



Wessex Water

---

# **Water Resources Management Plan 2024 (revised draft plan)**

Biodiversity Net Gain and Natural Capital Assessment

---

## Report for

Chris Hutton  
Water Resource Planning Manager  
Wessex Water  
Claverton Down  
Bath  
BA2 7WW

---

## Main contributors

Julia Baker  
George Siskos  
Jack Wheeler  
Heather Williams

---

## Issued by

.....  
Heather Williams

---

## Approved by

.....  
Pete Davis

---

## WSP

Davidson House  
Forbury Square  
Reading  
RG1 3EU  
United Kingdom  
Tel +44 (0)1628 851851

808276\_WWSL\_BNG NCA\_rdWRMP 20.08.23

x:\uk\gbwwk300-war\shared\projects\808276 wessex water environmental assessment of wrmp24\deliver stage\design technical\reports\bng\revised draft plan\808276\_wwsl\_bng nca\_wsp\_rdwrmpp 20.08.23.docx

---

## Copyright and non-disclosure notice

The contents and layout of this report are subject to copyright owned by WSP save to the extent that copyright has been legally assigned by us to another party or is used by WSP under licence. To the extent that we own the copyright in this report, it may not be copied or used without our prior written agreement for any purpose other than the purpose indicated in this report. The methodology (if any) contained in this report is provided to you in confidence and must not be disclosed or copied to third parties without the prior written agreement of WSP. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Any third party who obtains access to this report by any means will, in any event, be subject to the Third Party Disclaimer set out below.

---

## Third party disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by WSP at the instruction of, and for use by, our client named on the front of the report. It does not in any way constitute advice to any third party who is able to access it by any means. WSP excludes to the fullest extent lawfully permitted all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of this report. We do not however exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud or any other matter in relation to which we cannot legally exclude liability.

---

## Management systems

This document has been produced in full compliance with our management systems, which have been certified to ISO 9001, ISO 14001 and ISO 45001 by Lloyd's Register.

---

## Document revisions

No.	Details	Date
1	Draft issue to WWSL	23/09/22
2	Revised for submission	29/9/22
3	Minor edits during securitisation	23/11/22
4	Updated for revised draft WRMP	18/08/23

# Contents

---

<b>1.</b>	<b>Introduction</b>	<b>5</b>
1.1	Background and purpose of this report Wessex Water draft Water Resource Management Plan	5 5
1.2	Biodiversity Net Gain and Natural Capital	7
1.3	Biodiversity Net Gain and Natural Capital requirements for WRMPs	8
<b>2.</b>	<b>Approach to the Biodiversity Net Gain and Natural Capital assessments</b>	<b>10</b>
2.1	Biodiversity Net Gain Feasible Options assessment Preferred Options assessment Limitations	10 10 13 13
2.2	Natural Capital Assessment Natural Capital Assessment	14 14
<b>3.</b>	<b>Assessment outcomes for the feasible options</b>	<b>18</b>
3.1	Introduction	18
3.2	BNG (illustration of losses)	18
3.3	Natural Capital assessment	29
<b>4.</b>	<b>Assessment outcomes of the Preferred Programme</b>	<b>36</b>
4.1	Introduction	36
4.2	BNG	36
4.3	Natural Capital	38
<b>5.</b>	<b>Summary</b>	<b>40</b>
	Biodiversity Net Gain	40
	Natural Capital Assessments	40

---

Table 2.1 Carbon sequestration of land use from EA WRPG Supplementary Guidance	15
Table 2.2 Benefit Transfer Values: Natural Hazard Regulation	16
Table 3.1 BNG calculations for feasible options	19
Table 3.2 Natural Capital Assessments of feasible options	30
Table 4.1 Estimated BNG Requirements for Preferred Options	37
Table 4.2 Estimated Natural Capital losses and gains associated with permanent infrastructure in the Preferred Options	38

---

Appendix A Translation of CORINE habitats into the Biodiversity Metric V3.1 for this assessment

# 1. Introduction

## 1.1 Background and purpose of this report

1.1.1 Water companies in England have a statutory requirement to prepare a Water Resource Management Plan (WRMP) every five years. The latest Water Resource Planning Guideline (WRPG) produced by the regulatory bodies<sup>1</sup> (Ofwat, The Environment Agency) states that WRMPs should look to contribute to, and enhance, the natural environment by providing opportunities for biodiversity gain and enhancement. The Guideline also highlights the use of natural capital assessments to understand the value that natural assets provide. This report is driven by these requirements and expectations, and demonstrates how Wessex Water will meet these requirements in the assessment of their WRMP24 feasible options and preferred plan.

