime, possible mobilisation of existing contaminants	Moderate adverse	Adhere to best practice for construction site management	Negligible
Shallow Groundwater (superficial deposits) (high)	Permanent changes to local recharge regime, ground saturation and subsurface flow	Minor adverse	Assess and minimise dewatering needs near structures	Negligible
Surface water flood risk - car parking areas adjacent to Avon (low)	Temporary (during construction) localised interruption in surface water drainage as outfalls are relocated	Minor adverse	Avoidance of works at this location when significant rainfall forecast	Negligible
Sewer flood risk - properties and infrastructure at risk (N/A)	None	Negligible	Not required	Negligible

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
Fluvial flood risk - properties and infrastructure at risk (medium to high)	Temporary (during construction) potential risk of channel capacity exceedance due to diverted flows	Moderate to major adverse	Phasing of works Implementation of emergency response if flood event forecast	Negligible
Groundwater flooding (high)	Temporary (during construction) increase in groundwater flood risk resulting from upward movement of groundwater	Moderate or major adverse	Advance groundwater monitoring to determine optimum design for sub-surface structures (e.g. groundwater drainage/ sumps behind flood embankments if/where needed)	Negligible
Surface water flood risk - areas draining to the Summerlock Stream and Waitrose Culvert (medium to high)	Potential for improved surface water drainage due to lower flood levels at outfalls	Minor to moderate beneficial	Not required	Minor to moderate beneficial
Sewer flood risk - properties and infrastructure at risk (N/A)	None	Negligible	Not required	Negligible
Fluvial flood risk - properties and	Reduction in fluvial flood risk to areas adjacent to Ashley Road and the	Moderate to major beneficial	Not required	Moderate to major beneficial - significant

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
infrastructure at risk (medium to high)	Summerlock Stream, Fisherton Street and the city centre			
Fluvial flood risk - properties along Water Lane (medium to high)	Potential increase in fluvial flood risk to properties in climate change scenario (subject to further investigation)	Minor to moderate adverse	Localised improvements e.g. to kerb height, drainage	Negligible
Groundwater flooding (high)	Potential seepage beneath embankment (Fisherton Recreation Ground) and increased groundwater levels	Minor to moderate adverse	Pumped sumps/ drainage behind embankment as required	Negligible

11 Historic environment

11.1 Existing environment

A heritage asset is defined by the NPPF as “a building, monument, site, place or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest”.

Heritage assets include designated assets (World Heritage Sites, Scheduled Monuments, Listed Buildings, Conservation Areas, Registered Parks and Gardens, Registered Battlefields and Registered Historic Wrecks) and non-designated assets identified by the Local Planning Authority (for example: locally listed buildings, archaeological sites and monuments and historic landscapes). As detailed in Section 4.3.6, this chapter focuses on above ground designated assets only and in agreement with the County Archaeologist, does not consider the archaeological resource.

The study area used for this chapter is shown on Figure 11.1 and comprises the Scheme area and an approximate 50m buffer zone around the Scheme boundary.

There are no World Heritage Sites, Scheduled Monuments, Registered Parks and Gardens, Registered Battlefields or Registered Historic Wrecks within the study area.

11.1.1 Cultural heritage baseline

There are 33 designated cultural heritage assets located within the study area. These comprise:

- one Grade I Listed Building;
- six Grade II* Listed Buildings;
- 24 Grade II Listed Buildings; and
- two Conservation Areas (Salisbury Conservation Area and Stratford-sub-Castle Conservation Area).

The Grade I and Grade II* Listed Buildings are identified to be high value assets. Due to the number of high value Listed Buildings within the Salisbury Conservation Area, including the cluster of internationally important buildings within the Cathedral Close, this asset is also identified as high value. The Grade II Listed Buildings are identified to be medium value assets, as is the Stratford-sub-Castle Conservation Area (for reasons given later in this section).

The designated cultural heritage assets within the study area are summarised in Table 11.1 and shown on Figure 11.1. All assets (with the exception of the Grade II Salisbury Generating Station (NHLE 1243066) and two Conservation Areas) lie outside of the Scheme area.

Table 11.1: Designated cultural heritage assets

Asset/Receptor	NHLE Reference	Description	Grade	Value
Market House Chambers	1023552	Early 18th century building, three storeys with attic.	II*	High
31-35, Castle Street	1023553	Late 18th/early 19th century building, three storeys.	II	Medium

Asset/Receptor	NHLE Reference	Description	Grade	Value
Former Store to rear of no 41 across small yard	1023555	Early 19th century, two storey square plan building, originally merchant's storerooms.	II	Medium
45, Castle Street	1023557	Mid-18th century front to 17th century building. Three storeys of red brick on raised plinth.	II*	High
Ivy Place, 4-11 Castle Street	1023561	Circa 1800 building. Three storeys of rendered brick.	II	Medium
91, Castle Street	1023563	18th century re-fronting of a 15th century building. Two storeys stucco faced.	II*	High
Husseys Almshouses, 1 and 2 Castle Street	1023564	Founded 1794, rebuilt 1875. Semi-detached pair part of a group of almshouses. One storey and attics, free Tudor style. Red brick with stone dressings and quoins.	II	Medium
28 and 28a, Market Place	1242688	Late 18th century re-fronting of a 17th century two storey building.	II	Medium
British Legion	1242690	Circa 1680 house of Sir Samuel Eyre. Two storeys, attic and semi-basement. Colour-washed brick.	II	Medium
31 and 31a, Market Place	1242703	Probably 14th century origin and formerly a property of the Eyre family. Late 18th century re-fronting, three storeys of colour-washed brick with brick and stone cornice.	II*	High
32, Cheese Market	1242715	Formerly the Maidenhead Inn, rebuilt 1767 with 19th century refacing and ground floor altered. Three storeys, plum colour header bricks.	II	Medium
8, St Thomas's Square	1243065	17th/18th century building of two storeys in painted brick.	II	Medium
Ivy Place, 1-3 Castle Street	1249015	17th century building. Perhaps formerly one house. Two storeys and attics.	II	Medium
81, Castle Street	1249046	Early 17th century timber framed building of three storeys, formerly plastered stone ground floor now brick.	II	Medium

Asset/Receptor	NHLE Reference	Description	Grade	Value
Avon View	1249051	Early 16th century barn, timber framed with brick infilling. The fourth northernmost bay converted to a cottage in the late 18th century.	II	Medium
Husseys Almshouses, 4-14 Castle Street	1249073	Founded 1794, rebuilt 1875, part of a group of almshouses, a long range facing south at right angles to road.	II	Medium
The Market Hall	1259888	1859 by Mr Strapp. One-storey ashlar stone front on projecting plinth of three bays.	II	Medium
Church of St Thomas	1273123	The Parish Church of New Sarum. Probably founded 1220. Enlarged in the 14th and 15th centuries. Tower 1400. Rebuilt and extended in the 15th century.	I	High
63 and 65, Castle Street	1277654	18th century re-fronting of and early 16th century timber framed building. Two storeys with painted brick front.	II	Medium
Salisbury Generating Station	1243066	Former 18th century water mill with later 19th century modern extension. Front facing the bridge and Bridge Street, with mill pond in front: the left hand part 19th century, flint and stone dressings two gable end stone mullioned and transomed tall windows. Brick buttresses. Right hand 18th century part built over mill stream: Three storeys red brick with small irregular wood casements. Old tile roof half hipped to left. Later extensions to rear and two storey red brick range towards St Thomas's Square proper.	II	Medium
12, 12a and 14 Bridge Street	1023546	19th century block of four former houses. Three storeys of grey brick.	II	Medium
77, Castle Street	1023562	Early to mid-18th century house of two storeys.	II	Medium

Asset/Receptor	NHLE Reference	Description	Grade	Value
Husseys Almshouses Screen Wall and plaque to the south of No. 3	1023565	Founded 1794, rebuilt 1875, part of a group of almshouses,. Two storeys of red brick with stone dressings and quoins.	II	Medium
95, Castle Street	1249061	17th or 18th century two storey building.	II	Medium
Clock Tower including part of former County Jail	1260194	1892. Gothic clock tower. Ashlar with bands pointed niche and two lancets to upper register. Buttressed base with niche to street face and inscription. Clock faces flanked by columns, pierced parapet, pyramid roof with weathervane. The rectangular ashlar base was formerly part of the County Jail dating from 1631 with Georgian alterations.	II	Medium
Wall to pavement with piers and lamps in front of Congregational Church	1260238	Wall to pavement with piers and lamps in front of Congregational Church.	II	Medium
Congregational Church	1355795	1879 by Tarring and Wilkinson. Asymmetrical, Style of circa 1300. Stone rubble and stone dressings. Tower with corner buttresses and pinnacles. Stone spire with canopies in broaches.	II	Medium
27, 29 and 29a, Castle Street	1355859	Mid to late 19th century building of three storeys in red brick.	II	Medium
George and Dragon Public House	1355860	Early 16th century possibly one house originally. Two storeys and attic, timber framed building.	II*	High
93, Castle Street	1355861	Later 18th century facade to a timber framed building of 15th or 16th century origin. Two storeys of red brick, diamond cut brick eaves cornice.	II*	High
Stratford-sub-Castle	N/A	Conservation Area.	N/A	Medium

Asset/Receptor	NHLE Reference	Description	Grade	Value
Conservation Area				
Salisbury Conservation Area	N/A	Conservation Area.	N/A	High

These assets are discussed further by the two respective areas of the Scheme (Ashley Road area and the Maltings and Central Car Park area).

Ashley Road area

The Ashley Road area of the Scheme lies within the southern limit of the Stratford-sub-Castle Conservation Area (see Figure 11.1). There are no designated Listed Buildings in close proximity to this area. The Stratford-sub-Castle Conservation Area covers approximately 282ha extending along the River Avon from Ashley Road in the south of the Scheme area to the scheduled Old Sarum hillfort (NHLE 1015675) approximately 1.2km to the north of the Scheme area.

The asset includes the historic Stratford-sub-Castle village and is bounded to the west by the A360 road and to the east by residential development and the A345 road. The scheduled Romano-British settlement of Stratford-sub-Castle (NHLE 1004688) also lies centrally within the Conservation Area. The asset predominantly comprises undeveloped meadow, arable and grassed recreation areas, of which the latter falls within the Ashley Road area of the Scheme, comprising Fisherton Recreation Ground and Ashley Road Open Space. To the north, the area is bounded by allotment gardens, areas of undeveloped meadow and the leisure centre; and to the east, south and west by residential and retail areas on the urban fringe of Salisbury. The river corridor is lined by mature trees and vegetation.

Most of these areas were laid-out in the mid-1920s and have undergone limited subsequent change (refer to Appendix I1). The earliest detailed map of this area consulted was the 1800 Stratford-sub-Castle Enclosure Map which shows the area of the Scheme to comprise undeveloped water meadow.

There is no current Conservation Area Appraisal or Management Plan for the asset. The setting of the asset is considered to make a neutral contribution to its value, mostly being residential and retail areas to the south. The setting allows for a limited appreciation of the special character and appearance of the Conservation Area, which appears to have been designated to preserve the wider landscape setting of the scheduled Old Sarum hillfort (NHLE 1015675) and Stratford-sub-Castle village by preventing urban sprawl to the south and west of these features. This includes the green corridor along the Avon Valley, which connects the historic settlement of Old Sarum with the planned medieval settlement of New Sarum (Salisbury)

Given the above, the Stratford-sub Castle Conservation Area is identified to be of **medium value**. The asset's heritage interest derives from its historical and communal value as part of the historic link between Old Sarum and New Sarum. The Ashley Road area itself is considered to contribute little to the value of the asset in terms of aesthetic (architectural) or evidential value. This is in accordance with NPPF Paragraph 201.

The historic landscape character of the Ashley Road area is primarily identified as playing fields (HLC HWI8037) dating from the 20th century. Prior to this, the area formed part of an extensive post-medieval water meadow system (see Appendix I1). The historic landscape character of the Ashley Road area is therefore identified to be of **negligible value**.

The Maltings and Central Car Park area

The Maltings and Central Car Park area of the Scheme lies partly within the Salisbury Conservation Area, the western boundary of which is formed by the River Avon. This asset is considered collectively with the Listed Buildings located on Castle Street (refer to Table 11.1). The Grade II listed Salisbury Generating Station (NHLE 1243066) located within the Scheme area is described separately.

The Salisbury Conservation Area was formed through the amalgamation in 1990 of six previous Conservation Areas covering the city. The asset covers an area of approximately 286ha including the planned medieval settlement, a large area of water meadows to the south-west of the city and an extensive corridor along the River Avon to the south-east (Britford and Churchill).

There is a detailed Conservation Area Appraisal and Management Plan for the asset that was adopted by Wiltshire Council in December 2014 (Wiltshire Council 2014). The Maltings and Central Car Park area lies within Character Area 6 of the Conservation Area (Millstream and Riverside) which extends from Bridge Street in the south, to the railway in the north. Sainsbury's and the Central Car Park are not included within the asset, but form part of its setting.

The historical interest of Character Area 6 is summarised as follows:

'The availability of water from the River Avon and Mill Stream was a fundamental factor in the layout of the street pattern of the city in the thirteenth century. The Mill Stream fed the Town Ditch and other surface water drains which ran through the city in a series of culverts, later brick-lined, covered in the nineteenth century, and finally filled in by the end of the nineteenth century. There is archaeological evidence for this surviving in the mill stream banks.'

Important elements of the Character Area identified include:

- *'Both the River Avon and Mill Stream link a number of character areas together and form an important pivotal role in the Conservation Area. This is a role often forgotten;*
- *Views from the west bank of the River Avon across to the rear gardens (and garden outbuildings) of Castle Street (and to a lesser extent the Cathedral Close, at the southern end of the character area) are particularly important to the character of these buildings backing onto these, largely domestic spaces which run down to the riverside. These private spaces are sensitive to change given their public role of providing a setting for the Listed Buildings fronting Castle Street;*
- *To the northern section of the riverside, mature trees form an important part of the character of the Conservation Area and screen modern development to Castle Street from views across the former cattle market area;*
- *The southern section is also dominated by mature trees particularly where this part of the character area links with the water meadows to the south which includes Queen Elizabeth Gardens (to the west) and the mature rear gardens of the Cathedral Close; and*

- *Access to and enjoyment of the riverside is an important part of the character of this part of the city.'*

From the earliest depiction of the Maltings and Central Car Park area, provided by John Speed's 1611 map of Salisbury (see Appendix I1), until the 20th century, the importance of the Mill Stream and River Avon as sources of water for the city and associated mills/electricity generating station is clearly documented. The map regression indicates that prior to development in the later 19th and 20th centuries, this area of the Scheme comprised areas of undeveloped water meadow and formal gardens.

The immediate setting of the Conservation Area comprises the Central Car Park and Sainsbury's supermarket to the immediate west, which are considered to make a negative contribution to its special character and appearance.

Overall this asset group is identified to be of **high value**. The group's heritage interest derives from the evidential and historical value of the Mill Stream and River Avon. Both these watercourses are key components within the historical development of the planned medieval settlement and, as noted in the Conservation Area Appraisal and Management Plan (Wiltshire Council 2010), serve to link together different character areas within the city. In addition, the Mill Stream delimits the western boundary of the planned medieval settlement with views towards the Listed Buildings along Castle Street forming an important element of these asset's setting (aesthetic value). Public enjoyment of the open spaces along and between the two watercourses also contributes to the value of the asset and allows for the appreciation of the settings of the Listed Buildings in the vicinity (communal value). This includes some glimpsed views towards the cathedral to the south.

The Grade II listed Salisbury Generating Station (NHLE 1243066) is located at the southern end of the Scheme on the Mill Stream. The asset comprises the former Town Mill that was substantially rebuilt in 1757 and may overlie the site of 11th and 13th century mills. The asset was listed in 1952.

The Salisbury Generating Station and Salisbury Electric Light Company began electricity generation in June 1898 utilising a water turbine driven by the River Avon, which was geared to two dynamos (Coe 2008). A detailed description of the water turbine and its dynamo were given in the Salisbury Journal on the 25th June 1898 (see Appendix I1).

