A303 Amesbury to Berwick Down

TR010025

Volume 6

6.3 Environmental Statement Appendices

Appendix 11.2 Water Framework Directive Compliance Assessment

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

October 2018

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Executive Summary

This appendix reports on the compliance of the Scheme with the objectives of the Water Framework Directive (WFD) 2000/60/EC. The Scheme crosses, and comes within the close vicinity of several WFD surface water bodies and a WFD groundwater body. A number of these water bodies were scoped out at the preliminary assessment stage (Annex 1).

Those water bodies which were scoped in have been assessed within this appendix. The detailed impact assessment uses a traffic light rating system, as agreed with the Environment Agency, in order to assign the magnitude of the effect of each Scheme element on each of the quality elements of the respective WFD water body.

It has been concluded that the Scheme is unlikely to result in any effects which may cause deterioration in the status of any quality elements of the surface water bodies within the study area. There may be short term impacts on the quality of these surface water bodies, due to the construction of the embankments which are located in close proximity to the water bodies and through the construction and operation of the new viaduct over the River Till, however this assessment indicates that these temporary impacts will not affect the WFD status of any of these water bodies.

In terms of groundwater, it is unlikely that this Scheme will have any significant adverse effects on the Upper Hampshire Avon groundwater body.

Overall, the Scheme is unlikely to result in a permanent change in the WFD status of any of the identified water bodies, both surface water and groundwater, nor is it likely to prevent any water body from attaining the identified WFD objectives in the future. It is therefore concluded that the Scheme is compliant with the requirements of the WFD.

1 Introduction

1.1 Purpose of this appendix

1.1.1 This appendix reports on compliance of the Scheme with the objectives of the Water Framework Directive (WFD) 2000/60/EC[1].

1.1.2 The Scheme will cross several surface water bodies and a groundwater body. An assessment of the Scheme's compliance against the WFD objectives of each of the water bodies potentially affected is required (see Section 2).

1.1.3 This appendix summarises the assessment approach, results and additional mitigation requirements with respect to achieving compliance with WFD objectives.

1.1.4 The WFD compliance assessment is based on consideration of the baseline condition of the relevant surface water bodies and groundwater body and the Scheme design, which incorporates a range of mitigation measures. The assessment will be updated during the detailed design stage of the Scheme, in order to reflect the latest iteration of the design assessment process.

1.1.5 The assessment methodology has been developed in accordance with the WFD Advice Note (Ref 1.1) and in agreement with the Environment Agency.

1.2 Scope of the WFD compliance assessment

1.2.1 The spatial scope of the assessment includes all WFD designated surface water bodies and the groundwater body potentially affected by the Scheme (as outlined in Sections 4 and 5 respectively).

1.2.2 The assessment has been undertaken at the water body scale. For the surface water bodies, the assessment considers all tributary watercourses that are affected by the Scheme.

1.2.3 The assessment considers the impacts on all of the quality elements associated with the surface water and ground water bodies affected by the Scheme.

1.2.4 Temporary impacts (defined as those which would last less than three years) are not considered to result in deterioration in WFD status and so are not included within the assessment. Adverse impacts are not considered to result in a deterioration of status if the water body:

- Is only impacted for a short time period (less than three years);
- Is likely to recover within a short time period (less than three years); and/or
- Is likely to recover without the need for any restoration measures to be implemented.

[1] Water Framework Directive - Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Strasbourg, European Parliament and European Council

1.3 Assumptions and limitations

1.3.1 The WFD water body classification data is taken from the Environment Agency's 2015 Cycle 2 River Basin Management Plan (RBMP) data (Ref 1.2). These classifications are considered to provide the current best estimate of status and are the formal baseline against which the Environment Agency will assess compliance with the 'no deterioration' objective in 2018.

1.3.2 Limitations with respect to baseline information have been identified. The WFD baseline of water environment receptors has been defined using published data sources. The availability of contemporary data with which to define the sensitivity of these attributes is considered robust and therefore this approach is acceptable and does not affect the ability to conduct the WFD impact assessment to a compliant level. Where baseline data is limited, professional judgement has been used in the assessment and a precautionary approach has been taken with regard to the impact assessment.

1.3.3 The WFD assessment takes into account the embedded mitigation within the design and assumes that all the identified mitigation measures will be adopted.

2 Overview of the WFD

2.1 Aims

2.1.1 The WFD aims to protect and enhance the quality of the water environment across all the European Union (EU) Member States. It takes a holistic approach to the sustainable management of the water by considering the interactions between surface water, groundwater and water dependent ecosystems.

2.1.2 Under the WFD, water bodies are the basic management units and are defined as all or part of a river system or aquifer. These water bodies form part of a larger River Basin District (RBD), for which RBMPs are developed by EU Member States and environmental objectives are set. These RBMPs are produced every six years, in accordance with the river basin management planning cycle.

2.1.3 The WFD requires all EU Member States to classify the current condition or 'status or potential' of surface water and groundwater bodies and to set a series of objectives for maintaining or improving conditions to allow for water bodies to maintain or reach 'good status or potential'.

2.2 WFD requirements for new developments

2.2.1 To ensure compliance with the WFD, decision makers must consider whether proposals for new developments have the potential to:

- Cause a deterioration of a water body from its current status or potential;
- Prevent future attainment of good status or potential where not already achieved;
- Impact on protected or priority species and habitats; and/or
- Provide opportunities to improve the water environment.

The Bund case

2.2.2 The Bund case concerned a challenge by a Non-Governmental Organisation (NGO) – Bund für Umwelt and Naturschutz Deutschland – against a proposed scheme to dredge the River Weser for the purposes of navigation, allowing larger vessels to call at German ports. A WFD compliance assessment was undertaken, considering the impacts the scheme would have on the hydromorphological, water quality and biological supporting quality elements and concluded that, although some of the quality elements would potentially be deteriorated, the overall status would not. The assessment concluded that the proposals were therefore compliant with the objectives of the WFD as the scheme would not result in a deterioration of the overall water body status.

2.2.3 The NGO challenged this position, arguing that the Directive defines water body deterioration as occurring when there is deterioration, in any way, of the WFD supporting elements, even if the overall status has not deteriorated.

2.2.4 The Court of Justice of the European Union (CJEU) ruled in favour of the NGO, and in the process clarified several definitions with respect to what constitutes deterioration within the meaning and purpose of the WFD.

2.2.5 The three most significant aspects in relation to the assessment of the Scheme are set out below:

- "Deterioration of the status" of the relevant body of surface water includes a fall by one class of any element of the "quality elements" within the meaning of Annex V of the WFD, even if the fall does not result in a fall of the classification of the body of surface water as a whole;
- Consent for development must not be granted by an authorising authority, unless a derogation is granted, where the project may cause a deterioration in the status of a body of surface water or where it jeopardises the attainment of good surface water status or for good ecological potential and good surface water chemical status by the date laid down in the Directive, and
- If the quality element is already in the lowest class, any deterioration of that element represents deterioration of status within the meaning of Article 4(1)(a)(i).

2.2.6 Each of these ruling aspects is considered in detail in the proceeding subsections of this chapter with reference to how it affects the WFD compliance assessments carried out for the Scheme.

2.2.7 Thus, with regard to the Scheme, if it cannot be demonstrated that there will be no deterioration, then Highways England will need to submit documentation as part of its DCO application to show that it meets the tests for a derogation to obtaining these objectives under Article 4.7 to ensure that the Scheme is compliant under the WFD legislation.

2.3 Determination of WFD status

2.3.1 Surface water and groundwater bodies are defined within WFD legislation. There are three types of surface water body: natural water bodies, heavily modified water bodies (HMWB) and artificial water bodies (AWB).

2.3.2 The overall status of natural surface water bodies is determined on the basis of their ecological and chemical status. The overall status of HMWBs and AWBs is classified based on their ecological potential and chemical status. The overall status of groundwater bodies is determined on the basis of their quantitative status and chemical status.

3 WFD assessment methodology

3.1 Overview

3.1.1 The WFD assessment is undertaken as a stepped process, which can be summarised in the following steps:

- **Step 1**: Collect water body baseline data;
- **Step 2**: Collect Scheme baseline data;
- **Step 3**: Preliminary assessment;
- **Step 4**: Design options appraisal and selection of preferred option;
- **Step 5**: Detailed impact assessment;
- **Step 6**: Applications of Article 4.7 where applicable;
- **Step 7**: Reporting; and
- **Step 8**: Follow-up post-project appraisal work.

3.1.2 This process is illustrated in Figure 3.1.

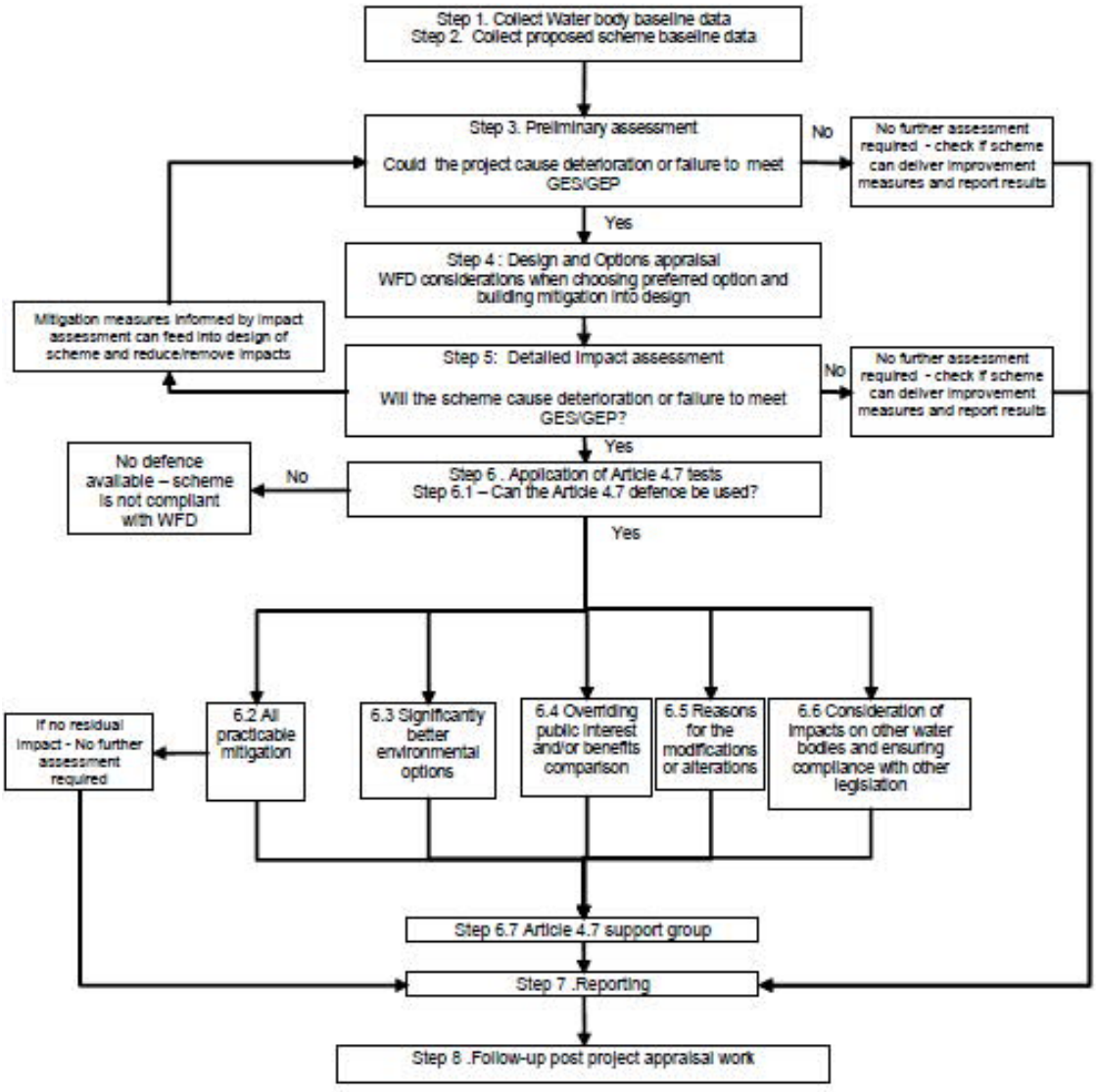


Figure 3.1 Steps in the WFD assessment process

3.1.3 The Planning Inspectorate's Advice Note Eighteen (AN18) (2017) on the WFD suggests a three-stage approach. Steps 1 to 3 outlined in Figure 3.1 represent Stage 1 (WFD screening) and Stage 2 (WFD scoping) and Steps 4 to 5 represent Stage 3 (WFD impact assessment).

3.1.4 The assessment process and methodology applied throughout this appendix has been developed in agreement with the Environment Agency who are the competent authority for the implementation of the WFD in England. The following sections summarise the key steps of the process.

3.2 Steps 1 to 4

3.2.1 Steps 1 to 3 of the assessment were reported in the WFD Screening and Scoping Report (May 2018) which is included in Annex 1. These steps are summarised in Sections 4 to 5 of this report. Step 4 was an iterative process undertaken throughout the design development and a summary of the embedded design mitigation is provided in Section 6 of this report.

3.2.2 After further consultation with the Environment Agency on the WFD Screening in June 2018 (Annex 2) it was agreed that the River Wylye (Lower) would be scoped back in due to the uncertainty of how the implementation of the tunnel may impact groundwater flow to the Till, and therefore the Lower Wylye. In addition to this, the Environment Agency also suggested assessing if the scheme may alter the risk of spreading non-native species, the impact of increased sediment on fish species within the Till and Avon and the impact of road drainage on hydrology. These comments have been addressed within this WFD Impact Assessment, rather than amending the WFD Screening and Scoping Report.

3.2.3 The elements of the Scheme that are considered within the assessment and the range of potential impacts and effects that may arise during construction and operation as a result of these scheme elements are presented in Annex 3.

3.3 Step 5: detailed impact assessment

3.3.1 Step 5, the detailed assessment of surface water and groundwater bodies is described in Section 7. It describes the spatial, temporal and technical scope of the assessment, including the water bodies considered within the assessment.

3.3.2 The objective of the detailed impact assessment is to establish the nature and anticipated magnitude of the effects of the relevant scheme components on the WFD quality elements of the surface water and groundwater bodies affected by the Scheme. These effects are considered in terms of the potential for deterioration of current status and/or the prevention of status objectives.

3.3.3 As with the preliminary assessment stage, the detailed impact assessment therefore comprises of two key parts, as follows:

- Assessment of effects on current status of quality element, including:
  - The assessment of the effects of individual scheme components at quality element level;
  - The assessment of 'cumulative' effects on quality elements at the water body scale, relating to the impacts of the scheme components located within other (typically adjacent) water bodies; and

- The assessment of the overall 'in combination' effects of scheme components on the quality elements at the water body scale, in order to assess potential for status change.

- Assessment of effects on status objectives, including further assessment of the effects of scheme components on the surface water and groundwater bodies.

3.3.4 There is currently no published methodology for conducting the WFD assessment; however the approach adopted for the assessment of the Scheme is based on previously received guidance from the Environment Agency and framed by the Planning Inspectorate's guidance note. The assessment is based on the baseline information available at the time the assessment was prepared.

3.4 Step 6: application of Article 4.7 test

3.4.1 Article 4.7 of the WFD states that Member States will not be in breach of the Directive when failure to meet its environmental objectives is the result of either new modifications to the physical characteristics of a water body or as a result of new human sustainable development, on the condition that the modifications of new development proposed are compliant with four key conditions:

- All practicable steps have been taken to mitigate the forecast adverse impacts on the water body;
- The modification and the use of Article 4.7 is to be reported and explained in the next River Basin Management Plan update after an exemption is granted;
- The reasons for the modifications are of overriding public interest and/or the benefits to the environment and society of achieving the WFD objectives are outweighed by the benefits of the new modifications to human health, maintenance of human safety or for the purpose of Sustainable Development; and
- The beneficial objectives served by the modifications to the water body cannot, for reasons of technical feasibility or disproportionate cost, be achieved by other means, which are a significantly better environmental option.

3.4.2 Whilst every effort has been made to ensure that an Article 4.7 test is not required, where unavoidable, the WFD compliance assessment identifies where such a test must be prepared for particular water bodies. No instances where an Article 4.7 test is required have been identified in this assessment.

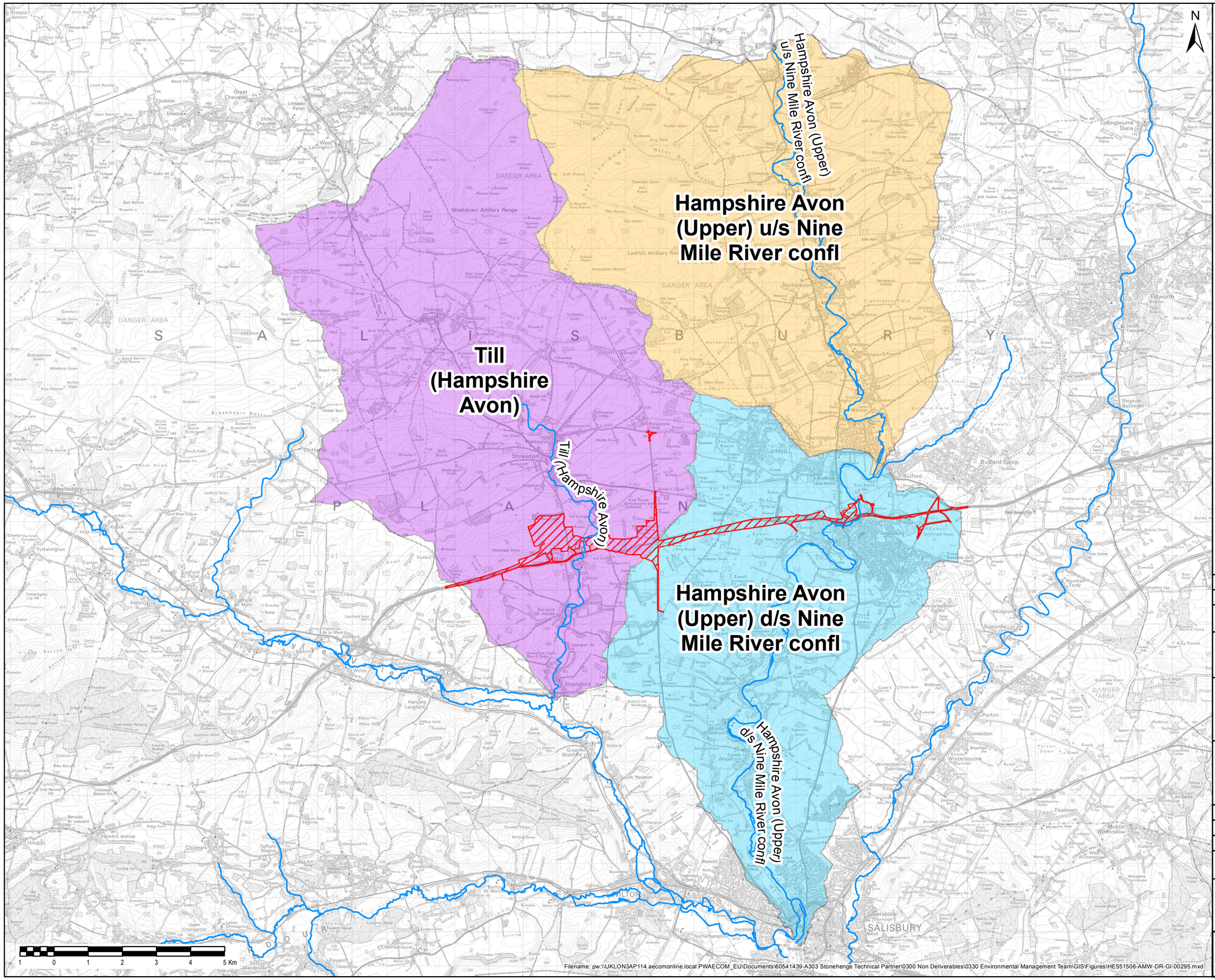
4 Surface water baseline

4.1 WFD water bodies

4.1.1 The surface water bodies considered in this study have been selected based on whether the Scheme is considered to impact the water body, either directly or indirectly, through the construction and operational phases. The screening report (Annex 1) identified the following water bodies which may potentially be impacted by the Scheme:

- River Till;
- River Avon (Upper) upstream of Nine Mile River confluence;
- River Avon (Upper) downstream of Nine Mile River confluence;
- Nine Mile River;
- River Wylye (Middle); and
- River Wylye (Lower)

4.1.2 The River Wylye (Middle), River Wylye (Lower) and Nine Mile River were all scoped out, however, the River Wylye (Lower) has subsequently been scoped back in following consultation with the Environment Agency. Detailed explanations as to why these water bodies were scoped out can be found in the scoping report. The baseline conditions for the remaining four surface water bodies, collated from the Environment Agency's Catchment Data Explorer and the 2015 South West RBMP, are detailed below. The location of each of these water bodies and their catchments are shown on Figure 4.1. The Environment Agency is in agreement that all the relevant water bodies have been reported on.



NOTES / LEGEND

- Scheme boundary
- WFD Waterbody
- Hampshire Avon (Upper) u/s Nine Mile Confluence
- Hampshire Avon (Upper) d/s Nine Mile Confluence
- Till (Hampshire Avon)

Revision Details	By / Check	Date	Suffix

Purpose of issue: FINAL

Client: Highways England

Working on behalf of: highways england

Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: APPENDIX 11.2 FIGURE 4.1 WATER FRAMEWORK DIRECTIVE (WFD) SURFACE WATER BODIES

Designed	Drawn	Checked	Approved	Date
CC	KD	BM	CC	31/08/18

Internal Project No. 60541200

Scale @ A3: 1:100,000 | Zone: SW

Highways England
Temple Quay House
2 The Square, Temple Quay
Bristol
BS1 6HA

AmW
AECOM + mace + WSP

Drawing Number: Highways England PIN	Originator	Volume	Location	Type	Role	Number	Rev
HE551506	AMW	GEN	SCHEME WIDE	DR	GI	00295	01

Filename: pw:\\UKLON3AP114.aecomonline.local:PWAECOM_EU\Documents\60541439-A303 Stonehenge Technical Partner\0300 Non Deliverables\0330 Environmental Management Team\GIS\Figures\HE551506-AMW-DR-GI-00295.mxd

River Till

4.1.3 The River Till (ID: GB108043022570) is a primarily groundwater fed winterbourne chalk stream, with the upper reaches being entirely fed by groundwater (Natural England SSSI Citation).

4.1.4 The stream is of European importance, being designated as part of the River Avon Special Area of Conservation (SAC). The stream acquired these designations as a result of the internationally important biota present within the aquatic system, both in terms of flora (river water-crowfoot *Ranunculion fluitantis* and reed canary grass, *Phalaris arundinacea*) and fauna (brown trout *Salmo trutta,* grayling *Thymallus thymallus* and bullhead *Cottus gobio*).

4.1.5 Based on the 2015 RBMP results, the overall status of the River Till is 'good' (Table 4.1).

Table 4.1 Water body classification for the River Till

Parameter		River Till		
		2009	2015	2016
Water Body ID		GB108043022570		
Water Body Area		127.785km^2		
Water Body Type		River		
Water Body Length		13.993km		
Hydromorphological Designation		Not designated artificial or heavily modified		
Status Objective		Overall 'good' status by 2015		
Overall Status		Good	Good	Good
Ecological Status		Good	Good	Good
Chemical Status		-	Good	Good
Biological Quality Elements	Invertebrates	High	High	High
Hydromorphological Supporting Elements	Hydrological Regime	Does Not Support Good	Supports Good	Does Not Support Good[2]
	Morphology	Supports Good	Supports Good	Supports Good
Physio-Chemical Quality Elements	Acid Neutralising Capacity	-	High	High
	Ammonia (Physio-Chemical)	High	High	High
	Dissolved Oxygen	High	High	High
	pH	High	High	High
	Phosphate	High	High	High
	Temperature	High	High	High
Specific Pollutants	Ammonia (Annex 8)	High	-	-
	Copper	High	High	High
	Iron	-	High	High
	Triclosan	-	-	-
	Zinc	High	-	-
Priority Substances	Lead and Its Compounds	Environment Agency have noted does not require assessment	Environment Agency have noted does not require assessment	Environment Agency have noted does not require assessment

River Avon

4.1.6 The River Avon, is a perennial, largely groundwater fed chalk river. Within the zone of influence, the river is designated as two WFD water bodies: the Upper River Avon upstream (u/s) (GB108043022351) and downstream (d/s) (GB108043022352) of the Nine Mile River confluence.

4.1.7 As with the River Till, the River Avon has been recognised as a site of ecological importance and is a designated SAC, supporting diverse populations of flora (water-starworts *Callitricho-Batrachion* and water-crowfoots *Ranunculus* vegetation) and fauna (brook lamprey *Lampetra planeri* and Desmoulin's whorl snail *Vertigo moulinsiana*). The Avon is also linked to protected areas under the Nitrates Directive.

[2] Note the decline in the status of the 'Hydrological Regime' parameter between the 2015 and 2016 cycle. The Environment Agency's Catchment Data Explorer does not provide a reason why this classification element does not support 'good' status, however other WFD waterbodies within the Avon Hampshire catchment do not support 'goof' hydrological scheme status due to surface water and groundwater abstractions. It could therefore be suggested that this is the reason why the River Till's hydrological regime does not support 'good' status.

4.1.8 Groundwater baseflow contributions[3] to this river from the Chalk follow two typical pathways. The first, matrix flow[4], accounts for approximately 80% of baseflow, with the water following this pathway being on average 55 years old (Ref 4.1). The alternate pathway is through rock fractures (20%). Recharge can reach the water table through fracture pathways within days or weeks', meaning that groundwater entering the river through the fracture features is far younger than that of matrix flow. These contrasting flow pathways influence the chemistry of the river, with water following the more rapid fracture pathways having less time for natural minerals within the rock to dissolve into it. Despite this, water following fracture pathways has a greater potential to deliver land derived pollutants (nitrates, pesticides etc.) to the river due to there being less time for these chemicals to be attenuated.

4.1.9 It is important to understand these pathways since it has been identified that phosphorus poses the most significant threat to the River Avon in terms of its ecological features, according to the River Avon Nutrient Management Plan. Furthermore, the Wiltshire Core Strategy core policy 69 identifies the River Avon SAC as a potentially sensitive receptor, in terms of water quality, which requires protection from adverse pollution impacts related to development.

4.1.10 Based on the 2015 RBMP results, the overall status of the River Avon (Upper) upstream of the Nine Mile River confluence is 'poor' (Table 4.2), being limited by the fish, and Macrophytes and Phytobenthos (combined) biological quality elements. It should also be mentioned that, whilst it doesn't influence the overall status of 'poor', phosphate status is also 'moderate' in this water body, reflecting the issue of phosphates within this study area.

4.1.11 The status of the River Avon (Upper) downstream of the Nine Mile River confluence is 'moderate' (Table 4.3). The status of the downstream Avon water body is not limited by biological quality elements (all at high or good status), but as a result of phosphates, demonstrating the previously mentioned influence phosphates have within this catchment. This is a recorded decline from 'good' status in 2012.

[3] Base Flow Index is 0.91 at Gauging Station 43005 – Avon at Amesbury

[4] Defined as the slower movement of water and solutes percolating through soil pores

Table 4.2 Water body classification for the River Avon (Upper) upstream of Nine Mile River confluence

Parameter		River Avon (Upper) u/s Nine Mile River confluence	
		2012[5]	2015/2016[6]
Water Body ID		GB108043022351	
Water Body Area		109.75km^2	
Water Body Type		River	
Water Body Length		23.682km	
Hydromorphological Designation		Not designated artificial or heavily modified	
Status Objective		Overall 'good' status by 2027 (Disproportionately expensive)	
Overall Status		Poor	Poor
Ecological Status		Poor	Poor
Chemical Status		Good	Good
Biological Quality Elements	Fish	Poor	Poor
	Invertebrates	High	High
	Macrophytes and Phytobenthos Combined	-	Poor
Hydromorphological Supporting Elements	Hydrological Regime	Supports Good	Supports Good
Physio-Chemical Quality Elements	Ammonia (Physio-Chemical)	-	High
	Dissolved Oxygen	-	High
	pH	-	High
	Phosphate	-	Moderate
	Temperature	-	High
Specific Pollutants	Copper	High	-
	Iron	-	High
	Triclosan	High	-
	Zinc	High	-
Priority Substances	Lead and Its Compounds	Good	Environment Agency have noted does not require assessment

[5] Earliest data provided by Environment Agency for this water body
[6] The 2015 results have been compared to the 2016 Cycle 2 results on the Environment Agency's Catchment Data Explorer and no changes in the status of any of the parameters is recorded.