### Wessex Water Revised Draft Water Resource Management Plan

1.1.2 For the development of WRMP24, there have been several step changes in the regulatory planning requirements:

- **Drought resilience:** improving resilience to droughts, by moving from the current 1-in-200 drought events to 1-in-500 drought resilience by 2039, or 2050 at the latest.
- **Licence reductions:** reducing abstraction from environmentally sensitive sources, particularly in the chalk catchments by 2035, and avoiding increased abstraction in the Hampshire Avon catchment to meet new growth.
- **Decision-making:** moving away from least-cost planning to best-value planning. This considers least-cost solutions alongside other outcomes, including carbon emissions, natural capital, and biodiversity net gain.
- **Distribution Input:** meeting the industry's commitments to reduce the use of public water supply in England per head of population by 20% by 2038, a target set by Defra under the Environment Act 2021.
- **Leakage:** contributing to the target to reduce leakage by 50% by 2050.
- **Household demand:** contributing to a national ambition on average per capita consumption of 110 litres/person/day by 2050.

1.1.3 The combined potential impact of these new requirements means that, with no interventions, Wessex Water forecasts to have an overall planning deficit of over 130 MI/d by 2079/80 under the dry year critical period scenario, with significant licence reductions in 2035.

1.1.4 To address this forecast deficit, Wessex Water have developed and screened a number of options to both increase supply and reduce demand. The screening process consisted of four key stages which moved from a high level of assessing criteria to carrying out in

---

<sup>1</sup> Ofwat, NRW & EA (2022), Water Resources Planning Guideline – Updated 22 July 2022

depth environmental and costing assessments. Options were identified at varying scales, from schemes that would assist localised areas of water stress, through to Strategic Resource Options in conjunction with neighbouring water companies within the West Country Water Resources Group. Wessex Water have also liaised with other water companies at a national scale to recognise any opportunities which would be mutually beneficial to many regions. It will also require the need to complete further AMP cycle investigations to confirm the actual licence reduction requirements.

- 1.1.5 In consequence, Wessex Water has screened its list of unconstrained options and has identified a total of 86 feasible options, comprised supply side (resource management) options and 'demand-side' (customer, distribution and production) options. The supply side options, include:
- enhancements to network operations and existing transfers;
  - new reservoir storage schemes and increasing storage at existing sites;
  - new transfers;
  - effluent re-use schemes;
  - modifications to existing source abstraction.
- 1.1.6 Wessex Water has developed a number of different plan options and tested these under different future growth and demand scenarios to address the future predicted supply deficits both at a companywide level and also at a sub-zone level. A decision-making tool has been applied to choose the optimum combination of supply and demand options to meet any deficits across the planning horizon. In response to regulator requests, additional options have been included to consider the effects of drought measures being implemented including restrictions on use (temporary use bans and non-essential use bans), drought orders, and assuming less severe droughts.
- 1.1.7 Following the application of the decision-making tools and testing to the 86 feasible options, Wessex Water identified a total of 11 revised preferred options comprising of eight supply options, and three demand management option (including a temporary use ban and change in the level of service). Of the total, seven were previously included in the Draft WRMP24. The four new options included a revised demand management portfolio which combines efficiency, leakage and metering measures, building on those individual options previously considered in the Draft WRMP24.
- 1.1.8 A key features of the Revised Draft WRMP24 is a commitment to continue protecting chalk streams, as part of the Environment Agency's Environmental Destination programmes, by substantially reducing further our abstraction licences by 2035. To achieve these abstraction reductions to protect the environment, and continue to provide a drought resilient service to customers, Wessex Water has committed to:
- Rollout advanced metering infrastructure (AMI) smart meters to 95% of customers by 2035.
  - Enhance their household and non-household water efficiency programmes.
  - Promote the anticipated government water efficient labelling of appliances.