The setting of the asset comprises its position on the Mill Stream and River Avon. To the north, east and west are the modern retail units dating from the redevelopment of The Maltings in the mid-1980s and the rears/gardens of buildings along Castle Street. To the south is Fisherton Street/Bridge Street. The architectural and historical interest of the asset can be appreciated both from The Maltings and Bridge Street areas. In particular, the footpath by the Mill Stream and pond to the north allows for the quiet enjoyment of the asset's aesthetic value.

The setting of the asset, in particular its position on the Mill Stream and River Avon, make a positive contribution to its value. This primarily relates to the historical and functional relationship between the watercourses and the asset.

The value of the asset derives from its evidential (archaeological), aesthetic (architectural) and historical value as a well preserved example of an 18th century mill with substantial later modification resulting from its conversion to an electricity generating station. The asset is of local historical interest as it formed a critical element in the supply of electricity to Salisbury in the late 19th and early 20th

centuries. The asset also potentially occupies the site of an earlier 11th and 13th century mill. This asset is identified to be of **medium value**.

The historic landscape character of the Maltings and Central Car Park area comprises four separate areas. In the east and south, is the historic urban core (HLC HWI8307) comprising the 13th century planned medieval settlement. In the south, The Maltings and Sainsbury's development are identified as part of the Civic Centre (HLC HWI8303) that was built in an area of post-medieval expansion. In the west is the Central Car Park (HLC HWI8301) which formed part of the former cattle market. Prior to its construction, the area of the car park was part of a post-medieval water meadow system as shown in the historic map regression above. In the north is an area of terraced housing (HLC HWI8285) dating from the early 20th century. The HLC of the Maltings and Central Car Park area is identified to be of **medium** (historic urban core) and **negligible** (Civic Centre, Central Car Park and terraced housing) **value** respectively.

11.1.2 Changes to the historic environment in absence of Scheme

In the absence of the Scheme, effects on the historic environment baseline will likely include repeated or heightened risk of damage to Listed Buildings through flooding in the study area.

In addition, where areas of existing flood plain around the city become permanently waterlogged, this will affect the setting of the numerous designated heritage assets present, including the above noted Listed Buildings and Conservation Areas.

11.2 Likely significant effects

11.2.1 During construction

Potential impacts to heritage assets arising from construction include:

- impacts on the setting of cultural heritage assets due to temporary works or construction activity for the Scheme; and
- direct physical impact to Listed Buildings (Salisbury Generating Station (NHLE 1243066) only).

11.2.2 During operation

Potential impacts to heritage assets arising from operation of the Scheme include:

- impacts on the setting of cultural heritage assets including the loss of screening provided by mature trees along the River Avon which will be removed;
- alteration of key components of the Conservation Areas (Mill Stream and River Avon) that may affect their value; and
- changes to the historic landscape character.

Impacts to heritage assets are shown in Table 11.2.

Table 11.2: Impacts on heritage assets

Receptor	Value	Description of effects	Magnitude of predicted effect	Duration	Significance of effects
Market House Chambers	High	Slight change to wider setting as a result of	Negligible	Permanent	Nil

Receptor	Value	Description of effects	Magnitude of predicted effect	Duration	Significance of effects
		modification of the Mill Stream and River Avon and landscaping associated with the Scheme.			
31-35, Castle Street Former Store to rear of no 41 across small yard	Medium	Slight change to wider setting as a result of modification of the Mill Stream and River Avon and landscaping associated with the Scheme. Very limited opening up of views to the west due to tree removal along the River Avon.	Minor (negative)	Permanent	Minor adverse
45, Castle Street 31 and 31a, Market Place	High	Slight change to wider setting as a result of modification of the Mill Stream.	Negligible	Permanent	Nil
49, 67,67a, 63 and 65 and 67b Castle Street Ivy Place, 1-3 and 4-11 Castle Street 28 and 28a, Market Place British Legion 32, Cheese Market 2 and 4, and 8, St Thomas's Square	Medium	Slight change to wider setting as a result of modification of the Mill Stream.	Negligible	Permanent	Nil

Receptor	Value	Description of effects	Magnitude of predicted effect	Duration	Significance of effects
91, Castle Street	High	Slight change to wider setting as a result of modification of the Mill Stream and River Avon and landscaping associated with the Scheme.	Negligible	Permanent	Nil
Husseys Almshouses, 1 and 2, and 4-14 Castle Street 81, Castle Street The Market Hall	Medium	Slight change to wider setting as a result of modification of the Mill Stream and River Avon and landscaping associated with the Scheme.	Negligible	Permanent	Nil
Avon View	Medium	Slight change to wider setting as a result of modification of the Mill Stream and River Avon and landscaping associated with the Scheme. Very limited opening up of views to the west due to tree removal along the River Avon.	Minor (negative)	Permanent	Minor adverse
Church of St Thomas	High	Slight change to wider setting as a result of modification of the Mill Stream.	Negligible	Permanent	Nil
12, 12a and 14 Bridge Street	Medium	None predicted.	Negligible	Permanent	Nil
77, Castle Street	Medium	Slight change to wider setting as a	Negligible	Permanent	Nil

Receptor	Value	Description of effects	Magnitude of predicted effect	Duration	Significance of effects
		result of modification of the Mill Stream and River Avon and landscaping associated with the scheme.			
Husseys Almshouses Screen Wall and plaque to the south of No. 3	Medium	Slight change to wider setting as a result of modification of the Mill Stream and River Avon and landscaping associated with the scheme.	Negligible	Permanent	Nil
95, Castle Street	Medium	Slight change to wider setting as a result of modification of the Mill Stream and River Avon and landscaping associated with the scheme.	Negligible	Permanent	Nil
Clock Tower including part of former County Jail	Medium	None predicted.	Negligible	Permanent	Nil
Wall to pavement with piers and lamps in front of Congregational Church	Medium	None predicted.	Negligible	Permanent	Nil
Congregational Church	Medium	None predicted.	Negligible	Permanent	Nil
27, 29 and 29a, Castle Street	Medium	Slight change to wider setting as a result of modification of the Mill Stream	Minor (negative)	Permanent	Minor adverse

Receptor	Value	Description of effects	Magnitude of predicted effect	Duration	Significance of effects
		and River Avon and landscaping associated with the scheme. Very limited opening up of views to the west due to tree removal along the River Avon.			
George and Dragon Public House	High	Slight change to wider setting as a result of modification of the Mill Stream and River Avon and landscaping associated with the scheme.	Negligible	Permanent	Nil
93, Castle Street	High	Slight change to wider setting as a result of modification of the Mill Stream and River Avon and landscaping associated with the scheme.	Negligible	Permanent	Nil
Salisbury Generating Station	Medium	Modification of modern fabric forming part of the fish pass beneath the asset dating from c.1980. Change in immediate setting resulting from reduced flow in the Mill Stream. Potential loss of historical context relating	Moderate (negative)	Permanent	Minor adverse – moderate adverse

Receptor	Value	Description of effects	Magnitude of predicted effect	Duration	Significance of effects
		to past usage as a mill /generating station. Slight change to wider setting as a result of modification of the Mill Stream and River Avon and landscaping associated with the Scheme.			
Stratford-sub-Castle Conservation Area	Medium	Change to character of the Conservation Area from the introduction of new flood embankments at the southern limit of the asset, modification to Summerlock Stream, new offtake channel from the River Avon and new wetland habitat. However, these changes will not affect the special architectural and historical interest of the asset as it will remain as open public space. The link between Old Sarum and New Sarum along the River Avon will not be affected.	Minor (negative)	Permanent	Minor adverse

Receptor	Value	Description of effects	Magnitude of predicted effect	Duration	Significance of effects
Salisbury Conservation Area	High	Change to character of the Conservation Area from the modification to the River Avon and reduction in the flow rate along the Mill Stream. Both these watercourses have important historical associations with the planned medieval settlement. As noted above, the Mill Stream historically fed the open water channels that ran through the city until the 19th century. It also powered the Town Mill and later the Salisbury Generating Station. The reduction in the rate of flow will serve to reduce the understanding and appearance of this historic watercourse. Albeit the alignment of the channel will not be altered.	Minor (negative)	Permanent	Minor adverse – moderate adverse

Receptor	Value	Description of effects	Magnitude of predicted effect	Duration	Significance of effects
		Access to the riverside, and the link the watercourses provide between the different character areas within the city will not be affected. Removal of trees along the River Avon will open up views of the Central Car Park and Sainsbury's to the west which is currently screened.			
Ashley Road area historic landscape	Negligible	There will be a change to the historic landscape character of the Ashley Road area through the creation of new channels, wetland habitat and a new flood defence embankment.	Minor (negative), given limited heritage interest of recreation fields	Permanent	Nil
The Maltings and Central Car park area historic landscape	Medium	There will be limited change to the historic landscape character of the Maltings and Central Car Park area as a result of the widened river corridor.	Negligible	Permanent	Nil

11.3 Mitigation

No significant adverse impacts on Listed Buildings or Conservation Areas require specific mitigation beyond that already incorporated into the design of the Scheme. Further consultation with the Wiltshire Conservation Officer will be undertaken throughout the detailed design phase to ensure all finishes, materials and landscaping are sympathetic to the historical and architectural interest of the Scheme and surrounding area.

All new features within the Scheme have been sensitively designed with appropriate colour pallets, materials and appearances detailed within Chapter 8 'Landscape and Visual Amenity'.

Consultation with the Wiltshire Conservation Officer (dated 4 November 2020) has confirmed that a Listed Building Consent application will not be required for the works affecting the fish pass beneath the Grade II listed Salisbury Generating Station (NHLE 1243066). The Scheme will be affecting modern fabric installed in c.1980.

11.4 Residual effects

The residual effects on the historic environment are presented in Table 11.3.

For the purpose of this assessment, residual effects on designated assets of moderate or major adverse significance were taken to be commensurate with 'substantial harm' as defined by the NPPF. No such residual effects have been identified.

Where residual effects on designated assets are of moderate adverse-minor adverse significance or less, these are to be taken to be commensurate with 'less than substantial harm' as defined by the NPPF and should be balanced against the public benefits of the Scheme described elsewhere in this ES.

Table 11.3: Residual impacts on historic environment

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
Listed Buildings (31-35, Castle Street, former store to rear of no 41 across small yard and Avon View) (medium)	Slight change to wider setting as a result of modification of the Mill Stream and River Avon and landscaping associated with the Scheme. Very limited opening up of views to the west from some assets (predicted) due to tree removal along the River Avon.	Minor adverse	Sensitive design of the Scheme. Continued consultation with the Conservation Officer throughout the detailed design of the Scheme. Mature tree loss minimised through detailed design (see Chapter 8 'Landscape and	Nil

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
			visual amenity').	
Salisbury Generating Station (medium)	Modification of modern fabric forming part of the fish pass beneath the asset dating from c.1980. Change in immediate setting resulting from reduced flow in the Mill Stream. Potential loss of historical context relating to past usage mill/generating station. Slight change to wider setting as a result of modification of the Mill Stream and River Avon and landscaping associated with the Scheme.	Minor adverse – moderate adverse	Sensitive design of the Scheme. Continued consultation with the Conservation Officer throughout the detailed design of the Scheme.	Minor adverse
Stratford-sub-Castle Conservation Area (medium)	Change to character of the Conservation Area arising from the introduction of new flood embankments at the southern limit of the asset, modification to Summerlock Stream, new offtake channel from the River Avon and new wetland habitat.	Minor adverse	Sensitive design of the Scheme. See mitigation outlined in Chapter 8 'Landscape and visual amenity'. Continued consultation with the Conservation Officer throughout the detailed design of the Scheme.	Nil
Salisbury Conservation Area (high)	Change to character of the Conservation Area arising from the modification to the River Avon and reduction in the flow	Minor adverse – moderate adverse	Sensitive design of the Scheme. Mature tree loss minimised through design	Minor beneficial to moderate beneficial

Receptor (Value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	rate along the Mill Stream. Both these watercourses have important historical associations with the planned medieval settlement. Removal of trees along the River Avon will open up views of the Central Car Park and Sainsbury's to the west which is currently screened.		(see Chapter 8 'Landscape and visual amenity'). Continued consultation with the Conservation Officer throughout the detailed design of the Scheme. The Scheme has the potential to improve this part of the Salisbury Conservation Area.	

12 Traffic and transport

12.1 Existing environment

This chapter focuses on the traffic and any other transport impacts associated with the construction of the Scheme, for those areas where the majority of traffic movements would be generated. This principally relates to the transport of materials and staff travelling to and from the two works sites in the Ashley Road and Central Car Park and The Maltings areas. Once operational, the Scheme would generate very few vehicles on the road network and as detailed in Section 4.3 operational impacts from traffic and transport have been scoped out of further assessment.

Where impacts are identified as result of the Scheme, the focus is related to Non-Motorised Users (NMUs) (i.e. pedestrians and cyclists) and water navigation (commercial and recreational). Impacts on recreational users are discussed in Chapter 7 'Recreation and access', however, specific references are made in this chapter to some element of NMU impacts due to potential impacts resulting from Heavy Goods Vehicle (HGV) movements.

The study area used for this chapter is shown on Figure 12.1. The study area comprises the Scheme area and primary routes which are likely to be impacted upon by the Scheme during the construction period (and those provided with an increased standard of flood protection once operational). The study area of the Scheme was agreed with Highways England and Wiltshire Council.

Throughout this chapter, one vehicle movement/number means a vehicle arriving at site and then leaving again.

12.1.1 Highway links

The key highway links to and within the study area are shown on Figure 12.1 and include: -

- A36 – forms part of the strategic road network (SRN), which is managed by Highways England. This road provides access to Warminster and the A303 to the north-west and to the M27, located south-east of Salisbury;
- A30 – provides connectivity to local villages to the north-east of Salisbury and to the A338, which connects with the A303;
- A338 – provides access to the south to local towns including Fordingbridge and Ringwood prior to joining the A31. To the south of the A338/A31 interchange, the A31 connects with Bournemouth. To the north, the A338 provides access to Porton, eventually connecting to the A303; and
- A354 – south-west of Salisbury, the A354 travels through the Cranborne Chase Area of Outstanding Natural Beauty, connecting with the A350 at Blandford Forum.

The proposed access routes to the Scheme area during construction are described in Section 3.2.3.

12.1.2 Car and coach parking

The Central Car Park and the Maltings area comprises the following car and coach parks, which are shown on Figure 12.2: -

- Riverside Car Park - 24 parking spaces;
- Long Stay Central Car Park - 887 parking spaces;

- Millstream Car Park - 39 parking spaces;
- Central Short Stay Car Park - 219 parking spaces;
- Maltings Car Park - 586 parking spaces; and
- Millstream Coach Parking - 23 parking spaces. The coach station is also used by many tourist coaches and is the main drop off and pick up point for tourists arriving in Salisbury by coach.

12.1.3 Proposed vehicle movements

A full breakdown of estimated vehicle movements during construction of the Scheme at both the Ashley Road area (medium sensitivity area for traffic) and the Maltings and Central Car Park area (high sensitivity area for traffic) during both 2022 and 2023 is provided in Tables 12.1 to 12.4.

The tasks shown are identified as having the greatest impact to the local highway based on a worst-case precautionary approach and therefore have been used within the assessment in Section 12.2.