Table 4.3 Water body classification for the River Avon (Upper) downstream of Nine Mile River confluence

Parameter		River Avon (Upper) d/s Nine Mile River confluence	
		2012[7]	2015/2016[8]
Water Body ID		GB108043022352	
Water Body Area		82.901km^2	
Water Body Type		River	
Water Body Length		31.521km	
Hydromorphological Designation		Not designated artificial or heavily modified	
Status Objective		Overall 'good' status by 2021[9]	
Overall Status		Good	Moderate
Ecological Status		Good	Moderate
Chemical Status		Good	Good
Biological Quality Elements	Fish	Good	High
	Invertebrates	High	High
	Macrophytes and Phytobenthos Combined	Good	Good
Hydromorphological Supporting Elements	Hydrological Regime	Supports Good	Supports Good
Physio-Chemical Quality Elements	Ammonia (Physio-Chemical)	High	High
	Dissolved Oxygen	High	High
	pH	High	High
	Phosphate	Good	Moderate
	Temperature	High	High
Specific Pollutants	Copper	High	Not assessed by the Environment Agency
	Triclosan	High	
	Zinc	High	
Priority Substances	Lead and Its Compounds	Good	Environment Agency have noted does not require assessment

[7] Earliest data provided by Environment Agency for this water body.

[8] The 2015 results have been compared to the 2016 Cycle 2 results on the Environment Agency's Catchment Data Explorer, with it being suggested that there have been no changes in the status of any of the parameters.

[9] The Environment Agency is aiming to achieve 'good' status in at least 60% of waters by 2021 and in as many waters as possible by 2027. It is believed that it is possible to achieve 'good' status in this waterbody catchment by 2021, largely by controlling both point and natural sources of phosphates.

River Wylye

4.1.12 The River Wylye is a chalk stream fed primarily (89%) (Ref 4.2) by large springs from the Upper Greensand aquifer as well as from the River Till, explaining the potential indirect impact from the Scheme. Within the zone of influence, the river is designated as two WFD water bodies: the Wylye (Middle) (GB108043022550) and Wylye (Lower) (GB108043022510).

4.1.13 As with the River Till and Avon, the Wylye is designated as an SAC. Along with the classic chalk stream plant communities (river water-crowfoot *Ranunculion fluitantis* and water-starworts *Callitricho-Batrachion*), the Wylye is noted for its wild brown trout (*Salmo trutta*) populations (Ref 4.3). The river is also linked to protected areas under the Habitats and Species Directive, in addition to the Nitrates and Urban Waste Water Treatment Directives.

4.1.14 Based on the 2015 RBMP results (Ref 4.4) the overall status of the River Wylye (Lower) is ‘good’ (Table 4.4).

Table 4.4 Water body classification for the River Wylye (Lower)

Parameter		River Wylye (Lower)		
		2009	2015	2016
Water Body ID		GB108043022510		
Water Body Area		21.740 km^2		
Water Body Type		River		
Water Body Length		15.775 km		
Hydromorphological Designation		Not designated artificial or heavily modified		
Status Objective		Overall 'good' status by 2021		
Overall Status		Good	Good	Good
Ecological Status		Good	Good	Good
Chemical Status		Good	Good	Good
Biological Quality Elements	Fish	Good	High	High
	Invertebrates	High	High	High
	Macrophytes and Phytobenthos Combined	Good	Good	High
Hydromorphological Supporting Elements	Hydrological Regime	Supports Good	Supports Good	Supports Good
Physio-Chemical Quality Elements	Ammonia (Physio-Chemical)	High	High	High
	Dissolved Oxygen	High	High	High
	pH	High	High	High
	Phosphate	Good	Good	Good
	Temperature	High	High	High
Specific Pollutants	Copper	High	Not assessed by the Environment Agency	High
	Triclosan	High		Not assessed by the Environment Agency
	Zinc	High		
	Iron	Not assessed by the Environment Agency		High[10]
Priority Substances	Lead and Its Compounds	Good	Environment Agency have noted does not require assessment	
	Nickel and Its Compounds	Good		
Priority Hazardous Substances	Cadmium and Its Compounds	Good		
	Di(2-ethylhexyl)phthalate	Good		
	Nonylphenol	Good		
	Tributyltin Compounds	Good		

[10] The 2016 results show that Iron concentrations are now being assessed along the River Wylye (Lower).

5 Groundwater baseline

5.1 WFD groundwater bodies

Upper Hampshire Avon (Chalk)

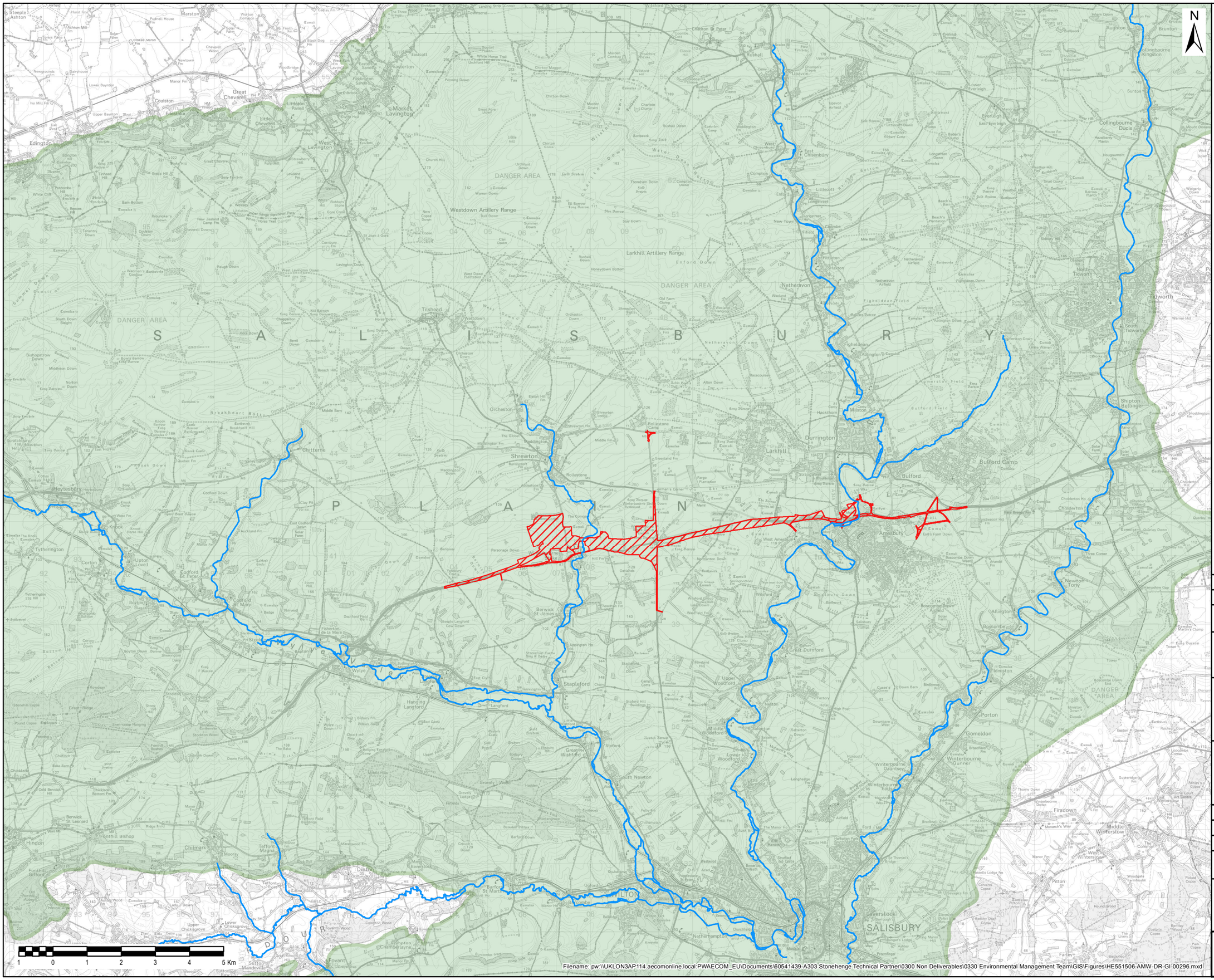
5.1.1 The Upper Hampshire Avon (ID: GB40801G806900) is a Chalk groundwater body that directly supports baseflow in the Avon, Till and Wylye Chalk rivers. The groundwater body location is shown in Figure 5.1. The Till and the Avon rivers are of European importance being designated as part of the River Avon Special Area of Conservation (SAC). The Chalk is underlain by the Upper Greensand, which is exposed in the Vale of Pewsey and the valley of the upper Wylye.

5.1.2 Based on the 2015 RBMP results (Table 5.1), the quantitative and chemical WFD elements in the Upper Hampshire Avon are classified as 'poor' status. For the chemical status of the water body, the objective is to achieve 'good' status by 2027 but due to the natural background conditions this could not be achieved for 2015. For the quantitative status, it has been identified, by the Environment Agency, that it is disproportionately expensive to achieve 'good' status through an unfavourable balance of costs and benefits. As such there is no objective beyond 2015 to be achieved.

Table 5.1 Water body classification for the Upper Hampshire Avon

Parameter		Upper Hampshire Avon	
		2009	2015/2016[11]
Water Body ID		GB40801G806900	
Water Body Area		1,569.156 km^2	
Water Body Type		Groundwater	
Status Objective		Poor Quantitative Status by 2015 Good Chemical Status by 2027	
Protected Area Designation		Drinking Water Protected Area, Nitrates Directive	
Overall Status		Poor	Poor
Quantitative Status		Poor	Poor
Chemical Status		Poor	Poor
Quantitative Elements	Saline or other intrusions	Good	Good
	Dependent Surface Water	Poor	Poor
	Groundwater Dependent Terrestrial Ecosystems (GWDTEs)	Good	Good
	Water Balance	Good	Good
Chemical Elements	Saline or other intrusions	Good	Good
	Dependent Surface Water	Poor	Poor
	GWDTEs	Good	Good
	Drinking Water Protected Areas (DrWPAs)	Poor	Poor
	General Chemical Test	Good	Poor

[11] The 2015 results have been compared to the 2016 Cycle 2 results on the Environment Agency's Catchment Data Explorer, with it being suggested that there have been no changes in the status of any of the parameters.



NOTES / LEGEND

Proposed scheme boundary

WFD Waterbody

WFD Groundwater Waterbodies

Upper Hampshire Avon

Revision Details	By / Check	Date	Suffix

Purpose of issue: FINAL

Client: Highways England

Working on behalf of: highways england

Project Title:

A303 AMESBURY TO BERWICK DOWN

Drawing Title:

APPENDIX 11.2
FIGURE 5.1
WATER FRAMEWORK DIRECTIVE (WFD) GROUNDWATER WATER BODY

Designed	Drawn	Checked	Approved	Date
CC	KD	BM	CC	31/08/18

Internal Project No. 60541200

Scale @ A3: 1:100,000 | Zone: SW

Highways England
Temple Quay House
2 The Square, Temple Quay
Bristol
BS1 6HA

AmW
AECOM + mace + WSP

Drawing Number: Highways England PIN	Originator	Volume	Rev
HE551506	AMW	GEN	01

Location	Type	Role	Number
SCHEME WIDE	DR	GI	00296

Filename: pw:\\UKLON3AP114.aecomonline.local:PWAECOM_EU\Documents\60541439-A303 Stonehenge Technical Partner\0300 Non Deliverables\0330 Environmental Management Team\GIS\Figures\HE551506-AMW-DR-GI-00296.mxd

6 Scheme baseline

6.1 Scheme components

6.1.1 The Scheme would be approximately 8 miles (13km) long (as shown on Figure 6.1) and will comprise the following key features:

- A northern bypass of Winterbourne Stoke with a viaduct over the River Till valley;
- A new junction between the A303 and A360 to the west of and outside the World Heritage Site (WHS), replacing the existing Longbarrow roundabout;
- A twin-bore tunnel approximately 2 miles (3.3km) long, past Stonehenge; and
- A new junction between the A303 and A345 at Countess Roundabout.

6.1.2 As part of the construction of the Scheme, the following elements will also be required:

- Temporary traffic management areas, temporary working and storage areas, material stockpiles, construction compounds, haul roads, and provision for site compounds to be used during the construction period; and,
- Preliminary works including utility diversions as required.

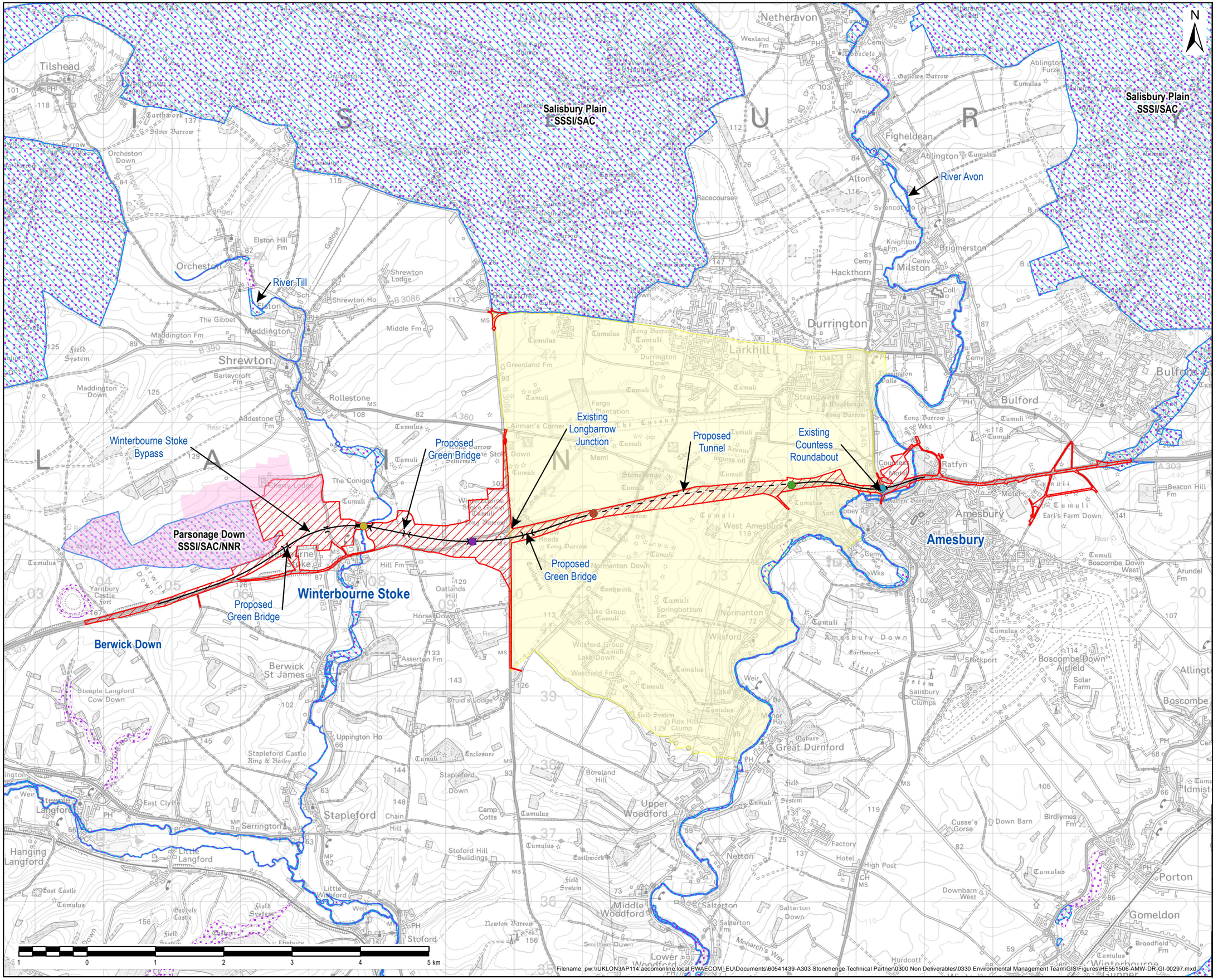
6.2 Design assumptions and embedded mitigation

6.2.1 Embedded mitigation includes all those measures that have been developed through iterative environmental assessment[12] and are incorporated into the design of the Scheme in order to avoid or reduce environmental effects. These are presented in detail in the ES Chapter 11 (Road Drainage and Water Environment). Those of particular relevance to the WFD Impact Assessment comprise:

- Mitigation through the design to reduce permanent land take within the floodplain and to avoid alteration to the river channel which could alter hydromorphology (WFD element).
- The inclusion of a twin deck viaduct for the new crossing over the River Till with an air gap between the east and westbound carriageways to allow for a reduction in shading effects, is essential mitigation for biodiversity;
- The application of noise absorbent surface to tunnel portals and tunnel entrance (for the first 200m) to minimise the breakout of noise from the construction and
  operation of the tunnel, helping to minimise the impact of noise on aquatic biota;
- The implementation of infiltration basins with improved amenity grassland along the proposed new A303 alignment. These basins have been designed to include areas which are impermeable and therefore retain water for longer periods of time for biodiversity benefits and drainage attenuation; and
- The reinstatement of habitats in the River Till valley following construction. This also comprises the ongoing monitoring of vegetation during the operational
  phase.

[12] The WFD was considered throughout the design process leading to embedded mitigation measures

6.2.2 Good practice construction techniques comprise mitigation measures that would be required regardless of the environmental assessment, as it is imposed, for example, as a result of legislative requirements and/or standard sectoral practices. These mitigation measures are detailed in the Outline Environmental Management Plan (OEMP) (2018).



NOTES / LEGEND

- Indicative centreline
- Proposed tunnel
- Proposed structure
- Proposed scheme boundary

Locations are indicative for the purpose of EIA

- Location of the Eastern portal
- Location of the Western portal
- Location of the Countess junction
- Location of the Longbarrow junction
- Location of the River Till crossing
- National Nature Reserve (NNR)
- Site of Special Scientific Interest (SSSI)
- Special Area of Conservation (SAC)
- World Heritage Site (WHS)

Revision Details	By / Check	Date	Suffix

Purpose of issue: FINAL

Client: Highways England

Working on behalf of: highways england

Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: APPENDIX 11.2 FIGURE 6.1 PROPOSED SCHEME

Designed	Drawn	Checked	Approved	Date
HS	KD	CC	WB	31/08/18

Internal Project No.: 60541200

Scale @ A3: 1:50,000 | Zone: SW

Highways England
Temple Quay House
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AmW
AECOM + mace + WSP

Drawing Number	Originator	Volume	Rev
Highways England PIN: HE551506	AMW	GEN	01
Location: SCHEME WIDE	Type: DR	Role: GI	Number: 00297

Filename: pw:\\UKLON3AP114.aecomonline.local:PWAECOM_EU\Documents\60541439-A303 Stonehenge Technical Partner\0300 Non Deliverables\0330 Environmental Management Team\GIS\Figures\HE551506-AMW-DR-GI-00297.mxd

7 Detailed impact assessment

7.1 Overview

7.1.1 Following the baseline and preliminary assessments, a detailed impact assessment has been undertaken for all waterbodies and scheme components where a potential for the Scheme to have an effect on the current status objectives has been identified (i.e. those which were scoped in during the scoping phase). The scheme components which were assessed for each water body include the following:

- River Till and any indirect impacts on the River Wylye (Lower):
  - Embankment 1
  - Winterbourne Stoke Cutting West
  - Embankment 2
  - Cutting West of River Till Viaduct
  - River Till Embankment West
  - River Till Viaduct
  - River Till Embankment East
  - Green Bridge No. 2 Cutting
  - Embankment 5
  - Longbarrow Cutting West
  - Embankment 6
  - Longbarrow Cutting Central
  - Longbarrow Cutting East
  - Cutting Approach to Western Portal
  - Twin-Bore Tunnel and Associated Eastern and Western Portals
  - Material processing, treatment and storage areas
  - Landscaping and habitat creation

- River Avon Upper downstream of the Nine Mile confluence and any indirect impacts on the River Avon Upper upstream of the Nine Mile confluence:
  - Twin-Bore Tunnel and Associated Eastern and Western Portals
  - Cutting Approach to Eastern Portal
  - Embankment 7
  - Amesbury Cutting
  - Countess Embankment West
  - Countess Flyover
  - Countess Embankment East
  - Existing River Avon Bridge
  - Material processing, treatment and storage areas
  - Landscaping and habitat creation

- Upper Hampshire Avon (Chalk):
  - Winterbourne Stoke Cutting West
  - Green Bridge 1 (Parsonage Down)
  - B3083 underbridge
  - Cutting West of River Till Viaduct
  - River Till Viaduct
  - Green Bridge No. 2 Cutting
  - Green Bridge 2 (East of Till)
  - Longbarrow Cutting West

- Longbarrow Cutting Central
- Green Bridge 3 – Longbarrow Junction
- Longbarrow Cutting East
- Green Bridge 3 (Longbarrow junction)
- Cutting Approach to Western Portal
- Western Portal – retaining wall
- Twin-Bore Tunnel
- Eastern Portal – retaining wall
- Cutting Approach to Eastern Portal
- Amesbury Cutting
- Countess Embankment West
- Countess Flyover
- Countess Embankment East
- Existing River Avon Bridge
- Other cuttings (new Longbarrow Junction diverges and merges, link to Winterbourne Stoke, Green Bridge 3, realigned A360 and Countess Junction eastbound diverge)
- Drainage

7.1.2 The detailed impact assessment is presented as a matrix in Annex 3. The assessment process for determining the potential for a deterioration of current status uses the following traffic light rating system, as agreed with the Environment Agency, in order to assign the magnitude of the effect anticipated on the quality elements of the affected water body:

- **Green**: No measurable change to (or effect on) status class for the quality element at water body scale;
- **Yellow**: Minor localised and/or temporary effect when balanced against likely embedded mitigation – insufficient to affect status class for the quality element at water body scale;
- **Amber**: An adverse effect is possible when balanced against likely embedded mitigation – the extent of effect is uncertain and there remains a potential to affect status class for the quality element at water body scale; and
- **Red**: adverse effect of sufficient scale to impact on status class for the quality element at a water body scale.

7.1.3 The outcome of the assessment identifies the overall effect of all the relevant scheme components on each quality element at a water body scale. As part of this process, the assessment also considers the ‘cumulative effects’ on quality elements associated with the impacts of scheme components located within other adjacent water bodies.

7.2 Summary of the detailed impact assessment

7.2.1 The detailed impact assessment uses a spreadsheet tool to assess the potential effects of the scheme elements on each of the WFD elements (biological, physico-chemical and hydromorphological surface water elements, and quantitative and chemical groundwater elements). The effects are assessed predominantly qualitatively, however there are some quantitative inputs, these include:

- Groundwater modelling of the Upper Hampshire Avon groundwater body;
- Monthly flow gauging along the River Till and River Avon using Acoustic Doppler Current Profiler instrumentation;

- A fluvial audit of the River Till at Winterbourne Stoke to assess the potential impact of the new crossing, comprising a winter site visit and subsequent desk based assessment; and
- Water Quality assessment of the routine road runoff and spillage risk.

7.2.2 A number of the Scheme elements were scoped out during the scoping/screening phase of this assessment, leaving those remaining elements which were identified as having the potential to result in the deterioration in status or potential of the surface water and/or groundwater bodies within the study area, or where measures to achieve good status may be prevented.

7.2.3 These scoped in elements were then each assessed against each WFD element. The majority of the Scheme elements were identified as having a negligible effect on the status of the respective waterbody, however several scheme elements were identified as having the potential to result in minor localised and/or temporary effects on individual WFD elements, most notably the River Till Viaduct and the embankments located within the close vicinity of either surface water body, and the presence of below ground structures affecting the groundwater table. However, the extent of the impacts were identified as being insufficient to affect the status class for any quality elements at the water body scale.

7.2.4 The River Till and River Avon (upstream and downstream of the Nine Mile River confluence) surface water bodies are not currently monitored for priority substances and therefore are reported as being at good chemical status. The Scheme will not discharge any chemicals that are priority substances and/or priority hazardous substances into the surface water bodies or groundwater body and therefore it will not change the chemical status.

8 Conclusions

8.1.1 The Scheme is unlikely to result in any effects which may cause a deterioration in the status of any quality element for the surface water bodies (River Till, River Wylye (Lower) and River Avon (Upper)) present within the study area. The construction of embankments close to either surface water body, road drainage, and the construction and operation of the new viaduct over the River Till were identified as scheme elements which have the potential to impact on WFD quality elements. The assessment, however, has shown that they would not affect the status of any of the water bodies within the study area.

8.1.2 The assessment has shown that the construction of scheme elements below the groundwater table (tunnel, cross-passages, piling and pile caps at the River Till viaduct) only has the potential to have minor localised effects, thereby not affecting the WFD status of the groundwater body (Upper Hampshire Avon).

8.1.3 The effects of the Scheme on the European designated sites have also been considered, with it being concluded that sites designated under the Habitats Directive (SAC) would not be affected.

8.1.4 There is the potential for localised and temporary water quality impacts as a result of maintenance or construction works, although any impacts are predicted to be minimal as a result of the implementation of sensitive construction techniques and OEMP measures.

8.1.5 Whilst sensitive construction techniques would not alter any pollution pathways created between the construction site and watercourses, the risk of water quality deterioration would be minimal as a result of other mitigation measures. These measures could include, but not necessarily be limited to, minimising the amount of exposed ground and soil stockpiles, sheeting or seeding of any soil that does require stockpiling, silt traps and/or sediment lagoons.

8.1.6 Based on the information available, the impacts resulting from the construction and operation of the Scheme are therefore unlikely to cause a permanent change in the ecological status of the water body and overall the Scheme is compliant with the requirements of the WFD.

Future Status

8.1.7 The Scheme is unlikely to prevent the future attainment of the identified WFD objectives for each of the respective water bodies, both surface and ground water. For both the Upper Hampshire Avon groundwater body and River Avon (Upper) upstream on Nine Mile River confluence WFD water body there are no specific RBMP measures in place to achieve the WFD status objectives as these have been identified by the Environment Agency in the RBMP as being disproportionately expensive.

8.1.8 For the River Wylye the detailed assessment concluded that none of the scheme elements are likely to prevent the Wylye from continuing to achieve 'good' status.

8.1.9 For the River Till the detailed assessment concluded that none of the scheme elements are likely to impact measures implemented to improve the hydrological regime status of the river, thereby not affecting the future status of the water body.

8.1.10 Finally, for the River Avon (Upper) downstream of the Nine Mile River confluence, it is concluded that the scheme elements are unlikely to have a detrimental impact on the attainment of 'good' phosphate status by 2021, with there being the potential for the proposed embankments to improve the phosphate status of this waterbody due to their ability to hold back agriculturally polluted surface water.

8.1.11 No instances where an Article 4.7 test is required have been identified within this assessment.

References

Ref 1.1 The Planning Inspectorate, June 2017. Advice Note 18: The Water Framework Directive

Ref 1.2 Environment Agency, Catchment Data Explorer, http://environment.data.gov.uk/catchment-planning/

Ref 4.1 Environment Agency, 2015. Phosphorus un the Hampshire Avon Special Area of Conservation Technical Report. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/429216/Annex_4_River_Avon_Nutrient_Management_Plan_Technical_Annex_Final_30_April_2015.pdf

Ref 4.2 Environment Agency, 2015. Phosphorus in the Hampshire Avon Special Area of Conservation Technical Report

Ref 4.3 The Wild Trout Trust, 2013, River Wylye: http://www.wildtrout.org/system/files/private/River%20Wylye%20at%20Wylye%20WFFC%20AV.pdf

Ref 4.4 Environment Agency, 2018. Catchment Data Explorer: http://environment.data.gov.uk/catchment-planning/WaterBody/GB108043022550

A303 Amesbury to Berwick Down

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Volume 6

6.3 Environmental Statement Appendices

Appendix 11.2 Annex 1 Water Framework Directive Screening and Scoping Report

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

October 2018

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1 Introduction

1.1 Overview

1.1.1 Consideration of the Water Framework Directive (WFD) (2000/60/EC) is required for Development Consent Order (DCO) applications, which have the potential to detrimentally impact the chemical and/or ecological status of a water body or to prevent improvements that may otherwise result in a water body meeting its WFD objectives. As a result of this, considerations must be made on the potential impacts to WFD water bodies that may arise through both the construction phase and operational phases of a project.