- Continue to reduce leakage levels from 2025 to meet the regulatory target of 50% reduction by 2050.
- Develop in 2025 a stream support option for two upper stour headwater catchments.
- By 2025, take forward several supply side schemes through design and development to be ready for potential delivery to meet licence reductions in 2035, depending on the outcome of future need and the needs of other users in the Hampshire Avon catchment.
- Given the scale of deficit in the long term, continue to investigate new regional strategic resource options, such as effluent re-use and/or a new reservoir in the Mendips, with South West Water as our main partner on the West Country Resources Group.

1.1.9 In combination, the options included in the preferred plan will ensure Wessex Water meet:

- the statutory water demand target to reduce the demand for water from public water supply per head of population in England by 20% by 2037/38 from the 2019/20 baseline;
- the long-term target to reduce average per capita water consumption to 110 l/p/d by 2050;
- the long-term target to reduce leakage by 50% by 2050; and
- the long-term target to reduce non-household water use by 15% by 2050.

## 1.2 Biodiversity Net Gain and Natural Capital

1.2.1 The UK's Good Practice Principles for Biodiversity Net Gain (BNG) define BNG as development that leaves biodiversity in a measurably better state than before<sup>2</sup>. These Principles set the benchmark of good practice for the design and long-term delivery of BNG. They include following the 'mitigation hierarchy' of first avoiding and minimising loss of biodiversity from a development, before restoring and finally offsetting residual losses to achieve net gain outcomes. They also include avoiding impacts on irreplaceable habitats, as such impacts cannot be offset to achieve net gain outcomes, and optimising BNG's wider benefits for society.

1.2.2 The Environment Act (2021) introduces a mandatory requirement for development subject to planning permission to achieve BNG. This is expected to come into force late 2023. Under the Act, BNG is achieved when the biodiversity value of on-site habitats has increased by a minimum of 10% post-development. Biodiversity value is measured in "habitat units" using the Secretary of State's Biodiversity Metric. At the time of this assessment, Biodiversity Metric V3.1 had been published by Natural England for developers to demonstrate BNG outcomes (note that the statutory biodiversity metric is expected to be published in late 2022).

---

<sup>2</sup> [Biodiversity Net Gain: Good Practice Principles for Development. | CIEEM](#)

- 1.2.3 Natural Capital (NC) studies key components of nature which are essential for the long-term provision of benefits on which society relies. These components can have a direct or indirect value to people. A natural capital approach, which has been followed in this assessment, understands that nature underpins human wealth, health, wellbeing and culture and seeks to demonstrate the value of the natural environment for people and the economy<sup>3</sup>.
- 1.2.4 Natural assets provide ecosystem services such as regulating floods and improving air quality, and those ecosystem services provide benefits such as reducing the chance a house will flood or improved health. This benefit can then be valued through use of natural capital metrics, and can be used to help in the support of delivery of targets, such as putting a value on the potential delivery of BNG.

### 1.3 Biodiversity Net Gain and Natural Capital requirements for WRMPs

- 1.3.1 The purpose of a Water Resource Management Plan (WRMP) is for water companies to set out how they will secure water supplies for customers whilst protecting the environment and securing water supplies that are resilient to challenges such as extreme droughts, climate change and population growth.
- 1.3.2 The WRMP should also demonstrate that a water company has considered and is prepared for current and forthcoming environmental legislation. This includes the NERC Act (Box 1) and the BNG mandatory requirement under the Environment Act 2021 for water companies operating in England.
- 1.3.3 The Regulator has published supplementary guidance on Environment and Society in decision-making<sup>4</sup>. This describes the expectation for Natural Capital Assessments (NCA) of Options considered in a WRMP. The purpose is for water companies to “make decisions that do not devalue, and look to enhance the value of the natural world for society benefit” (WRPG Supplementary Guidance<sup>8</sup>), as well as supporting water companies to

#### Box 1: WRPG 2022

##### Section 4.1.1 High-level considerations

Ensure your plan contributes to the conservation and enhancement of biodiversity, delivers net biodiversity gain where appropriate, delivers environmental gain and uses a proportionate natural capital approach.

Consider your duty to conserve biodiversity under section 40 of the Natural Environment and Rural Communities Act (2006) and the list of species and habitats of principal importance set out in section 41 of the Act (England).