Table 12.1: Construction traffic - Ashley Road area (Year 2022)

Task	Estimate of programme weeks	HGV per week	HGV per day	Staff/ LGV per day	Total per day
Site Setup					
Enabling Works	6	3	0.6	10	11
Excavations	10	27	5.4	15	20
Structures	26	5	1	10	11
Furniture	0	0	0	0	0
Reinstatements	0	0	0	0	0
Demobilisation	0	0	0	0	0

Table 12.2: Construction traffic - Ashley Road (Year 2023)

Task	Estimate of programme weeks	HGV per week	HGV per day	Staff/ LGV per day	Total per day
Site Setup	0	0	0	0	0
Enabling Works	0	0	0	0	0
Excavations	3	20	4	15	19
Structures	7	5	1	10	11
Furniture	4	5	1	15	16
Reinstatements	10	2	0.4	5	5
Demobilisation	5	6	1.2	5	6

Table 12.3: Construction traffic - Central Car Park and The Maltings area (Year 2022)

Task	Estimate of programme weeks	HGV per week	HGV per day	Staff/ LGV per day	Total per day
Site Setup	4	8	1.6	15	17
Enabling Works	24	10	2	13.4	15
Excavations	15	58	11.6	15	27
Structures	23	20	4	40	44
Furniture	0	0	0	0	0
Reinstatements	0	0	0	0	0
Demobilisation	0	0	0	0	0

Table 12.4: Construction traffic - Central Car Park and The Maltings area (Year 2023)

Task	Estimate of programme weeks	HGV per week	HGV per day	Staff/ LGV per day	Total per day
Site Setup	0	0	0	0	0
Enabling Works	0	0	0	0	0
Excavations	3	110	22	15	37
Structures	22	20	4	50	54
Furniture	12	15	3	25	28
Reinstatements	6	15	3	15	18
Demobilisation	4	15	3	20	23

For the Ashley Road area, there will be roughly 441 HGV construction vehicles during 2022, and an additional 166 movements during 2023, i.e. 607 in total during the two year construction period.

With regard to the Maltings and Central Car Park area, it is estimated that the site will generate roughly 1,416 HGV movements during 2022, with an additional 949 in 2023 (a total of around 2,365 over the course of the two years). Both sites will be active over this period hence during 2022 there will be roughly 1,857 movements, and during 2023 roughly 1,115 movements (total of around 2,972).

As shown in Tables 12.2 to 12.4, the HGV numbers fluctuate depending on the construction activity being undertaken. Therefore, for the purposes of this assessment the worst-case scenario for daily traffic is used, which would be in January 2023, with estimated 25 daily HGV movements and 36 LGV/Staff movements, all of which would be generated by the Maltings and Central Car Park site, given that the Ashley Road site is not active at that time.

All materials and equipment can be delivered on normal HGVs or towed on drum jacks between sites. No abnormal loads are anticipated, the largest vehicle being a mobile crane, but it is assumed this would fall below the thresholds as defined in Road Vehicles (Authorisation of Special Types) (general) Order 2003.

To improve road safety and reduce possible traffic nuisance caused by the Scheme, HGV construction traffic will not be able to gain access into or out of the site at certain times of the day. Construction vehicles associated with the Scheme will also avoid travelling to/from site during peak hours, typically 08:00-09:00 and 17:00-18:00. A booking system will be used to ensure that HGV arriving at the sites will be spread across the working day where possible to minimise the impact of HGV traffic during the network peak periods. Personnel will also be in place at all accesses to guide construction traffic and record arrivals and departure of vehicles against the deliveries schedule, if required.

All site staff will be expected to attend site daily. However, staff will be encouraged to travel using either public transport or car sharing via a Construction Travel Plan. It should be noted that all site staff will be made aware that there will be no provision for parking in the site compound or on neighbouring streets.

Core working hours will be 07:00-18:00 for five days a week. Work will include but not be limited to deliveries, movement to place of work, unloading, maintenance and general preparation works.

However, as identified above, the construction workers anticipated on-site during a particular task is considered relatively low.

Again this assessment uses a worst-case scenario, i.e. all staff/LGV movements will arrive at both sites in the AM peak and leave in the PM. The estimated peak is 36 movements. With regard to HGV movements these trips will be spread across the working day but specifically avoiding the AM and PM peaks. As such, setting a specific mode shift target has been deemed unnecessary given the low volumes of traffic movements.

Transport and traffic conditions

Traffic flow data (from automatic traffic counts) for the study area was obtained to assess the impact of severance, driver delay, pedestrian/ cyclist/ public transport delay and pedestrian/cyclist amenity and has been provided by Wiltshire Council and Highway England's Webtris portal. This data indicates the typical AM and peak flows as well as the average 12- and 24-hour flows on the local and strategic highway network. Traffic flow data for Ashley Road was not available from Wiltshire Council.

Figure 12.2 sets out the location of each site where traffic flow data was obtained. The traffic flow provides a generic assessment of the existing weekday traffic flows during the hours when the Scheme's construction staff are presumed to arrive and leave site.

- Site 1: Churchill Way North

Table 12.5 sets out the traffic flow information on Churchill Way North (A36), located in the north-east of the study area. Regarding the peak periods, the highest number

of vehicles seen in the AM peak (08:00-09:00) is in a northbound direction, with 1,186 vehicles heading towards Castle Roundabout. This is a 40 vehicle increase when compared to the southbound flow of 1,148 vehicles, heading towards St Mark's Roundabout. In the PM peak (17:00-18:00), the highest number of vehicles are travelling in a southbound direction, with 1,217 vehicles driving towards St Mark's Roundabout. A total of 26,238 vehicles are seen in the 12-hour period between 0700 and 1900, and a total of 32,558 across a 24-hour period.

Although both sites will be active during 2022 and 2023, the highest traffic numbers will be experienced in the Maltings and Central Car Park site during the January 2023 (based on an indicative programme) and therefore this period has been assumed as worst-case for all assessments. As indicated above, HGV movements will avoid the AM and PM peaks and are assumed to be spread evenly during the course of a day. It has been assumed that on average 3.5 HGV will be arriving and leaving the Maltings and Central Car Park site each hour during January 2023. Table 12.5 presents this worst-case scenario.

Table 12.5: Existing traffic flow and estimated construction movements for Maltings and Central Car Park area in January 2023

Peak Period	Existing Eastbound	Construction & Staff Increase	% increase	Existing Westbound	Construction & Staff Increase	% increase
AM (0800 - 0900)	1,186	18	1.5%	1,148	0	0.0%
PM (1700 - 1800)	1,103	0	0.0%	1,217	18	1.5%
12 hr period (0700 to 1900)	12,889	30.5	0.2%	13,349	30.5	0.2%
24 hr period	16,000	30.5	0.2%	16,558	30.5	0.2%

Using this worst-case scenario as an example, a total of 25 HGV movements split over the course of the day (7-hour period) would not be classed as significant. For construction staff 18 movements would also not be classed as significant during the AM or PM peaks.

- Site 2: Castle Street

Table 12.6 sets out the traffic flow information on Castle Street in the north of the study area. Regarding the peak periods, the highest number of vehicles seen in the AM peak is in a northbound direction with 485 vehicles heading towards the A36 junction, Castle Roundabout.

In the PM peak, both directions record similar vehicle numbers with 308 travelling northbound and 314 travelling southbound towards Blue Boar Row and the city centre. A total of 9,145 vehicles are seen in the 12-hour period between 0700 and 1900, and a total of 11,081 in a 24-hour period.

The proposed construction and staff traffic/movements have been presented in Table 12.6.

Table 12.6: Existing traffic flow and estimated construction movements for Castle Street in January 2023

Peak Period	Existing Northbound	Construction & Staff Increase	% increase	Existing Southbound	Construction & Staff Increase	% increase
AM (0800 - 0900)	485	0	0.0%	396	18	4.5%
PM (1700 - 1800)	308	18	5.8%	314	0	0.0%
12 hr period (0700 to 1900)	4,723	30.5	0.6%	4,422	30.5	0.7%
24 hr period	5,615	30.5	0.5%	5,466	30.5	0.6

Table 12.6 presents a worst-case scenario in terms of daily traffic, i.e. assuming that all site personnel travel in individual private cars. In reality car sharing and the use of public transport will be promoted in accordance with the outline CTMP.

- Site 3 Millstream Approach

Table 12.7 sets out the traffic flow estimations for Millstream Approach (east section only; the amount of traffic over the Millstream Approach west bridge will be lower), located in the south of the study area, off Castle Street. The highest number of vehicles seen in the AM peak is in a westbound direction with 158 vehicles heading towards the Central Car Park or the A36. In the PM peak, 156 vehicles are recorded travelling in the eastbound direction towards Castle Street and 132 travelling westbound. A total of 3,238 vehicles are seen in the 12-hour period between 07:00-19:00, and a total of 3,581 in a 24-hour period. The proposed construction and staff traffic/movements have been incorporated into these numbers in Table 12.7 to estimate the percentage increases (again worst-case, with no CTMP in place).

Table 12.7: Existing traffic flow and estimated construction movements for Millstream Approach in January 2023

Peak Period	Existing Eastbound	Construction & Staff Increase	% increase	Existing Westbound	Construction & Staff Increase	% increase
AM (0800 - 0900)	91	0	0.0%	158	18	11.4%
PM (1700 - 1800)	156	18	11.5%	132	0	0.0%
12 hr period (0700 to 1900)	1656	30.5	1.8%	1582	30.5	1.9%
24 hr period	1800	30.5	1.7%	1781	30.5	1.7%

- Site 4: Castle Road (A345)

As described previously, the worst-case scenario uses predicted site traffic for January 2023. This is actually only related to the Maltings and Central Car Park site, but for the purposes of this assessment these same worst-case numbers have been used to assess the Ashley Road site as the highest possible increase of vehicles that would travel via Castle Road.

Table 12.8 sets out the traffic flow information on Castle Road, which is the northern arm of the Castle Roundabout and is located in the north of the study area. The highest number of vehicles seen in the AM peak is in the southbound direction with 1,016 vehicles heading towards the A36 junction, Castle Roundabout. In the PM peak, both directions record similar vehicle numbers with 881 travelling northbound and 802 travelling southbound towards Paul's Dene and the city centre respectively. A total of 18,817 vehicles are seen in the 12-hour period between 07:00-19:00, and a total of 21,897 in a 24-hour period.

The worst-case construction and staff traffic movements have been incorporated into Table 12.8.

Table 12.8: Existing traffic flow and assumed worst-case construction movements for Castle Road

Peak Period	Existing Northbound	Construction & Staff Increase	% increase	Existing Southbound	Construction & Staff Increase	% increase
AM (0800 - 0900)	769	18	2.3%	1,016	0	0.0%
PM (1700 - 1800)	881	0	0.0%	802	18	2.2%
12 hr period (0700 to 1900)	9,132	30.5	0.3%	9,685	30.5	0.3%
24 hr period	10,909	30.5	0.3%	10,988	30.5	0.3%

Tables 12.5 to 12.8 demonstrate that construction impacts of the Scheme on the highway network would be limited, even during a worst-case scenario.

As part of the Annual Average Weekday Traffic (AAWT) estimation process, baseline traffic flows, which include surveyed flows and surveys, and background traffic growth to 2022 and 2023, can be provided upon request.

Accessibility and sustainable travel

This section describes accessibility of the study area by feasible modes of transport to determine how construction employees will be able to access the Scheme area: -

- Private vehicle - the majority of construction personnel will arrive and depart before the traditional network peak hours i.e. AM (08:00-09:00) and PM Peak (17:00-18:00). Workers bringing their own equipment are unlikely to travel by public transport.
- Coaches - Salisbury Coach Station is located within the Maltings and Central Car Park area. Local coach companies offer services to Salisbury Coach Station, but National Express is the primary national coach service provider who runs services

between Salisbury and Basingstoke, Bath, Bournemouth, Bristol, Exeter, Heathrow Airport, London, Plymouth, Southampton and Winchester.

- Bus services - There are no bus services which currently operate along Ashley Road. Services operate along Castle Road (with stops at Butts Road and Victoria Park) and Devizes Road (A360) which Ashley Road joins to the east and west. Bus stops on Devizes Road include Orchards Place, Hastings Court, Highbury Avenue and Gas Lane Car Sales.

  There are numerous bus services which currently operate along Castle Street, which runs to the east of the River Avon. The northbound bus stops along Castle Street include Archers Court, Millstream Approach, Castle Street, Castle Street (Stop J), Tesco (Stop K) and the southbound stops are Archers Court and Friends Provident.

- Rail network - Salisbury Railway Station is located in the western part of the city centre, off South Western Road (see Figure 12.2). The two main rail operators at the station are South Western Railway and Great Western Railway, typically providing peak hourly connections to Portsmouth, Cardiff, Basingstoke, Exeter, Romsey and Bristol, and twice/hour to London. Ashley Road lies at a distance of 1.7km (walking time of around 25 minutes) from the railway station and the Maltings and Central Car Park area is located approximately 0.7km (walking time of around 9 minutes).

During construction, specialised teams will work on the project for a set number of weeks before being replaced by another specific set of skilled workers. Workers may therefore stay in local accommodation and make work related journeys in one vehicle together.

The location of accommodation is currently unknown but contractors will be able to manage the impact of staff trips to site when works teams are in place and accommodation identified.

Pedestrians and cyclists

The footpaths and cycle routes within the study area are described in Section 7.1.1.

Collisions and personal injuries

Personal Injury Accident data was obtained from Wiltshire Council for a five-year period between February 2015 and January 2020. Table 12.9 provides a breakdown of the collisions during this period and Table 12.10 provides the total number of injuries.

It should be noted that the study area (Figure 12.3) for personal injury data covers additional roads within the local network which it is currently acknowledged construction traffic and staff will not use.

Figure 12.3: Location of Personal Injury Accident 2015-2020

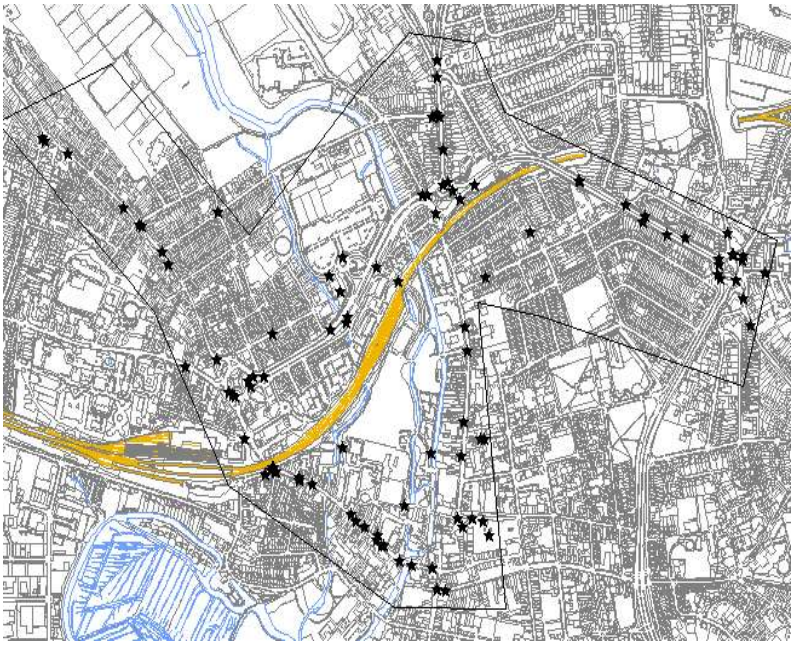


Table 12.9: Traffic collisions 01/02/2015 - 31/01/2020

All Collisions							
Severity	2015*	2016	2017	2018	2019	2020*	Total
Fatal	0	0	0	0	0	0	0
Serious	2	3	2	5	3	1	16
Slight	12	16	15	23	15	2	83
Total	14	19	17	28	18	3	99

** It should be noted that the figures representing 2015 and 2020 are not complete year periods.*

Table 12.10: Traffic-related casualties 01/02/2015 - 31/01/2020

All Casualties							
Severity	2015*	2016	2017	2018	2019	2020*	Total
Fatal	0	0	0	0	0	0	0
Serious	2	4	2	6	3	2	19
Slight	13	17	20	24	16	2	92
Total	15	21	22	30	19	4	111

**Not complete year*

The collision and injury data reveals the following relevant to construction traffic management planning:

- of the 99 collisions that occurred, 46 involved a pedestrian (33) or cyclist (13);
- no collisions were classed as fatal, 16 were serious and 83 were considered as slight, resulting in a serious injured value of 16%;
- 72 of the 99 collisions occurred during daylight whilst 27 occurred during dark conditions; 71 occurred on a dry surface whilst 28 occurred on a wet surface; and

- five collisions occurred during the AM peak period (08:00-09:00) and nine in the PM peak period (17:00-18:00).

Given the relatively low forecast traffic flows generated by the Scheme, no road safety issues, which may be exacerbated by the either site have been identified.