1.1.2 The A303 Stonehenge – Amesbury to Berwick Down Scheme (the proposed scheme) is classified as a Nationally Significant Infrastructure Project (NSIP) which subsequently requires a DCO application for consent. Since the proposed scheme has the potential to impact the current or targeted WFD status of the water bodies which the scheme interacts with (either directly or indirectly), therefore it is a requirement to assess their compliance against the WFD objectives of these potentially affected water bodies.

1.1.3 This report sets out further information on the WFD and comprises the stage 1 (screening) and stage 2 (scoping) for the proposed scheme identifying the potential impacts that require further assessment at stage 3 (WFD impact assessment). This staged approach to the WFD compliance assessment is not defined in legislation but follows guidance outlined in Planning Inspectorate's Advice Note Eighteen (2017) (Ref 1-1) which is described in further detail in Section 2.4.

1.2 Background to the proposed scheme

1.2.1 The A303/ A358 corridor is a vital connection between the South West and London and the South East. While most of the road has been dualled, there are still over 35 miles (56km) of single carriageway. These sections act as bottlenecks for users of the route resulting in congestion, particularly in the summer months and at weekends. This causes delays to traffic travelling between the M3 and the South West and increases the risk of accidents.

1.2.2 The scheme is part of a wider package of proposals for the A303/A358 corridor designed to transform connectivity to and from the South West by creating a dual-carriageway. The A303/A358 package was identified in the 2014 National Infrastructure Plan (Ref 1-2) as one of the country's top 40 priority infrastructure projects.

1.2.3 The preferred route for the proposed scheme was confirmed by the Secretary of State in September 2017. It commences south east of Yarnbury Castle, near Berwick Down, and follows a general west-east alignment similar to the existing A303, but passing to the north of Winterbourne Stoke, for some 12.6km to finish just east of Solstice Park, Amesbury.

1.2.4 The proposed scheme will involve the construction of a high quality dual two lane all-purpose carriageway on the A303 trunk road between Amesbury and Berwick Down in Wiltshire, linking with existing dual carriageways. The proposed scheme also involves the construction of a twin-bore tunnel that will divert the A303 away

from Stonehenge, reducing the impact, both aesthetically and environmentally, on the wider World Heritage Site (WHS). Furthermore, this proposed scheme will involve the construction of a viaduct over the River Till, approximately 500m north of Winterbourne Stoke. Further detail on various elements of the proposed scheme is provided in Section 4.1.

2 The Water Framework Directive

2.1 Overview

2.1.1 The WFD aims to protect and enhance (or improve) surface water bodies, transitional waters, coastal waters (out to one nautical mile from low water mark) and groundwater bodies across all EU member states. The WFD requires that the water environment be viewed holistically, integrating water quality, quantity and physical habitat with ecological indicators.

2.1.2 Under the WFD, 'water bodies' are the basic management units and are defined as all or part of a river system or aquifer. These water bodies form part of a larger River Basin District (RBD) for which River Basin Management Plans (RBMPs) are developed by EU member states and environmental objectives are set. These management plans are produced every six years.

2.1.3 The WFD requires all EU member states to classify the current status (or potential) of surface and groundwater bodies and set a series of objectives for maintaining or improving conditions so that water bodies are at 'good status' (or potential) during the next river basin management planning cycle. In order to achieve the aims of the WFD, eight primary objectives are identified:

a) Prevent the deterioration of the status of the aquatic ecosystems whilst improving the ecological conditions of waters;

b) Achieve at least 'good' chemical and ecological status for surface waters and 'good' chemical and quantitative status for groundwater bodies;

c) Meet the requirements of WFD protected areas;

d) Promote sustainable use of water as a natural resource;

e) Conserve habitats and species that depend directly on water;

f) Make progress in reducing and/or phasing out the release of individual or groups of pollutants that present a significant threat to the aquatic environment;

g) Continuously reduce the pollution of groundwater and prevent or limit the entry of pollutants; and,

h) Contribute to mitigating the effects of flood and droughts.

2.1.4 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 transpose the WFD for England and Wales.

2.2 Surface Water Body Status

2.2.1 Under the WFD, surface water body status is classified on the basis of chemical and ecological status or potential. Ecological status is assigned to surface water bodies that are natural and considered by the Environment Agency not to have been significantly modified for anthropogenic purposes. Ecological potential is assigned to artificial and man-made water bodies (such as canals), or natural water bodies that have undergone significant modification (these are termed Heavily Modified Water Bodies). Under the WFD, the worst case classification is assigned as the overall surface water body status, that is, a 'one-out-all-out' system. This system is summarised in Figure 2-1.

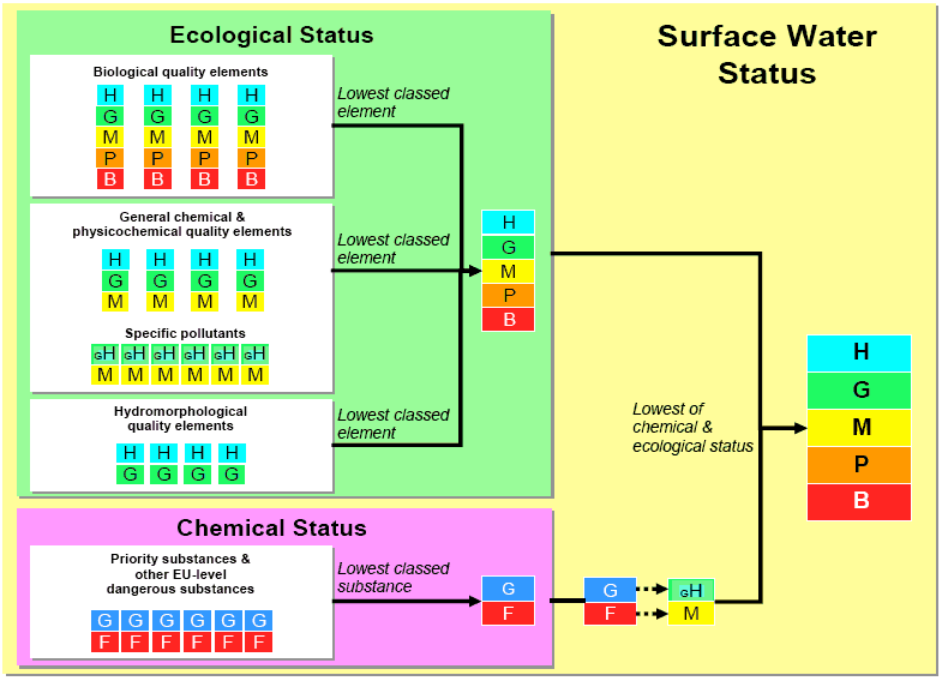


Figure 2-1 WFD classification elements for surface water body status

Chemical Status

2.2.2 Chemical status is defined by compliance with environmental standards for chemicals that are priority substances and/or priority hazardous substances, in accordance with the Environmental Quality Standards Directive (2008/105/EC). Compliance is assessed for a specified list of 'priority' and 'priority hazardous' substances. These substances were established by the Priority Substances Directive (2009/105/EC), with an updated version having been published in 2013 (2013/39/EU) identifying further priority substances. This is assigned on a scale of good or fail.

2.2.3 Surface water bodies are only monitored for priority substances where there are known discharges of these pollutants; otherwise surface water bodies are reported as being at good chemical status.

Ecological Status or Potential

2.2.4 Ecological status or potential is defined by the overall health or condition of the watercourse. This is assigned on a scale of high, good, moderate, poor or bad, and on the basis of 4 classification elements or 'tests' (Ref 2-2), as follows.

Biological

2.2.5 This test is designed to assess the status indicated by a biological quality element such as the abundance of fish, invertebrates or algae and by the presence of invasive species. The biological quality elements can influence an overall water body status from bad through to high.

Physico-chemical

2.2.6 This test is designed to assess compliance with environmental standards for supporting physico-chemical conditions, such as dissolved oxygen, phosphorus and ammonia. The physico-chemical elements can only influence an overall water body status from moderate through to high.

Specific pollutants

2.2.7 This test is designed to assess compliance with environmental standards for concentrations of specific pollutants, such as zinc, cypermethrin or arsenic. As with the physico-chemical test, the specific pollutant assessment can only influence an overall water body status from moderate through to high.

Hydromorphology

2.2.8 For natural water bodies this test is undertaken when the biological and physico-chemical tests indicate that a water body may be of high status. It specifically assesses elements such as water flow, sediment composition and movement, continuity, and structure of the habitat against reference or 'largely undisturbed' conditions. If the hydromorphological elements do not support high status, then the status of the water body is limited to good overall status.

2.2.9 For artificial or heavily modified water bodies, hydromorphological elements are assessed initially to determine which of the biological and physico-chemical elements should be used in the classification of ecological potential.

2.2.10 In all cases, assessment of baseline hydromorphological conditions are an important factor in determining possible reasons for classifying biological and physico-chemical elements of a water body as less than good, and hence in determining what mitigation measures may be required to address these failing waterbodies.

2.3 Groundwater Body Status

2.3.1 Under the WFD, groundwater body status is classified on the basis of quantitative and chemical status. Groundwater bodies are separated into Groundwater Management Units (GWMUs) and Water Resource Units (WRMUs). Groundwater Management Units are sub-divisions of the groundwater to aid the resource assessment process. Water Resource Management Units are sub-divisions according to the water resource availability and the management of water.

2.3.2 Status is assessed primarily using data collected from the Environment Agency monitoring network; therefore the scale of assessment means that groundwater status is mainly influenced by larger scale effects such as significant abstraction or widespread diffuse pollution. The worst case classification is assigned as the overall groundwater body status, in a 'one-out all-out' system (Figure 2-2), similar to that of surface body status.

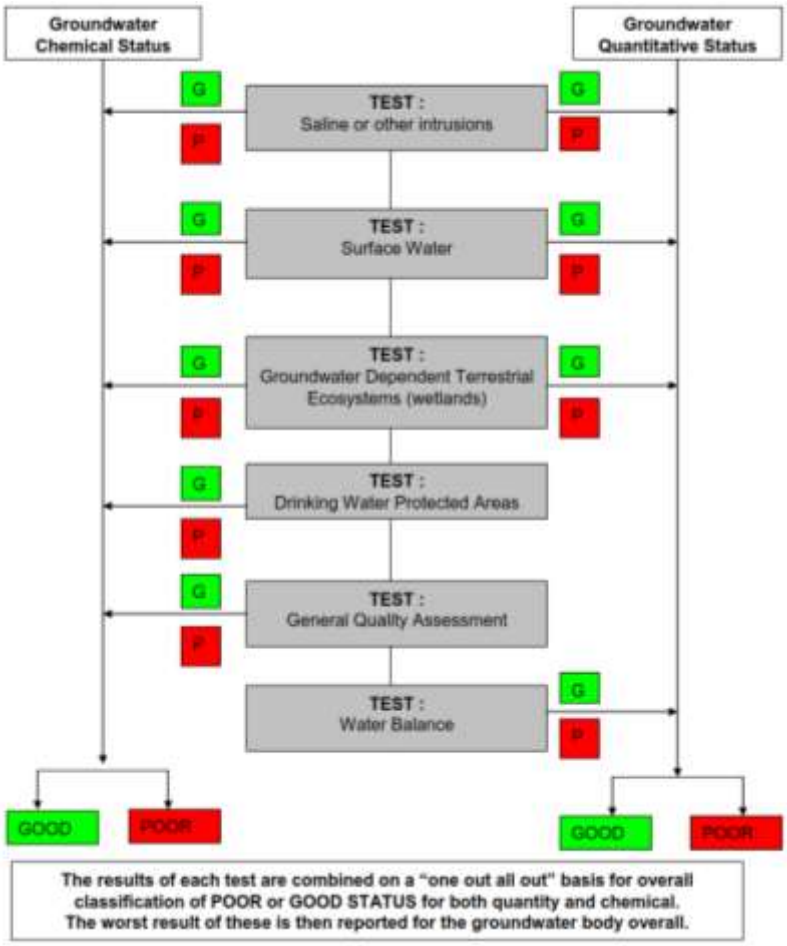


Figure 2-2 WFD classification elements for groundwater body status

Quantitative Status

2.3.3 Quantitative status is defined by the quantity of groundwater available as base flow to watercourses and water-dependent ecosystems, and as 'resource' available for use as drinking water and other consumptive purposes. This is assigned on a scale of good or poor, and on the basis of four classification elements or 'tests' as follows:

Saline or other intrusions

2.3.4 This test is designed to identify groundwater bodies where the intrusion of poor quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction, is leading to significant impact on one or more groundwater abstractions.

Surface water

2.3.5 This test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the ecological status of associated surface water bodies.

Groundwater dependent terrestrial ecosystems (GWDTE's)

2.3.6 This test is designed to identify groundwater bodies where groundwater abstraction is leading to "significant damage" to associated GWDTE's (with respect to water quantity).

Water balance

2.3.7 This test is designed to identify groundwater bodies where groundwater abstraction exceeds the "available groundwater resource", defined as the rate of overall recharge to the groundwater body itself, as well as the rate of flow required to meet the ecological needs of associated surface water bodies and GWDTE's.

Chemical Status

2.3.8 Chemical status is defined by the concentrations of a range of key pollutants, by the quality of groundwater feeding into watercourses and water-dependent ecosystems, and by the quality of groundwater available for drinking water purposes. Chemical status is assigned on a scale of good or poor, and on the basis of five classification elements or 'tests'.

Saline or other intrusions

2.3.9 This test is designed to identify groundwater bodies where the intrusion of poor quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction, is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.

Surface water

2.3.10 This test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the chemical status of associated surface water bodies.

Groundwater dependent terrestrial ecosystems (GWDTE's)

2.3.11 This test is designed to identify groundwater bodies where groundwater abstraction is leading to "significant damage" to associated GWDTE's (with respect to water quality).

Drinking Water Protected Areas (DrWPA's)

2.3.12 This test is designed to identify groundwater bodies failing to meet the DrWPA objectives, defined in Article 7 of the WFD, or at risk of failing in the future.

General quality assessment

2.3.13 This test is designed to identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater.

2.4 The WFD Assessment Process

2.4.1 In England the Environment Agency is the competent authority for implementing the WFD. As the competent authority the Environment Agency must make sure that development must:

a) Not result in a deterioration of status of the water body;

b) Not prevent the achievement of 'good' status by 2027;

c) Not infringe other legislation; and,

d) Where possible, enhance the environment.

2.4.2 New developments that therefore have the potential to impact the current or targeted WFD status of a water body are required to assess their compliance against the WFD objectives of the potentially affected water bodies. There is currently no specific or prescribed Environment Agency format or process to follow for WFD assessments (other than for coastal and transitional waters); however the Planning Inspectorate's Advice Note Eighteen (2017) on the WFD suggests a three-stage approach:

a) **Stage 1 – WFD Screening** – The WFD water bodies potentially impacted by the proposed Scheme (through defining the zone of influence), and the extent to which they will be affected are identified. Some activities associated with the proposed Scheme may be excluded (screened out); however, explicit reasons should be provided. In some instances the screening may conclude that no further consideration of WFD matters is required. This screening process should be reviewed periodically.

b) **Stage 2 – WFD Scoping** – Post-screening, the scope for further assessment work, that may be required as part of Stage 3, needs to be defined and agreed with the Environment Agency. This scoping stage involves undertaking an initial assessment to identify risks from the proposed Scheme to receptors (within the zone of influence) based on relevant water bodies and their WFD elements. In addition to this, water bodies where a more detailed impact assessment is required should be identified.

c) **Stage 3 – WFD Impact Assessment** – A detailed assessment of the water bodies and activities carried forward from the WFD screening and scoping stages. It involves:

I. The identification of water bodies that will potentially be directly or indirectly affected by the proposed Scheme;
II. The baseline conditions of the concerned water bodies;
III. A description of the proposed Scheme;
IV. The methods used to quantify the scale of WFD impacts;
V. An assessment of the risk of deterioration;
VI. A description of any mitigation that is required and how it will be implemented; and,
VII. An explanation of any positive contributions to the RBMP objectives proposed, and how they will be delivered.

2.4.3 The initial screening stage (Stage 1) identifies the water bodies which may potentially be affected by the proposed scheme, both during the construction and operational phases, and the WFD parameters which need to be considered to inform scoping (Stage 2). This report focuses on Stages 1 and 2 of this three stage WFD assessment approach.

2.4.4 The National Policy Statement for National Networks (2014) (Ref 2-3) (paragraphs 5.219 – 5.227) outline the need for proposed projects to contribute to WFD commitments, assess any impacts on WFD water bodies and aim for no deterioration of the ecological status of these water bodies. Using the staged methodology approach outlined above should provide sufficient evidence to

demonstrate compliance with these policy requirements for the proposed scheme.

3 Screening Assessment

3.1 Overview

3.1.1 RBMPs are a requirement of the WFD, outlining measures for each RBD to maintain and improve the status of the water environment in that District, including river, lake, groundwater, estuarine and coastal water bodies. The first RBMPs were published in 2009, and the first cycle of planning then took place between 2009 and 2015 when the second RBMPs were published. The second cycle of planning is currently underway (2015 – 2021). The proposed Scheme is located within the catchment of the South West RBMP (Ref 3-1), which has been used to identify potentially impacted water bodies.

3.1.2 The land to be used for construction, operation and maintenance of the proposed scheme, which includes land required for permanent and temporary purposes (hereafter referred to as the 'Proposed draft DCO site boundary'), is shown in more detail in Figure 3.1. It is important to note that the current proposed draft DCO site boundary may be subject to change, but currently captures what is thought to be a reasonable worst-case land take.

3.1.3 The water bodies considered in this study have been selected based on the following criteria:

a) All surface water bodies that may potentially be directly or indirectly impacted by the construction and operation of the proposed scheme; and,

b) Any groundwater bodies that have direct or indirect connectivity to the proposed scheme.

3.1.4 These criteria have been used to identify the potential zone of influence which includes the water bodies shown in Figure 3.2. Sections 3.2 and 3.3 describe the baseline WFD status of each of the identified water bodies, where the baseline used is the 2015 RBMP cycle but the latest available information from the Environment Agency's Catchment Data Explorer (CDE) is presented for reference.

N

Salisbury Plain SSSI/SAC

Salisbury Plain SSSI/SAC

River Avon

River Till

Existing Longbarrow Junction

Proposed Tunnel

Existing Countess Roundabout

Winterbourne Stoke Bypass

Proposed Green Bridge

Parsonage Down SSSI/SAC/NNR

Proposed Green Bridge

Winterbourne Stoke

Proposed Green Bridge

Berwick Down

Amesbury

1 0 1 2 3 4 5 km

filename: pw:\\UKLON3AP114.aecomonline.local:PWAECOM_EU\Documents\60541439-A303 Stonehenge Technical Partner\0300 Non Deliverables\0330 Environmental Management Team\GIS\Figures\HE551506_AMW_GEN_SW_GN_000_GS_GI_00041_WFDScopingLocation.mxd

NOTES / LEGEND

- Indicative centreline
- Proposed Tunnel
- Proposed draft DCO site boundary

Locations are indicative:

- Location of the Eastern portal
- Location of the Western portal
- Location of the Countess junction
- Location of the Longbarrow junction
- Location of the River Till crossing
- National Nature Reserve (NNR)
- Site of Special Scientific Interest
- Special Area of Conservation
- World Heritage Site

Revision Details	By / Check	Date	Suffix

Purpose of issue: FINAL

Client: Highways England

Working on behalf of: highways england

Project Title: A303 STONEHENGE AMESBURY TO BERWICK DOWN

Drawing Title: FIGURE 3.1 PROPOSED SCHEME

Designed	Drawn	Checked	Approved	Date
HS	CC	BM	WB	27/04/18

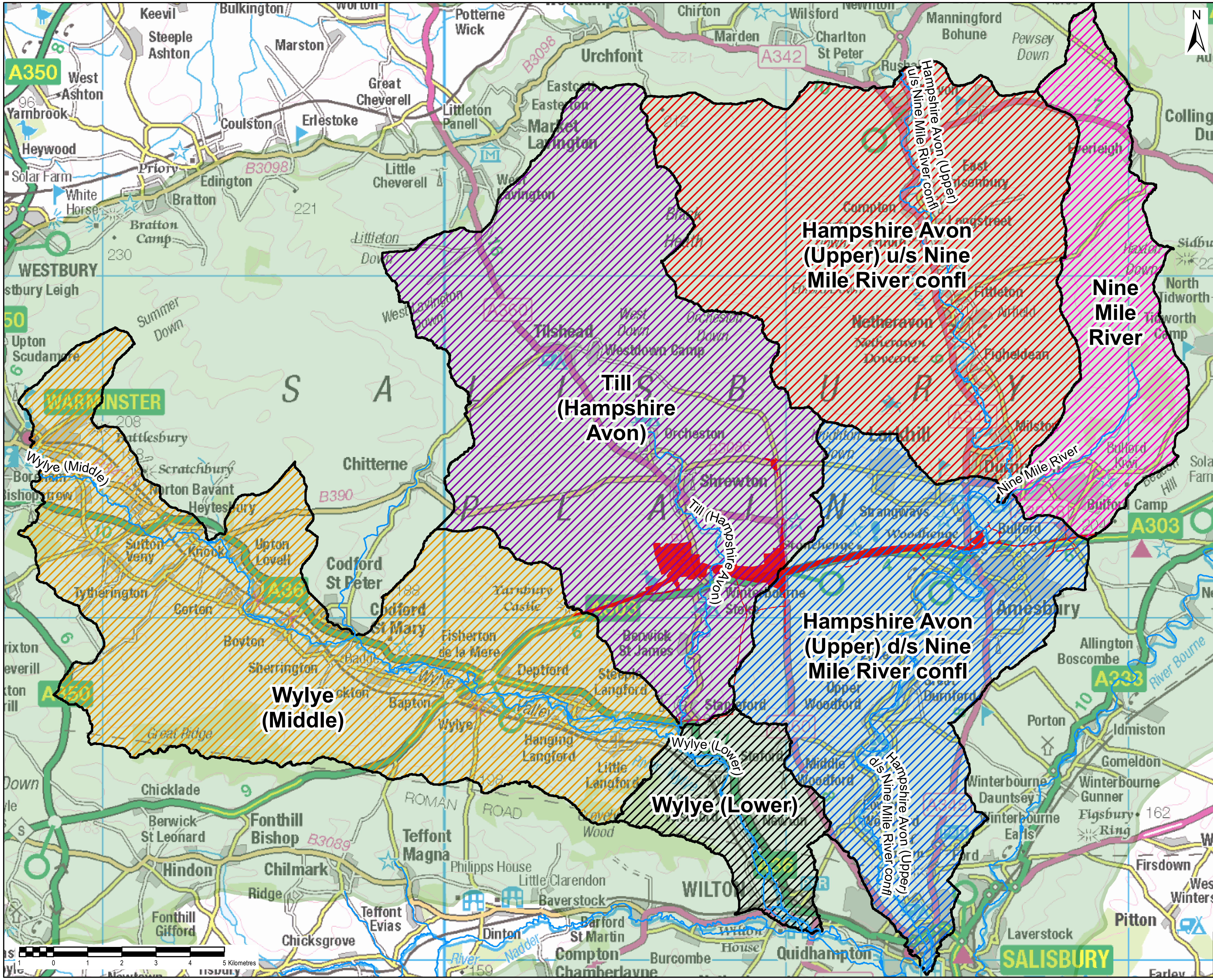
Internal Project No.: 60541200

Scale @ A3: 1:50,000 | Zone: SW

Highways England
Temple Quay House
2 The Square, Temple Quay
Bristol
BS1 6HA

AMW
AECOM + mace + WSP

Drawing Number	Originator	Volume	Rev
Highways England PIN			
HE551506	AMW	GEN	01
SCHEME WIDE	DR	GI 00041	
Location	Type	Role	Number



NOTES / LEGEND

- Proposed Draft DCO Boundary
- WFD Waterbody

Waterbody Catchment Name

- Wylye (Lower)
- Wylye (Middle)
- Hampshire Avon (Upper) u/s Nine Mile Confluence
- Hampshire Avon (Upper) d/s Nine Mile Confluence
- Nine Mile River
- Till (Hampshire Avon)

WFD Groundwater Waterbodies

- Upper Hampshire Avon

Revision Details	By / Check	Date	Suffix

Purpose of issue: FINAL

Client: Highways England

Working on behalf of highways england

Project Title: A303 STONEHENGE AMESBURY TO BERWICK DOWN

Drawing Title: FIGURE 3.2 WATER FRAMEWORK DIRECTIVE (WFD) WATERBODIES

Designed	Drawn	Checked	Approved	Date
CC	HB	BM	CC	27/04/18

Internal Project No. 60541200

Scale @ A3: 1:100,000 | Zone: SW

Highways England
Temple Quay House
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BS1 6HA

AmW
AECOM + mace + WSP

Drawing Number					Rev
Highways England PIN	Originator	Volume			
HE551506	AMW	GEN			01
SCHEME WIDE	MP	HD	00001		
Location	Type	Role	Number		

Filename: pw:\\UKLON3AP114.aecomonline.local:PWAECOM_EU\Documents\60541439-A303 Stonehenge Technical Partner\0300 Non Deliverables\0330 Environmental Management Team\GIS\Figures\HE551506-AMW-MP-HD-00001.mxd

3.2 Surface Water Bodies

River Till

3.2.1 The River Till (ID: GB108043022570) is a primarily groundwater fed winterbourne chalk stream, with the upper reaches being entirely fed by groundwater (Natural England SSSI Citation).

3.2.2 The stream is of international importance, being designated as part of the River Avon Special Area of Conservation (SAC), and of national importance, being designated as a Site of Special Scientific Interest (SSSI). The stream acquired these designations as a result of the internationally important biota present within the aquatic system, both in terms of flora (river water-crowfoot *Ranunculion fluitantis* and reed canary grass, *Phalaris arundinacea*) and fauna (brown trout *Salmo trutta,* grayling *Thymallus thymallus* and bullhead *Cottus gobio*) (Ref 3-2).

3.2.3 Based on the 2015 RBMP results (Ref 3-3), the overall status of the River Till is 'good' (Table 3-1).

Table 3-1 Water body classification for the River Till (Ref 3-3)

Parameter		River Till		
		2009	2015	2016
Water Body ID		GB108043022570		
Water Body Area		127.785km^2		
Water Body Type		River		
Water Body Length		13.993km		
Hydromorphological Designation		Not designated artificial or heavily modified		
Status Objective		Overall 'good' status by 2015		
Overall Status		Good	Good	Good
Ecological Status		Good	Good	Good
Chemical Status		-	Good	Good
Biological Quality Elements	Invertebrates	High	High	High
Hydromorphological Supporting Elements	Hydrological Regime	Does Not Support Good	Supports Good	Does Not Support Good[1]
	Morphology	Supports Good	Supports Good	Supports Good
Physio-Chemical Quality Elements	Acid Neutralising Capacity	-	High	High
	Ammonia (Physio-Chemical)	High	High	High
	Dissolved Oxygen	High	High	High
	pH	High	High	High
	Phosphate	High	High	High
	Temperature	High	High	High
Specific Pollutants	Ammonia (Annex 8)	High	-	-
	Copper	High	High	High
	Iron	-	High	High
	Triclosan	-	-	-
	Zinc	High	-	-
Priority Substances	Lead and Its Compounds	Environment Agency have noted does not require assessment	Environment Agency have noted does not require assessment	Environment Agency have noted does not require assessment
	Nickel and Its Compounds			
Priority Hazardous Substances	Cadmium and Its Compounds			
	Di(2-ethylhexyl)phthalate			
	Nonylphenol			
	Tributyltin Compounds			

[1] Note the decline in the status of the 'Hydrological Regime' parameter between the 2015 and 2016 cycle

River Avon

3.2.4 The River Avon, is a perennial, largely groundwater fed chalk river. Within the zone of influence, the river is designated as two WFD water bodies: the Upper River Avon upstream (u/s) (GB108043022351) and downstream (d/s) (GB108043022352) of the Nine Mile River confluence.