<sup>3</sup> UK Government (2021), Enabling a Natural Capital Approach (ENCA) – Updated 20 August 2021

<sup>4</sup> EA (2021) WRPG 2024 supplementary guidance – Environment and society in decision-making. Published 24/03/2021



promote Plans that secure water supplies in ways that generate wider environmental and social benefits.

## 2. Approach to the Biodiversity Net Gain and Natural Capital assessments

### 2.1 Biodiversity Net Gain

#### Feasible Options assessment

- 2.1.1 Initial BNG calculations were undertaken on all feasible options, using the Biodiversity Metric V3.1. The calculations used national habitat datasets mapped over the Option boundaries, within a Geographical Information System (GIS). This provided a high-level estimate of each Option's BNG requirements, which was used to assign a Red-Amber-Green (RAG) score so that indicative BNG requirements for all options could be compared.

#### Digitising the Option boundary

- 2.1.2 Each Option scope book included a graphical summary of the elements that made up the Option. These graphics were geo-referenced within ArcGIS Pro software so that digitisation of the boundary of each Option could be undertaken within ArcGIS Pro.

#### Caveats and assumptions

- 2.1.3 During digitisation of the Option boundaries, it was noted that the Option scope book summary graphics represented an overestimation of the size of the Option boundary. To improve the accuracy of the Option boundaries mapped in GIS, open-source aerial imagery combined with Google Street View was utilised to provide an additional higher-level assessment of the polygon extents that represented the Option boundary.
- 2.1.4 Proposed developments outlined within option scope books were unable to be assessed given a lack of information. Consequently, the proposed development extents provided by Wessex Water in the summary graphic were used for analysis.
- 2.1.5 Elements within each Option boundary, namely pipelines and boreholes, were digitised where possible. For pipelines, a 30m buffer (15m on each side) was assumed around polyline shapefiles. When proposed areas associated with borehole construction were provided in the option scope book, these were buffered accordingly. However, the information provided did not enable consistent identification of these elements for all Options. Consequently, on review of the information provided, a single polygon for each Option boundary was used for this initial BNG calculation.

#### Baseline habitat extractions

- 2.1.6 To assess habitats within each Option boundary, vector data was obtained from CORINE 2018. The CORINE dataset is an open-source land cover product developed by the

Copernicus Land Monitoring Service (CLMS)<sup>5</sup>. The dataset provides continuous classified land cover parcels across the UK with a minimum mapping unit of 25 hectares and a minimum mapping width of 100m. A total of 44 land cover classes are contained within the dataset, spanning across five main broader land cover/use categories (Artificial surfaces, Agriculture, Forests and Seminatural Areas, Wetlands and Water).

- 2.1.7 Other open-source vector data such as Crop Map of England (CROME) 2020<sup>6</sup> are available. These were reviewed for use for this initial BNG calculation. However, most land cover classes were beyond the project scope and did not provide comprehensive habitat information to cover all Options. As a result, the dataset was discounted, and the CORINE dataset was used instead.
- 2.1.8 Linear features of lines of trees and hedgerows, and rivers, could not be included in this initial BNG calculation because these features are not identified in detail in the CORINE dataset. These features (which are unique features in the Biodiversity Metric and have their own BNG requirements) will need to be assessed for a full BNG assessment.

### Ancient Woodland

- 2.1.9 Net gain outcomes cannot be achieved for losses of irreplaceable habitats, in accordance with the UK's Good Practice Principles for BNG. While there are a variety of irreplaceable habitats in England, open-source credible data on the extent for many irreplaceable habitats is limited. The Natural England Inventory on Ancient Woodland, however, is readily available and used for this assessment to identify any Option boundaries that overlap with Ancient Woodland. Further assessment for BNG should consider all irreplaceable habitats.
- 2.1.10 Option boundaries were overlaid with Ancient Woodland data from the Natural England Inventory, allowing options with Ancient Woodland within the boundary to be identified. BNG losses were calculated for these options in order to provide a comparison of loss between options, but it was acknowledged that net gain could not be achieved for those options based on the currently available information, due to the assumed impact on Ancient Woodland.
- 2.1.11 It is likely that, with refinement, options could avoid a negative impact on Ancient Woodland, in which case net gain may ultimately prove possible for those options. In such cases, enhancements to the Ancient Woodland should be explored, as such enhancements can count towards BNG under Natural England's current approach to BNG.