12.1.2 Changes to traffic and transport in absence of Scheme

Wiltshire Council's Central Car Park and the Maltings Masterplan, which is endorsed by the Strategic Planning Committee, identifies that the redevelopment of the Maltings and Central Car Park area will result in changes to and a reduction in existing parking facilities within the Scheme area, in the absence of the Scheme.

In the absence of the Scheme, flooding will continue (with increasing frequency) to cause transport disruption, with substantial impacts to transport infrastructure including transport proposals within the Maltings and Central Car Park Masterplan.

12.2 Likely significant effects

12.2.1 During construction

This section describes the construction related impacts of the Scheme:

Car and coach parking

We are proposing some changes to car and coach parking arrangements in the Maltings and Central Car Park area in 2023 to facilitate construction of the scheme.

Riverside Car Park

- The Riverside Car Park will experience no impact during construction and will remain in operation throughout construction.

Long Stay Central Car Park

- Temporary loss of 288 car parking spaces (out of an available 887 spaces) during construction resulting from:
    - the temporary loss of parking due to the construction compound at the long stay Central Car Park (loss of 138 spaces). These spaces will be reinstated upon completion of the Scheme; and
    - proposed increase in green space in the footprint of the widened river corridor and associated temporary works; along with a footway provided during construction to allow for safe pedestrian access (loss of 150 spaces).
- Of the 288 spaces, 115 on the eastern edge of the car park will not be reinstated due to increase in green space along the widened river corridor

Millstream Car Park

- Permanent loss of this car park i.e. 39 car parking spaces as this area will be used to create a pocket park (mini park for recreational use)

Central Short Stay Car Park and Maltings Car Park

- Given their location it has been assumed that both will experience no impact during construction and will remain fully operation throughout.

Millstream Coach Park

- The layout for the coach park is to be determined during detailed design in consultation with Wiltshire Council and interested parties. The area for coach parking will be maximised with only an estimated 10% reduction in area, which should not affect the number of coaches that currently use the coach park. Consultation will also confirm the permanent route for a segregated cycle path in this area. As part of the Scheme, the coach park will be raised (to reduce its flood risk and improve the drainage) and resurfaced.

The loss of 327 car parking spaces during construction accounts for 35% of the total 926 car parking spaces across the long-stay component of the Central Car Park and Millstream car park.

Upon completion of the Scheme, there will be a permanent reduction of 154 car parking spaces, which accounts for 17% of the available car parking across the long-stay component of the Central Car Park and Millstream Car Park.

As the average occupancy rate of the combined car parks is 29% and there will be a temporary reduction of 34% and permanent reduction of 17%, the magnitude of change on people using the car parks is likely to be minor adverse to negligible. The overall temporary and permanent loss of car parking spaces is therefore considered to be a **moderate to slight adverse impact**.

These changes will be considered further by the contractor as part of their construction plan during the detailed design stage of the Scheme.

Changes to transport and traffic

Vehicle movements

Tables 12.1 to 12.4 have calculated the number of vehicle movements that will be generated by the Scheme during construction.

Those tasks identified as having the worst impact to the local highway (because they have the highest number of HGV movements) have been estimated to be 25 daily HGV movements and 36 LGV/staff movements. However it should be noted that this traffic is only generated for the Maltings and Central Car Park site; the Ashley Road site will not be generating any vehicle movements between October 2022 and the end of May 2023.

To portray the worst-case scenario, it has been assumed that all staff/LGV movements will arrive at both sites in the AM peak and leave in the PM peak. With regards to HGV movements, these have been assumed to be spread throughout the course of the day, but will occur within either the AM or the PM peak periods. The surrounding highway networks for both sites have been classed as being of low sensitivity, and as the numbers of construction-related traffic movements are low the impact on highways is considered to be **negligible**.

Severance

The severance impacts of the Scheme have been assessed for each of the links and junctions where there is available traffic flow data (low sensitivity receptors) to determine whether the Scheme will affect how the local community will move through the Scheme area during construction. The results of this assessment are presented in Table 12.11.

Table 12.11: Severance Impacts

Network location	Change in LGV flow from baseline		Change in HGV flow compared to baseline	Magnitude of impact
	AM	PM		
Churchill Way North (Eastbound)	0 (0.0%)	18 (1.5%)	No HGVs have been incorporated within the peaks given the low daily numbers and associated delivery times	Negligible
Churchill Way North (Westbound)	18 (1.5%)	0 (0.0%)		Negligible
Castle Street (Northbound)	0 (0.0%)	18 (4.5%)		Negligible
Castle Street (Southbound)	18 (5.8%)	0 (0.0%)		Negligible
Castle Road (A345) (Northbound)	18 (2.3%)	0 (0.0%)		Negligible
Castle Road (A345) (Southbound)	0 (0.0%)	18 (2.2%)		Negligible
Millstream Approach (Eastbound)	18 (11.5%)	0 (0.0%)		Negligible
Millstream Approach (Westbound)	0 (0.0%)	18 (11.4%)		Negligible

These impacts on severance related construction impacts will be **neutral/slight** (based on low sensitivity receptors and negligible magnitude).

Accessibility and sustainable travel

Driver Delay

Disruption and driver delay due to traffic congestion during construction of a Scheme can lead to changes in driver's behaviour and health. Due to the limited changes in traffic volumes resulting from the Scheme, no capacity assessments of the network have been requested by Highways England or Wiltshire Council. It has therefore been inferred that the magnitude of impacts to driver delay will be negligible, resulting in a **slight to neutral impact**.

Pedestrian / Cyclist / Public Transport Delay

The impacts of the Scheme on pedestrian, cycle and public transport delay have been assessed for each of the links and junctions where there is available traffic flow data (assigned a high or low sensitivity).

Table 12.12 presents the worst-case scenario (i.e. highest construction vehicle movements during excavation work) for the Maltings and Central Car Park area.

Table 12.12: Pedestrian / cycle / public transport delay impacts - Maltings and Central Car Park

Network location	Baseline flow (two way)		Total flow including construction traffic		Magnitude of impact
	AM	PM	AM	PM	
Churchill Way North	2,334	2,320	2,352	2,338	Negligible
Castle Street	879	622	890	630	Minor
Castle Road (A345)	1,785	1,683	1,803	1,701	Negligible
Millstream Approach	249	288	267	306	Minor

Using the worst-case scenario, the impacts on pedestrian, cycle and public transport delay will range from minor adverse (at castle Street and Millstream Approach) to negligible at the remaining locations. This will result in **slight adverse** temporary impacts for a duration of approximately eight weeks due to construction traffic.

Pedestrian/cyclist amenity

The impacts of the Scheme on pedestrian/cyclist amenity have been assessed for each of the highway links which have been assigned a high or low sensitivity. The results of this assessment are presented in Table 12.13.

Table 12.13: Pedestrian/cyclist amenity impacts

Network location	Change in LGV flow from baseline		Change in HGV flow compared to baseline	Magnitude of impact
	AM	PM		
Churchill Way North (Eastbound)	0 (0.0%)	18 (1.5%)	No HGVs have been incorporated within the peaks given the low daily numbers and associated delivery times	Negligible
Churchill Way North (Westbound)	18 (1.5%)	0 (0.0%)		Negligible
Castle Street (Northbound)	0 (0.0%)	18 (4.5%)		Negligible
Castle Street (Southbound)	18 (5.8%)	0 (0.0%)		Negligible
Castle Road (A345) (Northbound)	18 (2.3%)	0 (0.0%)		Negligible
Castle Road (A345) (Southbound)	0 (0.0%)	18 (2.2%)		Negligible
Millstream Approach (Eastbound)	18 (11.5%)	0 (0.0%)		Insignificant
Millstream Approach (Westbound)	0 (0.0%)	18 (11.4%)		Insignificant

As demonstrated by the tables, the impacts of the Scheme on pedestrian/cyclist amenity for each of the highway links will be **negligible**. However, the overall impacts on pedestrian and cyclists in terms of connectivity and changes to footpaths and cycleways have been assessed separately in Chapter 7 'Recreation and access'.

Collisions and personal injury

Accidents and safety

Based on the current collision record on the highway network and the relatively low traffic flows generated by the Scheme during construction, no road safety issues, which may be exacerbated by the development, have been identified. Therefore, it can be inferred that the magnitude of impacts to accidents and safety will result in no change.

12.2.2 During operation

During operation of the Scheme, there will be an improved standard of flood protection to the surrounding transport network. The predicted beneficial impacts are of minor magnitude in highway terms due to the low occurrence of flooding that causes sustained disruption.

The permanent changes to car parking arrangements in the Maltings and Central Car Park area in 2023 are discussed in Section 12.2.1, as some of the changes will occur during the construction period. To reiterate, there will be a permanent reduction of 154 car parking spaces, which accounts for 17% of the available car parking across the long-stay component of the Central Car Park and Millstream Car Park. As the average occupancy rate of the combined car parks is 29%, the magnitude of change on people using the car parks is likely to be negligible. The overall permanent loss of car parking spaces is therefore considered to be a **slight adverse impact.** It should be noted that these parking spaces have already been agreed to be reduced in number as part of separate regeneration proposals by Wiltshire Council and therefore this impact has been previously assessed.

Upon completion of the Scheme, the raised Millstream Coach Park will have an improved standard of flood protection, which is considered to be a **moderate beneficial impact** of the Scheme. The redevelopment of this coach park will subsequently accommodate increased visitor numbers associated with future phases of the wider Salisbury River Park Master Plan and provide a more visually appealing environment to welcome visitors travelling by coach to the city.

Once operational, the Scheme will involve very few vehicles and therefore operational impacts on the local transport network were scoped out of further assessment in agreement with the Local Planning Authority.

12.3 Mitigation

As the construction phase of the Scheme is not anticipated to generate any significant effects, no further mitigation is proposed. The significant effects identified on pedestrian/ cyclist/ public transport delay are considered to be as a result of the existing infrastructure rather than the Scheme proposals.

However, as set out below, an outline Construction Traffic Management Plan (CTMP) has been developed to ensure construction related traffic effects are minimised as far as possible.

To help lower staff vehicle numbers each site will have sustainable travel plans present to encourage staff to travel by alternative modes of transport which will be developed by the contractor during detailed design.

Construction Traffic Management Plan

The CTMP will form a fundamental part of the construction methodology and is likely to form a requirement by the highway authorities as part of planning consent granted.

An Outline CTMP is provided within Appendix P1 and is summarised below. It provides a framework for which the appointed contractor will consider the following requirements:

- preparation of site plans;
- construction access routes and movement including signage;
- traffic management and road closures (i.e. those necessary when making alterations to the existing highway network). Traffic management measures will be specific to each access as required;
- site management (including site access, vehicle and pedestrian access arrangements, boundary demarcations, on-site parking and management of deliveries);
- construction vehicle requirements;
- debris and damage to the highway network (including pre-construction condition surveys and monitoring arrangements);
- staff travel (including a series of measures set out within a Travel Plan including how to travel to the site by non-car modes, sharing details of public transport maps and timetables, and encouraging sharing of vehicles); and
- diversions of NMU/ pedestrian, cyclist and equestrian routes.

A Transport Management Working Group (TMWG) will be established prior to commencement of construction and maintained for the duration of the works. The main responsibility of the group will be to monitor to the CTMP, but it will also allow direct communication between, amongst others the contractor, the Local Highway Authority and Highways England. Parking and construction traffic will be monitored during construction and reported to the TMWG as required.

12.4 Residual effects

The residual effects on traffic and transport are presented in Table 12.14.

It is considered that this Scheme can be implemented without any significant adverse effects on the identified traffic and transport receptors. Furthermore, following completion of the Scheme, the highway network in the area will benefit from an improved standard of flood protection. As such it will reduce disruption during flood events bringing a positive outcome for Salisbury.

Table 12.14: Summary of residual effects on traffic and transport

Receptor (value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
Car parks used by local community (high)	Temporary loss of 327 car parking spaces during construction and permanent reduction of 154 car parking spaces.	Moderate to slight adverse	Implementation of CTMP and establishment of Transport Management Working Group	Slight adverse
	Temporary loss of parking in footprint of site compound at the Central Car park during construction.	Moderate to slight adverse		Slight adverse
Transport infrastructure (low)	Temporary impacts on highways from construction-related traffic movements	Neutral	No mitigation required	Neutral
	Permanently reduced risk of flooding to transport infrastructure including raised Millstream Coach Park	Slight beneficial (due to low occurrence of flooding) increasing to moderate beneficial (for raised coach park)	N/A	Slight to moderate beneficial
Vehicle travellers and NMU (medium)	Increase in HGV traffic during construction temporarily increasing severance for users	Neutral/slight adverse	Implementation of CTMP and establishment of Transport Management Working Group	Neutral/slight adverse
	Temporary increase in driver delay due to increase in HGV movements	Neutral/slight adverse		Neutral/slight adverse

Receptor (value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
	during construction			
	Temporary increase in delays to pedestrians, cycles and public transport due to increase in HGV movements during construction	Slight adverse temporary impacts for a duration of approximately eight weeks.		Slight adverse temporary impacts for a duration of approximately eight weeks.
	Potential for temporarily increased risk of collisions and injury	No change - neutral	No mitigation required	Neutral
	Temporary reductions in amenity of routes for both vehicles and non motorised users due to additional HGV movements	Neutral	No mitigation required	Neutral

13 Sustainable use of land

13.1 Existing environment

The study area for sustainable use if land is defined as the Scheme area (see Figure 1.2) with a 1km buffer zone. This allows for the potential for contamination to migrate both to and into the footprint of the Scheme area.

13.1.1 Soil and geology

Salisbury is located in the Hampshire Basin, a Palaeogene structural depression in southern Britain (Edwards and Freshney, 1987; Hopson et al., 2006). The River Avon rises in the Vale of Pewsey and drains into the English Channel at Christchurch and is located south of the maximal extent of the Pleistocene glaciations (Clark et al., 2004). Fluvial incision has resulted in a steep-sided valley on the chalk substrate in the Avon's northern reaches around Salisbury.

The 1:50,000 scale digital mapping from the British Geological Society (BGS) shows the solid geology underlying the Scheme area to be the Newhaven Chalk Formation (Newhaven Chalk) and the Seaford Chalk Formation (Seaford Chalk).

The Newhaven Chalk underlies the drift geology of the central and eastern part of the Ashley Road area and the Maltings and Central Car Park area. The Newhaven Chalk has a maximum thickness of 55–70m across the Salisbury District but it is expected to be considerably thinner within the Scheme area given the proximity to the underlying Seaford Chalk (Hopson et al, 2008).

The Seaford Chalk underlies the north-western part of Ashley Road area. The Seaford Chalk has a maximum thickness of 60–70m across the Salisbury District (BGS, 2008).

The solid strata is typically at about 8-10m below the surface (see Jacobs 2020), covered by a sequence of superficial deposits. The 1:50,000 scale digital mapping from the BGS shows the superficial deposits as Alluvium (comprising both cohesive, less permeable clays and silts and more permeable sands and gravels), gravels of the River Terrace Deposits-4, Head and Head 1. Each of these units varies between 1 – 10m thick (Hopson, P.M. et al, 2008). The majority of the Ashley Road area and The Maltings area are overlain with Alluvium. The River Terrace Deposits, Head and Head 1 are topographically restricted to the valley sides.

Made Ground is mapped by the BGS as Made Ground/Landscaped Ground, Infilled Ground and Disturbed or Worked Ground within the study area. Ground Investigations in 2020 have shown that Made Ground is present within the Ashley Road area, and there is known Made Ground within the Maltings and Central Car Park area.

There are no Local Geological Sites within the study area.

The hydromorphology of the wider study area relevant to the Scheme is described in Chapter 10 'Water and hydromorphology'.

13.1.2 Ground contamination

The potential for ground contamination within the Scheme area has been informed by a Geotechnical Desk Study (Jacobs 2020). It should be noted that further ground investigations for the Scheme are planned for December 2020.

A gasworks, located approximately 100m south of Ashley Road (see Figure 13.1), is recorded on the 1924 Ordnance Survey Map. Anecdotal evidence indicated that the Ashley Road area was raised up using clinker material from gas works.

Made Ground was found in the Ashley Road area in the majority of Ground Investigation locations, although there was no evidence of significant contamination. The Made Ground in the Ashley Road area is therefore not likely to be from the nearby gasworks.