3.2.5 As with the River Till, the River Avon has been recognised as a site of ecological importance and is a designated SAC and SSSI, supporting diverse populations of flora (water-starworts *Callitricho-Batrachion* and water-crowfoots *Ranunculus* vegetation) and fauna (brook lamprey *Lampetra planeri* and Desmoulin's whorl snail *Vertigo moulinsiana*) (Ref 3-2). The Avon is also linked to protected areas under the Nitrates Directive (Ref 3-3).

3.2.6 Groundwater baseflow contributions to this river from the Chalk (Base Flow Index = 0.91 at Gauging Station 43005 – Avon at Amesbury) follow two typical pathways. The first, matrix flow, accounts for approximately 80% of baseflow, with the water following this pathway being on average 55 years old. The alternate pathway is through rock fractures (20%). Recharge can reach the water table through these pathways within days or weeks', indicating that groundwater entering the river through the fracture features is far younger than that of matrix flow. These contrasting flow pathways influence the chemistry of the river, with water following the more rapid fracture pathways having less time for natural minerals within the rock to dissolve into it. Despite this, water following fracture pathways has a greater potential to deliver land derived pollutants (nitrates, pesticides etc.) to the river due to there being less time for these chemicals to be attenuated (Ref 3-4).

3.2.7 It is important to understand these pathways since it has been identified that phosphorus poses the most significant threat to the River Avon in terms of its ecological features, according to the River Avon Nutrient Management Plan (2015, Ref 3-5). Furthermore, the Wiltshire Core Strategy core policy 69 (Ref 3-6) identifies the River Avon SAC as a potentially sensitive receptor, in terms of water quality, which requires protection from adverse pollution impacts related to development.

3.2.8 Based on the 2015 RBMP results (Ref 3-7 & 3-8), the overall status of the River Avon (Upper) upstream of the Nine Mile River confluence is 'poor' (Table 3-2), being limited by the fish biological quality element. The status of the River Avon (Upper) downstream of the Nine Mile River confluence is 'moderate' (Table 3-3) as a result of phosphates, exacerbating the previously mentioned importance and influence phosphates have within this catchment. This is a recorded decline from 'good' status in 2012.

Table 3-2 Water body classification for the River Avon (Upper) upstream of Nine Mile River confluence (Ref 3-7)

Parameter		River Avon (Upper) u/s Nine Mile River confluence	
		2012[2]	2015/2016[3]
Water Body ID		GB108043022351	
Water Body Area		109.75km^2	
Water Body Type		River	
Water Body Length		23.682km	
Hydromorphological Designation		Not designated artificial or heavily modified	
Status Objective		Overall 'good' status by 2027 (Disproportionately expensive)	
Overall Status		Poor	Poor
Ecological Status		Poor	Poor
Chemical Status		Good	Good
Biological Quality Elements	Fish	Poor	Poor
	Invertebrates	High	High
	Macrophytes and Phytobenthos Combined	-	Poor
Hydromorphological Supporting Elements	Hydrological Regime	Supports Good	Supports Good
Physio-Chemical Quality Elements	Ammonia (Physio-Chemical)	-	High
	Dissolved Oxygen	-	High
	pH	-	High
	Phosphate	-	Moderate
	Temperature	-	High
Specific Pollutants	Copper	High	-
	Iron	-	High
	Triclosan	High	-
	Zinc	High	-
Priority Substances	Lead and Its Compounds	Good	Environment Agency have noted does not require assessment
	Nickel and Its Compounds	Good	
Priority Hazardous Substances	Cadmium and Its Compounds	Good	
	Di(2-ethylhexyl)phthalate	Good	
	Nonylphenol	Good	
	Tributyltin Compounds	Good	

[2] Earliest data provided by Environment Agency for this water body
[3] The 2015 results have been compared to the 2016 Cycle 2 results on the Environment Agency's Catchment Data Explorer and no changes in the status of any of the parameters is recorded.

Table 3-3 Water body classification for the River Avon (Upper) downstream of Nine Mile River confluence (Ref 3-8)

Parameter		River Avon (Upper) d/s Nine Mile River confluence	
		2012[4]	2015/2016[5]
Water Body ID		GB108043022352	
Water Body Area		82.901km^2	
Water Body Type		River	
Water Body Length		31.521km	
Hydromorphological Designation		Not designated artificial or heavily modified	
Status Objective		Overall 'good' status by 2021[6]	
Overall Status		Good	Moderate
Ecological Status		Good	Moderate
Chemical Status		Good	Good
Biological Quality Elements	Fish	Good	High
	Invertebrates	High	High
	Macrophytes and Phytobenthos Combined	Good	Good
Hydromorphological Supporting Elements	Hydrological Regime	Supports Good	Supports Good
Physio-Chemical Quality Elements	Ammonia (Physio-Chemical)	High	High
	Dissolved Oxygen	High	High
	pH	High	High
	Phosphate	Good	Moderate
	Temperature	High	High
Specific Pollutants	Copper	High	Not assessed by the Environment Agency
	Triclosan	High	
	Zinc	High	
Priority Substances	Lead and Its Compounds	Good	Environment Agency have noted does not require assessment
	Nickel and Its Compounds	Good	
Priority Hazardous Substances	Cadmium and Its Compounds	Good	
	Di(2-ethylhexyl)phthalate	Good	
	Nonylphenol	Good	
	Tributyltin Compounds	Good	

[4] Earliest data provided by Environment Agency for this water body.

[5] The 2015 results have been compared to the 2016 Cycle 2 results on the Environment Agency's Catchment Data Explorer, with it being suggested that there have been no changes in the status of any of the parameters.

[6] The Environment Agency is aiming to achieve 'good' status in at least 60% of waters by 2021 and in as many waters as possible by 2027. It is believed that it is possible to achieve 'good' status in this waterbody catchment by 2021, largely by controlling both point and natural sources of phosphates.

Nine Mile River

3.2.9 The Nine Mile River is tributary of the River Avon, where it joins in the village of Bulford. Based on the 2015 RBMP results (Ref 3-9), the overall status of the Nine Mile River (GB 108043022360) is 'moderate' (Table 3-4), being limited by the macrophytes and phytobenthos biological quality element.

Table 3-4 Water body classification for the Nine Mile River (Ref 3-9)

Parameter		Nine Mile River	
		2009	2015/2016[7]
Water Body ID		GB108043022360	
Water Body Area		39.35km^2	
Water Body Type		River	
Water Body Length		6.85 km	
Hydromorphological Designation		Not designated artificial or heavily modified	
Status Objective		Overall 'good' status by 2021	
Overall Status		Moderate	Moderate
Ecological Status		Moderate	Moderate
Chemical Status		-	Good
Biological Quality Elements	Fish	Good	High
	Invertebrates	Good	High
	Macrophytes and Phytobenthos Combined	-	Moderate
Hydromorphological Supporting Elements	Hydrological Regime	Does Not Support Good	Does Not Support Good
	Morphology	Supports Good	Supports Good
Physio-Chemical Quality Elements	Ammonia (Physio-Chemical)	High	High
	Dissolved Oxygen	High	High
	pH	High	High
	Phosphate	High	High
	Temperature	High	High
Specific Pollutants	Copper	High	High
	Zinc	High	-
Other Pollutants	Carbon Tetrachloride	Environment Agency have noted does not require assessment	Good
	DDT Total		Good
	Para - para DDT		Good
Priority Substances	1,2-dichloroethane		Good
	Benzene		Good
	Dichloromethane		Good
	Trichloromethane		Good
Priority Hazardous Substances	Nonylphenol		Good

[7] The 2015 results have been compared to the 2016 Cycle 2 results on the Environment Agency's Catchment Data Explorer, with it being suggested that there have been no changes in the status of any of the parameters.

River Wylye

3.2.10 The River Wylye) is a chalk stream fed primarily (89%) (Ref 3-4) by large springs from the Upper Greensand aquifer as well as from the River Till, explaining the potential indirect impact from the proposed Scheme. Within the zone of influence, the river is designated as two WFD water bodies: the Wylye (Middle) (GB108043022550) and Wylye (Lower) (GB108043022510).

3.2.11 As with the River Till and Avon, the Wylye is designated as a SSSI and a SAC. Along with the classic chalk stream plant communities (river water-crowfoot Ranunculion fluitantis and water-starworts Callitricho-Batrachion), the Wylye is noted for its wild brown trout (Salmo trutta) populations (Ref 3-10). The river is also linked to protected areas under the Habitats and Species Directive, in addition to the Nitrates and Urban Waste Water Treatment Directives.

3.2.12 Based on the 2015 RBMP results (Ref 3-11), the overall status of the River Wylye (Middle) is ‘moderate’ (Table 3-5), being limited by the macrophytes and phytobenthos biological quality element and phosphate. Based on the 2015 RBMP results (Ref 3-12) the overall status of the River Wylye (Lower) is ‘good’ (Table 3-6).

Table 3-5 Water body classification for the River Wylye (Middle) (Ref 3-11)

Parameter		River Wylye (Middle)		
		2009	2015	2016
Water Body ID		GB108043022550		
Water Body Area		122.421 km^2		
Water Body Type		River		
Water Body Length		40.013 km		
Hydromorphological Designation		Not designated artificial or heavily modified		
Status Objective		Overall 'good' status by 2027		
Overall Status		Moderate	Moderate	Moderate
Ecological Status		Moderate	Moderate	Moderate
Chemical Status		-	Good	Good
Biological Quality Elements	Fish	Moderate	High	Moderate[8]
	Invertebrates	High	High	High
	Macrophytes and Phytobenthos Combined	-	Moderate	Moderate
Hydromorphological Supporting Elements	Hydrological Regime	Supports Good	Supports Good	Supports Good
	Morphology	Supports Good	Supports Good	Supports Good
Physio-Chemical Quality Elements	Ammonia (Physio-Chemical)	High	High	High
	Dissolved Oxygen	High	High	High
	pH	High	High	High
	Phosphate	Moderate	Moderate	Moderate
	Temperature	High	High	High
Specific Pollutants	Copper	High	Not assessed by the Environment Agency	
	Triclosan	-		
	Zinc	High		
Priority Substances	Lead and Its Compounds	Environment Agency have noted does not require assessment		
	Nickel and Its Compounds			
Priority Hazardous Substances	Cadmium and Its Compounds			
	Di(2-ethylhexyl)phthalate			
	Nonylphenol			
	Tributyltin Compounds			

[8] Note the decline in the status of the 'Fish' parameter between the 2015 and 2016 cycle

Table 3-6 Water body classification for the River Wylye (Lower) (Ref 3-12)

Parameter		River Wylye (Lower)		
		2009	2015	2016
Water Body ID		GB108043022510		
Water Body Area		21.740 km^2		
Water Body Type		River		
Water Body Length		15.775 km		
Hydromorphological Designation		Not designated artificial or heavily modified		
Status Objective		Overall 'good' status by 2021		
Overall Status		Good	Good	Good
Ecological Status		Good	Good	Good
Chemical Status		Good	Good	Good
Biological Quality Elements	Fish	Good	High	High
	Invertebrates	High	High	High
	Macrophytes and Phytobenthos Combined	Good	Good	High
Hydromorphological Supporting Elements	Hydrological Regime	Supports Good	Supports Good	Supports Good
Physio-Chemical Quality Elements	Ammonia (Physio-Chemical)	High	High	High
	Dissolved Oxygen	High	High	High
	pH	High	High	High
	Phosphate	Good	Good	Good
	Temperature	High	High	High
Specific Pollutants	Copper	High	Not assessed by the Environment Agency	High
	Triclosan	High		Not assessed by the Environment Agency
	Zinc	High		
	Iron	Not assessed by the Environment Agency		High[9]
Priority Substances	Lead and Its Compounds	Good	Environment Agency have noted does not require assessment	
	Nickel and Its Compounds	Good		
Priority Hazardous Substances	Cadmium and Its Compounds	Good		
	Di(2-ethylhexyl)phthalate	Good		
	Nonylphenol	Good		
	Tributyltin Compounds	Good		

[9] The 2016 results show that Iron concentrations are now being assessed along the River Wylye (Lower).

3.2.13 The catchment area of these surface water bodies also contains other surface water features that are not classified under the WFD, yet they need to be considered in their own right as water body features. The identified features include:

1 Four small ponds on the River Till floodplain, two north of Winterbourne Stoke and two south;

2 Two ponds on the River Avon floodplain north of Amesbury;

3 Channels and ditches present on the River Avon floodplain, both upstream and downstream of Amesbury;

4 Channels and ditches present on the River Till floodplain, located downstream of Winterbourne Stoke; and,

5 A small seasonal pond at Lake, south of Amesbury.

3.2.14 The status of these features has yet to be identified and will be explored in the WFD Impact Assessment (Stage 3).

3.3 Groundwater Bodies

Upper Hampshire Avon (Chalk)

3.3.1 The Upper Hampshire Avon (ID: GB40801G806900) is a Chalk groundwater body that directly supports baseflow in the Avon, Till and Wylye Chalk rivers. The Chalk rivers are of international importance being designated as part of the River Avon Special Area of Conservation (SAC) and a Site of Special Scientific Interest (SSSI). The Chalk is underlain by the Upper Greensand, which is exposed in the Vale of Pewsey and the valley of the upper Wylye.

3.3.2 Based on the 2015 RBMP (Ref 3-13) results, the quantitative and chemical WFD elements in the Upper Hampshire Avon are classified as ‘poor’ status. For the chemical status of the water body the objective is to achieve ‘good’ chemical status by 2027 but due to the natural background conditions this could not be achieved for 2015. For the quantitative status it has been identified that it is disproportionately expensive to achieve ‘good’ status through an unfavourable balance of costs and benefits. As such there is no objective beyond 2015 to be achieved.

Table 3-7 Water body classification for the Upper Hampshire Avon (Ref 3-13)

Parameter		Upper Hampshire Avon	
		2009	2015/2016[10]
Water Body ID		GB40801G806900	
Water Body Area		1,569.156 km^2	
Water Body Type		Groundwater	
Status Objective		Poor Quantitative Status by 2015 (Disproportionately expensive), Good Chemical Status by 2027 (Disproportionately expensive and natural conditions).	
Protected Area Designation		Drinking Water Protected Area, Nitrates Directive	
Overall Status		Poor	Poor
Quantitative Status		Poor	Poor
Chemical Status		Poor	Poor
Quantitative Elements	Saline or other intrusions	Good	Good
	Dependent Surface Water	Poor	Poor
	Groundwater Dependent Terrestrial Ecosystems (GWDTEs)	Good	Good
	Water Balance	Good	Good
Chemical Elements	Saline or other intrusions	Good	Good
	Dependent Surface Water	Poor	Poor
	GWDTEs	Good	Good
	Drinking Water Protected Areas (DrWPAs)	Poor	Poor
	General Chemical Test	Good	Poor

[10] The 2015 results have been compared to the 2016 Cycle 2 results on the Environment Agency's Catchment Data Explorer, with it being suggested that there have been no changes in the status of any of the parameters.

4 Scoping Assessment

4.1 Overview

4.1.1 A scoping phase (Stage 2 of the three stage approach to WFD assessments) is required to determine which of the WFD parameters may be impacted by the proposed Scheme, both positively and adversely, and therefore need to be assessed in the WFD Impact Assessment (Stage 3). This scoping phase needs to be performed for both surface and groundwater water bodies.

4.1.2 Section 4.2 describes the proposed scheme and the elements that are considered to have the potential to impact on the WFD water bodies. Section 4.3 identifies the WFD water bodies that have been scoped out of further assessment and details the reasoning to support this determination. Section 4.4 identifies the potential impacts on water quality elements for those WFD water bodies that have the potential to be impacted by the proposed scheme.

4.2 The proposed scheme

4.2.1 The Scheme would be approximately 8 miles (13km) long (as shown on Figure 6.1) and will comprise the following key features:

- A northern bypass of Winterbourne Stoke with a viaduct over the River Till valley;
- A new junction between the A303 and A360 to the west of and outside the World Heritage Site (WHS), replacing the existing Longbarrow roundabout;
- A twin-bore tunnel approximately 2 miles (3.3km) long, past Stonehenge; and
- A new junction between the A303 and A345 at Countess Roundabout.

4.2.2 As part of the construction of the Proposed Scheme, the following elements will also be required:

- Temporary traffic management areas, temporary working and storage areas, material stockpiles, construction compounds, haul roads, and provision for site compounds to be used during the construction period; and,
- Preliminary works including utility diversions as required.

4.3 Scoping out

4.3.1 The River Wylye (Middle) was presented in the screening assessment due to the western extent of the red line boundary for the proposed scheme being marginally within the catchment for this surface water body. However, the major works associated with the western extent of the proposed scheme lies completely within the catchment for the River Till. Ssubsequently, there is limited or no potential for any impacts on the River Wylye (Middle) since any activities will be short term associated with tying in the proposed scheme with the existing A303 during the construction phase. Therefore, as part of the scoping assessment it has been determined that further assessment is not required for the River Wylye (Middle).

4.3.2 The River Wylye (Lower) was presented in the screening assessment due to the potential for indirect impacts. However, as part of the scoping assessment it has been determined that further assessment is not required for the River Wylye (Lower) because there is limited potential for possible impacts to have an indirect effect or impacts were not anticipated. Further details on the reasons for scoping out further assessment on the River Wylye are provided below:

a) the confluence of the River Till with the River Wylye is over 6km downstream from the new crossing of the proposed scheme with the River Till which will mean that any localised impacts from the introduction of the viaduct are not anticipated to have an indirect impact on the River Wylye;

b) under low flow conditions the head of the River Till is downstream of the new crossing of the proposed scheme and therefore indirect impacts on the River Wylye are not anticipated;

c) as water will not be removed from the catchment as part of the proposed scheme, any changes to the hydrological regime within the River Till are anticipated to be localised and therefore indirect impacts on the River Wylye are not anticipated; and

d) no below ground works are proposed within the Wylye surface water body catchment, and as such no impacts on the groundwater in this catchment are anticipated.

4.3.3 The Nine Mile River was presented in the screening assessment due to the eastern extent of the red line boundary for the proposed scheme being marginally within the catchment for this surface water body. However, the major works for the eastern extent of the proposed scheme lies completely within the catchment for the River Avon (downstream of the Nine Mile River confluence). Subsequently, there is limited or no potential for any impacts on the Nine Mile River since any activities within this catchment will be short term associated with stopping up and closing existing access routes to and from the A303 as part of the construction phase. Therefore, as part of the scoping assessment it has been determined that further assessment is not required for the Nine Mile River.

4.4 Potential impacts on water quality elements

4.4.1 For the surface water bodies, primarily the River Avon and River Till, and the groundwater body, the parts of the proposed scheme likely to have the greatest direct impact on the status of these aquatic systems include the construction of

the bridge over the River Till and the dual two lane carriageway (including the twin-bore tunnels).

4.4.2 For the purpose of the scoping assessment the following elements of the proposed scheme have been determined as having the potential to impact on the WFD surface water bodies:

a) tunnels, including the tunnel portals;

b) viaduct over the River Till;

c) cuttings;

d) material processing, treatment and storage areas;

e) embankments;

f) landscaping and habitat creation;

g) drainage system; and

h) alterations to the existing River Avon bridge crossing.

4.4.3 For the purpose of the scoping assessment the following elements of the proposed scheme have been determined as having the potential to impact on the WFD groundwater body:

a) at grade construction;

b) embankments;

c) flyover foundations and alterations to River Avon bridge crossing;

d) River Till viaduct foundations;

e) Cuttings;

f) retaining walls;

g) bored tunnels;

h) cross passage tunnels;

i) tunnel portals;

j) excavated material processing, treatment and storage areas;

k) landscaping and habitat creation; and

l) drainage system.

4.4.4 For the purpose of the scoping assessment, it has been assumed that all cuttings, bored tunnels, retaining walls, and tunnel portals have the potential to:

a) extend below the water table;

b) interfere with groundwater flow; and

c) create contaminant pathways during construction and to alter pathways during operation.

4.4.5 In order to develop a useable approach for the scoping assessment, a number of key assumptions have had to be made. These are described below.

a) The WFD baseline of water environment receptors has been defined using published data sources. The availability of contemporary data with which to define the importance (sensitivity) of these attributes is considered robust and therefore this approach is acceptable;

b) Discharges of surface water from the new infrastructure will, wherever reasonably practicable, be managed in accordance with the principles of the non-statutory technical standards for sustainable drainage systems (Ref 4-1);

c) Road drainage will be kept separate from existing land drainage; and

d) All landfills (Down Barn, Porton Road and Porton Firs) will be assumed to represent a source of contamination which could detrimentally impact the quality of the groundwater.

4.4.6 Any activities which cause a short term change, that is, a short term activity, such as the construction of the viaduct, that impacts the waterbody for a short period of time and the waterbody recovers within a short period of time without the need for restoration measures, are not considered to cause deterioration as defined in the WFD (Ref 4-2). For the purpose of the scoping assessment, short term has been assumed as 3 years or less, which is in line with other large infrastructure projects. Longer lasting has been used to describe a potential impact anticipated to last for longer than 3 years.

4.4.7 The potential of each scheme element to impact on WFD objectives during both the construction and operational phases has been considered and identified. These are summarised for surface water bodies in Table 4-2 Potential impacts of scheme elements on the River Avon surface water bodies, and for groundwater bodies in Table 4-3. Those activities which have been assessed as having no impact have been greyed out in the tables and those which have been assessed as having the potential for a longer lasting impact (and therefore will require further assessment in the WFD assessment) are highlighted in bold. Those activities assessed as having the potential for a short term impact are included for information.

Table 4-1 Potential impacts of scheme elements on the River Till surface water body

Impact Considered	WFD Element	Tunnels (including tunnel portals)			Viaduct over the River Till			Cuttings			Material processing, treatment and storage areas			Embankments			Landscaping & Habitat Creation			Drainage System		
		Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description
Land take leading to loss of habitat and reduced connectivity	Biological Quality Elements Hydrological Regime	✓	Short Term	Temporary surface land take is needed for tunnel construction.	✓	**Longer Lasting**	**Minor land take will be needed for the viaduct with the pier supports. With these being located in close proximity to the river it is possible that this could have a detrimental impact.**	✓	**Longer Lasting**	**Minor land take will be needed for the construction of the cuttings.**	✓	Short Term	Temporary land take will be needed for the processing, treatment and storage of materials.	✓	**Longer Lasting**	**Permanent land take is required for the embankments.**	X	-	N/A	X	-	N/A
Alteration to the hydrological regime	Biological Quality Elements Hydrological regime	✓	**Longer Lasting**	**The tunnel itself may act as a barrier to groundwater flow. Due to the Till being primarily groundwater fed, any alteration to groundwater flow may result in a change in the hydrological regime, which could impact the ecological diversity of the Till.**	✓	**Longer lasting**	**Pile structures that extend beneath the groundwater table may require construction dewatering and could act as a long term barrier or preferential pathway for groundwater flow which could result in a change to the hydrological regime.**	✓	Short Term	Dewatering and drainage of cuttings can lower groundwater levels which may influence the groundwater regime. Due to the Till being primarily groundwater fed, any dewatering activities may result in a change in the hydrological regime but these are only anticipated to be short term during construction.	X	-	Associated areas for excavated material processing, treatment and storage are not anticipated to require dewatering.	X	-	Construction of embankments will not require dewatering.	X	-	The creation of habitat through the placement of suitable material will not require dewatering.	X	-	The drainage system will not require dewatering.
Disturbance of sensitive species	Biological Quality Elements	✓	Short Term	Noise and vibrations during construction of the tunnel may detrimentally impact fish species present within the Till.	✓	Short Term	Noise and vibrations during the construction of the viaduct may detrimentally impact fish species present within the Till.	✓	Short Term	Noise and vibrations during the construction of cuttings may detrimentally impact fish species present within the Till.	✓	Short Term	Noise and vibrations during the processing, treatment and storage of excavated material cuttings may detrimentally impact fish species present within the Till.	✓	Short Term	Noise and vibrations during the construction of embankments may detrimentally impact fish species present within the Till.	✓	Short Term	Noise and vibrations during the placement of suitable materials may detrimentally impact fish species present within the Till.	✓	Short Term	Noise and vibrations during the construction of the drainage system may detrimentally impact fish species present within the Till.
Increase in sediment erosion and transport	Biological Quality Elements Hydrological Regime Morphology	X	-	Topographic divide and distance between the tunnel and the River Till mean no impact is anticipated.	✓	Short Term	Noise and vibrations produced during the construction phase of the viaduct may result in an increased quantity of sediment being delivered to the Till.	✓	Short Term	Noise and vibrations produced during the construction phase may result in an increased quantity of sediment being delivered to the Till.	✓	Short Term	Noise and vibrations produced during the construction phase may result in an increased quantity of sediment being delivered to the Till.	✓	Short Term	Noise and vibrations produced during the construction phase of embankments may result in an increased quantity of sediment being delivered to the Till.	✓	Short Term	Noise and vibrations produced during the construction phase may result in an increased quantity of sediment being delivered to the Till.	✓	Short Term	Noise and vibrations produced during the construction phase may result in an increased quantity of sediment being delivered to the Till.
Mobilisation of contaminants from their source (e.g. contaminated land), and ultimately their delivery to aquatic systems	Biological Quality Elements Physio-Chemical Quality Elements	✓	Short Term	It is primarily during the construction phase of the tunnel that contaminated land may be disrupted and transported to the Till. The tunnel passes through phosphatic chalk and could mobilise phosphate from this natural source which could reach the Till via groundwater.	✓	Short Term	During construction of the viaduct there is the potential for construction activities to mobilise contaminants.	✓	Short Term	During the construction of the cuttings it is possible that some contaminated land may be disturbed and some of this material may be delivered to the Till.	✓	Short Term	It is possible that leaching from uncovered stockpiles results in contaminated surface run-off migrating to the Till via surface water and/or groundwater.	✓	Short Term	During the construction of the embankments it is possible that some contaminated land may be disturbed and some of this material may be delivered to the Till.	✓	Short Term	It is possible that leaching from the soil source results in contaminated surface run-off migrating to the Till via surface water and/or groundwater.	✓	Short Term	During the construction of the drainage system it is possible that some contaminated land may be disturbed and some of this material may be delivered to the Till.