---

<sup>5</sup> Copernicus, Corine Land Cover (CLC) 2018, Version 2020\_20u1, available from: <https://land.copernicus.eu/pan-european/corine-land-cover/clc2018?tab=mapview>

<sup>6</sup> Rural Payments Agency (2021) Crop Map of England (CROME) 2019, available from: <https://www.data.gov.uk/dataset/8c5b635f-9b23-4f32-b12a-c080e3f455d0/crop-map-of-england-crome-2019>

## Habitat data extraction

- 2.1.12 CORINE habitats within each Option boundary were extracted in GIS. The resultant dataset contained individual extracted habitat parcels, for which the area (in hectares) was then measured.

## Initial BNG Calculation

- 2.1.13 CORINE habitat types were translated into the most appropriate habitat type within the Biodiversity Metric V3.1. This translation is shown in **Appendix A**.
- 2.1.14 The condition score of each CORINE habitat was assigned based on the Biodiversity Metric V3.1 condition method (e.g., cropland is scored as N/A for condition) or assumptions, which are also listed in **Appendix A**.
- 2.1.15 Strategic Significance was assigned as Low for all habitats, as the level of detail that would be required to assess Strategic Significance was beyond the scope of this assessment.
- 2.1.16 For each Option, data on the type of habitat, its condition and Strategic Significance score was entered into the Biodiversity Metric V3.1. The estimated total Biodiversity Unit score was calculated for all habitats within the boundary of each Option; this gave the estimated total number of Area-Based Habitat Units (ABHU) for each Option. Different habitats generate different numbers of ABHU and so the estimated total number of ABHU per hectare was calculated to enable a standardised comparison between the Options.
- 2.1.17 As it was not possible to spatially disaggregate different elements within the Options, it was not possible to consider temporary and permanent losses separately. So, a worst-case assumption was made that all habitat within the Option boundary will be permanently lost. Then the estimated total ABHU for each Option was compiled representing the worst-case deficit of ABHU from which BNG would be required.
- 2.1.18 These results were Red Amber Green (RAG) scored as follows:
- Estimated total number of ABHU for the Option: <100 = 1; 101-200 = 2; >200 = 3
  - Estimated number of ABHU/ha: <3 = 1, 3.01-6 = 2; >6 = 3
- 2.1.19 The two parts of the RAG scores were summed to give the overall RAG score for BNG whereby Red indicated a greater BNG requirement and Green indicating the preferred Options from a BNG perspective. The total scores were grouped as follows: <=3 GREEN; 4 AMBER; and >=5 RED.
- 2.1.20 For options containing Ancient Woodland, two alternative scores were given: the base score using the approach calculated above, and an over-ride score of 6, to recognise the presence of Ancient Woodland.
- 2.1.21 In addition, CORINE habitats within the Option boundaries were reviewed in order to provide commentary on the context for which BNG would be required.

## Preferred Options assessment

- 2.1.22 Following the initial BNG calculation for the feasible options, this second stage of estimating BNG requirements in terms of habitat creation was only undertaken for the Preferred Options.
- 2.1.23 At the time of assessment of the preferred options, it was understood that boundaries of the Preferred Options had not changed since the assessment of feasible options, so this assessment was based on the original Option boundaries digitised from the scope books.
- 2.1.24 This assessment was based on the assumption that all baseline habitats within the Option boundary would be cleared and no areas on-site would be available for the habitat creation needed to achieve BNG.
- 2.1.25 The Biodiversity Metric V3.1 was used to estimate the off-site habitat creation likely required for each Preferred Option to achieve a minimum 10% increase in area-based habitat units in ways that meet 'trading rules' within the metric. Off-site baselines were assumed to be low-distinctiveness farmland with condition N/A and a low strategic significance. Habitat creation was targeted to ecological habitats within the Option boundaries as evident from Google maps, such as woodland and scrub. The advanced / delay function in the metric was set to zero.
- 2.1.26 Habitat creation estimates were calculated only for areas of "permanent" habitat loss. Pipeline laying was assumed to be a temporary activity lasting less than two years, and hence not requiring net gain within the Defra metric.
- 2.1.27 The results illustrate the type and hectares of habitat creation that each Preferred Option might need to achieve BNG.
- 2.1.28 Information on Wessex Water's land-holding was requested in order to match the estimated BNG habitat creation requirements of each Preferred Option with nearby land owned by Wessex Water. This information was not available at this time, but any future BNG assessment should consider BNG delivery on Wessex Water's land-holdings.