The key source of contamination in the Scheme area is considered to be associated with Made Ground in the Maltings and Central Car Park area. The source of the Made Ground in this area is not fully known but is considered (based on the 2020 Ground Investigations) to have partly included waste products from the gas works.

Previous ground investigation was conducted within the Scheme area in the Central Car Park and Maltings only. The contaminants found in the Made Ground are elevated concentrations of Poly Aromatic Hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPH), lead and beryllium. Chemical analysis included leaching tests which recorded some elevated concentrations of leachable contaminations, mostly metals, indicating the Made Ground is a potential source of contamination to groundwater and surface water.

The superficial geology (Secondary Aquifer) provides some protection to the underlying Chalk (Principal Aquifer) and given that there is no evidence of gross contamination, for example, free phase oils, based on the current situation it is unlikely that the Scheme area is currently causing significant contamination of the groundwater.

The 2020 Ground Investigation adds to the available information (and will be used in the detailed design of the Scheme) but does not significantly change the conclusions from the previous Ground Investigation.

13.1.6 Changes to use of land in absence of Scheme

In the absence of the Scheme, the land within the study area will continue to flood, and will be subject to increased flooding due to climate change. Additionally, areas of potential soil contamination may be subject to increased flood risk, with potential for future migration of contaminants.

13.2 Likely significant effects

13.2.1 During construction

Soil and geology

There are likely to be direct localised **minor adverse impacts** on ground conditions (based on a low value receptor i.e. soils of a local importance and a moderate negative magnitude) as a result of land requirements for site compounds, storage areas and working areas during the construction phase. The proposed construction works have the potential to cause compaction of soils when wet, which could indirectly affect land drainage and the creation of wetland habitats at Fisherton Recreation Ground. However, much of the access for constructing the Scheme and on-site haulage will be undertaken within the footprint of the Scheme area and therefore these impacts will be localised to the Scheme area.

Ground contamination

There is potential for the construction works to expose contaminants and open pathways for contaminants, with the following impacts:

- exposure of construction workers to direct contact with soil contamination and soil gas during excavation work;

- exposure of local land-users (residents, commercial property users and recreational users) to contaminated material via dust and vapours from exposed soils and soil stockpiles;
- exposure of local land-users to soil gas risk because of changes to existing gas migration pathways;
- odour from exposed in situ or stockpiled organic soils; and
- migration of contaminated groundwater (from Made Ground) to river channels (all designated as part of the River Avon SAC) during construction.

All of these potentially **moderate to major adverse impacts** (based on high to very high value receptors and potentially moderate to major negative magnitude) are considered manageable by application of good practice. The Scheme will be designed to avoid or mitigate these impacts during detailed design**.**

Some of the waste soils from the channel excavation will be beneficially re-used to raise the existing Millstream Coach Park to reduce flooding and minimise the volume of soils to be exported off-site. Further risk assessment will be required to ensure the soils are suitable for re-use and will not present a risk to human health or the environment.

13.2.2 During operation

Soil and geology

The Scheme will provide a reduced risk of flooding for existing land uses and soils within the floodplain, thereby helping to prevent pollution – a **moderate beneficial** impact.

Ground contamination

There is potential for the excavation of land within the Scheme area (e.g. for new and widened channels and new wetland habitat areas) within areas of Made Ground to lead to:

- a reduction in protection of the underlying aquifer; and
- an increased flushing of water though the Made Ground as a result of drainage via the channels.

These changes could lead to pollution of the surface waters and possibly the underlying Chalk. Water quality is further discussed in Chapter 10 'Water and hydromorphology.

As described in Section 4.3.11, no significance has been assigned to these potential impacts as sufficient mitigation (see Section 13.3) will result from the measures that are required to ensure suitable protection of human health and controlled waters, as defined by statutory guidelines; and/or health and safety law.

13.3 Mitigation

Soil and geology

We will implement the following management practices to minimise damage to soils within the Scheme area:

- carry out a detailed soil resource survey (to include assessment of topsoil depths, soil structure, anaerobism, plasticity, drainage characteristics, and soil sampling for laboratory testing) during detailed design of the Scheme to further understand the fertility of the existing soils and inform the landscaping and habitat management for the Scheme;
- programme the majority of earth movements and soil handling during summer months;

- construct the Scheme in accordance with a Soil Management Plan, which will follow Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra 2009) as well as our strategy document 'Soil a Precious Resource: Our strategy for protecting, managing and restoring soil (Environment Agency, 2007) to include:
    - ensuring haul routes and working areas are stripped of both topsoil and subsoil down to a firm base and the soils stored appropriately for re-use;
    - ensuring that any areas outside of the Scheme area are not trafficked by construction vehicles;
    - storing stripped topsoil in separate resource bunds to an approximate maximum height of 2m high. These bunds will be kept grassed and free from construction traffic until required for re-use; and
    - implementing measures to minimise the frequency of vehicle movements and/or improve load-bearing ability e.g. the use of temporary, pressure-absorbing tracks or ground mats.

Ground contamination

The following measures will be taken to ensure there is no contamination of surface or groundwater as a result of constructing the Scheme:

- carry out sufficient ground investigation and assessment to identify all areas of significant contamination to enable appropriate mitigation to be implemented; and
- line new channels/wetlands during construction to reduce the potential to mobilise contamination within the Made Ground by separating the surface water from the Made Ground. This will apply to the channels constructed in the Maltings and Central Car Park area. In the Ashley Road area, the lining of wetlands and channels is not likely to be required, although further risk assessment during detailed design will inform this requirement.

In addition, generic mitigation to manage soil contamination risks during construction (which are standard good standard practice) will include:

- employment of a health and safety plan for any workers likely to come into physical contact with contaminated soils, gases or vapours during the construction phase;
- use of measures to mitigate dust migration risks from exposed soils and stockpile areas (e.g. tarpaulins, dust suppression sprays and/or siting of any contaminated/odorous stockpiles away from residential areas – see Chapter 14 'Air Quality');
- storage of excavated soils on low permeability ground or pads with suitable temporary drainage/bunding to prevent risk of wash-off of stockpiled soils by rain or flood water and/or leaching into the ground;
- adoption of risk-based human health/controlled waters screening values to determine appropriate locations for the re-use of materials within the project boundary; and
- appropriate design of a capping layer or seeding of any bare soils exposed at the end of the earthworks phase to reduce potential exposure pathways.

It is anticipated that these measures will leave no additional residual health risk from the Scheme during the operational phase. We will provide further details of the mitigation strategy to be employed in the outline remediation strategy for the Scheme, which will be implemented via the Contractor's CEMP and EAP.

13.4 Residual effects

The residual effects on the sustainable use of land are presented in Table 13.1.

Table 13.1: Residual impacts on the sustainable use of land

Receptor (value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
Soils and land use (low value)	Improved standard of flood protection for existing land uses including potentially polluted land	Moderate beneficial	No mitigation required	Moderate beneficial - significant
Soils and ground conditions (low value)	Localised impacts on ground conditions and compaction damage to soils during construction	Minor adverse	Programme the majority of earth movements and soil handling during summer. Soil resource survey of the Scheme undertaken during detailed design Implement a Soil Management Plan to: ensure areas outside of the Scheme are not trafficked by construction vehicles; store topsoil in separate bunds to a height of <2m; grass bunds; and minimise frequency of vehicle movements and/or improve load-bearing ability of tracked areas.	Minor adverse
Health of construction workers and local land-users (very high value)	Exposure of soil contamination with potential for direct contact	Moderate to major adverse	Apply a health and safety plan for any workers likely to come into physical contact with contaminated soils, gases or vapours during construction Use measures to mitigate dust migration risks from exposed soils and stockpile areas (e.g. tarpaulins, dust suppression sprays and/or siting of any contaminated/ odorous stockpiles away from residential areas)	No significant Impact
	Exposure of soil gas/vapours with potential for inhalation	Moderate to major adverse		No significant impact

Receptor (value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
			Store excavated soils on low permeability ground or pads with suitable temporary drainage/bunding to prevent risks of wash-off and leaching Adopt risk-based human health/controlled waters screening values to determine appropriate locations for the re-use of materials Appropriate design of a capping layer or seeding of any bare soils exposed at the end of the earthworks phase to reduce potential exposure pathways.	
Surface water and groundwater (very high value)	Potential mobilisation of contaminated groundwater from Made Ground as a result of excavations	Moderate to major adverse	Line channels and wetlands to separate the surface water from the Made Ground Further Ground Investigation and risk assessment required to fully inform design	Minor adverse

14 Air quality

14.1 Existing environment

IAQM's 'Guidance on the Assessment of Dust from Demolition and Construction Activities v1.1' (IAQM 2016) indicates that an assessment will normally be required where there is:

- a 'human receptor' within 350m of the boundary of the site or 50m of the route(s) used by construction vehicles on the public highway, up to 200m from the site entrance(s); or
- a 'ecological receptor' within 50m of the boundary of the site or 50m of the route(s) used by construction vehicles on the public highway, up to 200m from the site entrance(s).

As such, the study area for the assessment of construction phase air quality effects has been defined as a 350m radius from the Scheme area and a 50m radius from the routes likely to be used by construction vehicles on the public highway, up to 200m from the site entrance; the extents of which are shown in Figure 14.2.

14.1.1 Sensitive receptors

A number of sensitive receptors are located within close proximity to the Scheme, which have the potential to be impacted during its construction (as displayed in Figures 14.1 and 14.2).

14.1.2 Local air quality management

The Scheme is located within the administrative area of Wiltshire Council. The most recent air quality Annual Status Report (Wiltshire Council, 2020) has been reviewed in order to understand existing air quality within the study area.

Wilshire Council has declared eight Air Quality Management Areas (AQMA) within their administrative boundary; three of which are located within close proximity to the Scheme (as seen in Figure 14.1), namely:

- Salisbury City Centre AQMA (declared in 2007), which is located within a portion of the Scheme's extent;
- Salisbury Wilton Road (A36) AQMA (declared in 2007 and later amended in 2016) which is located approximately 0.3km west of the Scheme; and
- Salisbury London Road AQMA (declared in 2007), which is located approximately 0.5km east of the Scheme.

These AQMAs were declared due to exceedances of the annual mean nitrogen dioxide (NO_2) Air Quality Objective (AQO) of 40 µg/m^3, with the primary contributor to these exceedances being road traffic emissions. The legislation and regulations that set the requirements to comply with pollutant AQOs can be found in Appendix O.

Wiltshire Council has produced an Air Quality Action Plan (Wiltshire Council, 2015b), which sets out what actions the Council is going to take to improve air quality particularly in these AQMAs, as well as an Air Quality Strategy (Wiltshire Council, 2019b) which seeks to maintain progress with the improvement of air quality across Wiltshire as a whole.

14.1.3 Local air quality monitoring

Wiltshire Council undertake ambient monitoring of air quality across their administrative area using a network of four continuous monitoring stations (CMS) and 76 passive NO_2 diffusion tubes. Site AM1, at which both particulates (PM_{10}) and NO_2 are measured, is the only CMS in the vicinity of the Scheme. There is also a total of ten passive NO_2 diffusion tubes within close proximity of the Scheme.

Measured PM_{10} concentrations in recent years at site AM1 are summarised in Table 14.1 and the location is shown in Figure 14.1.

Table 14.1: Measured PM_{10} concentrations at site AM1 (2015-2019)

Site ID	Site name	Site type	Distance/ Direction from scheme	Annual mean PM10 concentration (µg/m3)				
				2015	2016	2017	2018	2019
AM1	Exeter St Salisbury	Roadside	0.5 km - SE	14	14	20	22	22

The results in Table 14.1 indicate that annual mean PM10 concentrations have been well within the AQO of 40µg/m^3 at this location in recent years. AM1 does, however, indicate a slight increase in PM_{10} concentrations since 2015.

Measured NO_2 concentrations in the vicinity of the Scheme are summarised in Table 14.2.

Table 14.2: Measured NO_2 concentrations in the vicinity of the Scheme (2015-2019)

Site ID	Site name	Monitor type	Site Type	Distance/ Direction from scheme	Annual Mean NO2 Concentration (µg/m3)				
					2015	2016	2017	2018	2019
AM1	Exeter St Salisbury	CMS	Roadside	0.5km - SE	36	35	35	35	30
DT53	2 Minster St	Diffusion tube	Kerbside	0.1km -SE	40	**41**	35	**43**	37
DT55	Endless St	Diffusion tube	Roadside	0.2km - E	35	34	31	**41**	34
DT56	16 Winchester St	Diffusion tube	Roadside	0.3km - E	32	33	29	34	30
DT59	123 South Western Rd	Diffusion tube	Roadside	0.3km - W	**46**	**47**	**41**	**51**	**44**
DT65	17 Wilton Rd	Diffusion tube	Roadside	0.4km - W	**58**	**58**	**46**	**58**	**51**
DT66	31 Devizes Rd	Diffusion tube	Roadside	0.4km - W	40	**41**	37	**41**	37
DT68	Catherine St	Diffusion tube	Roadside	0.3km - SE	n/a	39	31	**41**	35
DT70	161 Castle St	Diffusion tube	Roadside	0.1km - E	39	**41**	33	**41**	36
DT73	99 Devizes Rd	Diffusion tube	Roadside	0.2km - W	31	32	28	32	29

DT74	37 Castle Rd	Diffusion tube	Roadside	0.2km - E	n/a	30	28	35	28

*Note: Measured exceedances of the annual mean AQO (40µg/m3) are shown in **bold** type.*

The results in Table 14.2 indicate that the annual mean NO_2 AQO has been exceeded at a number of sites in close proximity to the Scheme in recent years, including:

- DT53 in 2016 and 2018, which is located on Minster Street and within the Salisbury City Centre AQMA;
- DT55 in 2018, which is located on Endless Street and within the Salisbury City Centre AQMA;
- DT59 between 2015 and 2019, which is located on South Western Road and within the Salisbury City Centre AQMA;
- DT65 between 2015 and 2019, which is located on Wilton Road and within the Salisbury Wilton Road (A36) AQMA;
- DT66 in 2016 and 2018, which is located adjacent to the A360 (Devizes Road) and within the Salisbury Wilton Road (A36) AQMA;
- DT68 in 2018, which is located on Catherine Street and within the Salisbury City Centre AQMA; and
- DT70 in 2016 and 2018, which is located on Castle Street and within the Salisbury City Centre AQMA.

14.1.4 Mapped background concentrations

Background NO_x, NO_2, PM_{10} and $PM_{2.5}$ concentrations modelled by Defra based and corresponding to the 1km x 1km grid squares in close proximity to the Scheme were obtained from Defra's Local Air Quality Management support tools (Defra, 2020a).

A summary of the range of concentrations for grid squares covering or within close proximity to the Scheme is provided in Table 14.3, which indicates that background concentrations for all pollutants are well within the relevant AQOs. The relevant AQO for each pollutant can be seen in Appendix O.

Table 14.3: Defra background concentrations (2019)

Site ID	2019 Mapped Annual Mean Concentrations (µg/m3)	
	Minimum	**Maximum**
NO_x	11.8	18.0
NO_2	9.1	13.3
PM_{10}	13.1	14.3
$PM_{2.5}$	8.8	9.7

Note: Defra background 1km x 1km grid squares selected are those within 500m of the Scheme.

14.1.5 Pollution Climate Mapping Model Outputs

The Pollution Climate Mapping (PCM) model, provided by Defra, is designed to fulfil part of the UK's commitment to report on the concentrations of major air pollutants that impact human health, such as NO_2, PM_{10} and $PM_{2.5}$. Modelled roadside concentrations are provided for a 2018 base year, and projected for every year up to 2030, at representative roads throughout the UK (Defra, 2020b).

Five PCM model links cover or are within close proximity to the Scheme (as shown in Figure 14.1). Projected roadside annual mean NO_2 concentrations adjacent to these links are projected to be well within the Limit Value of 40µg/m^3, as shown in Table 14.4. PM_{10} and PM2.5 PCM model concentrations are modelled to be within their corresponding Limit Values (40 and 25 µg/m3, respectively) throughout England.