Impact Considered	WFD Element	Tunnels (including tunnel portals)			Viaduct over the River Till			Cuttings			Material processing, treatment and storage areas			Embankments			Landscaping & Habitat Creation			Drainage System		
		Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description
Shading leading to loss of habitats/sensitive vegetation	Biological Quality Elements Morphology	X	-	The tunnel will have no direct impact on the shading of the river.	✓	**Long Lasting**	**The implementation of a bridge over the Till will increase the shading of the river potentially impacting the vegetation and other aquatic fauna living in this area. Reduced vegetation may result in materials within the riverbed becoming unconsolidated, altering the morphology of the river.**	X	-	The cuttings will have no direct impact on the shading of the river.	X	-	The excavated material processing, treatment and storage areas will have no direct impact on the shading of the river.	X	-	The embankments will have no direct impact on the shading of the river.	X	-	Habitat creation will have no direct impact on the shading of the river.	X	-	The drainage systems will have no direct impact on the shading of the river.
Changes to surface water runoff	Biological Quality Elements Physio-Chemical Quality Elements	X	-	N/A	✓	**Longer lasting**	**Revised road drainage and discharge routes could increase the risk of pollutants reaching the Till. Improvements to the treatment of road runoff could provide a positive impact.**	X	-	N/A	X	-	N/A	✓	**Longer lasting**	**Potential interruption of dry valleys could result in changes to the hydrological regime of the Till.**	✓	**Longer lasting**	**Potential interruption of dry valleys could result in changes to the hydrological regime of the Till.**	✓	**Longer lasting**	**Changes to surface water drainage could result in changes to the hydrological regime of the Till. Improvements to the treatment of road runoff could provide a positive impact.**
Change to channel hydraulics leading to erosion and accretion in sensitive habitats	Biological Quality Elements Morphology	✓	**Longer lasting**	**The tunnel itself may act as a barrier to groundwater flow. Due to the Till being primarily groundwater fed, any alteration to groundwater flow may result in a change in the hydrological regime.**	✓	**Longer lasting**	**Pile structures that extend beneath the groundwater table may require construction dewatering and act as a barrier or preferential pathway for groundwater flow which could result in a change to the hydrological regime.**	X	-	N/A	X	-	N/A	X	-	N/A	X	-	N/A	✓	**Longer lasting**	**Changes to surface water drainage could result in changes to the hydrological regime of the Till.**
Change in channel profile leading to loss of connectivity	Biological Quality Elements Hydrological Regime Physio-Chemical Quality Elements	X	-	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system. However, the topographic divide and distance between the tunnel and the River Till mean no impact is anticipated.	✓	**Longer Lasting**	**With a potential decline in vegetation on the banks and bed of the river directly beneath the proposed viaduct there may be increased erosion and sedimentation leading to changes in the channel profile.**	X	-	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system. However, it is unlikely that the quantity of sediment entering the river from this construction process will significantly alter this connectivity.	X	-	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system. However, it is unlikely that the quantity of sediment entering the river from this construction process will significantly alter this connectivity.	X	-	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system. However, it is unlikely that the quantity of sediment entering the river from this construction process will significantly alter this connectivity.	✓	Short Term	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system.	X	-	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system. However, it is unlikely that the quantity of sediment entering the river from this construction process will significantly alter this connectivity.

Table 4-2 Potential impacts of scheme elements on the River Avon surface water bodies

Impact Considered	WFD Element	Tunnels (including tunnel portals)			Alterations to the River Avon Bridge Crossing			Cuttings			Material Processing, Treatment and Storage Areas			Embankments			Landscaping & Habitat Creation			Drainage System		
		Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description
Land take leading to loss of habitat and reduced connectivity	Biological Quality Elements Hydrological Regime	✓	Short Term	Temporary surface land take is needed for tunnel construction.	✓	**Longer Lasting**	**The implementation of gabions or sheet piles to retain the new fill and carriageway will require some minor land take**	✓	**Longer Lasting**	**Minor land take will be needed for the construction of the cuttings.**	✓	Short Term	Temporary land take will be needed for the processing, treatment and storage of materials.	✓	**Longer Lasting**	**Permanent land take is required for the embankments.**	X	-	N/A	X	-	N/A
Alteration to the hydrological regime	Biological Quality Elements Hydrological regime	✓	**Longer Lasting**	**The tunnel itself may act as a barrier to groundwater flow. Due to the Avon being groundwater fed, any alteration to groundwater flow could result in a change in the hydrological regime, which could impact the ecological diversity of the Avon.**	✓	**Longer Lasting**	**Pile structures that extend beneath the groundwater table may require construction dewatering and act as a barrier or preferential pathway for groundwater flow which could result in a change to the hydrological regime.**	✓	Short Term	Dewatering and drainage of cuttings can lower groundwater levels which may influence the groundwater regime. Due to the Avon being groundwater fed, any dewatering activities may result in a change in the hydrological regime, which may could ultimately impact the ecological diversity of the Avon.	X	-	Associated areas for excavated material pro-cessing, treatment and storage are not anticipated to require dewatering.	X	-	Construction of embankments will not require dewatering.	X	-	The creation of habitat through the placement of suitable material will not require dewatering.	X	-	The drainage system will not require dewatering.
Disturbance of sensitive species	Biological Quality Elements	✓	Short Term	Noise and vibrations during construction of the tunnel may detrimentally impact fish species present within the Avon.	✓	Short Term	Noise and vibrations during construction may detrimentally impact fish species within the Avon.	✓	Short Term	Noise and vibrations during the construction of cuttings may detrimentally impact fish species present within the Avon.	✓	Short Term	Noise and vibrations during the processing, treatment and storage of excavated material cuttings may detri-mentally impact fish species present within the Avon.	✓	Short Term	Noise and vibrations during the construction of embankments may detrimentally impact fish species present within the Avon.	✓	Short Term	Noise and vibrations during the placement of suitable materials may detrimentally impact fish species present within the Avon.	✓	Short Term	Noise and vibrations during the construction of the drainage system may detrimentally impact fish species present within the Avon.
Increase in sediment erosion and transport	Biological Quality Elements Hydrological Regime Morphology	✓	Short Term	Noise and vibrations produced during the construction may result in an increased quantity of sediment being delivered to the Avon.	✓	Short Term	Noise and vibrations produced during the construction phase may result in an increased quantity of sediment being delivered to the Avon.	✓	Short Term	Noise and vibrations produced during the construction phase may result in an increased quantity of sediment being delivered to the Avon.	✓	Short Term	Noise and vibrations produced during the construction phase may result in an increased quantity of sediment being delivered to the Avon.	✓	Short Term	Noise and vibrations produced during the construction phase of embankments may result in an increased quantity of sediment being delivered to the Avon.	✓	Short Term	Noise and vibrations produced during the construction phase may result in an increased quantity of sediment being delivered to the Avon.	✓	Short Term	Noise and vibrations produced during the construction phase may result in an increased quantity of sediment being delivered to the Avon.
Mobilisation of contaminants from their source (e.g. contaminated land), and ultimately their delivery to aquatic systems	Biological Quality Elements Physio-Chemical Quality Elements	✓	Short Term	It is primarily during the construction phase of the tunnel that contaminated land may be disrupted and transported to the Till. The tunnel passes through phosphatic chalk and could mobilise phosphate from this natural source which could reach the Avon via groundwater.	✓	Short Term	During construction of the viaduct there is the potential for construction activities to mobilise contaminants.	✓	Short Term	During the construction of the cuttings it is possible that some contaminated land may be disturbed and some of this material may be delivered to the Avon.	✓	Short Term	It is possible that leaching from uncovered stockpiles results in contaminated surface run-off migrating to the Avon via surface water and/or groundwater.	✓	Short Term	During the construction of the cuttings it is possible that some contaminated land may be disturbed and some of this material may be delivered to the Avon.	X	-	N/A	✓	Short Term	During the construction of the drainage system it is possible that some contaminated land may be disturbed and some of this material may be delivered to the Avon.
Shading leading to loss of habitats/sensitive vegetation	Biological Quality Elements Morphology	X	'	The construction/operation of the tunnel has no direct impact on the shading of the river	X	'	The main bridge structure is already in existence and any alterations will have a minimal impact on additional shading of the river.	X	-	The cuttings will have no direct impact on the shading of the river.	X	-	The excavated material processing, treatment and storage areas will have no direct impact on the shading of the river.	X	-	The embankments will have no direct impact on the shading of the river.	X	-	Habitat creation will have no direct impact on the shading of the river.	X	-	The drainage systems will have no direct impact on the shading of the river.

Impact Considered	WFD Element	Tunnels (including tunnel portals)			Alterations to the River Avon Bridge Crossing			Cuttings			Material Processing, Treatment and Storage Areas			Embankments			Landscaping & Habitat Creation			Drainage System		
		Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description
Changes to surface water runoff	Biological Quality Elements Physio-Chemical Quality Elements	X	-	N/A	✓	Longer Lasting	**With widening of the road it could be expected that there will be a greater volume of traffic passing along this road every day. Therefore, there is the potential for larger amounts of pollutants within the road runoff entering the Avon.**	X	-	N/A	X	-	N/A	X	-	N/A	X	-	N/A	✓	Longer lasting	**The design of the drainage system is such that runoff will be managed and treated providing a potential positive impact.**
Change to channel hydraulics leading to erosion and accretion in sensitive habitats	Biological Quality Elements Morphology	✓	Longer lasting	**The tunnel itself may act as a barrier to groundwater flow. Due to the Till being primarily groundwater fed, any alteration to groundwater flow may result in a change in the hydrological regime.**	✓	Longer lasting	**Pile structures that extend beneath the groundwater table may require construction dewatering and act as a barrier or preferential pathway for groundwater flow which could result in a change to the hydrological regime.**	X	-	N/A	X	-	N/A	X	-	N/A	X	-	N/A	✓	Longer lasting	**Changes to surface water drainage could result in changes to the hydrological regime of the Avon.**
Change in channel profile leading to loss of connectivity	Biological Quality Elements Hydrological Regime Physio-Chemical Quality Elements	X	-	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system. However, it is unlikely that the quantity of sediment entering the river from this construction process will significantly alter this connectivity	X	-	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system. However, it is unlikely that the quantity of sediment entering the river from this construction process will significantly alter this connectivity.	X	-	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system. However, it is unlikely that the quantity of sediment entering the river from this construction process will significantly alter this connectivity.	X	-	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system. However, it is unlikely that the quantity of sediment entering the river from this construction process will significantly alter this connectivity.	X	-	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system. However, it is unlikely that the quantity of sediment entering the river from this construction process will significantly alter this connectivity.	✓	Short Term	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system.	X	-	During the construction phase, when there is the potential for sediment to be produced and transported to the river, this sediment may block the hyporheic zone, reducing the connectivity between the river and the groundwater system. However, it is unlikely that the quantity of sediment entering the river from this construction process will significantly alter this connectivity.

Table 4-3 Potential impacts of scheme elements on Upper Hampshire Avon groundwater body.

Impact Considered	At Grade			Embankments			Flyover Foundations and Alterations to River Avon Bridge Crossing			Till Viaduct Foundations			Cuttings			Retaining Walls		
	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description
Quantitative																		
Lowering of groundwater levels and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstractions by temporary dewatering or permanent groundwater control	X	-	Construction at grade would not require dewatering; as such there is no impact.	X	-	Construction of Embankments will not require dewatering; as such there is no impact.	✓	Short Term	Pile structures that extend beneath the groundwater table may require construction dewatering.	✓	Short Term	Localised dewatering may be required during the installation of the pier foundations for the viaduct.	✓	Short Term	Dewatering and drainage of cuttings can lower groundwater levels. This may influence the groundwater flow regime	✓	Short Term	Localised dewatering may be required for the construction of retaining walls.
"Damming" of groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstractions	X	-	Construction at grade would not lead to a damming of groundwater flow; as such there is no impact.	X	-	Construction of Embankments will not lead to a damming of groundwater flow; as such there is no impact.	✓	**Longer Lasting**	**Pile structures that extend beneath the groundwater table may potentially act as barriers or preferential pathways for groundwater flow.**	✓	**Longer Lasting**	**Pier foundations that extend beneath the groundwater table may potentially act as barriers or preferential pathways for groundwater flow.**	✓	**Longer Lasting**	**Cuttings that extend beneath the groundwater table may potentially act as barriers or preferential pathways for groundwater flow.**	✓	**Longer Lasting**	**Structures that extend beneath the groundwater table may potentially act as barriers or preferential pathways for groundwater flow.**
Chemical																		
Disturbing or mobilising existing poor quality groundwater by temporary dewatering or depressurisation and permanent groundwater control	X	-	Construction at grade would not require dewatering; as such there is no impact.	X	-	Construction of Embankments will not require dewatering; as such there is no impact.	✓	Short Term	Localised dewatering may be required for the construction of pile structures; there is the potential for disturbing existing poor quality groundwater including from the Countess Filling Station during construction.	✓	Short Term	Dewatering and drainage of cuttings can lower groundwater levels, there is the potential for disturbing existing poor quality groundwater during construction.	✓	Short Term	Dewatering and drainage of cuttings can lower groundwater levels, there is the potential for disturbing existing poor quality groundwater during construction.	✓	Short Term	Localised dewatering may be required for the construction of retaining walls; there is the potential for disturbing existing poor quality groundwater during construction.
Mobilisation of contaminants from their soil source (e.g. contaminated land), to groundwater	X	-	Construction at grade is not anticipated to mobilise any existing contaminated soils, as such there is no impact.	X	-	Construction of Embankments is not anticipated to mobilise any existing contaminated soils, as such there is no impact.	✓	Short Term	There is potential for construction activities to mobilise existing contamination.	✓	Short Term	There is potential for piling activities to mobilise any existing contamination.	✓	Short Term	There is the potential for contaminants from ground contamination including from the pig farm and former RAF Stonehenge to be mobilised during construction.	✓	Short Term	There is potential for construction activities to mobilise any existing contamination.
Creating or altering of pathways along which existing poor quality groundwater can migrate	X	-	Construction at grade would not lead to creating or alteration of pathways, as such there is no impact.	X	-	Construction of Embankments would not lead to creating or alteration of pathways, as such there is no impact.	✓	**Longer Lasting**	**The pile structures have the potential to create pathways along which existing poor quality groundwater can migrate.**	✓	**Longer Lasting**	**Piling has the potential to create pathways along which existing poor quality groundwater can migrate.**	✓	**Longer Lasting**	**Cuttings have the potential to create pathways along which existing poor quality groundwater can migrate.**	✓	**Longer Lasting**	**The retaining walls have the potential to create pathways along which existing poor quality groundwater can migrate.**

Impact Considered	Bored Tunnels			Cross Passage Tunnels			Tunnel Portals			Material Processing, treatment and storage areas			Landscaping & Habitat Creation			Drainage System		
	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description	Potential Impact?	Short Term or Longer Lasting Impact?	Description
Quantitative																		
Lowering of groundwater levels and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstractions by temporary dewatering/ permanent groundwater control	✓	Short Term	The use of a TBM will limit the requirement for dewatering during construction. As such any impact will be localised and temporary.	✓	Short Term	The method for construction is still be to determined but any impact will be localised and temporary.	✓	Short Term	The use of a TBM and timing of construction will limit the requirement for dewatering during construction. As such any impact will be localised and temporary.	X	-	The construction of excavated material processing associated areas is not anticipated to require dewatering.	X	-	The creation of habitat through placement of suitable material will not require dewatering.	X	-	The drainage system will not require dewatering.
"Damming" of groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstractions	✓	**Longer Lasting**	**There will be a local influence on the groundwater flow regime due to the presence of the tunnels in the groundwater body.**	✓	**Longer Lasting**	**There will be a local influence on the groundwater flow regime due to the presence of the tunnels in the groundwater body.**	✓	**Longer Lasting**	**There will be a local influence on the groundwater flow regime due to the presence of the tunnel portals in the groundwater body.**	✓	Short Term	The presence of impermeable surfaces in the excavated material processing associated areas will lead to a reduction in groundwater infiltration, which could impact contributions.	X	-	The creation of habitat through the placement of suitable material will not reduce groundwater infiltration.	X	-	The drainage system would not lead to a damming of groundwater flow; as such there is no impact.
Chemical																		
Disturbing or mobilising existing poor quality groundwater by temporary dewatering or depressurisation and permanent groundwater control	✓	Short Term	The Tunnels extend below water table. Tunnel construction may have potential to impact groundwater quality due to fluids used in construction.	✓	Short Term	The Tunnels extend below water table. Tunnel construction may have potential to impact groundwater quality due to fluids used in construction.	✓	Short Term	The use of a TBM and timing of construction will limit the requirement for dewatering during construction. But there is potential for contamination to be present in groundwater.	X	-	The construction of excavated material processing associated areas is not anticipated to re-quire dewatering.	X	-	The creation of habitat through placement of suitable material will not require dewatering; as such there is no impact.	X	-	The drainage system would not require dewatering; as such there is no impact.
Mobilisation of contaminants from their soil source (e.g. contaminated land), to groundwater	✓	Short Term	The tunnel passes through phosphatic chalk, and could mobilise phosphate from this natural source.	✓	Short Term	The tunnel passes through phosphatic chalk, and could mobilise phosphate from this natural source.	✓	Short Term	There is the potential for contaminants from ground contamination from the pig farm and former RAF Stonehenge to be mobilised during construction.	✓	Short Term	There is the potential for contaminants from ground contamination including from former RAF Oatlands to be mobilised during construction.	✓	Short Term	There is the potential for contaminants to be mobilised from the soil source used for the creation of habitat.	✓	Short Term	There is the potential for contaminants from ground contamination including from the pig farm and former RAF Stonehenge to be mobilised during construction.
Creating or altering of pathways along which existing poor quality groundwater can migrate	✓	**Longer Lasting**	**The tunnel will be grouted in place, and would only provide a pathway for flow due to an inward head gradient.**	✓	**Longer Lasting**	**The tunnel will be grouted in place, and would only provide a pathway for flow due to an inward head gradient.**	✓	**Longer Lasting**	**The tunnel portals would provide a pathway for flow due to an inward head gradient at high groundwater levels.**	X	-	The construction of excavated material processing associated areas is not anticipated to cre-ate or alter pathways for exist-ing poor quality groundwater to migrate.	✓	Short Term	The creation of habitat through placement of suitable material may provide a new pathway for the movement of any existing poor quality groundwater such as from the ESSO pipeine at high groundwater levels	✓	**Longer Lasting**	**The design of the drainage system is to be such that the existing pathway for any poor quality water to enter groundwater will be reduced. There is therefore a potential benefit.**

5 Conclusion

5.1.1 The WFD screening and scoping (Stages 1 and 2) exercise has identified the water bodies that may potentially be affected by the proposed scheme, both during the construction and operational phases, and which WFD parameters may be detrimentally impacted by the proposed Scheme and therefore need to be assessed in the WFD Impact Assessment (Stage 3).

5.1.2 The WFD assessment (Stage 3) will be undertaken for the surface water body catchments of the River Till and River Avon (upstream and downstream of the Nine Mile River) and the Chalk groundwater body (Upper Hampshire Avon). This will encompass areas proposed to be used for construction and the potential zone of influence for the proposed scheme.

5.1.3 This report is provided to allow the Environment Agency to comment on the identified impacts for assessment, which will inform the WFD assessment.

6 References

Ref 1-1 The Planning Inspectorate, June 2017. Advice Note 18: The Water Framework Directive

Ref 1-2 National Infrastructure Plan 2014, HM Treasury, December 2014.

Ref 2-1 Organisation for Economic Co-operation and Development *Global Competitiveness Report 2011/12*

Ref 2-2 Environment Agency, 2015. Rules for assessing Surface Water Body Status and Potential

Ref 3-1 Environment Agency, 2015, South West River Basin District River Basin Management Plan

Ref 3-2 Natura 2000, 2015. Special Areas of Conservation Under the EC Habitats Directive

Ref 3-3 Environment Agency, 2018. Catchment Data Explorer: http://environment.data.gov.uk/catchment-planning/WaterBody/GB108043022570

Ref 3-4 Environment Agency, 2015. Phosphorus in the Hampshire Avon Special Area of Conservation Technical Report

Ref 3-5 David Tyldesley & Associates, 2015. River Avon Special Area of Conservation Nutrient Management Plan for Phosphorus

Ref 3-6 Wiltshire Council, 2015. Wiltshire Core Strategy

Ref 3-7 Environment Agency, 2018. Catchment Data Explorer: http://environment.data.gov.uk/catchment-planning/WaterBody/GB108043022351

Ref 3-8 Environment Agency, 2018. Catchment Data Explorer: http://environment.data.gov.uk/catchment-planning/WaterBody/GB108043022352

Ref 3-9 Environment Agency, 2018. Catchment Data Explorer:

http://environment.data.gov.uk/catchment-planning/WaterBody/GB108043022360

Ref 3-10 The Wild Trout Trust, 2013, River Wylye: http://www.wildtrout.org/system/files/private/River%20Wylye%20at%20Wylye%20WFFC%20AV.pdf

Ref 3-11 Environment Agency, 2018. Catchment Data Explorer: http://environment.data.gov.uk/catchment-planning/WaterBody/GB108043022550

Ref 3-12 Environment Agency, 2018. Catchment Data Explorer: http://environment.data.gov.uk/catchment-planning/WaterBody/GB108043022510

Ref 3-13 Environment Agency, 2018. Catchment Data Explorer: http://environment.data.gov.uk/catchment-planning/WaterBody/GB40801G806900

Ref 4-1 Department for Environment, Food and Rural Affairs, 2015. Sustainable Drainage Systems: Non-statutory technical standards for sustainable drainage systems.

Ref 4-2 Water Framework Directive, 2016, Exemptions under Article 4(7) of the Water Framework Directive: https://circabc.europa.eu/sd/a/d453b9ae-e001-461c-80cc-a056d308295e/Key%20Issue%20Paper%204.7%20-%20Final.pdf

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6.3 Environmental Statement Appendices

Appendix 11.2 Annex 2 Environment Agency Consultation Response on WFD Screening and Scoping Report

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

October 2018

Mrs Bernadine Maguire
Principal Flood Risk & Coastal Consultant
AECOM
Midpoint Alencon Link
Basingstoke
Hampshire
RG21 7PP

Our ref: WX/2018/131776/01-L01
Your ref: WFD Reports

Date: 15 June 2018

Dear Mrs Maguire

CHARGEABLE ENVPAC/1/WSX/00021 - A303 STONEHENGE (AMESBURY TO BERWICK DOWN). WATER FRAMEWORK DIRECTIVE ASSESSMENT SCREENING AND SCOPING REPORT

Thank you for consulting the Environment Agency on the A303 Stonehenge Water Framework Directive (WFD) Screening and Scoping Report, dated 26 April 2018.

We consider this to be a comprehensive document and you and your colleagues have been thorough in terms of the process and have considered all the relevant scheme elements and water bodies. There are however a few points that we wish to raise, which we recommend should be included in the WFD Assessment. These are discussed in the paragraphs below.

Geomorphology
We would prefer the Lower Wylye water body to remain screened in for the moment. Without a better understanding of how the tunnel may impact groundwater flow to the Till and therefore Lower Wylye it should remain screened in until the groundwater modelling progresses and provides evidence to justify the assumption at this stage that the impacts will be minimal. The assessment acknowledges that there is a risk of groundwater flows being modified and possibly ponded by the tunnel and therefore we require more evidence before the more remote potential downstream impacts are screened out fully.

Fisheries and Biodiversity
The impact tables (page 27 onwards) should also include the risk of spreading non-natives species.

The risks to fish are not only from noise and vibration due to piling, but also from increased sediment in both the Avon and River Till as a result of the works. This

End

should be updated in the impact tables.

Groundwater and contaminated land
Section 4.4.6: This paragraph mentions that for the purposes of the scoping assessment, short term has been assumed as 3 years or less. We wish to point out that up to 3 year impacts may be significant and material. Where appropriate mitigation should be put in place to ensure construction and operation of the works will not have a detrimental impact and should be considered as part of the risk assessment.

Table 4-1:

- Drainage. Road drainage has the potential to impact on hydrology by diverting water drained from road system to soakaways, potentially altering resource balance and or quality (subject to discharge controls).
- Sub water table working (boring) is likely to result in some inflow that will need to be managed and as such may impact on Hydrology. We would recommend this should be remained scoped in until risk assessment and detailed design demonstrates this is not required.
- The operation of the drainage system may also impact on hydrology and Water Quality in addition to construction as detailed in the table.

Table 4-3

- Material processing may also impact on surface run off.
- Construction and operation of the road and tunnel, etc. may introduce new contaminants (as well as existing contaminants) and new pathways for contaminants to migrate to surface and groundwaters. This should be considered.
- Tunnel construction could have long term lowering influence on groundwater down gradient of the tunnel if it is diverted elsewhere.
- Some subsurface drainage may also be required in portals etc. and we would recommend this remains scoped in until detailed design and risk assessment identifies this is not the case. This could therefore impact on surface and groundwater levels and quantity.

I hope these comments are useful, but please contact me if you have any queries.

Yours sincerely

Miss Katherine Burt
Sustainable Places - Planning Specialist

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End

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Appendix 11.2 Annex 3 WFD Detailed Impact Assessment

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

October 2018

A. Risk screening of potential to cause deterioration of current WFD Ecological status

Surface Water body	Current status	Status objective	Scheme Elements	Embankment 1				Winterbourne Stoke Cutting West			Embankment 2				Cutting West of River Till Viaduct			Embankment 3 (River Till Embankment West)				River Till Viaduct					Embankment 4 (River Till Embankment East)			
GB108043022570	Good	Good status by 2015		Chainage: 1180 - 1600, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1002				Chainage: 1810 - 3045, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1002 and 1003			Chainage: 3045 - 3640, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1003				Chainage: 3640 - 3880, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1003 and 1004			Chainage: 3880 - 3975, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1004				Chainage: 3975 - 4170, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1004					Chainage: 4170 - 4390, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1004			
River Till			Identified biological impacts	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes (i.e. either decrease due to de-watering/damming of groundwater flows or increase due to re-charge) in flow velocity and volume due to de-watering	Change in water quality due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes (i.e. either decrease due to de-watering/damming of groundwater flows or increase due to re-charge) in flow velocity and volume due to de-watering	Change in water quality due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Vibration	Landtake (for bridge footings)	Shading	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Drainage	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream
Biological quality elements																														
1. Macrophytes and phytobenthos - diatoms	-	-	Predicted change to status elements (green = none)							Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Till, suffocating macrophytes and reducing their ability to photosynthesize. Mitigation measures identified in the Operations Environmental Management Plan should significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.	Vibrations made during the construction of the embankment may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Till, suffocating macrophytes and reducing their ability to photosynthesize. The majority of this embankment is located in relatively close proximity to the Till indicating that there is the potential for this scheme element to detrimentally impact this receptor. Mitigation measures identified in the Operations Environmental Management Plan should significantly [illegible]						Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Till, suffocating macrophytes and reducing their ability to photosynthesize. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this [illegible]	Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Till, suffocating macrophytes and reducing their ability to photosynthesize. This embankment is located approximately 50m from the Till indicating that there is the potential for this scheme element to detrimentally impact this receptor. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on [illegible]	[illegible]		Negligible effect anticipated on river processes and macrophytes and phytobenthos habitats upstream and downstream of this scheme element with no measurable change in quality element.	[illegible]	[illegible]		[illegible]		Vibrations made during the construction of the embankment may indirectly impact these aquatic species through an increased quantity of sediment being delivered to the Till, suffocating macrophytes and reducing their ability to photosynthesize. This embankment is located approximately 50m from the Till indicating that there is the potential for this scheme element to detrimentally impact this receptor. Mitigation measures identified in the Operations Environmental Management Plan should [illegible]	Scheme element located close (approx 50m) to the River Till and therefore landtake has the potential to detrimentally impact riparian habitats, albeit a localised impact. With good construction practice measures, the embedded mitigation and the ongoing monitoring of vegetation during the construction and operation phases this impact will be minimised.		Negligible effect anticipated on river processes and macrophytes and phytobenthos habitats upstream and downstream of this scheme element with no measurable change in quality element.
2. Macrophytes and phytobenthos - macrophytes	-	-										[illegible]																		
3. Macroinvertebrates	High	-		No impacts identified as a result of this scheme element, largely due to this element being located approximately 1km west of the River Till and the fact this embankment is relatively unintrusive.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4. Fish	-	-								[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]				[illegible]	[illegible]	[illegible]		[illegible]
Physico-Chemical quality elements																														
5. Dissolved Oxygen	-	-	Predicted change to status elements (green = none)	No impacts identified as a result of this scheme element.						[illegible]					[illegible]	[illegible]		[illegible]						[illegible]			[illegible]			
6. pH	High	-																				[illegible]								
7. Phosphate	High	-			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8. Ammonia	High	-		Receptor not sensitive to impact.						[illegible]			[illegible]					[illegible]								[illegible]			[illegible]	
9. Temperature	High	-			[illegible]				[illegible]	[illegible]	[illegible]				[illegible]	[illegible]		[illegible]						[illegible]						
10. Salinity	-	-		No impacts identified as a result of this scheme element.				[illegible]		[illegible]																				
11. Acid Neutralising Capacity	-	-			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12. Specific Pollutants (Annex VIII)	High	-								[illegible]						[illegible]														
Hydromorphological supporting elements																														
13. Quantity and dynamics of river flow	Supports Good	-	Predicted change to status elements (green = none)	No impacts identified as a result of this scheme element, largely due to this element being located approximately 1km west of the River Till.							No impacts identified as a result of this scheme element, largely due to this element being located approximately 800m west of the River Till.						[illegible]	[illegible]				[illegible]	[illegible]					[illegible]		
14. Connection to Groundwater	Supports Good	-		Receptor not sensitive to impact.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15. River continuity	Supports Good	-																												
16. River depth and width variation bed	Supports Good	-		No impacts identified as a result of this scheme element, largely due to this element being located approximately 1km west of the River Till and the fact this embankment is relatively unintrusive							No impacts identified as a result of this scheme element, largely due to this element being located approximately 800m west of the River Till.							[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]			[illegible]			
17. Structure and substrate of river bed	Supports Good	-																												
18. Structure of riparian zone	Supports Good	-															[illegible] sediment entering the river, from this scheme element, will have a detrimental impact on any aspect of the hydromorphological status of this river. Mitigation measures identified in the Operations Environmental Management Plan should significantly reduce the risk of contaminants and sediment being transported to the river, thus minimising the impact on this receptor.	Due to the close proximity of this scheme element to the Till, it is possible that the construction of this scheme element will detrimentally impact this receptor. With good construction practice measures, the embedded mitigation and the ongoing monitoring of vegetation during the construction and operation phases this impact will be minimised.			Vibrations may disturb the riparian zone. The potential movement of sediment, caused by vibrations may reduce the ability for certain plants to stabilize and grow within this region. Mitigation measures identified in the Operations Environmental Management Plan should significantly reduce the risk of contaminants and sediment being transported to the river, thus minimising the impact on this receptor.	Since the footings are located within the floodplain there may be direct disturbance to riparian zone.	The increase in shading is likely to reduce the photosynthetic productivity of macrophytes and other biota in the riparian zone underneath the bridge, and therefore may impact the structure of the riparian zone.	[illegible]		[illegible] sediment entering the river, from this scheme element, will have a detrimental impact on any aspect of the hydromorphological status of this river. Mitigation measures identified in the Operations Environmental Management Plan should significantly reduce the risk of contaminants and sediment being transported to the river, thus minimising the impact on this receptor.	Due to the close proximity of this scheme element to the Till, it is possible that the construction of this scheme element will detrimentally impact this receptor. With good construction practice measures, the embedded mitigation and the ongoing monitoring of vegetation during the construction and operation phases this impact will be minimised.		
Risk screening of potential to prevent future attainment of good WFD status	The River Till is currently classified as 'good' overall status and is meeting all the status objectives, with the exception of 'hydrological regime' which currently 'Does Not Support Good'. This is likely due to over abstraction from either surface or groundwater sources. There are currently no specific mitigation measures identified in the RBMP.			This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status.				This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status. There is a risk that dewatering during construction may marginally alter the hydrological regime of the river, however these impacts are likely to be short term and therefore unlikely to have a long term impact.			This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status.				This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status. There is a risk that dewatering during construction may marginally alter the hydrological regime of the river, however these impacts are likely to be short term and therefore unlikely to have a long term impact.			This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status.				This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status. There is a risk that dewatering during construction may marginally alter the hydrological regime of the river, however these impacts are likely to be short term and therefore unlikely to have a long term impact.					This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status.			