Table 14.4: Defra pollution climate mapping (PCM) outputs for NO_2 (2019)

Census ID	Road	2019 Projected Roadside Annual Mean NO2 Concentration (µg/m3)
802078031	A345	24.5
802078030	A360	16.5
802006316	A36	26.5
802036319	A36	24.6
802056285	A36	20.5

14.1.6 Local meteorology

The windrose from the closest available meteorological station indicates that the prevailing wind direction is predominantly from the southwest, with a considerable portion of wind also coming from the south and west. Therefore, receptors to the northeast of the scheme have the greatest potential to experience dust soiling and/or changes in PM_{10} concentrations as a result of the construction of the Scheme.

14.1.7 Local sources of emissions

Air quality in the vicinity of the Scheme is considered to be primarily influenced by emissions from road traffic using the A36 and adjoining local roads. No significant sources of dust or industrial emissions that are likely to influence air quality have been identified in the study area.

14.1.8 Changes to air quality in absence of Scheme

In the absence of the Scheme, there will continue to be an increase in population within the city, resulting in an increased reliance on the road network and an increase in road vehicle emissions. However, improvements to air quality within the city are underway, and will continue as new actions are taken, aimed at ensuring that air quality objectives within the city are met in the future. Air pollutant concentrations would be expected to improve overtime (with or without the Scheme) relative to the baseline conditions presented above, as a result of a reduction in background concentrations and general improvements in vehicle technology.

14.2 Likely significant effects

14.2.1 During construction

Construction dust

There is the potential for dust effects during the construction phase of the Scheme at sensitive receptors within the distance bands outlined in IAQM (2016) and displayed on Figure 14.2. A summary of the assessment results is presented below, whilst the full methodology and assessment is presented in Appendix L.

The IAQM guidance recommends that the fugitive dust emission magnitude should be based on the scale of the anticipated works for demolition, earthworks, construction and trackout. The dust emission magnitudes derived for the Scheme are presented in Table 14.5.

Table 14.5: Dust emission magnitudes derived for each construction activity

Activity	**Derived dust emission magnitude**
Demolition	Small
Earthworks	Medium
Construction	Medium
Trackout	Medium

The sensitivity of the area to dust soiling, human health and ecological effects was defined for each construction activity as described in Appendix L. The sensitivities of the surrounding area are summarised in Table 14.6.

Table 14.6: Sensitivity of the surrounding area to dust soiling, human health and ecological effects

Potential Impact	**Sensitivity of the surrounding area**			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust soiling	High	High	High	High
Human health	Medium	Medium	Medium	Medium
Ecological	High	High	High	High

The dust emission magnitudes detailed in Table 14.5 were combined with the sensitivity of the area detailed in Table 14.6 to determine the risk of effects with no mitigation applied. The risks without mitigation applied for dust soiling, human health and ecological impacts are provided in Table 14.7.

A full description of the assessment of dust from demolition, construction, earthworks and trackout activities, including the assigned risk of impacts and sensitivity of receptors, is provided in Appendix L.

Table 14.7: Summary dust risk used to define site-specific mitigation

Potential Impact	**Risk of Dust Impacts**			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust soiling	Medium	Medium	Medium	Medium
Human health	Low	Medium	Medium	Low
Ecological	Medium	Medium	Medium	Medium

Across the different stages of the construction of the Scheme, it is concluded that there is a medium risk of dust soiling and impact to ecological sites and a low to medium risk of human health impacts (in the absence of mitigation).

Construction traffic

There is the potential for increased NO_x, PM_{10} and $PM_{2.5}$ emissions as a result of construction-related vehicle movements, that may have a subsequent impact on pollutant concentrations at nearby human and ecological receptors. It is anticipated, however, that during the construction phase there will be a maximum of 46 AADT HGV movements on roads likely to be affected by construction traffic. Given these relatively low flows (which also represent a worst-case scenario) are well within DMRB LA 105's (Highways England et al. 2019) traffic screening criteria (i.e. change in AADT HGV flow ≥ 200), coupled with the temporary nature of the works, it is considered unlikely that construction traffic will have a significant impact on air quality in the vicinity of the Scheme. Therefore, no further assessment is proposed, as impacts are assumed likely to be negligible.

Construction plant

The operation of site equipment, vehicles and machinery during construction would result in emissions to the atmosphere from exhaust gases. However, such emissions are unlikely to be significant, particularly in comparison to levels of similar emissions from vehicle movements on the surrounding road network. Impacts would also be managed through standard mitigation (e.g. no idling engines). Emissions of NOx, PM_{10} and $PM_{2.5}$ from construction plant are therefore considered likely to be negligible and scoped out of further assessment.

14.2.2 During operation

The operation of the Scheme is anticipated to result in minimal additional traffic movements, relating only to periodic inspection and maintenance. For this reason, the Environmental Statement has scoped out operational air quality impacts. Therefore, no further assessment has been undertaken.

14.3 Mitigation

The CEMP prepared by the contractor during the detailed design stage of the Scheme will adopt good practice measures to control fugitive dust (and hence minimise potential impacts) with reference to IAQM (2016) Guidance. The contractor should enter into pre-works discussions with Wiltshire Council to agree the method of works and appropriate dust mitigation measures outlined in a Dust Management Plan.

Construction dust mitigation measures, based on those outlined by the IAQM, are detailed within Table 12 of Appendix L. These mitigation measures will be used as a guide to inform the best practice measures within the CEMP and should be reviewed as the contractor confirms further details of the construction activities, location and programme.

As the Scheme is considered unlikely to result in a significant air quality effect during the operational phase, no operational phase mitigation measures are deemed necessary.

14.4 Residual effects

The residual effects on air quality are presented in Table 14.8.

Table 14.8: Residual impacts on air quality

Receptor (value)	Description of potential impact	Significance of predicted impact	Mitigation measures	Significance of residual impact
Human (high)	Dust soiling during construction	Moderate adverse	Application of EMP	Negligible
Human (medium)	Impacts of PM_{10} and $PM_{2.5}$ on health during construction.	Moderate adverse	Application of EMP	Negligible
Ecological (high)	Dust effects during construction	Moderate adverse	Application of EMP	Negligible

15 Sustainability, carbon, and climatic factors

15.1 Sustainability

Sustainability can be assessed in relation to the natural environment, human and social factors and economic factors. The Scheme has been designed so that it will meet all three of these sustainability criteria when considering both its construction and its operation and maintenance over its design life of 100 years.

The Scheme creates more space for water within the city centre with a new channel and wetland area at Fisherton Recreation Ground and a widened River Avon corridor through the Maltings and Central Car Park area. The design will operate predominantly as a passive Scheme i.e. with minimal intervention, no automated structures and has sought to remove in-channel structures to renaturalise the river system. Consequently the operational carbon cost for the Scheme is low compared with other options considered as it will provide new passive structures to replace energy-intensive and maintenance-intensive ones. Furthermore, if all carbon costs linked to flood recovery impacts are factored in then the proposed Scheme returns a much lower carbon cost relative to other options as it offers the largest reduction in the risk of flooding.

Where possible, the detailed design of the Scheme has incorporated environmentally sustainable techniques and materials (e.g. sustainable timber or recycled steel for use in new bridges) aimed at, amongst other things, minimising the carbon footprint. We will re-use some of the excavated materials from ground lowering at Fisherton Recreation Ground for landscaping including the creation of the shoulders of the new flood defence embankment in the Ashley Road area. We will also re-use the majority of the gravels excavated within the Scheme area for channel improvements (although some of the gravels will be exported off site for the beneficial re-use in other environmental improvement projects where possible).

In order to ensure that all habitat creation and environmental mitigation works are realised on site and that our long-term aims are met, we have produced an Environmental Action Plan (Section 15.3), a Post-Construction Monitoring Plan (Section 15.4) and a high-level Landscape Habitat Management Plan (Section 15.5). Collectively these will help to ensure that all of the mitigation measures in this ES are implemented (through the EAP), that the landscaping is supported towards maturity (by implementing the Landscape Habitat Management Plan), and that any need for remedial measures is identified during the initial years of operation (by implementing the Post-Construction Monitoring Plan).

The Scheme incorporates social sustainability as an integral part of its core objectives of managing flood risk in Salisbury and improving public open space for local communities. As identified in other chapters, the design has targeted net gains for accessibility and landscape quality (whilst seeking to minimise adverse impacts on other social, as well as environmental, receptors).

Compared with the alternative options considered during Scheme development, the Scheme is not considered to be the most economically sustainable option (i.e. providing optimum economic efficiency). Instead the preferred Scheme was selected on the basis of supporting strategic policy and the future phases of the wider Salisbury River Park Master Plan, which is a condition of Wiltshire Council funding.

15.2 Carbon and climatic factors

The Scheme's principal objective is to reduce flood risk to people, property and infrastructure in the centre of Salisbury and provide resilience/adaptive measures to climate change.

Climate change is expected to increase the extent, severity and frequency of flooding in Salisbury, and the Scheme will reduce each of these flooding factors and will thus help areas of the city to be more resilient. The Scheme will achieve this without exacerbating flood risk in any other area of the city or upstream or downstream.

Other specific success factors for the Scheme include its resilience to other climate change factors, specifically:

- river channel improvements will make the waterbodies and their ecological communities more resilient to both lower and higher flows, both of which are likely to result from future climate change;
- landscape planting in open spaces will use mostly native trees and shrubs that are resilient to climate change;

A Carbon Calculator Tool was applied during the option development stage, to provide an indication of the whole life carbon requirements of the options under consideration. Subsequently, the Carbon Calculator was applied to select and design a Scheme which has as low a footprint as possible with currently-available construction technology, to help increase our resource efficiency and to minimise the carbon emissions associated with construction activities and operational maintenance ('whole-life' carbon).

The scale of the Scheme's capital (construction) carbon footprint is a consequence of activities to build the new flood defence embankment and flood defence wall in the Ashley Road area, the new road bridge in the Maltings and Central Car Park area and various new river control structures, culverts and associated features at both sites. The modelled whole-life carbon emissions are estimated at 2,750 tonnes and operational carbon at 6,650 tonnes, based on the proposed maintenance regime.For the Ashley Road area, the construction of the extended channel for the Summerlock Stream and associated wetland area will produce large volumes of excavated materials, mainly comprising made ground. This material will require removal from the floodplain with associated emissions from vehicles transporting spoil to licensed restoration sites. We estimate a total volume of 3,600m^3 will be excavated. In order to minimise and reduce the associated carbon footprint, the soil requirement for the new flood defence embankment will be met by the reuse of materials generated by these on-site excavations. The intention is to achieve a cut and fill balance, minimising the excess that will require removal from site along with any unsuitable materials (e.g. if found to be contaminated).

For the Maltings and Central Car Park area, the earthworks to form the widened river corridor for the River Avon and for the new culverts will produce large volumes of excavated materials, mainly comprising made ground. Some of this is known to be contaminated and will require removal from the floodplain. We estimate a total volume of 12,000m^3 will be excavated. In order to minimise and reduce the associated carbon footprint, the soil requirement for raising of the adjacent coach park area, estimated at 1,500m^3 (12.5% of the total), will be met by reuse of suitable materials generated by these on-site excavations.

We investigated a range of options for the re-use or disposal of unusable materials and determined that disposal to a local soil recycling centre was the preferred option as much of the material derives from made ground and is known to be contaminated.

The Contractor will use well-maintained equipment, low emission vehicles where feasible, and implement construction procedures (e.g. regular fleet maintenance) to minimise emissions, as will be detailed in the CEMP (see outline CEMP in Appendix M). Additionally, the Contractor will ensure sustainable use and disposal of resources, as outlined in the MMP (see Appendix O). A Site Waste Management Plan (SWMP) will be prepared by the Contractor, which will consider reduction, re-use and recycling of all resources, including but not limited to soils, timber and 'wastes'. Each of these sustainability requirements will also be extended to the wider sub-contractor and supply chain.

15.3 Environmental Action Plan

All mitigation measures identified in this ES necessary to protect the environment prior to and during construction, or during operation of this Scheme, will be incorporated into the contract documents by means of an Environmental Action Plan (EAP). The initial EAP is provided in Appendix N and is a mechanism by which we manage the environmental impacts set out in the ES and ensure compliance with environmental commitments. This will be maintained as a live document throughout Scheme finalisation (for example by adding any additional commitments as may be required to meet planning conditions) and construction..

The EAP includes the requirement for a number of separate method statements and sub-plans relating to specific areas of mitigation (including a Construction Traffic Management Plan and a Site Waste Management Plan). We have defined roles and responsibilities in the EAP to ensure, firstly, the implementation of the mitigation measures, secondly, the monitoring procedures to check their implementation and thirdly, audit and review mechanisms to ensure that mitigation measures are implemented and adhered to. Specifically, the following has been tabulated:

- the location of the mitigation measure;
- the objective of the mitigation;
- the actions to be taken to implement the proposed mitigation, including any special monitoring requirements;
- the timing and the party responsible for implementing the mitigation; and
- information on any further action and progress made during the construction.

The EAP therefore collates mitigation measures identified throughout the ES, both for ease of reference and for use by those overseeing the contract documents. It provides a record of our commitments, and those of the Contractor, which will be incorporated within the contract documents and which the Contractor will be obliged to meet throughout the contract period.

15.4 Post-construction Monitoring Plan

We have committed to undertaking some post-construction monitoring to ensure that mitigation measures will achieve their target outcomes. These are outlined in Table 15.1.

Table 15.1: Post construction monitoring plan

Topic Area/Receptor	Suggested Monitoring Method	Purpose	Frequency
Local community			
Memorial trees	Survey of memorial trees, if they are translocated	To determine whether they have successfully been translocated and to identify whether new trees are required	Annually for five years
Recreation and public access			
Use of public open space	Pre-and post Scheme questionnaire	To assess influence of Scheme on existing and new areas of public open space	Once upon Scheme completion
Flora and fauna			
Qualifying features of SAC and newly created channel and wetland habitat at Fisherton Recreation Ground	Visual survey of newly created habitat Fish survey River condition surveys	To monitor any changes to the qualifying features of the SAC, success of new wetland habitat adjacent to SAC and delivery of high quality river habitat. Monitoring will include triggers for action, should they be needed, and updates to the Habitat and Landscape Management Plan, as required.	Frequency to be confirmed but likely to be several times each year, for five years
Trees	Tree survey	To monitor success of newly planted trees and newly created woodland, and take action, should it be needed	Annually for five years
Invasive Non-Native (INN) Plants	Visual survey of new wetland area and Fisherton Recreation Ground	To detect any colonisation in the Scheme area by Nuttall's waterweed and trigger eradication measures, if needed. To monitor success of control measures in	Annually for three years

		place for Giant bramble.	
Bats	Activity survey and box-checks (only if an EPS survey is required)	To establish level of activity in modified landscape and use of the ten new artificial bat boxes attached to trees and bridges along the river corridor	Annually for five years
Water Voles	Survey of translocation site	To monitor the translocated population	Annually for five years
	Survey of new Summerlock Channel and modified River Avon corridor	To see if the new Summerlock channel becomes occupied.	Survey of new Summerlock Channel and modified River Avon corridor
Macroinvertebrates in new watercourse	Macroinvertebrate kick sample surveys	To monitor colonisation of the new watercourse by macroinvertabrates as an indicator of habitat quality.	Annually for five years
Breeding birds	Breeding bird (water birds only) surveys. [Requirement for this survey to be confirmed during detailed design in consultation with relevant conservation bodies.]	To assess the impacts on the Scheme on breeding birds. Does the modified River Park corridor attract more wetland species and provide greater opportunities for kingfishers? To monitor artificial nest boxes for grey wagtail under the new Millstream Approach Bridge.	Years 3 and 5
Water and hydromorphology			
River channels	Geomorphological survey of identified and agreed locations (as part of SAC survey)	To monitor any changes to erosion and sediment ingress along existing channels within Scheme area	Bi-annually for three years

River flows	Continued monitoring of hydrometric data from flow stations	What sort of flows are the channels carrying throughout the year? Monitoring of flows to understand effects of new control structures and in-channel enhancements including Avon offtake into the Summerlock, the River Avon split at the top of the Mill Stream and the performance of the berm downstream on the Avon to attract fish away from the fish pass at the Maltings. Is the Scheme working as anticipated? Do some of the structures (with incorporated adaptive features) require modifying to adjust flow splits etc?	Monthly

These measures will be detailed in a Monitoring Plan, together with roles, responsibilities and timescales, for discussion and agreement with affected landowners and conservation organisation in advance of the works.

We will review the Monitoring Plan regularly during Years 1-5 to ensure that it remains relevant and fit for purpose. Where appropriate and of mutual benefit, we will carry out the monitoring in partnership with interested individuals, groups and organisations including schools. In this way, the Scheme will provide ongoing opportunities for environmental education in Salisbury.

Mitigation strategies for the management of impacted habitats and protected species are discussed in Chapter 8 ‘Flora and Fauna’.

15.5 Landscape Habitat Management Plan

Over 600 new trees will be planted following completion of the Scheme as part of our landscaping proposals. Allnew tree species and replanting have been carefully selected to ensure that they are resilient to future climate change. For example, through the proposed planting of wetland grass mixes that will tolerate more frequent flooding and tree species that are typically found in floodplains (as well as being local to Salisbury).

An outline Landscape and Habitats Management Plan (Appendix E3) has been produced and will be developed further during the detailed design of the Scheme in consultation with Natural England. This plan details the five-year management and establishment of the landscape and habitats associated with the Scheme. We will ensure that the Scheme area is managed in a way that is as sustainable as possible.

16 Cumulative effects and inter-relationships

16.1 Introduction

This section sets out the results of the assessment of cumulative effects of the Scheme during construction and on completion of the Scheme. As described in Section 4.3.14, cumulative effects can be effects resulting from incremental changes caused by current or reasonably foreseeable activities, developments or plans together with the Scheme i.e. multiple projects/plans acting in combination. 'Reasonably foreseeable' has been interpreted to include other proposals in the Scheme area that are both committed and/or are awaiting determination in the planning process with sufficient design information readily available in the public domain to make an informed assessment. Cumulative effects for this Scheme can be divided into two broad categories as follows: -

Intra-project effects: effects that arise as a result of the combination of topic specific effects defined for a given scheme.

Inter-project effects: effects that arise due to the interaction of the Scheme with other relevant development proposals within the general locality of the scheme area. For example:

- construction impacts from more than one project at the same time or concurrently, and/or;
- operational impacts from more than one project affecting the same receptor(s); and
- how the impacts act together.

Inter-project cumulative effects are subdivided according to the following categories:

- additive: where similar impact types from the same or different development affect a receptor at the same time in a similar way; or
- synergistic: where different types of impact affect a receptor and interact to increase their combined significance.

The study area for the assessment of cumulative effects is the Scheme area plus a buffer of 5km for most receptors, and Scheme area plus watercourses and habitats hydrologically linked with the River Avon in the case of water receptors and ecological receptors. The projects included in this assessment of cumulative effects were identified in consultation with Wiltshire Council's Planning team.

16.2 Likely significant effects

16.2.1 Intra-project effects

Intra-project effects between topics are an integral part of the EIA for the Scheme and have been considered within the various chapters of this ES.

During the two-year construction, the local community will be exposed to localised noise disturbance, disruption to access and visual disturbance from different construction activities e.g. earthworks, piling, landscaping. The additive effect of these different construction activities in multiple locations within the Scheme area will be temporary. These effects (which will be dependent on the types of construction activities being undertaken concurrently and the distance of the receptor from the construction activities) have been described in earlier technical chapters.

Ecological receptors will also be affected by a range of environmental impacts during construction including noise, change to landscape and disturbance to wetland habitats but these factors have all been considered when determining the significance of impacts predicted in Chapter 9 ‘Flora and fauna’ and no further cumulative effects assessment is needed here.

Gradual cumulative changes in visual amenity and landscape character for the local community are likely to be experienced within and around the Scheme area during the two years of construction and upon Scheme completion. The landscape will be affected by changes to habitats and trees (as trees are felled, translocated, replanted and mature), the creation of a new and widened channel sections, new flood defence embankment and walls, new wetland habitat and changes affecting the historic landscape character. These factors have been considered in Chapter 8 ‘Landscape and visual amenity’ and no further cumulative effects assessment is needed here.

During construction, surface and ground water receptors in the study area have the potential to be affected by changes in flora (for example vegetation clearance on land releasing sediment and affecting water quality, and changes in in-stream vegetation releasing bedded sediments), changes in flood risk, the construction of new access to the riverside (i.e. viewing platforms and beach areas), changes in soils and land use change. These factors have all been considered in Chapter 10 'Water and hydromorphology' and no further cumulative effects assessment is needed here.

Heritage can be affected by various environmental impacts including landscape changes (which may contribute to the setting of heritage features or affect their historical context), changes in surface and groundwater levels/flows, the construction of new accesses and changes in land use resulting from the Scheme. These in-combination impacts have already been considered when determining the significance of impacts in Chapter 11 'Historic environment' and no further cumulative effects assessment is needed here.

During construction soils and geology can be affected by in-combination impacts on access (e.g. soil stripping and ground lowering), biodiversity (e.g. changes in vegetation types), changes in flood risk (and erosion) and temporary working areas (e.g. compaction of soils from soil storage/working machinery). These impacts have been assessed in Chapter 13 ‘Sustainable use of land’ and no further cumulative effects assessment is needed here.

During construction, air quality can be affected by in-combination impacts resulting from changes to traffic flows from increased HGV movements, and general construction machinery, albeit primarily affecting different locations. However, neither HGV traffic nor construction plant are expected to have significant effects on air quality, as indicated in Chapter 14 'Air quality', and no further cumulative effects assessment is needed here.

As indicated above, no significant cumulative intra-Scheme effects are predicted over and above those already identified in the chapters of this ES.

16.2.2 Inter-project effects

The potential cumulative effects of the following developments or plans have been reviewed with regard to their relevance to the Scheme, in the following sub-sections: -

- Wiltshire Council's Central Area Framework (CAF);
- Salisbury River Park Master Plan (Phases 2 to 6); and
- Change of use from offices to flats at 141 Castle Street.

Wiltshire Council's CAF (Wiltshire Council et al. 2020): This is a framework for future projects to regenerate Salisbury city centre. The Scheme is an integral part of the Salisbury River Park Master Plan (see below), which itself forms part of the CAF. The objectives of the Scheme align with the wider CAF objectives.

The following relevant projects forming part of the CAF have been considered:

- **Station Quarter:** Various interventions are being proposed to improve quality of the public realm around Salisbury Railway Station, including an enhanced travel interchange, improved Stonehenge visitor experience, improved wayfinding, landscaping and car parking facilities. The Station is located approximately 0.4km to the west of the Scheme area and therefore no cumulative effects are anticipated (should these interventions coincide with the timing of the Scheme). This project will be the subject of a Master Plan;
- **Fisherton Street Gateway:** Fisherton Street is located outside of the Scheme area, to the south. This project proposes to provide a new welcoming entrance to the city with various interventions including implementation of people-friendly streets principles, creation of waterside seating areas to complement the existing café culture and public art in key locations. As no planning application has been submitted for this project, any cumulative changes with the Scheme will need to be assessed and mitigated during its consenting, when further details of the project are available;
- **Public arts:** Proposals for a number of public art and lighting artists to create high quality public realm interventions in Fisherton Street. Lighting as part of public arts has the potential to interact with operation of the Scheme with potential for impacts on local community, visual amenity and faunal receptors. As no planning application has been submitted for this project, any cumulative changes with the Scheme will need to be assessed (and mitigated if needed) during its consenting, when further details of the project are available. There are opportunities for public art projects to be integrated with the Scheme which could have minor beneficial impacts (i.e. locally important) on the local community and landscape and visual amenity receptors.
- **Illuminating Salisbury.** This project proposes an outdoor visitor light attraction that will illuminate the stories of Salisbury's rich heritage. The project aims to work with international and local writers to present light shows and iconic images on buildings within the city that can be changed over time. The localised light shows may fall within parts of the Scheme area with possible shows and city walks indicated at Fisherton Street, rivers and trees behind the Maltings and in the mill/bridge/river area. This project therefore has potential for synergistic cumulative effects with the operation of the Scheme on the local community and visual amenity (e.g. through additional lighting of residential areas) and on fauna (e.g. with possible effects on birds, bats, otters and water voles). As no further details are currently available for this project, any cumulative changes with the Scheme will need to be assessed (and mitigated if needed) during its consenting, when further details of the project are available.
- **Wayfinding:** Proposals to deliver a Wayfinding Strategy which will inform the delivery of significant improvements to the signage infrastructure in the city, to support visitors' experience of moving through the city. Due to the small scale and localised nature of these proposals (i.e. for new signage), they are not anticipated to have any adverse synergistic cumulative effects with the Scheme; and
- **Heritage trail app:** Wiltshire Council are developing a Salisbury Heritage Trail app for a smart phone. This proposal will not have any in-combination effects with the Scheme.

No planning applications for these projects have been submitted and there is limited information available on the nature, timing and extent of each project.

Salisbury River Park Master Plan (Phases 2 to 6) (Wiltshire Council 2020b): As described in Section 2.1.1 and shown on Figure 2.1, the Salisbury River Park Master Plan includes development proposals in a total of six phases, which are located within or close to the Scheme area. This section considers the cumulative effects of the Scheme (Phase 1) with future phases 2 to 6 of the Master Plan, which will be subject to separate consenting and assessment. No planning applications have been submitted associated with works in phases 2 to 6 and at the time of writing this ES, it is unknown when construction of these phases would commence.

Although the Scheme has been designed to align with and accommodate future phases of the Master Plan, there is also the potential for the following cumulative effects with phases 2 to 6: -

- Local community/recreation and access

  The Scheme will result in synergistic minor to moderate beneficial impacts from new and improved public rights of way, new amenity features and public realm improvements. The Scheme will retain space for amenity proposals as part of other Master Plan phases.

  The Master Plan, notably Phase 3 'the riverside footpath between Ashley Road and the Central Car park' will also result in improvements to access, through the provision of a key pedestrian and cycle route linking the city centre to the northern residential areas of the city. Continued improvements to amenity assets through future implementation of Phases 4, 5 and 6 of the Master Plan (e.g. improved public seating areas and modernisation of open space) and access along the river park corridor will likely result in moderate to major beneficial additive cumulative effects (i.e. of city wide/regional importance) with the Scheme on the local community and human health.

- Landscape and visual amenity

  Implementation of the Scheme will result in changes in visual amenity and landscape/townscape character within the Scheme area. These changes will result in both positive localised synergistic impacts (e.g. improved aesthetics of the landscaped river park corridor upon completion) and negative localised impacts (e.g. tree loss and introduction of some new structures) which, on balance and in combination, are likely to result in overall beneficial effects on both visual amenity and landscape/townscape character. The effects of the Scheme will locally enhance the setting and quality of the River Avon corridor in line with the objectives of the Salisbury River Park Master Plan. Future phases of the Master Plan will widen the extent of, and further enhance these beneficial effects on the River Avon corridor.

- Flora and fauna

  Some proposals arising from future phases of the Master Plan (e.g. within the car park, commercial, cultural and residential areas) have the potential to interact with flora and fauna in the Scheme area including trees, vegetation, the River Avon and associated streams, and therefore have potential for beneficial and adverse cumulative effects with the Scheme. The in-combination synergistic and additive beneficial impacts may include increased tree/vegetation planting, combined in-channel and bankside habitat improvements and additional opportunities to manage and control invasive species. Some of the adverse effects may include increased recreational disturbance to biodiversity, habitat loss and habitat fragmentation, which will require further consideration during the assessment of future works arising from the Master Plan.

  In-combination impacts of the Scheme and future phases of the Master Plan on the qualifying features of the SAC (i.e. on Atlantic salmon, brook lamprey and bullhead

populations and water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation) have been assessed separately through the HRA (see Appendix J). These impacts include habitat loss and fragmentation, changes to natural function of the watercourses, increased recreational use and increased access to the river, physical damage, turbidity/siltation/smothering, toxic contamination and invasive species. The HRA concluded that there will be no adverse effects on the SAC following the implementation of mitigation measures. During detailed design of the Scheme, the Landscape Habitat Management Plan (see Section 15.5) will be prepared in more detail and will include a five year monitoring plan. The monitoring plan may overlap with projects arising from future phases of the Master Plan and therefore could be used to help support and complement landscaping and habitat management regimes during phases 2 to 6 of the Master Plan.

- Historic environment

  The combined changes in landscape and historic character of the area during both the Scheme and works arising from future phases of the Master Plan have the potential to result in changes (both beneficial and adverse) to the setting and historical context of built heritage assets – both Listed Buildings and Salisbury Conservation Area. Any cumulative changes will need to be assessed and mitigated during the consenting of future phases of the Master Plan (when further details of the proposals are available) and could be mitigated through appropriate and sympathetic landscaping.

- Water and hydromorphology

  There is potential for in-combination adverse impacts to water quality (notably increased sediment input and degradation of morphological features) in the River Avon, Summerlock Stream and Mill Stream through increased erosion from the Scheme and future development. Additionally, there is potential for both the Scheme and future Master Plan proposals to result in changes to the local groundwater regime (from cumulative soil compaction and the additive effects of new structures and barriers on groundwater flow) and to groundwater flood risk.

  Any cumulative changes will need to be assessed and mitigated during the consenting of future phases of the Master Plan (when further details of the proposals are available) and could be managed through a range of commonplace construction monitoring and mitigation measures and through adherence to relevant pollution prevention legislation and guidance.

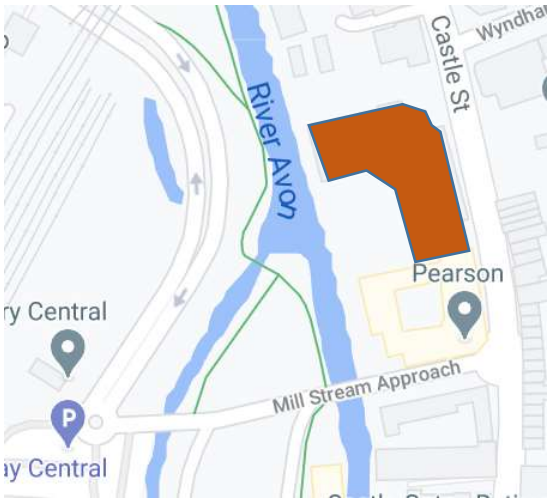
- Sustainable use of land

  The Scheme will provide an improved standard of flood protection for existing land uses and future land use changes resulting from any Master Plan proposals. There is however potential for in-combination impacts from the Scheme and future Master Plan phases on groundwater from the exposure and mobilisation of contaminants (if present) during excavation works. Any changes arising from future phases of the Master Plan would need to be identified, assessed and avoided through appropriate design and consenting.

As construction of future phases of the Master Plan is not expected to occur at the same time as the Scheme, no significant adverse cumulative effects are expected.

Change of use from offices to flats at 141 Castle Street. An application for change of use from offices to flats was approved at 141 Castle Street in December 2019. This is the building adjacent to the River Avon (left bank) before the River Avon splits at Swimming Pool Gate and borders the eastern boundary of the Scheme area (see Figure 16.1).

Figure 16.1: 141 Castle Street redevelopment



The planning application is for demolition of the existing office building (which is currently underway at the time of writing this ES) and redevelopment of the site as two residential blocks, with associated parking, landscaping, amenity space and dedicated site access.

There is potential for additive and synergistic cumulative effects from the development at 141 Castle Street with the Scheme, as outlined below. The construction of the development may be continuing between Spring and December 2022 when the planning permission for the development expires and when the Phase 1 Scheme is due to be commencing, subject to consenting.

- Landscape and visual amenity

  Landscaping work required as a condition of the 141 Castle Street development and proposed lighting may overlap with the Scheme area around Swimming Pool Gate. Although any cumulative landscaping effects of the development and the Scheme are likely to be beneficial (e.g. through removal of a building that is unsightly), there is potential for adjacent visual receptors to experience additive cumulative visual impacts if there is an overlap in the construction periods. Further review of the development will be undertaken during detailed design of the Scheme to ensure any conflicts and potentially adverse cumulative impacts on landscape or visual amenity are avoided in the affected area.