(Row groups are labelled "WFD classification elements".)

Green Bridge No. 2 Cutting — Chainage: 4390 - 4780, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1004

Changes (i.e. either decrease due to de-watering/damming of groundwater flows or increase due to re-charge) in flow velocity and volume due to de-watering	Change in water quality due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)
Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Till, suffocating macrophytes and reducing their ability to photosynthesize. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.
		Vibrations made during the construction of the cutting may indirectly impact these aquatic species through an increased quantity of sediment being delivered to the Till, suffocating macrophytes and reducing their ability to photosynthesize, thereby reducing a major food source of the macrophytes. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.
		Vibrations made during the construction of the cutting may indirectly impact these aquatic species through an increased quantity of sediment being delivered to the Till, reducing the presence of macrophytes and macroinvertebrates within the river and ultimately reducing a major food source of many fish. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.
[illegible]	[illegible]	There is the potential for vibrations to disturb previously unidentified contaminated land delivered to the Till within the runoff and sediments which could alter the chemical status of the river. Mitigation measures identified in the Operations Environmental Management Plan should significantly reduce the risk of contaminants and sediment being transported to the river, thus minimising the impact on this receptor.
[illegible]	[illegible]	[illegible]
This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status. There is a risk that dewatering during construction may marginally alter the hydrological regime of the river, however these impacts are likely to be short term and therefore unlikely to have a long term impact.		

Embankment 5 (River Till Embankment East) — Chainage: 4780 - 4990, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1004

Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream
No impacts identified as a result of this scheme element, largely due to this element being located approximately 1km west of the River Till and the fact this embankment is relatively unintrusive.	No impacts identified as a result of this scheme element, largely due to this element being located approximately 1km west of the River Till and the fact this embankment is relatively unintrusive.	Drainage has been designed to reduce the rate and volume of run-off from the new route with appropriate treatment, therefore there are no anticipated changes in water quality during the operation of this road. There is a risk of accidental spillages during the operation of this new road and therefore, due to the close proximity to the Till, there is a possibility of detrimental impacts to the water quality. However, the completed spillage risk assessment has shown there will be a reduction in the risk compared to the exisitng road due to the nature of the embedded mitigation within the drainage design.	No impacts identified as a result of this scheme element, largely due to this element being located approximately 1km east of the River Till. In addition to this, due to the fact this embankment is small and relatively unintrusive the impacts of damming and connectivity between groundwater and surface water will be minimal, if present at all.
There is the potential for vibrations to disturb previously unidentified contaminated land delivered to the Till within the runoff and sediments which could alter the chemical status of the river. Mitigation measures identified in the Operations Environmental Management Plan should significantly reduce the risk of contaminants and sediment being transported to the river, thus minimising the impact on this receptor.	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status.			

Longbarrow Cutting West — Chainage: 4990 - 5125, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1004

Changes (i.e. either decrease due to de-watering/damming of groundwater flows or increase due to re-charge) in flow velocity and volume due to de-watering	Change in water quality due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)
Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Till, suffocating macrophytes and reducing their ability to photosynthesize. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.
		Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Till, reducing the presence of macrophytes within the river and ultimately reducing a major food source of many macroinvertebrates. The majority of this cutting, however is located over 800m away (at its closest point) to the Till, thereby significantly reducing the likelihood of this scheme element detrimentally impacting these macroinvertebrates. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.
		Vibrations made during the construction of the cutting may indirectly impact these aquatic species through an increased quantity of sediment being delivered to the Till, reducing the presence of macrophytes and macroinvertebrates within the river and ultimately reducing a major food source of many fish. The majority of this cutting, however is located over 800m away (at its closest point) to the Till, thereby significantly reducing the likelihood of this scheme element detrimentally impacting these fish. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status. There is a risk that dewatering during construction may marginally alter the hydrological regime of the river, however these impacts are likely to be short term and therefore unlikely to have a long term impact.		

Embankment 6 — Chainage: 5125 - 5255, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1004 and 1005

Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream
No impacts identified as a result of this scheme element, largely due to this element being located approximately 1km east of the River Till and the fact this embankment is relatively unintrusive.	No impacts identified as a result of this scheme element, largely due to this element being located approximately 1km east of the River Till and the fact this embankment is relatively unintrusive.	Drainage has been designed to reduce the rate and volume of run-off from the new route with appropriate treatment, therefore there are no anticipated changes in water quality during the operation of this road. There is a risk of accidental spillages during the operation of this new road and therefore, due to the close proximity to the Till, there is a possibility of detrimental impacts to the water quality. However, the completed spillage risk assessment has shown there will be a reduction in the risk compared to the exisitng road due to the nature of the embedded mitigation within the drainage design.	No impacts identified as a result of this scheme element, largely due to this element being located approximately 1km east of the River Till. In addition to this, due to the fact this embankment is small, and relatively unintrusive, the impacts of damming and connectivity between groundwater and surface water will be minimal, if present at all.
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status.			

Longbarrow Cutting Central, Longbarrow Cutting East, Cutting Apporach to Western Portal — Chainage: 5255 - 7200, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1005 and 1006

Changes (i.e. either decrease due to de-watering/damming of groundwater flows or increase due to re-charge) in flow velocity and volume due to de-watering	Change in water quality due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)
Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Till, suffocating macrophytes and reducing their ability to photosynthesize. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.
		Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Till, reducing the presence of macrophytes within the river and ultimately reducing a major food source of many macroinvertebrates. The majority of this cutting, however is located over 1.2km away (at its closest point) to the Till, thereby significantly reducing the likelihood of this scheme element detrimentally impacting these macroinvertebrates. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.
		Vibrations made during the construction of the cutting may indirectly impact these aquatic species through an increased quantity of sediment being delivered to the Till, reducing the presence of macrophytes and macroinvertebrates within the river and ultimately reducing a major food source of many fish. The majority of this cutting, however is located over 1.2km away (at its closest point) to the Till, thereby significantly reducing the likelihood of this scheme element detrimentally impacting these fish. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status. There is a risk that dewatering during construction may marginally alter the hydrological regime of the river, however these impacts are likely to be short term and therefore unlikely to have a long term impact.		

Twin-Bore Tunnel and Associated Eastern and Western Portals — Chainage: 7200 - 10485, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1006, 1007 and 1008

Noise and Vibration	Disruption/contamination of watercourse during construction	Landtake (for slab or other surface infrastructure overlying tunnel)	"Damming" of groundwater flow and reduction in groundwater contribution
The majority of this scheme element is located far (>3km) from the River Till meaning that potential impacts from the construction of this scheme element (eg. increased sediment load to the river, ecology directly disturbed by noise/vibrations) are not likely.	Due to the Till being predominantly groundwater fed, the water levels fluctuate dramatically throughout the year. As a result of this, it is unlikely that dewatering activities would have a significant impact on this receptor. The groundwater system has been modelled to identify if any intrusive scheme element, including the tunnel and associated portals, has the potential to impact on the baseflow to the rivers. It was found that for three contrasting scenarios (Average, 1974 low and 2014 high) the impact of these elements on the flow in both the Till and Avon will be negligible. If all OEMP measures are successfully implemented it is also unlikely that construction activities will detrimentally impact the quality of the water course.	Landtake would be approximately 3km from the Till (at its closest point), therefore the impacts on this receptor are likely to be negligible.	Groundwater modelling for three constrasting scenarios (Average, 1974 drought and 2014 high) indicates that the implementation all currently designed intrusive scheme elements will have a negligible impact on the flow within the Avon and Till. It has been suggested that damming may occur, resulting in groundwater backing up behind the dam (whilst slowly continuing to pass under the tunnel) having the potential to cause minor GW flooding. It should also be noted that water removed during dewatering, either during construction or operation, will be returned in another location.
[illegible]	[illegible]	[illegible]	Groundwater modelling for three constrasting scenarios (Average, 1974 drought and 2014 high) indicates that the implementation all currently designed intrusive scheme elements will have a negligible impact on the flow within the Avon and Till. It has been suggested that damming may occur, resulting in groundwater backing up behind the dam (whilst [illegible]
[illegible]	[illegible]	[illegible]	Receptor is unlikely to be significantly impacted by damming.
This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status. There is a risk that dewatering during construction may marginally alter the hydrological regime of the river, however these impacts are likely to be short term and therefore unlikely to have a long term impact.			

Material processing, treatment and storage areas — Multiple locations

Sediment erosion and transport	Landtake (for new storage areas)
Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Till, suffocating macrophytes and reducing their ability to photosynthesize. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.	Scheme element located at such a distance away from the Till that landtake is unlikely to impact riparian habitats.
There is the potential for an increased quantity of sediment being delivered to the Till, reducing the presence of macrophytes within the river and ultimately reducing a major food source of many macroinvertebrates. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.	
There is the potential for an increased quantity of sediment being delivered to the Till, reducing the presence of macrophytes and macroinvertebrates within the river and ultimately reducing a major food source of many fish. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.	
There is the potential for previously unidentified contaminated land to be disturbed and delivered to the Till within the runoff and sediments which could alter the chemical status of the river. Mitigation measures identified in the Operations Environmental Management Plan should significantly reduce the risk of [illegible]	[illegible]
[illegible] … Mitigation measures identified in the Operations Environmental Management Plan should significantly reduce the risk of contaminants and sediment being transported to the river, thus minimising the impact on this receptor.	[illegible]
This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status. There is a risk that dewatering during construction may marginally alter the hydrological regime of the river, however these impacts are likely to be short term and therefore unlikely to have a long term impact.	

Landscaping and habitat creation — Multiple locations

Sediment erosion and transport	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream
Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Till, suffocating macrophytes and reducing their ability to photosynthesize. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.	During construction, when activity will need to take place close to the river channel, there could be an increse in the sediment transport within surface runoff. Ranunculion fluitantis (specifically sub-type 1) found in both the Till and Avon has been shown to be adversely impacted by artificial changes in flow regime caused by engineering works (DEFRA). Due to recent engineering work around the UK the potential habitats for these species has reduced. Sub-type 1 already has a limited distribution throughout the UK, due to its reliance on underlying chalk geology, thus any small impact this project may have on the flow regime may significantly impact these important macrophytes. Embedded mitigation within the design and mitigation measures identified in the OEMP should significantly reduce the risk of significant changes to the hydromorphology and therefore alteration to the flow regime.
There is the potential for an increased quantity of sediment being delivered to the Till, reducing the presence of macrophytes within the river and ultimately reducing a major food source of many macroinvertebrates. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.	
There is the potential for an increased quantity of sediment being delivered to the Till, reducing the presence of macrophytes and macroinvertebrates within the river and ultimately reducing a major food source of many fish. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.	
There is the potential for previously unidentified contaminated land to be disturbed and delivered to the Till within the runoff and sediments which could alter the chemical status of the river. Mitigation measures identified in the Operations [illegible]	[illegible]
[illegible] aspect of the hydromorphological status of this river. Mitigation measures identified in the Operations Environmental Management Plan should significantly reduce the risk of contaminants and sediment being transported to the river, thus minimising the impact on this receptor.	[illegible]
This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status. There is a risk that dewatering during construction may marginally alter the hydrological regime of the river, however these impacts are likely to be short term and therefore unlikely to have a long term impact.	This scheme element is not expected to prevent the Till from continuing to achieve WFD 'good' status by 2027, nor is It expected to prevent the attainment of 'supports good' hydrological regime status. There is a risk that dewatering during construction may marginally alter the hydrological regime of the river, however these impacts are likely to be short term and therefore unlikely to have a long term impact.

Detailed Impact Assessment Results

Cumulative effects - effects on element from scheme component(s) located in other WFD water bodies	Overall effects on element: Summary of scheme components proposed on watercourses within water body catchment with the potential to effect element status	Overall effects on element: Summary of effects on elements	Overall effects on element: Overall effect on element	Additional mitigation requirements: Construction	Additional mitigation requirements: Operation	Residual effect on element	WFD compliance outcome - potential for deterioration of current status
None - No cumulative effects are associated with the impacts of the scheme component located within other, adjacent water bodies have been identified for any of the surface water bodies affected by the Proposed Scheme. Whilst there are water bodies located downstream of this water body, it is expected that there will be no widespread adverse effects within any of these.	Viaduct - River Till Viaduct Embankments - 6 embankments of varying lengths and heights located within approximately 1km of the River Till Cuttings - 5 cuttings of varying lengths and depths located within approximately 1km of the River Till	Viaduct The viaduct will cause some minor shading. The implementation of an air gap within the twin deck viaduct will reduce this shading, however minor shading impacts may remain. This resulting shading will likely have a negligible impact on macrophytes, phytobenthos, macroinvertebrates and fish. Embankments These structures may alter the quantity of surface water runoff delivered to the Till, however, since the Till is close to 100% groundwater fed, this is unlikely to have an impact on flow rates and therefore unlikely to impact biota. During construction, noise and vibrations have the potential to increase the sediment load to the Till, hence disrupting biota. Cuttings As with the embankments, the construction of these scheme elements may result in increased sediment being delivered to the Till. During the operational phase, these cuttings are unlikely to significantly impact the connection between the groundwater and surface water systems, as made evident by the results of the groundwater modelling.	Localised adverse effect anticipated when scheme components considered in combination. No change in quality element when balanced against mitigation embedded in the scheme.	None required	None required	N/A	Compliant - No change in biological status of water body
			Localised adverse effect anticipated when scheme components considered in combination. No change in quality element when balanced against mitigation embedded in the scheme.			N/A	
			Localised adverse effect anticipated when scheme components considered in combination. No change in quality element when balanced against mitigation embedded in the scheme.			N/A	
			Localised adverse effect anticipated when scheme components considered in combination. No change in quality element when balanced against mitigation embedded in the scheme.			N/A	
[illegible]	[illegible]	Viaduct The viaduct will cause some minor shading. The implementation of an air gap within the twin deck viaduct will reduce this shading, however minor shading impacts may remain. This resulting shading will likely have a negligible impact on dissolved oxygen and temperature. Emankments These structures may alter the quantity of surface [illegible]	Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	Compliant - No change in physicochemical status of water body
			Negligible effect anticipated when effects considered in combination. No measureable change in quality element.			N/A	
[illegible]	[illegible]	[illegible]	[illegible]	None required	None required	N/A	Compliant - No change in hydromorphological status of water body

A303 Amesbury to Berwick Down
WFD Surface Water Assessment

5. Risk screening of potential in-scope deterioration of current WFD biological status

Surface Water body	Current status	Status objective
GB616000025010	Good	Good Overall by 2015
River Wylye (Lower)		

Scheme Elements	Embankment 1				Winterbourne Duke Cutting West			Embankment 2				Cutting West of Down Till Viaduct			Embankment 3 (River Till Embankment West)				River Till Viaduct					Embankment 4 (River Till Embankment East)				Green Bridge No.1 Cutting			Green
	Chainage: 1160 - 1665, Plan Profile Drawing Number: HE601509-RMM-HGN/SM_ZN_003_Z DR CH -1032, Sheet Embankment				Chainage: 3010 - 3540, Plan Profile Drawing Number: HE601509-RMM-HGN/SM_ZN_003_Z DR CH-3222 and 3310			Chainage: 3515 - 3665, Plan Profile Drawing Number: HE601509-RMM-HGN/SM_ZN_003_Z DR CH-3320				Chainage: 3540 - 3985, Plan Profile Drawing Number: HE601509-RMM-HGN/ SM_ZN_003_Z DR CH-3320 and 3354			Chainage: 3680 - 3975, Plan Profile Drawing Number: HE601509-RMM-HGN/SM_ZN_003_Z DR CH -3354				Chainage: 3975 - 4170, Plan Profile Drawing Number: HE601509-RMM-HDN/ BM_ZN_003_Z DR CH-3354					Chainage: 4170 - 4380, Plan Profile Drawing Number: HE601509-RMM-HDN/ BM_ZN_006_Z DR CH-3354				Chainage: 4380 - 4760, Plan Profile Drawing Number: HE601509-RMM-HDN/ BM_ZN_008_P DR CH-3354			Chainage
Bio-Med Biological Impacts	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes (i.e. either decrease or increase in the elevation of groundwater flows or groundwater levels) in recharge to groundwater from surface water leading to de-watering	Change in water quantity due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes (i.e. either decrease or increase in the elevation of groundwater flows or groundwater levels) in recharge to groundwater from surface water leading to de-watering	Change in water quantity due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Vibration	Landtake (for Bridge footings)	Shading	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Drainage	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes (i.e. either decrease or increase in the elevation of groundwater flows or groundwater levels) in recharge to groundwater from surface water leading to de-watering	Change in water quantity due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)	Vibration

Supported quality elements

WFI Macrophytes and phytobenthos	1. Macrophytes and phytobenthos - diatoms	Good	-	Supports Good
	2. Macrophytes and phytobenthos - macrophytes	Good	-	
	3. Macroinvertebrates	High	-	
	4. Fish	High	-	

Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.

Groundwater modelling of the impact of all relevant scheme elements on the Frare is both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Deminimised impacts are therefore not predicted to occur.

Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.

Groundwater modelling of the impact of all relevant scheme elements on the Frare is both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Deminimised impacts are therefore not predicted to occur.

Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.

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Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.

Supported quality elements

WFI Invertebrates	6. Dissolved Oxygen	High	-	Supports Good
	8. pH	High	-	
	7. Phosphate	Good	-	
	9. Ammonia	High	-	
	4. Temperature	High	-	
	10. Salinity	-	-	
	11. Acid Neutralising Capacity	-	-	
	12. Specific Pollutants (Annex VIII)	High	-	

Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.

Groundwater modelling of the impact of all relevant scheme elements on the Frare is both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Deminimised impacts are therefore not predicted to occur.

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Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.

Supported quality elements

WFI Hydromorphology	22. Quantity and dynamics of river flow	Supports Good	-	Supports Good
	14. Connection to Groundwater	Supports Good	-	
	16. River continuity	Supports Good	-	
	18. River depth and width variation bed	Supports Good	-	
	17. Structure and substrate of river bed	Supports Good	-	
	19. Structure of riparian zone	Supports Good	-	

Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.

Groundwater modelling of the impact of all relevant scheme elements on the Frare is both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Deminimised impacts are therefore not predicted to occur.

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Groundwater modelling of the impact of all relevant scheme elements on the Frare is both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Deminimised impacts are therefore not predicted to occur.

Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.

Risk screening of potential to prevent future attainment of good WFD status	The River Wylye (Lower) is currently of good overall status and is meeting all the status objectives.	This scheme element is not expected to prevent the Wylye from continuing to achieve WFD 'good' status.

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Embankment 5 (River Till Embankment East)			Longbarrow Cutting West			Embankment 6				Longbarrow Cutting Central, Longbarrow Cutting East, Cutting Apporach to Western Portal			Twin-Bore Tunnel and Associated Eastern and Western Portals				Material processing, treatment and storage areas		Landscaping and habitat creation		Detailed Impact Assessment Results							
e: 4780 - 4990, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1004			Chainage: 4990 - 5125, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1004			Chainage: 5125 - 5255, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1004 and 1005				Chainage: 5255 - 7200, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1005 and 1006			Chainage: 7200 - 10485, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1006, 1007 and 1008				Multiple locations		Multiple locations		Cumulative effects - effects on element from scheme component(s) located in other WFD water bodies	Overall effects on element			Additional mitigation requirements		Residual effect on element	WFD compliance outcome - potential for deterioration of current status
Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes (i.e. either decrease due to de-watering/damming of groundwater flows or increase due to re-charge) in flow velocity and volume due to de-watering	Change in water quality due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes (i.e. either decrease due to de-watering/damming of groundwater flows or increase due to re-charge) in flow velocity and volume due to de-watering	Change in water quality due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)	Noise and Vibration	Disruption/contamination of watercourse during construction	Landtake (for slab or other surface infrastructure overlying tunnel)	"Damming" of groundwater flow and reduction in groundwater contribution	Sediment erosion and transport	Landtake (for new storage areas)	Sediment erosion and transport	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream		Summary of scheme components proposed on watercourses within water body catchment with the potential to effect element	Summary of effects on elements	Overall effect on element	Construction	Operation		
t, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.			Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.			Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.				Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.			Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.				Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.		Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.		None - No cumulative effects are associated with the impacts of the scheme component located within other, adjacent water bodies have been identified for any of the surface water bodies affected by the Proposed Scheme. Whilst there are water bodies located downstream of this water body, it is expected that there will be no widespread adverse effects within any of these.	Viaduct - River Till Viaduct Embankments - 6 embankments of varying lengths and heights located within approximately 1km of the River Till and 4.5km of the Lower Wylye Cuttings - 5 cuttings of varying lengths and depths located within approximately 1km of the River Till and 4.5km of the Lower Wylye	Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). These scheme elements are therefore unlikely to detrimentallty impact the status of the Lower Wylye.	Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A N/A N/A N/A	Compliant - No change in biological status of water body
t, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.			Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.			Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.				Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.			Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.				Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.		Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.		None - No cumulative effects are associated with the impacts of the scheme component located within other, adjacent water bodies have been identified for any of the surface water bodies affected by the Proposed Scheme. Whilst there are water bodies located downstream of this water body, it is expected that there will be no widespread adverse effects within any of these.		Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). These scheme elements are therefore unlikely to detrimentallty impact the status of the Lower Wylye.	Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A N/A N/A N/A N/A N/A N/A N/A	Compliant - No change in physiochemical status of water body
t, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.			Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.			Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.				Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.			Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.			Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact flow (much less than natural variability). Detrimental impacts are therefore not predicted to occur. Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point. Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact flow (much less than natural variability). Detrimental impacts are therefore not predicted to occur. Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.		Receptor not sensitive to impact, primarily due to the scheme element being located approximately 4.5 km north of this waterbody at it's closest point.	Alterations to the dry valleys could result in changes to surface water runoff which could impact on the hydrology. As the potential changes are only under higher flow conditions there is unlikely to be an impact on the low flow conditions. In addition, mitigation measures are proposed to avoid the damming of surface water runoff so the dry valleys can continue to function.	None - No cumulative effects are associated with the impacts of the scheme component located within other, adjacent water bodies have been identified for any of the surface water bodies affected by the Proposed Scheme. Whilst there are water bodies located downstream of this water body, it is expected that there will be no widespread adverse effects within any of these.		Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till (and therefore the Lower Wylye) and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). These scheme elements are therefore unlikely to detrimentallty impact the status of the Lower Wylye.	Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element. Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	one requir	N/A N/A N/A N/A N/A N/A	Compliant - No change in hydromorphological status of water body
eme element is not expected to prevent the Wylye from continuing to achieve WFD 'good' status.			This scheme element is not expected to prevent the Wylye from continuing to achieve WFD 'good' status.			This scheme element is not expected to prevent the Wylye from continuing to achieve WFD 'good' status.				This scheme element is not expected to prevent the Wylye from continuing to achieve WFD 'good' status.			This scheme element is not expected to prevent the Wylye from continuing to achieve WFD 'good' status.				This scheme element is not expected to prevent the Wylye from continuing to achieve WFD 'good' status.		This scheme element is not expected to prevent the Wylye from continuing to achieve WFD 'good' status.									