- Water and flora and fauna

  There is potential for the redevelopment to interact with the River Avon SAC and its features through the lowering of the existing sheet piled wall, as well as surface water drainage and through potential naturalising of the river margins, which will interact with the Scheme area. We are currently awaiting final details on the redevelopment proposals at this location, which we will consider further during detailed design to ensure that there are no adverse cumulative effects on water, and local flora and fauna.

16.3 Mitigation

No additional intra-Scheme cumulative effects have been identified beyond those already identified in earlier technical chapters, and therefore no additional mitigation is needed over those measures identified in the technical assessments in Chapters 5 to 14.

It can reasonably be anticipated that each of the other developments or projects arising from Wiltshire Council's Central Area Framework will have their own Construction Management Plans and/or Construction Codes of Practice setting out measures to limit impacts on the environment and local community. Any identified inter-project cumulative construction effects can be partially mitigated through the following good practice measures:

- communication between the Environment Agency and the other developers to ensure that works are phased or planned together to limit disruption in any given location;
- providing the public with signage and information about temporary PRoW closures, and details of alternative routes that can be taken;
- phasing works so that some PRoW and cycle routes remain open and accessible throughout the combined construction programmes of the projects;
- use of standard measures such as maintaining a tidy site and use of hoarding and screening to limit noise and visual intrusion; and
- phasing works and timing vehicle journeys to avoid peak traffic conditions.

17 Summary

The proposed Scheme comprises the construction of flood defence embankments and walls, temporary pumping areas, flood control measures, new bridges and culverts and river channel modifications including river widening and channel infilling to provide improved flood defence to people and property in Salisbury. The design also incorporates improved green space for recreational use, significant areas of new wetland habitat that will become nationally designated (as well as considerable new hedgerow creation) resulting in a net gain in habitat and improved fish passage, and enhanced routes for pedestrians and cyclists that are accessible for all groups of people.

Our ES presents the results of an EIA undertaken in accordance with the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017 for the Scheme. The Scheme is likely to give rise to significant environmental effects and therefore requires an ES. Planning permission is also required for the Scheme. The Scheme is the larger part of Phase 1 of the wider Salisbury River Park Master Plan. Future phases of the Master Plan are being developed by Wiltshire Council and will be subject to separate consenting.

In accordance with the EIA scoping technical note for the Scheme, this EIA has considered the potential impacts of the Scheme on sensitive receptors across the following topic areas:

- Local community (Chapter 5)
- Noise and vibration (Chapter 6)
- Recreation and access (Chapter 7)
- Landscape and visual amenity (Chapter 8)
- Flora and fauna (Chapter 9)
- Water and hydromorphology (Chapter 10)
- Historic environment (Chapter 11)
- Traffic and transport (Chapter 12)
- Sustainable use of land (Chapter 13)
- Air quality (Chapter 14)
- Sustainability, carbon, and climatic factors (Chapter 15)

Cumulative effects with other plans and projects have also been considered within Chapter 16.

In this assessment, we have identified that the Scheme will result in the following significant beneficial effects following mitigation:

- long-term reduction in fluvial flood risk to properties, businesses, infrastructure, recreational assets and land uses (including potentially polluted land) adjacent to Ashley Road and the Summerlock Stream, Fisherton Street and the city centre once the Scheme is completed with associated beneficial impacts on human health from reduced stress and anxiety;
- permanent reduced flood risk to recreational assets (including PRoW, public access land, parks, recreation grounds);
- permanent improvement to landscape character of the Ashley Road area by year 15 as a result of the creation of the new channel, wetland habitat, new amenity facilities and

tree planting, as well as some long-term landscape benefits to the remaining Scheme areas;

- improved visual amenity to users of public footpath SALS 9 in the Ashley Road area and for users of Fisherton Recreation Ground;
- improvements to fish passage (particularly benefitting Atlantic salmon, bullhead, brook lamprey, European eel, brown/sea trout) and to aquatic biodiversity from the removal of sluice structures, reprofiling of the channel bed and re-naturalisation of the River Avon corridor upon completion of the Scheme;
- 14% net gain in river habitat from the creation of the new main and secondary channels at Fisherton Recreation Ground (and associated wetland habitats) and the widened River Avon channel corridor, which will form part of the River Avon System SSSI, as well as creation of 445m of hedgerow within the Maltings and Central Car Park, which will provide refuge, foraging and nesting opportunities for a range of species.
- improved variability in sediment transport and flow type, improved bedforms and channel characteristics, improved morphological diversity and geomorphic behaviour within the River Avon, Summerlock Stream and Mill Stream; and
- long-term improvements to water quality from a more naturally functioning River Avon.

Some significant adverse impacts will be experienced during construction or on completion of the works. However, most of these can be adequately controlled through measures included in the works contract documentation, including the application of procedures that are detailed in the EAP (Appendix N). This will be updated during detailed design of the Scheme as the construction working methods are further developed to ensure that it captures all relevant actions. During construction it will be implemented by the contractors supported by an ECW. The EAP also identifies mitigation to further reduce the minor and minor-to-moderate adverse impacts.

The following significant adverse impacts remain following this mitigation:

- temporary elevated noise levels (i.e. over 65dB) which will be limited in duration to specific 'noisy' construction activities taking place during the two year construction period) at houses along Ashley Road, Coldharbour Lane, Hulse Road, Summerlock Bridge, Castle Street, Castle Street South, Ivy Place and at Summerlock Approach, at the Studio Theatre on Ashley Road, at the Riverside Tennis Club, at the Community Rehabilitation Centre, Millstream Medical Centre and Heath Walk Centre and at offices on Castle Street, Millstream Approach, Cheviot House and on Bridge Street (see Chapter 6 'Noise and vibration');
- temporary elevated vibration from construction activities limited in duration to specific activities (e.g. using vibratory compaction) during the two year construction period in residential areas at Hulse Road at Summerlock Bridge, Castle Street South and at Ivy Place, at the Community Rehabilitation Centre, Millstream Medical Centre and Heath Walk Centre and at offices at Cheviot House (see Chapter 6 'Noise and vibration');
- permanently reduced visual amenity for occupant of one private property in the Ashley Road area upon completion of the Scheme.

It is concluded that the Scheme will result in significant socio-environmental benefits, providing a more sustainable and significantly improved river corridor for both people and nature conservation within the urban constraints of Salisbury city centre. The design of a full integrated multi-beneficial Scheme not only reduces the flood risk to people and property but also delivers habitat creation (and overall net gain in habitat), an enhanced landscape and improved amenity.

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List of abbreviations

Term	Meaning / Definition
AIL	Abnormal Indivisible Load
AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BAP	Biodiversity Action Plan
BGS	British Geological Survey
BPM	Best Practice Measures
CAF	Central Area Framework
CMS	Continuous monitoring station
CFA	Continuous Flight Auger
CEMP	Construction Environmental Management Plan
CFMP	Catchment Flood Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CRTN	Calculation of Road Traffic Noise
CTMP	Construction Traffic Management Plan
DEFRA	Department for Environment, Food and Rural Affairs (the government department responsible for flood management policy in England)
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EAP	Environmental Action Plan
ECiA	Ecological impact assessment
ECW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
ES	Environmental Statement
FAS	Flood Alleviation Scheme
FRA	Flood Risk Assessment
FRMS	Flood Risk Management Strategy
GI	Green Infrastructure
GIS	Geographical Information Systems
GWDTE	Groundwater dependent terrestrial ecosystems
HGV	Heavy Goods Vehicle
HRA	Habitat Regulations Assessment

IAQM	Institute of Air Quality Management
IEEM	Institute of Ecology and Environment
IEMA	Institute of Environmental Management and Assessment
LAQM	Local Air Quality Management
LCA	Landscape Character Areas
LOAEL	Lowest Observed Adverse Effect Level
LNR	Local Nature Reserve
LVIA	Landscape and visual impact assessment
LWS	Local Wildlife Site
NERC	Natural Environment Research Council
NOX	Nitrogen Oxides
NCN	National Cycle Network
NMU	Non-Motorised Users
NPPF	National Planning Policy Framework
NVZ	Nitrate Vulnerable Zone
ORVal	University of Exeter's Outdoor Recreation Valuation Tool
PAH	Poly Aromatic Hydrocarbons
PEIR	Preliminary Environmental Information Report
PIA	Personal Injury Accident
PM	Particulate Matter
PPG	Planning Practice Guidance
PPV	Peak Particle Velocity
PRoW	Public Right of Way
SAC	Special Area of Conservation
SAGP	Salisbury Area Greenspace Partnership
SFRA	Strategic Flood Risk Assessment
SOAEL	Significant Observed Adverse Effect Level
SSSI	Site of Special Scientific Interest
TPH	Total Petroleum Hydrocarbons
WCS	Wiltshire Core Strategy
WER	Water Environment Regulations
ZTV	Zone of Theoretical Visibility

Glossary

Air quality management area (AQMA)	Area defined by the local authority as an area requiring management because air quality levels do not meet national air quality objectives
Aquifer	An underground layer of rock with water storage capability.
Backwater	Water surface profile upstream from a structure.
Baseline	A description of the present state of the environment with the consideration of how the environment would change in the future in the absence of the plan/programme/project as a result of natural events and other human activities.
Baseline studies/ survey	Collection of information about the environment which is likely to be affected by the project
Bed armouring	Development of a bed structure through chemical and/or physical sorting processes that is resistant to erosion.
Berm	Flat-topped depositional feature at channel margins. May confine low flows to central section of channel.
Biodiversity Action Plan (BAP)	An agreed plan for a habitat or species, which forms part of the UK's commitment to biodiversity in response to the Convention on Biological Diversity, Rio de Janeiro 1992
Brownfield site	A site which has been previously developed, often a disused factory site or industrial area.
Catchment abstraction management strategy (CAMS)	Used to manage water resources to balance the need for abstraction and management of the aquatic environment in consultation with local interested parties.
Catchment	A surface water catchment is the total area that drains into a river. A groundwater catchment is the total area that supplies the groundwater part of the river flow.
Catchment Flood Management Plan (CFMP)	A high level plan carried out by the Environment Agency in order to manage the risk of flooding to people, property and the environment in an integrated way. These plans form the basis of future flood risk management proposals.
Character area	An area of land with distinctive landscape features resulting from an interaction of wildlife, landforms, geology, land use and human activity as defined by the Countryside Agency.
Conservation area	An area designated under the Town and Country Planning Act, 1990 to protect its architectural or historic character.
Cumulative impacts	The combined impacts of several projects within an area, which individually are not significant, but together amount to a significant impact.

Drift geology	Superficial deposits - these are the youngest geological deposits formed during the most recent period of geological time, the Quaternary
Ecological Impact Assessment (EcIA)	An assessment of the potential effects of a proposed development on species, habitats and sites that are of value to conservation or protected by national and/or international legislation.
Historic England	Government statutory advisor on the historic environment, funded jointly by the government and by revenue from properties and members.
Environmental Action Plan (EAP)	A standalone report or section within another environmental impact assessment document which ensures that constraints, objectives and targets set in the main Environmental Report/Statement are actually carried out on the ground. Actions are separated into those to be carried out before, during and after construction.
Environmental Impact Assessment (EIA)	"EIA is an assessment process applied to both new development proposals and changes or extensions to existing developments that are likely to have significant effects on the environment. The EIA process ensures that potential effects on the environment are considered, including natural resources such as water, air and soil; conservation of species and habitats; and community issues such as visual effects and impacts on the population. EIA provides a mechanism by which the interaction of environmental effects resulting from development can be predicted, allowing them to be avoided or reduced through the development of mitigation measures. As such, it is a critical part of the decision-making process." www.iema.net/eiareport
Environmental Statement (ES)	The document produced to describe the environmental impact assessment process where statutory environmental impact assessment is required.
Flood alleviation Scheme (FAS)	Scheme designed to reduce the risk of flooding in a given area
Flood defence	A structure (or system of structures) that reduce flooding from rivers or the sea
Floodline	Environment Agency flood warning system, accessible by telephone or internet and updated every 15 minutes
Flood risk management strategy (FRMS)	A long term (50 years or more) plan for coastal or river management to reduce the risk of flooding and carry out. They are more detailed than CFMPs.
Geographical Information Systems (GIS)	A computer based system for capturing, storing, integrating, manipulating, analysing and displaying data spatially.

Habitats Regulations	The Conservation (Natural habitats and wild flora and fauna) Regulations (1994) establishes a system of protection of certain flora, fauna and habitats considered to be of International conservation importance. Sites are designated as Special areas of conservation (SACs), special protection areas (SPAs) and/or Ramsar sites. Any developments in or close to these designated areas are subject to the Habitat Regulations for approval of Natural England Together these sites are referred to as the Natura 2000 network.
Landscape Character Assessments	Landscape character assessment (LCA) is the process of identifying and describing variation in character of the landscape. LCA documents identify and explain the unique combination of elements and features that make landscapes distinctive by mapping and describing character types and areas.
Local Nature Reserve (LNR)	Nature reserves designated under the National Parks and Countryside Act (1949) for locally important wildlife or geological features. They are controlled by local authorities in liaison with Natural England
Made ground	Artificial deposits, such as embankments and spoil heaps, on the natural ground surface.
Main river	A watercourse designated by Defra. The Environment Agency has permissive powers to carry out flood defence works, maintenance and operational activities on main rivers. Responsibility for maintenance rests on the riparian owner.
Mitigation measures	Actions that are taken to minimise, prevent or compensate for adverse effects of the development.
Natural England	Natural England is an Executive Non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs. Their purpose is to protect and improve England's natural environment and encourage people to enjoy and get involved in their surroundings. Their aim is to create a better natural environment that covers all of our urban, country and coastal landscapes, along with all of the animals, plants and other organisms that live with us.
Natural flood management	Natural flood management is when natural processes are used to reduce the risk of flooding and coastal erosion. Examples include: restoring bends in rivers, changing the way land is managed so soil can absorb more water and creating saltmarshes on the coast to absorb wave energy
Nitrate vulnerable zone (NVZ)	Area where surface or ground waters are above the standards set out in SI2164/2002
Poaching	Damage to banks caused by animal feet.
Precipitation	Process of conversion of a chemcial substance into a solid from a solution.

Resection	Creation of new channel geometry by removal and/or modification of river bed and banks.
Revetment	An artificial lining often designed to stabilise banks.
Riparian	Area of land or habitat adjacent to rivers and streams
Scheduled monument	Nationally important historic sites, buildings or monuments identified by Historic Englandand designated by the Secretary of State for Culture, Media and Sport. Any work affecting a scheduled monument must gain consent from Historic England under the Ancient Monuments and Archaeological Areas Act (1979).
Scoping	The process of deciding the scope or level of detail of an EIA/ SEA. During this stage the key environmental issues (likely significant effects) of a project/strategy are identified so that the rest of the process can focus on these issues. Issues may result from the proposal itself or from sensitivities of the site.
Screening	For environmental impact assessment, the process of deciding which developments require an environmental impact assessment to be carried out and whether this will be statutory.
Screening opinion	Statutory opinion from the competent authority as to whether a proposed project requires statutory environmental impact assessment according to the Environmental Impact Assessment Regulations.
Site of Special Scientific Interest (SSSI)	Nationally important sites designated for their flora, fauna, geological or physiographical features under the Wildlife and Countryside Act (1981) (as amended) and the Countryside Rights of Way (CRoW) Act (2000).
Special Area for Conservation (SAC)	See 'Habitats regulations'.
Strata	A layer of sedimentary rock or soil, or igneous rock that was formed at the Earth's surface with consistent characteristics that distinguish it from other layers.
Stream power	The rate of doing work (in transporting water and sediment).
Sustainable development	A concept defined by the Brundtland Report (1987) as “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs”
Water Environment Regulations	Regulations that establish environmental objectives for water status based on ecological and chemical parameters, common monitoring and assessment strategies, arrangements for river basin administration and planning and a programme of measures in order to meet the objectives.

Working With Natural Process (WWNP)	Working with Natural Processes (WWNP) to reduce flood and coastal erosion risk (FCRM) involves implementing measures that help to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast. WWNP takes many different forms and can be applied in urban and rural areas, and on rivers, estuaries and coasts.