Surface Water body	Current status	Status objective	Scheme Elements	Twin-Bore Tunnel and Associated Eastern and Western Portals				Cutting Approach to Eastern Portal			Embankment 7				Amesbury Cutting			Countess Embankment West				Countess Flyover				Countess Embankment East				River Avon Bridge					Material processing, treatment and storage areas	
GB108043022352	Moderate	Good status by 2021	Description of scheme element impact	Chainage: 7200 - 10485, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1006, 1007 and 1008				Chainage: 10485 - 10780, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1008			Chainage: 10780 - 10830, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1008				Chainage: 10830 - 11045, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1008			Chainage: 11340 - 11710, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1009				Chainage: 11740 - 11805, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1009				Chainage: 11835 - 12200, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1009				Existing River Avon Bridge. Alterations only. Chainage: 12245 - 12290, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1009					Multiple locations	
River Avon (Upper) downstream of Nine Mile River confluence			Identified biological impacts	Noise and Vibration	Disruption/contamination of watercourse during construction	Landtake (for slab or other surface infrastructure overlying tunnel)	"Damming" of groundwater flow and reduction in groundwater contribution	Changes (i.e. either decrease due to de-watering/damming of groundwater flows or increase due to re-charge) in flow velocity and volume due to de-watering	Change in water quality due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes (i.e. either decrease due to de-watering/damming of groundwater flows or increase due to re-charge) in flow velocity and volume due to de-watering	Change in water quality due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Vibration	Landtake (for bridge footings)	Drainage	Shading	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Sediment erosion and transport	Landtake (to provide an area for the newly constructed storage areas)
Biological quality elements																																				
1.Macrophytes and phytobenthos - diatoms	Good	-	Predicted change to status elements (green = none)							Vibrations made during the construction of the cutting may indirectly impact these aquatic species resulting in an increased quantity of sediment being delivered to the Avon, suffocating macrophytes and reducing their ability to photosynthesize. This cutting is located approximately 400m (at [illegible]	Vibrations made during the construction of the embankment may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Avon, suffocating macrophytes and reducing their ability to photosynthesize. This embankment is located in [illegible]						Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Avon, suffocating macrophytes and reducing their ability to photosynthesize. This cutting is located approximately 300m (at [illegible]	Vibrations made during the construction of the embankment may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Avon, suffocating macrophytes and reducing their ability to photosynthesize. The majority of this embankment is located adjacent to the [illegible]	This embankment is located approximately 50-100m from the Avon, and may therefore be present within the riparian zone of the river. Due to the length of this scheme element (approximately 400m), there is the potential for the landtake associated with the [illegible]			Vibrations made during the construction of the embankment may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Avon, suffocating macrophytes and reducing their ability to photosynthesize. The majority of this embankment is located [illegible]	[illegible]			Vibrations made during the construction of the embankment may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Avon, suffocating macrophytes and reducing their ability to photosynthesize. The majority of this embankment is located [illegible]	[illegible]			[illegible]	[illegible]			[illegible]	Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Avon, suffocating macrophytes and reducing their ability to [illegible]	[illegible]
2. Macrophytes and phytobenthos - macrophytes	Good	-																																		
3. Macroinvertebrates	High	-		The majority of this scheme element is located relatively far (>1km) from the River Avon. Due to the length of this tunnel, the easternmost section of this structure is located approximately 700m north of the Avon. This remains a considerable distance from the river, meaning that the potential impacts from the construction of this scheme element (eg. increased sediment load to the river, ecology directly disturbed by noise/vibrations) are likely to be minimal, if present at all.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4. Fish	High	-								[illegible]	[illegible]						[illegible]	[illegible]	[illegible]			[illegible]				[illegible]									[illegible]	[illegible]
Physico-Chemical quality elements																																				
5. Dissolved Oxygen	High	-	Predicted change to status elements (green = none)		[illegible]					[illegible]	[illegible]						[illegible]	[illegible]	[illegible]			[illegible]	[illegible]			[illegible]	[illegible]						[illegible]		[illegible]	
6. pH	High	-																																		
7. Phosphate	Moderate	Good by 2021		Vibrations during construction may disturb potential previously unidentified areas of contaminated land in the local area, allowing pollutants present in these areas to be mobilised, and ultimately transported to the Avon. Vibrations may also result in a change in groundwater pathways, providing new routes in which pollutants present within the groundwater (eg. phosphates) can be transported to the Avon. Both of these potential impacts are unlikely and therefore this receptor is not classed as being receptive to this scheme element.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8. Ammonia	High	-					[illegible]												[illegible]				[illegible]													
9. Temperature	High	-																														[illegible]			[illegible]	
10. Salinity	-	-			[illegible]			[illegible]	[illegible]	[illegible]					[illegible]	[illegible]	[illegible]																			
11. Acid Neutralising Capacity	-	-																																	[illegible]	
12. Specific Pollutants (Annex VIII)	High	-									[illegible]						[illegible]	[illegible]								[illegible]									[illegible]	
Hydromorphological supporting elements																																				
13. Quantity and dynamics of river flow	Supports Good	-	Predicted change to status elements (green = none)	Vibrations may create alternative pathways for groundwater to flow, however these are not expected to be large enough to impact the quantity and dynamics of river flow within the Avon.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14. Connection to Groundwater	Supports Good	-		Vibrations may create alternative pathways for groundwater to flow, however these are not expected to be large enough to reduce the connectivity between the Avon and the groundwater body.	[illegible]		[illegible]																												[illegible]	
15. River continuity	Supports Good	-		Receptor not sensitive to impact.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16. River depth and width variation bed	Supports Good	-			[illegible]		[illegible]												[illegible]											[illegible]					[illegible]	
17. Structure and substrate of river bed	Supports Good	-					Receptor not sensitive to impact																								[illegible]					
18. Structure of riparian zone	Supports Good	-					Receptor is unlikely to be significantly impacted by damming.												Due to the majority of the embankment being approximately 50-100m from the Avon, it is likely that some of the landtake required for its construction will detrimentally impact the structure of the riparian zone of the Avon.				Due to the majority of the embankment being approximately 50-100m from the Avon, it is likely that some of the landtake required for its construction will detrimentally impact the structure of the riparian zone of the Avon.				Due to the majority of the embankment being approximately 50-100m from the Avon, it is likely that some of the landtake required for its construction will detrimentally impact the structure of the riparian zone of the Avon.				If the sheet piles or gabions are located within the riparian zone, then it is likely that these structures will detrimentally impact the structure of the riparian zone					
Risk screening of potential to prevent future attainment of good WFD status	The River Avon (Upper) upstream of Nine Mile River confluence is currently of 'moderate' overall status, being restricted from achieving 'good' status by the 'moderate' phosphate status.			This scheme element is not expected to prevent the Avon from continuing to achieve WFD 'good' status by 2021.				This scheme element is not expected to prevent the Avon from continuing to achieve WFD 'good' status by 2021.			This scheme element is not expected to prevent the Avon from continuing to achieve WFD 'good' status by 2021.				This scheme element is not expected to prevent the Avon from continuing to achieve WFD 'good' status by 2021.			This scheme element is not expected to prevent the Avon from continuing to achieve WFD 'good' status by 2021.				This scheme element is not expected to prevent the Avon from continuing to achieve WFD 'good' status by 2021.				This scheme element is not expected to prevent the Avon from continuing to achieve WFD 'good' status by 2021.				This scheme element is not expected to prevent the Avon from continuing to achieve WFD 'good' status by 2021.					This scheme element is not expected to prevent the Avon from continuing to achieve WFD 'good' status by 2021.	

Landscaping and habitat creation	Detailed Impact Assessment Results							
Multiple hazards	Cumulative effects - effects on elements from scheme component(s) tested in other WFD water bodies	Overall effect on elements			Additional mitigation required		Residual effect on receptor	WFD compliance outcome - potential for diminution of current status
Sediment erosion and transport		Summary of scheme components proposed on watercourses within water body catchment with the potential to affect element status	Summary of effects on elements	Overall effect on elements	Construction	Operation		
Vibrations made during the construction of the cutting may indirectly impact these aquatic species as a result of an increased quantity of sediment being delivered to the Avon, reducing the presence of macrophytes within the river, reducing their ability to photosynthesise. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.	Varying conservation, when activity will need to take place close to the river channel, there could be an increase in the sediment content within surface runoff. Successful fluvarins (specifically sub-type 1) are reliant on the river channel to have clean, gravel bed which is impacted by artificial changes in flow regime caused by engineering works (SD734). Due to recent observations of the presence of the somewhat rare species has reduced. Sub-type 1 already has a limited distribution throughout the UK, due to its specific habitat requirements. Any changes to the flow regime may significantly impact these important macrophytes. Embedded mitigation within the proposed mitigation measures and the Operations CEMP would significantly reduce the risk of significant changes to the hydromorphology and therefore alterations to the flow regime.	None - No cumulative effects are assessed with the impacts of the scheme component located within other, adjacent water bodies have been identified for any of the surface water bodies affected by the Proposed Scheme. Within there are water bodies located downstream of this water body, it is not expected that there will be no-endangered adverse effects within any of these.	Existing bridge - River Avon Bridge Embankments - 4 embankments of varying lengths and heights located within floodplain (total 2km) of River Avon. Cuttings - 2 cuttings of varying lengths and depths located within approximately 2km of the River avon. Tunnel - Twin-bore tunnel and associated western and western portals	Viaduct - Once the main bridge has been built, there will be only impacts of the scheme element on the Avon are likely to originate from the implementation of gabions and the bridge abutments. Once the likely stones in the quantity of road runoff produced. This increase in could is dealt with through embedded mitigation measures. Embankments - 4 embankments have the potential to interfer with the Avon catchment however, due to the Avon being predominantly groundwater fed, the impact of altering surface water flow pathways on the river water flow is likely to be minimal. The majority of water from the construction phase when it is expected that a larger sediment load will be delivered to the river. Embedded mitigation measures are expected to minimise this risk. Cuttings - Some cuttings are unlikely significantly impact the connection between the groundwater and surface water systems, as made evident by the height of the groundwater mounding (.mod). Tunnel - Twin-bore tunnel and associated western portals are unlikely on significantly impact the connection between the groundwater and surface water systems, as made evident by the height of the groundwater mounding (.mod). Any excavations from construction may also lead to an increase in sediment delivered to the river in with the cuttings and embankments. Increased sediment is likely to be dealt with through embedded mitigation measures.	Localised adverse effect anticipated when scheme components considered in combination. No change in quality element when balanced against mitigation embedded in the scheme.	None required	None required	N/A	Compliant - No change in physicochemical status of water body
There is the potential for an increased quantity of sediment to be delivered to the Avon, reducing the presence of macrophytes within the river, ultimately reducing a key food source of many fish. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.					Localised adverse effect anticipated when scheme components considered in combination. No change in quality element when balanced against mitigation embedded in the scheme.	None required	None required	N/A	
There is the potential for an increased quantity of sediment being delivered to the Avon, reducing the presence of macrophytes and macroinvertebrates within the river, ultimately reducing a key food source of many fish. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor.					Localised adverse effect anticipated when scheme components considered in combination. No change in quality element when balanced against mitigation embedded in the scheme.	None required	None required	N/A	
There is the potential for previously unidentified contaminated land to be disturbed and delivered to the Avon within the runoff and sediment, impacting the chemical status of the river. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of contaminants and sediment being transported to the river, thus minimising the impact on this receptor.	Receptor not sensitive to impact.	None - No cumulative effects are assessed with the impacts of the scheme component located within other, adjacent water bodies have been identified for any of the surface water bodies affected by the Proposed Scheme. Within there are water bodies located downstream of this water body, it is not expected that there will be no-endangered adverse effects within any of these.			Localised adverse effect anticipated when scheme components considered in combination. No change in quality element when balanced against mitigation embedded in the scheme.	None required	None required	N/A	Compliant - No change in physicochemical status of water body
					Negligible effect anticipated when effects considered in combination. No measurable change in quality element.	None required	None required	N/A	
Phosphates are naturally present with the chalk geology of the UK. The increase in sediment also may result in an increase in the quantity of phosphates entering the river. The concentrations of these phosphates, however, are not likely to have a significant impact on the concentration of phosphates and life the River Avon. Mitigation measures identified in the Operations Environmental Management Plan should help to reduce the risk of sediment being transported to the river, thus minimising the impact on this receptor. Another source of phosphates is existing agricultural runoff.					Negligible effect anticipated when effects considered in combination. No measurable change in quality element.	None required	None required	N/A	
Receptor not sensitive to impact.					Negligible effect anticipated when effects considered in combination. No measurable change in quality element.	None required	None required	N/A	
	No impacts identified as a result of this scheme element.				Negligible effect anticipated when effects considered in combination. No measurable change in quality element.	None required	None required	N/A	
There is the potential for previously unidentified contaminated land to be disturbed and delivered to the Avon within the runoff and sediment, impacting the chemical status of the river. Mitigation measures identified in the Operations Environmental Management Plan should help to significantly reduce the risk of contaminants and sediment being transported to the river, thus minimising the impact on this receptor.					Localised adverse effect anticipated when scheme components considered in combination. No change in quality element when balanced against mitigation embedded in the scheme.	None required	None required	N/A	
Increased sediment transport may impact the dynamics of the river, and if this is significant enough it may also affect the flow. The quantity of sediment reaching the river, however, is unlikely to be large enough to significantly impact either of these characteristics. Mitigation measures identified in the Operations Environmental Management Plan should significantly reduce the risk of contaminants and sediment being transported to the river, thus minimising the impact on this receptor.	Alterations to the dry valleys could result in changes to surface water runoff which could impact on the hydrology. As the potential changes are only under higher flow conditions, there is unlikely to be an impact on the low flow conditions. In addition, mitigation measures are proposed to avoid the diverting of surface water runoff as the dry valleys can continue to function.	None - No cumulative effects are assessed with the impacts of the scheme component located within other, adjacent water bodies have been identified for any of the surface water bodies affected by the Proposed Scheme. Within there are water bodies located downstream of this water body, it is not expected that there will be no-endangered adverse effects within any of these.			Localised adverse effect anticipated when scheme components considered in combination. No change in quality element when balanced against mitigation embedded in the scheme.	None required	None required	N/A	Compliant - No change in hydromorphological status of water body
					Negligible effect anticipated when effects considered in combination. No measurable change in quality element.	None required	None required	N/A	
Receptor not sensitive to impact.					Negligible effect anticipated when effects considered in combination. No measurable change in quality element.	None required	None required	N/A	
During the construction phase, when there is the potential for sediment to be produced and delivered to the Avon, this sediment may disrupt the hydromorphological status of the river (eg. through blocking the hyporheic zone). It is, however, not likely that the quantity of sediment entering the river from this scheme element, will have a detrimental impact on any aspect of the hydromorphological status of the river. Mitigation measures identified in the Operations Environmental Management Plan should significantly reduce the risk of contaminants and sediment being transported to the river, thus minimising the impact on this receptor.					Negligible effect anticipated when effects considered in combination. No measurable change in quality element.	None required	None required	N/A	
					Negligible effect anticipated when effects considered in combination. No measurable change in quality element.	None required	None required	N/A	
					Localised adverse effect anticipated when scheme components considered in combination. No change in quality element when balanced against mitigation embedded in the scheme.	None required	None required	N/A	
This scheme element is not expected to prevent the Avon from continuing to achieve WFD 'good' status by 2033.									

	Surface Water body	Current status	Status objective	Scheme Elements	Twin-Bore Tunnel and Associated Eastern and Western Portals				Cutting Approach to Eastern Portal		
	GB108043022351	Poor	Good status by 2027	Description of scheme element impact	Chainage: 7200 - 10485, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1006, 1007 and 1008				Chainage: 10485 - 10780, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1008		
	River Avon (Upper) upstream of Nine Mile River confluence			Identified biological impacts	Noise and Vibration	Disruption/contamination of watercourse during construction	Landtake (for slab or other surface infrastructure overlying tunnel)	"Damming" of groundwater flow and reduction in groundwater contribution	Changes (i.e. either decrease due to de-watering/damming of groundwater flows or increase due to re-charge) in flow velocity and volume due to de-watering	Change in water quality due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)
	Biological quality elements										
WFD classification elements	1.Macrophytes and phytobenthos - diatoms	Poor	High by 2027	Predicted change to status elements (green = none)	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2.5km southwest of this waterbody at it's closest point.			Groundwater modelling for three constrasting scenarios (Average, 1974 drought and 2014 high) indicates that the implementation all currently designed intrusive scheme elements will have a negligible impact on the flow within the Avon and Till. It has been suggested that damming may occur, resulting in groundwater backing up behind the dam (whilst slowly continuing to pass under the tunnel) having the potential to cause minor GW flooding. It should also be noted that water removed during dewatering, either during construction or operation, will be returned in another location.	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.		
	2. Macrophytes and phytobenthos - macrophytes	Poor	High by 2027								
	3. Macroinvertebrates	High	-								
	4. Fish	Poor	Good by 2021								
	Physico-Chemical quality elements										
WFD classification elements	5. Dissolved Oxygen	High	-	Predicted change to status elements (green = none)	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2.5km southwest of this waterbody at it's closest point.	Due to the Avon being predominantly groundwater fed, the water levels of the Avon (and the Till) fluctuate dramatically throughout the year. As a result of this, it is unlikely that dewatering activities would have a significant impact on this receptor. The groundwater system has been modelled to identify if any intrusive scheme element, including the tunnel and associated portals, has the potential to impact on the baseflow to the rivers. It was found that for three contrasting scenarios (Average, 1974 low and 2014 high) the impact of these elements on the flow in both the Till and Avon will be negligible. If all OEMP measures are successfully implemented it is also unlikely that construction activities will detrimentally impact the quality of the water course.	Landtake would be over 3.5km from the Avon (at its closest point), therefore the impacts on this receptor are likely to be negligible.	Groundwater modelling for three constrasting scenarios (Average, 1974 drought and 2014 high) indicates that the implementation all currently designed intrusive scheme elements will have a negligible impact on the flow within the	Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact flow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact flow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.
	6. pH	High	-								
	7. Phosphate	Moderate	Good by 2027					Receptor not sensitive to impact.	Receptor not sensitive to impact.	Receptor not sensitive to impact.	
	8. Ammonia	High	-								
	9. Temperature	High	-								
	10. Salinity	-	-								
	11. Acid Neutralising Capacity	-	-								
	12. Specific Pollutants (Annex VIII)	High	-								
	Hydromorphological supporting elements										
WFD classification elements	13. Quantity and dynamics of river flow	Supports Good	-	Predicted change to status elements (green = none)	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2.5km southwest of this waterbody at it's closest point.			Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact flow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact flow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact flow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.
	14. Connection to Groundwater	Supports Good	-								
	15. River continuity	Supports Good	-					Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2.5km southwest of this waterbody at it's closest point.			
	16. River depth and width variation bed	Supports Good	-								
	17. Structure and substrate of river bed	Supports Good	-								
	18. Structure of riparian zone	Supports Good	-								
	Risk screening of potential to prevent future attainment of good WFD status	The River Avon (Upper) upstream of Nine Mile River confluence is currently of 'poor' overall status, being restricted from achieving 'good' status by the 'poor' status of fish and macrophytes and 'moderate' phosphate status. There are no specific RBMP measures in place to achieve the WFD status objective as these would be disproportionately expsensive.			Due to there being no specific RBMP measures in place to achieve the WFD status objective, due to it being concluded that these would be disproportionately expensive, this scheme element will not affect the progress of attaining the WFD status objective by 2027.				Due to there being no specific RBMP measures in place to achieve the WFD status objective, due to it being concluded that these would be disproportionately expensive, this scheme element will not affect the progress of attaining the WFD status objective by 2027.		

	Surface Water body	Current status	Status objective	Scheme Elements	Embankment 7				Amesbury Cutting		
	GB108043022351	Poor	Good status by 2027	Description of scheme element impact	Chainage: 10780 - 10830, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1008				Chainage: 10830 - 11045, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1008		
	River Avon (Upper) upstream of Nine Mile River confluence			Identified biological impacts	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes (i.e. either decrease due to de-watering/damming of groundwater flows or increase due to re-charge) in flow velocity and volume due to de-watering	Change in water quality due to discharge of groundwater to a surface water body.	Noise and Vibration (during construction)
	Biological quality elements										
WFD classification elements	1.Macrophytes and phytobenthos - diatoms	Poor	High by 2027	Predicted change to status elements (green = none)	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.				Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact on baseflow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.
	2. Macrophytes and phytobenthos - macrophytes	Poor	High by 2027								
	3. Macroinvertebrates	High	-								
	4. Fish	Poor	Good by 2021								
	Physico-Chemical quality elements										
WFD classification elements	5. Dissolved Oxygen	High	-	Predicted change to status elements (green = none)	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.				Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact flow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact flow (much less than natural variability). Detrimental impacts are therefore	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.
	6. pH	High	-								
	7. Phosphate	Moderate	Good by 2027						Receptor not sensitive to impact.	Receptor not sensitive to impact.	
	8. Ammonia	High	-								
	9. Temperature	High	-								
	10. Salinity	-	-								
	11. Acid Neutralising Capacity	-	-								
	12. Specific Pollutants (Annex VIII)	High	-								
	Hydromorphological supporting elements										
WFD classification elements	13. Quantity and dynamics of river flow	Supports Good	-	Predicted change to status elements (green = none)	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.				Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact flow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Groundwater modelling of the impact of all intrusive scheme elements on the flow in both the Till and the Avon suggests that these elements will have a negligible impact flow (much less than natural variability). Detrimental impacts are therefore not predicted to occur.	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.
	14. Connection to Groundwater	Supports Good	-								
	15. River continuity	Supports Good	-								
	16. River depth and width variation bed	Supports Good	-								
	17. Structure and substrate of river bed	Supports Good	-								
	18. Structure of riparian zone	Supports Good	-								
	Risk screening of potential to prevent future attainment of good WFD status	The River Avon (Upper) upstream of Nine Mile River confluence is currently of 'poor' overall status, being restricted from achieving 'good' status by the 'poor' status of fish and macrophytes and 'moderate' phosphate status. There are no specific RBMP measures in place to achieve the WFD status objective as these would be disproportionately expsensive.			Due to there being no specific RBMP measures in place to achieve the WFD status objective, due to it being concluded that these would be disproportionately expensive, this scheme element will not affect the progress of attaining the WFD status objective by 2027.				Due to there being no specific RBMP measures in place to achieve the WFD status objective, due to it being concluded that these would be disproportionately expensive, this scheme element will not affect the progress of attaining the WFD status objective by 2027.		

	Surface Water body	Current status	Status objective	Scheme Elements	Countess Embankment West				Countess Flyover			
	GB108043022351	Poor	Good status by 2027	Description of scheme element impact	Chainage: 11340 - 11710, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1009				Chainage: 11740 - 11805, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1009			
	River Avon (Upper) upstream of Nine Mile River confluence			Identified biological impacts	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Vibration	Landtake (flyover footings)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream
	Biological quality elements											
WFD classification elements	1.Macrophytes and phytobenthos - diatoms	Poor	High by 2027	Predicted change to status elements (green = none)	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.				Receptor not sensitive to impact, primarily due to the scheme element being located approximately 1.5km southwest of this waterbody at it's closest point.	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 1.5km southwest of this waterbody at it's closest point.		
	2. Macrophytes and phytobenthos - macrophytes	Poor	High by 2027									
	3. Macroinvertebrates	High	-									
	4. Fish	Poor	Good by 2021						Vibrations made during the construction of the embankment may directly impact these aquatic species. The majority of this embankment is located adjacent to the Avon (approx. 50-100m) indicating that there is the potential for this scheme element to detrimentally impact this receptor. However, mitigation measures identified in the OEMP will ensure potential impacts to water quality (etc) are reduced to minor impacts with negligible effect.			
	Physico-Chemical quality elements											
WFD classification elements	5. Dissolved Oxygen	High	-	Predicted change to status elements (green = none)	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.				Receptor not sensitive to impact, primarily due to the scheme element being located approximately 1.5km southwest of this waterbody at it's closest point.			
	6. pH	High	-									
	7. Phosphate	Moderate	Good by 2027									
	8. Ammonia	High	-									
	9. Temperature	High	-									
	10. Salinity	-	-									
	11. Acid Neutralising Capacity	-	-									
	12. Specific Pollutants (Annex VIII)	High	-									
	Hydromorphological supporting elements											
WFD classification elements	13. Quantity and dynamics of river flow	Supports Good	-	Predicted change to status elements (green = none)	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.				Receptor not sensitive to impact, primarily due to the scheme element being located approximately 1.5km southwest of this waterbody at it's closest point.			
	14. Connection to Groundwater	Supports Good	-									
	15. River continuity	Supports Good	-									
	16. River depth and width variation bed	Supports Good	-									
	17. Structure and substrate of river bed	Supports Good	-									
	18. Structure of riparian zone	Supports Good	-									
	Risk screening of potential to prevent future attainment of good WFD status	The River Avon (Upper) upstream of Nine Mile River confluence is currently of 'poor' overall status, being restricted from achieving 'good' status by the 'poor' status of fish and macrophytes and 'moderate' phosphate status. There are no specific RBMP measures in place to achieve the WFD status objective as these would be disproportionately expsensive.			Due to there being no specific RBMP measures in place to achieve the WFD status objective, due to it being concluded that these would be disproportionately expensive, this scheme element will not affect the progress of attaining the WFD status objective by 2027.				Due to there being no specific RBMP measures in place to achieve the WFD status objective, due to it being concluded that these would be disproportionately expensive, this scheme element will not affect the progress of attaining the WFD status objective by 2027.			

	Surface Water body	Current status	Status objective	Scheme Elements	Countess Embankment East				River Avon Bridge		
	GB108043022351	Poor	Good status by 2027	Description of scheme element impact	Chainage: 11835 - 12200, Plan Profile Drawing Number: HE551506-AMW-HGN-SW_GN_000_Z-DR-CH-1009				Existing River Avon Bridge. Alterations only. Chainage: 12245 - 12290, Plan Profile Drawing Numbe		
	River Avon (Upper) upstream of Nine Mile River confluence			Identified biological impacts	Vibration	Landtake (for the construction of the embankment)	Drainage	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Vibration	Landtake (for bridge footings)	Drainage
	Biological quality elements										
WFD classification elements	1.Macrophytes and phytobenthos - diatoms	Poor	High by 2027	Predicted change to status elements (green = none)	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 1.5km southwest of this waterbody at it's closest point.	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 1.25km southwest of this waterbody at it's closest point.			Receptor not sensitive to impact, primarily due to the scheme element being located approximately 1km southwest of this waterbody at it's closest point.	Receptor not sensitive to impact, primarily due to the scheme elem at it's clos	
	2. Macrophytes and phytobenthos - macrophytes	Poor	High by 2027								
	3. Macroinvertebrates	High	-								
	4. Fish	Poor	Good by 2021		Vibrations made during the construction of the embankment may directly impact these aquatic species. The majority of this embankment is located adjacent to the Avon (approx. 50-100m) indicating that there is the potential for this scheme element to detrimentally impact this receptor. However, mitigation measures identified in the OEMP will ensure potential impacts to water quality (etc) are reduced to minor impacts with negligible effect.				Vibrations/noise occuring when alterations are made to the existing bridge may directly and/or indirectly (e.g. increase in sediment load to river) impact biota present in the Avon (or dependent on it). With the implementation of OEMP meaures these impacts on this receptor should be minimised.		
	Physico-Chemical quality elements										
WFD classification elements	5. Dissolved Oxygen	High	-	Predicted change to status elements (green = none)	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 1.25km southwest of this waterbody at it's closest point.				Receptor not sensitive to impact, primarily due to the scheme element being located approximately		
	6. pH	High	-								
	7. Phosphate	Moderate	Good by 2027								
	8. Ammonia	High	-								
	9. Temperature	High	-								
	10. Salinity	-	-								
	11. Acid Neutralising Capacity	-	-								
	12. Specific Pollutants (Annex VIII)	High	-								
	Hydromorphological supporting elements										
WFD classification elements	13. Quantity and dynamics of river flow	Supports Good	-	Predicted change to status elements (green = none)	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 1.25km southwest of this waterbody at it's closest point.				Receptor not sensitive to impact, primarily due to the scheme element being located approximately		
	14. Connection to Groundwater	Supports Good	-								
	15. River continuity	Supports Good	-								
	16. River depth and width variation bed	Supports Good	-								
	17. Structure and substrate of river bed	Supports Good	-								
	18. Structure of riparian zone	Supports Good	-								
	Risk screening of potential to prevent future attainment of good WFD status	The River Avon (Upper) upstream of Nine Mile River confluence is currently of 'poor' overall status, being restricted from achieving 'good' status by the 'poor' status of fish and macrophytes and 'moderate' phosphate status. There are no specific RBMP measures in place to achieve the WFD status objective as these would be disproportionately expsensive.			Due to there being no specific RBMP measures in place to achieve the WFD status objective, due to it being concluded that these would be disproportionately expensive, this scheme element will not affect the progress of attaining the WFD status objective by 2027.				Due to there being no specific RBMP measures in place to achieve the WFD status objective, due to it being c scheme element will not affect the progress of attaining the WFD st		

	Material processing, treatment and storage areas		Landscaping and habitat creation		Detailed Impact Assessment Results							
	Multiple locations		Multiple locations		Cumulative effects - effects on element from scheme components located in other WFD water bodies	Overall effects on element			Additional mitigation measures		Residual effects	WFD compliance outcome - potential to cause deterioration of current status
Shading	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Sediment erosion and transport	Landtake (for new storage areas)	Sediment erosion and transport	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream		Summary of scheme components located on watercourses within water body catchment with the potential to affect element status	Summary of effects on elements	Overall effect on element	Construction	Operation	
nent being located approximately 1km southwest of this waterbody at point.	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 1km southwest of this waterbody at it's closest point.			Receptor not sensitive to impact, primarily due to the scheme element being located approximately 1.5km southwest of this waterbody at it's closest point.	None - No cumulative effects are associated with the impacts of the scheme component located within other, adjacent water bodies have been identified for any of the surface water bodies affected by the Proposed Scheme. Whilst there are water bodies located downstream of this water body, it is expected that there will be no widespread adverse effects within any of these.	Crossing bridge - River Avon Bridge Embankments - 4 embankments of varying lengths and depths / elevations approximately 2km of the River Avon Cuttings - 2 cuttings of varying lengths and depths / elevations approximately 2km of the River avon Tunnel - Twin bore tunnel and associated eastern and western portals	Viaduct - Since the main bridge structure already exists the only impacts of this scheme element on the Avon are likely to originate from the construction operations and intrusive sheet piles and from the likely increase in the quantity of road runoff produced. This increase in runoff is dealt with through embedded mitigation measures. Embankments - 4 embankments have the potential to interfer with surface flow pathways, however due to the Avon being predominantly groundwater fed, the impacts on the surface water flow pathways on the Avon water body is likely to be minimal. The effects on the River Avon are likely to come from the construction phase when it is expected that the most sediment will be delivered to the river. Embedded mitigation measures are expected to minimise this risk. Cuttings - These cuttings are unlikely significantly impact the connection between the groundwater and surface water systems, as made evident by the results of the groundwater modelling study Tunnel - Twin bore tunnel and associated eastern and western portals are unlikely to significantly impact the connection between the groundwater and surface water systems, as made evident by the results of the groundwater modelling study. Noise and vibrations from construction may also lead to an increase in sediment delivered to the river. Due to the depth of the embankments, the increase in sediment is likely to be dealt with through embedded mitigation measures	Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	Compliant - No change in biological status of water body
								Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	
								Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	
								A localised adverse effect anticipated when scheme components considered in combination. No change in quality element when balanced against mitigation embedded in the scheme.	None required	None required	N/A	
2km southwest of this waterbody at it's closest point.	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.			Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.	None - No cumulative effects are associated with the impacts of the scheme component located within other, adjacent water bodies have been identified for any of the surface water bodies affected by the Proposed Scheme. Whilst there are water bodies located downstream of this water body, it is expected that there will be no widespread adverse effects within any of these.			Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	Compliant - No change in groundwater body status of water body
								Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	
								Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	
								Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	
								Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	
								Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	
2km southwest of this waterbody at it's closest point.	Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.			Receptor not sensitive to impact, primarily due to the scheme element being located approximately 2km southwest of this waterbody at it's closest point.	None - No cumulative effects are associated with the impacts of the scheme component located within other, adjacent water bodies have been identified for any of the surface water bodies affected by the Proposed Scheme. Whilst there are water bodies located downstream of this water body, it is expected that there will be no widespread adverse effects within any of these.			Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	Compliant - No change in groundwater body status of water body
								Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	
								Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	
								Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	Compliant - No change in Hydromorphological supporting status of water body
								Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	
								Negligible effect anticipated when effects considered in combination. No measureable change in quality element.	None required	None required	N/A	
concluded that these would be disproportionately expensive, this value objective by 2027.	This scheme element is not expected to prevent the Wylye from continuing to achieve WFD 'good' status.			This scheme element is not expected to prevent the Wylye from continuing to achieve WFD 'good' status.								

A. Risk screening of potential to cause deterioration of current WFD status

	Groundwater body			Scheme Elements	Cutting	Road Bridge		Cutting	Viaduct	Cutting	PROW Bridge	Cutting		Road Bridge	Cutting	PROW Bridge	Cutting	Retained Cutting	Tunnel	Retained Cutting	Cutting		Reinforced embankment
					Winterbourne Stoke cutting west	Green bridge one	B3083 underbridge	Cutting West of River Till Viaduct	River Till Viaduct	Green Bridge No.2 Cutting	Green Bridge Two	Lonbarrow Cutting West	Longbarrow Cutting Central	Green Bridge Three - Longbarrow Junction	Longbarrow Cutting east	Green Bridge Four	Cutting aproach to western portal	Western portal - Retaining wall	Tunnel	Eastern portal - Retaining wall	Cutting aproach to Eastern portal	Amesbury Cutting	Countess embankment west
					Chainage 1810 -3045	Chainage 2833 -2870	Chainage 3500-3517	Chainage 3640-3880	Chainage 3975-4170	Chaninage 4390-4780	Chainage 4665-4730	Chainage 4990-5125	Chainage 5255-5657.5	Chainage 5625-5690	Chaninage 5657.5-6240	Chaninage 6220-6260	Chaninage 6240-7200	Chaninage 6240-7400	Chaninage 7400-10400	Chainage 10420-10680	Chainage 10485-10780	Chainage 10830-11045	
	GB40801G806900			Phase	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction
	Upper Hampshire Avon (Chalk)	Current status	Status objective	Identified quantitative impacts	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions
WFD classification elements	1.Saline or other intrusions. To identify groundwater bodies where the intrusion of poor quality water as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.	Good	Good status by 2015	Predicted change to status elements (green = none, amber = possibly, red = likely)	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.
	2. Surface water. To assess the impact of groundwater abstractions on the ecological status of surface water bodies.	Poor	Poor status by 2015		No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	Part of scheme element is below groundwater level in the chalk and may be located in the overlying superficial deposit aquifer leading to a localised interference with groundwater flow. CoCP and best practice for design, construction reduce risks of any significant chnage to base flow to the River Till.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No sufrcae water features within the local area. No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	Numerical modeling undertaken has shown there is no impact of changes to groundwater levels effecting baseflow to surface water bodies.	Numerical modeling undertaken has shown there is no impact of changes to groundwater levels effecting baseflow to surface water bodies.	Numerical modeling undertaken has shown there is no impact of changes to groundwater levels effecting baseflow to surface water bodies.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	Part of scheme element is below groundwater level in the chalk and may be located in the overlying superficial deposit aquifer leading to a localised interference with groundwater flow. CoCP and best practice for design, construction reduce risks of any significant chnage to baseflow to the River Avon.
	3. Groundwater Dependent Terrestrial Ecosystems (GWDTE's). To assess the impact of groundwater abstractions on the condition of GWDTE'S.	Good	Good status by 2015		No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No impact on GWDTE's as scheme element is above groundwater table.	No impact on GWDTE's as scheme element is above groundwater table.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. CoCP and best practice for design and construction reduce risks of any change in groundwater level to GWDTE.	No impact on GWDTE's as scheme element is above groundwater table.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. Numerical modeling undertaken has shown there is no impact of groundwater levels in the vasinity of GWDTE's.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. Numerical modeling undertaken has shown there is no impact of groundwater levels in the vasinity of GWDTE's.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. Numerical modeling undertaken has shown there is no impact of groundwater levels in the vasinity of GWDTE's.	No impact on GWDTE's as scheme element is above groundwater table.	No impact on GWDTE's as scheme element is above groundwater table.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. CoCP and best practice for design and construction reduce risks of any change in groundwater level to GWDTE.
	4. Water balance. To identify groundwater bodies where abstractions exceed the available resource.	Good	Good status by 2015		No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	Part of the foundations are below groundwater level in the chalk, leading to a localised interference with groundwater flow. The nearest groundwater abstraction is 281m from the scheme element this is a pending EA licence abstractor for agricultural and domestic use. No significant impacts predicted.	No impact as scheme element is above groundwater table.	Part of the foundations are below groundwater level in the chalk, leading to a localised interference with groundwater flow. The nearest groundwater abstraction is 618m from the scheme element this is a EA licenced abstratcor for agricultrual use . No significant impacts predicted.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	Part of the foundations are below groundwater level in the chalk, leading to a localised interference with groundwater flow. The nearest groundwater abstraction is 278m from the scheme element this is a pending EA licence abstractor for agricultural and domestic use. No significant impacts predicted.	No impact as scheme element is above groundwater table.	Part of the foundations are below peak groundwater level in the chalk, leading to a localised interference with groundwater flow. The nearest groundwater abstraction is 741m from the scheme element this is a pending EA licence abstractor for agricultural and domestic use. No significant impacts predicted.	No impact as scheme element is above groundwater table.	Part of the retaining wall are below groundwater level in the chalk, leading to a localised interference with groundwater flow. The closest abstractor is 2157m from the scheme Element this is an EA Licence abstraction for agricultural use however it was indicated that this isn't currently used. No significant impacts predicted.	Part of the tunnel is below groundwater level in the chalk leading to an interference with groundwater flow. The closest abstractor is 1926m from the tunnel this is an EA Licence abstraction for agricultural use however it was indicated that this isn't currently used. Groundwater modelling undertaken to support the environmental statement has shown results in a negligible impact on this abstractor as such impacts are conservatively put as localised close to the route.	Part of the retaining wall is below groundwater level in the chalk, leading to a localised interference with groundwater flow. The closest abstractor is 1786m from the scheme Element this is an EA Licence abstraction used for public water supply . No significant impacts predicted.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	Part of scheme element is below groundwater level in the chalk leading to a localised interference with groundwater flow. The clossest abstratcion is 1641m from the scheme Element this is an EA Licence abstraction used for public water supply. No significant impacts predicted.

Quantitative status	Poor

	Groundwater body			Scheme Elements	Cutting	Road Bridge		Cutting	Viaduct	Cutting	PROW Bridge	Cutting		Road Bridge	Cutting	PROW Bridge	Cutting	Retained Cutting	Tunnel	Retained Cutting	Cutting		Reinforced embankment
					Cutting 1	Green Bridge 1	Underbridge 1	Cutting West of River Till Viaduct	River Till Viaduct	Green bridge No.2 Cutting	Green Bridge Two	Lonbarrow Cutting West	Longbarrow Cutting Central	Green Bridge Three - Longbarrow Junction	Longbarrow Cutting east	Green Bridge Four	Cutting aproach to western portal	Western portal - Retaining wall	Tunnel	Eastern portal - Retaining wall	Cutting aproach to Eastern portal	Amesbury Cutting	Countess embankment west
					Chainage 1810 -3045	Chainage 2833 -2870	Chainage 3500-3517	Chainage 3640-3880	Chainage 3975-4170	Chaninage 4390-4780	Chainage 4665-4730	Chainage 4990-5125	Chainage 5255-5657.5	Chainage 5625-5690	Chaninage 5657.5-6240	Chaninage 6220-6260	Chaninage 6240-7200	Chaninage 6240-7400	Chaninage 7400-10400	Chainage 10420-10680	Chainage 10485-10780	Chainage 10830-11045	
	GB40801G806900			Phase	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction
	Upper Hampshire Avon (Chalk)	Current status	Status objective	Identified chemical impacts	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate
WFD classification elements	1. Saline or other intrusions. To identify groundwater bodies where the intrusion of poor quality water as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.	Good	Good status by 2015	Predicted change to status elements (green = none, amber = possibly, red = likely)	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.
	2. Surface water. To assess the impact of groundwater on the chemical and ecological status of surface water bodies.	Poor	Good status by 2027		In catchment of River Till (GB108043022570). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Till (GB108043022570) waterbody is located at a distance of 850 m southeast. Scheme element is above peak modeled groundwater levels. Potential for creation of new pathways between surface and chalk aquifer due to piling. Changes in groundwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element, due to distance from surface water body.	In catchment of River Till (GB108043022570). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Till (GB108043022570). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Till (GB108043022570). Scheme element is below peak and average high modeled groundwater levels. Potential for creation of new pathways between surface and chalk aquifer due to piling. Changes in groundwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element.	In catchment of River Till (GB108043022570). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Till (GB108043022570) waterbody is located at a distance of 383m northwest. Scheme element is below peak and average high modeled groundwater levels. Potential for creation of new pathways between surface and chalk aquifer due to piling. Changes in groundwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element, due to distance from surface water body.	In catchment of River Till (GB108043022570). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Till (GB108043022570). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Avon (GB1080430223512) waterbody is located at a distance of 4155m southeast. Scheme element is below peak and average high modeled groundwater levels. Potential for creation of new pathways between surface and chalk aquifer due to piling. Changes in groundwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element, due to distance from surface water body.	In catchment of River Avon (GB1080430223512). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Avon (GB1080430223512) waterbody is located at a distance of 3750m southeast. Scheme element is below peak modeled groundwater levels. Potential for creation of new pathways between surface and chalk aquifer due to piling. Changes in groundwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element, due to distance from surface water body.	In catchment of River Avon (GB1080430223512). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Avon (GB1080430223512) waterbody is located at a distance of 2653m southeast. Scheme element is below peak and average high modeled groundwater levels. Potential for creation of new pathways between surface and chalk aquifer due to retaining wall. Changes in groundwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element, due to distance from surface water body.	In catchment of River Avon (GB1080430223512) waterbody is located at a distance of 2653m southeast. Scheme element is below peak and average high modeled groundwater levels. Potential for creation of new pathways between surface and chalk aquifer due to tunnel. Changes in groundwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element, due to distance from surface water body.	In catchment of River Avon (GB1080430223512) waterbody is located at a distance of 749m southeast. Scheme element is below peak and average high modeled groundwater levels. Potential for creation of new pathways between surface and chalk aquifer due to retaining wall. Changes in groundwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element, due to distance from surface water body.	In catchment of River Avon (GB1080430223512). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Avon (GB1080430223512). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Avon (GB1080430223512) waterbody is located at a distance of 50m south. Scheme element is below peak and average high modeled groundwater levels. Potential for creation of new pathways between surface and chalk aquifer due to piling. Changes in groundwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element, due to distance from surface water body.
	3. GWDTE's. To assess the impact of nutrient concentrations in groundwater (primarily phosphates) on GWDTE's.	Good	Good status by 2015		No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	Within the River Avon catchment, waterbody is located at a distance of 4155m southeast. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. No impacts expected as a result of scheme element.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. The scheme element is above groundwater table. No impact is expected as a result of scheme element.	Within the River Avon catchment waterbody is located at a distance of 3750m southeast. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. CoCP and best practice for design and construction and operations reduce risks to water quality.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. The scheme element is above groundwater table. No impact is expected as a result of scheme element.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. Numerical modeling of the impact of the scheme element on groundwater flow has indicated there will be no impact on the GWDTE as such no impact is expected to water quality.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. Numerical modeling of the impact of the scheme element on groundwater flow has indicated there will be no impact on the GWDTE as such no impact is expected to water quality.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. Numerical modeling of the impact of the scheme element on groundwater flow has indicated there will be no impact on the GWDTE as such no impact is expected to water quality.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. The scheme element is above groundwater table. No impact is expected as a result of scheme element.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. The scheme element is above groundwater table. No impact is expected as a result of scheme element.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. CoCP and best practice for design and construction reduce risks to water quality.
	4. Drinking Water Protected Areas (DrWPAs). To identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WFD or at risk of failing in the future.	Poor	Good status by 2027		In DrWPA and 505m from nearest groundwater abstractor. CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 561m from nearest groundwater abstractor. CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 523m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 329m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 281m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 571m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 618m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 400m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and SPZ2, 245m from a pending EA Abstractor licence. Scheme element is above groundwater table. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 278m from nearest groundwater abstractor. CoCP and best practice for design, construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 312m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 741m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 2202m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. Negligible impact following mitigation.	In DrWPA and 2157m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 1926m from nearest groundwater abstractor. Twin-bore tunnel is to be constructed using a TBM, cross passage tunnels may include construction techniques such as micro TBM, ground freezing and grouting. CoCP and best practice for design and construction reduce risks to groundwater quality. Negligible impact following mitigation.	In DrWPA and 1786m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 1786m from nearest groundwater abstractor. CoCP and best practice for design and constructionreduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 1648m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 1654m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.
	5. General quality assessment. To identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater.	Good	Good status by 2027		CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction and operations reduce risks to groundwater quality. No significant impacts identified as result of scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No significant impacts identified as result of scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No significant impacts identified as result of scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No significant impacts identified as result of scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No significant impacts identified as result of scheme element.	CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No significant impacts identified as result of scheme element.	CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No significant impacts identified as result of scheme element.	Twin-bore tunnel is to be constructed using a TBM, cross passage tunnels may include construction techniques such as micro TBM, ground freezing and grouting. CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No significant impacts identified as result of scheme element.	CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No significant impacts identified as result of scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No significant impacts identified as result of scheme element.

Chemical status	Poor
Overall status	Poor

B. Risk screening of potential to prevent future attainment of good WFD status

There are no specific RBMP measures in place to achieve the WFD status objective as these would be disproportionately exspensive

Ref:
Environment Agency South West River Basin District River Basin Management Plan (February 2016)
http://environment.data.gov.uk/catchment-planning/WaterBody/GB40801G806900
Environment Agency. Hampshire Avon WFD Management Area Abstraction Licensing Strategy, December 2012.

A. Risk screening of potential to cause deterioration of current WFD st

	Groundwater body			Scheme Elements	Road bridge		Reinforced embankment	Road Bridge	Cutting									Drainage	Overall impact	Impact on Current (2009) WFD Element Status	Further WFD Mitigation (to retain or promote good status)	Residual Impact on Current (2009) WFD Element Status
					Countess flyover 1	Countess flyover 2	Countess embankment east	Existing River Avon Bridge	New Longbarrow Junction Western Diverge	New Longbarrow Junction Western Merge	New Longbarrow Junction Eastern Diverge	New Longbarrow Junction Eastern Merge	Link to Winterbourne Stoke	Green Bridge No 3	Realingned A360 north	Realined A360 south	Countess Junction Eastbound Diverge					
					Chainage 11710-11740	Chainage 11805-11835		Chainage 12245-12290	Chainage 0-400	Chainage 0-413	Chainage 0-470	Chainage 0-402	Chainage 50-180	Chainage 0-175	Chainage 200-1090	Chainage 300-790	Chainage 0-200					
	GB40801G806900			Phase	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction				
	Upper Hampshire Avon (Chalk)	Current status	Status objective	Identified quantitative impacts	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions	"Damming" of Groundwater flow and reduction in groundwater contributions to surface water bodies, GWDTE's or groundwater abstaractions				
WFD classification elements	1.Saline or other intrusions. To identify groundwater bodies where the intrusion of poor quality water as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.	Good	Good status by 2015	Predicted change to status elements (green = none, amber = possibly, red = likely)	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relevant in this waterbody.	Not relvant for scheme Element	Not relevent to the waterbody	Remains at Good Status	None required	Remains at Good Status
	2. Surface water. To assess the impact of groundwater abstractions on the ecological status of surface water bodies.	Poor	Poor status by 2015		Part of scheme element is below groundwater level in the chalk and may be located in the overlying superficial deposit aquifer leading to a localised interference with groundwater flow. CoCP and best practice for design, construction reduce risks of any significant chnage to baseflow to the River Avon.	Part of scheme element is below groundwater level in the chalk and may be located in the overlying superficial deposit aquifer leading to a localised interference with groundwater flow. CoCP and best practice for design, construction reduce risks of any significant chnage to baseflow to the River Avon.	Part of scheme element is below groundwater level in the chalk and may be located in the overlying superficial deposit aquifer leading to a localised interference with groundwater flow. CoCP and best practice for design, construction reduce risks of any significant chnage to baseflow to the River Avon.	Sheet piling at scheme element may be located in superficial deposits aquifer leading to localised interference with groundwater flow. CoCP and best practice for design, construction reduce risks of any significant change to baseflow to the River Avon.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	No impact on surface water / groundwater interaction as scheme element above groundwater table.	Not relvant for scheme Element	Combined impacts of all design elements have the potential to lead to a minor localised or temporary adverse effect on the WFD element.	Remains at Poor Status	None required	No Significant deterioration
	3. Groundwater Dependent Terrestrial Ecosystems (GWDTE's). To assess the impact of groundwater abstractions on the condition of GWDTE'S.	Good	Good status by 2015		Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. CoCP and best practice for design and construction reduce risks of any change in groundwater level to GWDTE.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. CoCP and best practice for design and construction reduce risks of any change in groundwater level to GWDTE.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. CoCP and best practice for design and construction reduce risks of any change in groundwater level to GWDTE.	No impact on GWDTE's as scheme element is above groundwater table.	No impact on GWDTE's as scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No impact on GWDTE's as scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No impact on GWDTE's as scheme element is above groundwater table.	No impact on GWDTE's as scheme element is above groundwater table.	No impact on GWDTE's as scheme element is above groundwater table.	Not relvant for scheme Element	No significant impacts identified	Remains at Good Status	None required	Remains at Good Status
	4. Water balance. To identify groundwater bodies where abstractions exceed the available resource.	Good	Good status by 2015		Part of foundations are below groundwater level in the chalk leading to a localised interference with groundwater flow. The clossest abstratcion is 1646m from the scheme Element this is an EA Licence abstraction used for public water supply. No significant impacts predicted.	Part of foundations are below groundwater level in the chalk leading to a localised interference with groundwater flow. The clossest abstratcion is 1647m from the scheme Element this is an EA Licence abstraction used for public water supply. No significant impacts predicted.	Part of foundations are below groundwater level in the chalk leading to a localised interference with groundwater flow. The clossest abstratcion is 1630m from the scheme Element this is an EA Licence abstraction used for public water supply. No significant impacts predicted.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	No impact as scheme element is above groundwater table.	Not relvant for scheme Element	Combined impacts of all design elements have the potential to lead to a minor localised or temporary adverse effect on the WFD element.	No Significant deterioration	None required	Remains at Good Status
	Quantitative status	Poor																		Poor		Poor

	Groundwater body			Scheme Elements	Road bridge		Reinforced embankment	Road Bridge	Cutting									Drainage	Overall impact	Impact on Current (2009) WFD Element Status	Further WFD Mitigation (to retain or promote good status)	Residual Impact on Current (2009) WFD Element Status
					Countess flyover 1	Countess flyover 2	Countess embankment east	Existing River Avon Bridge	New Longbarrow Junction Western Diverge	New Longbarrow Junction Western Merge	New Longbarrow Junction Eastern Diverge	New Longbarrow Junction Eastern Merge	Link to Winterbourne Stoke	Green Bridge No 3	Realingned A360 north	Realined A360 south	Countess Junction Eastbound Diverge					
					Chainage 11710-11740	Chainage 11805-11835		Chainage 12245-12290	Chainage 0-400	Chainage 0-413	Chainage 0-470	Chainage 0-402	Chainage 50-180	Chainage 0-175	Chainage 200-1090	Chainage 300-790	Chainage 0-200	As drainage design				
	GB40801G806900			Phase	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Operation				
	Upper Hampshire Avon (Chalk)	Current status	Status objective	Identified chemical impacts	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate				
WFD classification elements	1. Saline or other intrusions. To identify groundwater bodies where the intrusion of poor quality water as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.	Good	Good status by 2015	Predicted change to status elements (green = none, amber = possibly, red = likely)	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No impacts as result of scheme element.	No significant impact identified.	Remains at Good Status	None Required	Remains at Good Status
	2. Surface water. To assess the impact of groundwater on the chemical and ecological status of surface water bodies.	Poor	Good status by 2027		In catchment of River Avon (GB1080430223512) waterbody is located at a distance of 81m south. Scheme element is below peak and average high modeled groundwater levels. Potential for creation of new pathways between surface and chalk aquifer due to piling. Changes in groundwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element.	In catchment of River Avon (GB1080430223512) waterbody is located at a distance of 58m south. Scheme element is below peak and average high modeled groundwater levels. Potential for creation of new pathways between surface and chalk aquifer due to piling. Changes in groundwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element.	In catchment of River Avon (GB1080430223512) waterbody is located at a distance of 39m south. Scheme element is below peak and average high modeled groundwater levels. Potential for creation of new pathways between surface and chalk aquifer due to piling. Changes in groundwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element.	In catchment of River Avon (GB1080430223512). Scheme element is above average modeled groundwater levels. Sheet piles may be located within the superficial deposits. Potential for creation of new pathways between surface and superficial deposits sue to piling. chnages in grounwater quality may lead to impact on surface water quality. CoCP and best practice for design and construction including method of piling reduce risks to water quality. No significant impacts identified as result of scheme element.	In catchment of River Avon (GB1080430223512). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Till (GB108043022570). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Avon (GB1080430223512). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Till (GB108043022570). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Till (GB108043022570). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Till (GB108043022570). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Avon (GB1080430223512). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Avon (GB1080430223512). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	In catchment of River Avon (GB1080430223512). Scheme element is above peak modeled groundwater levels. No impacts as result of scheme element.	The drainage system upgrade will involve the use of infiltration basins and soakaways that will include Re-medi8 treatment which will reduce impact of road drainage pollution. In addition lined ponds including treatment system are to be used at countess roundabout. Scheme element is an improvement on the current situation and will lead to beneficial effect.	Combined impacts of all design elements have the potential to lead to a minor localised or temporary adverse effect on the WFD element.	No significant deterioration	None Required	No significant deterioration
	3. GWDTE's. To assess the impact of nutrient concentrations in groundwater (primarily phosphates) on GWDTE's.	Good	Good status by 2015		Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. CoCP and best practice for design and construction reduce risks to water quality.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. CoCP and best practice for design and construction reduce risks to water quality.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. CoCP and best practice for design and construction reduce risks to water quality.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. The scheme element is above groundwater table. No impact is expected as a result of scheme element.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. The scheme element is above groundwater table. No impact is expected as a result of scheme element.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. The scheme element is above groundwater table. No impact is expected as a result of scheme element.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	No GWDTE's in the Till catchment and the scheme element is above groundwater table.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. The scheme element is above groundwater table. No impact is expected as a result of scheme element.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. The scheme element is above groundwater table. No impact is expected as a result of scheme element.	Within the River Avon catchment. The River Avon SAC covers a GWDTE for supporting Desmoulin's whorl snail. The scheme element is above groundwater table. No impact is expected as a result of scheme element.	No impacts as result of scheme element.	No significant impact identified.	Reamins at Good Satus	None Required	No significant deterioration
	4. Drinking Water Protected Areas (DrWPAs). To identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WFD or at risk of failing in the future.	Poor	Good status by 2027		In DrWPA and 1654m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 1640m from nearest groundwater abstractor. CoCP and best practice for design and construction and operations reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 1612m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 1549m from nearest groundwater abstractor. CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 422m from nearest groundwater abstractor. CoCP and best practice for design, construction reduce risks to groundwater quality.No impact expected as a result of the scheme element.	In DrWPA and 309m from nearest groundwater abstractor. CoCP and best practice for design, construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and SPZ2, 183m from a pending EA Abstractor licence . Scheme element is above groundwater table. CoCP and best practice for design, construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and SPZ2, 246m from a pending EA Abstractor licence . Scheme element is above groundwater table. CoCP and best practice for design, construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 349m from nearest groundwater abstractor. CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 254m from nearest groundwater abstractor. CoCP and best practice for design, construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and SPZ2, 183m from a pending EA Abstractor licence. Scheme element is above groundwater table. CoCP and best practice for design, construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 444m from nearest groundwater abstractor. CoCP and best practice for design, construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In DrWPA and 1642m from nearest groundwater abstractor. CoCP and best practice for design, construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	In a DrWPA. The drainage system upgrade will involve the use of infiltration basins and soakaways that will include Re-medi8 treatment which will reduce impact of road drainage pollution. In addition lined ponds including treatment system are to be used at countess roundabout. Scheme element is an improvement on the current situation and will lead to beneficial effect.	Combined impacts of all design elements have the potential to lead to a minor localised or temporary adverse effect on the WFD element.	No significant deterioration	None required	No Significant deterioration
	5. General quality assessment. To identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater.	Good	Good status by 2027		CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No significant impacts identified as result of scheme element.	CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No significant impacts identified as result of scheme element.	CoCP and best practice for design, construction and operations reduce risks to groundwater quality. No significant impacts identified as result of scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	CoCP and best practice for design and construction reduce risks to groundwater quality. No impact expected as a result of the scheme element.	The drainage system upgrade will involve the use of infiltration basins and soakaways that will include Re-medi8 treatment which will reduce impact of road drainage pollution. In addition lined ponds including treatment system are to be used at countess roundabout. Scheme element is an improvement on the current situation and will lead to beneficial effect.	Combined impacts of all design elements have the potential to lead to a minor localised or temporary adverse effect on the WFD element.	No significant deterioration	None Required	No significant deterioration
	Chemical status	Poor																		Poor		Poor
	Overall status	Poor																		Poor		Poor

B. Risk screening of potential to prevent future attainment of good WFD status

There are no specific RBMP measures in place to achieve the WFD status objective as these wou

Ref:
Environment Agency South West River Basin District River Basin Management Plan (February 2
http://environment.data.gov.uk/catchment-planning/WaterBody/GB40801G806900
Environment Agency. Hampshire Avon WFD Management Area Abstraction Licensing Strategy,

If you need help accessing this or any other Highways England information, please call **0300 123 5000** and we will help you.

This document is also available on our website at **www.gov.uk/highways**

If you have any enquiries about this document email **info@a303stonehenge.co.uk** or call **0300 123 5000***.

*Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and must count towards any inclusive minutes in the same way as 01 and 02 calls.
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