## Limitations

- 2.1.29 The CORINE dataset provided broad land cover classes for this initial BNG calculation and assessment. The large-scale mapping of CORINE means it provides broad coverage only and does not pick up areas of habitats below its minimum mappable unit, for example pockets of woodland within an area dominated by farmland. It was evident from Google maps that many other habitats existed within the Option boundary than that mapped on CORINE including woodland, scrub, hedgerows and lines of trees. These habitats score higher than farmland within the Biodiversity Metric. Subsequently, given limited data on the type of habitat present on site, only an initial BNG calculation was possible at this stage.
- 2.1.30 As this was a desk-based assessment, assumptions had to be made for habitat condition, and Strategic Significance was set to Low.
- 2.1.31 Given the above, it is recommended that a full BNG assessment be undertaken of the Preferred Options, as the design develops. Note that the metric's trading rules state that

loss of habitats of very high distinctiveness are not permitted within the metric; the same habitat type must replace high distinctiveness habitats; the same broad habitat type or habitat with a higher distinctiveness must replace medium distinctiveness habitats and low distinctiveness habitats must be replaced by habitats of the same distinctiveness or higher.

## 2.2 Natural Capital Assessment

2.2.1 WRPG Supplementary Guidance states that NCAs in England should include as a minimum the following five ecosystem services:

- Biodiversity and habitat;
- Climate regulation;
- Natural hazard regulation;
- Water purification;
- Water regulation.

2.2.2 The assessment has, therefore, taken each of these ecosystem services into account.

### Natural Capital Assessment

2.2.3 The NCA has been completed using the data sources described below, as recommended by the All Company Working Group (ACWG) environmental assessment guidance for SROs<sup>7</sup> and the EA Water Resources Planning Guideline (WRPG) WRMP24 Supplementary Guidance on Environment and Society in Decision-Making<sup>8</sup>.

### Natural Capital stocks

2.2.4 The assessment for the NC approach is based on the same available open-source data as used for the BNG assessment. The habitat types used for BNG were converted to broad habitat types to give the total area of each broad habitat impacted by each option. The conversion from the detailed habitat layers to broad habitat is outlined in **Appendix A**.

2.2.5 Broad habitat groupings were determined following the broad groups identified for calculation of carbon sequestration by land use from the EA's Supplementary Guidance. Modified grassland has been classified as arable land and not grassland, as per advice from the Office for National Statistics (ONS) in developing a semi-natural grassland ecosystems account<sup>9</sup>. The UK NEA differentiates semi-natural grassland from improved and amenity grassland, as semi natural grassland has a much higher species-richness<sup>10</sup>. Where a land cover class could belong in multiple broad habitat groups it was placed

<sup>7</sup> All Company Working Group (2020). WRMP environment assessment guidance and applicability with SROs

<sup>8</sup> Environment Agency (2022) Water resources planning guideline supplementary guidance – Environment and society in decision-making - England. Published 3<sup>rd</sup> February 2022.

<sup>9</sup> Office for National statistics (2018) Developing semi-natural grassland ecosystem accounts

<sup>10</sup> UK Habitat Classification Working Group (2018). UK Habitat Classification - Habitat Definitions V1.0 at <http://ecountability.co.uk/ukhabworkinggroup-ukhab>

within the one that had a lower carbon sequestration rate, to give a more conservative estimate of benefits.

#### Climate Regulation (carbon sequestration)

- 2.2.6 For climate regulation, a quantitative and monetised approach has been taken, which meets the minimum requirements set out in the EA WRPG supplementary guidance.
- 2.2.7 The carbon sequestration rates for NC stocks have been taken from the EA WRPG Supplementary Guidance, as shown in **Table 2.1**. Carbon sequestration rates of the relevant Natural Capital assets have been converted into monetary values using the Department for Business, Energy, and Industrial Strategy (BEIS) Carbon Values. As the prices published by BEIS are in £2020, GDP deflators were used to adjust them to the £2019 base year of modelling.
- 2.2.8 It is not possible to quantify the non-spatial changes in biodiversity and habitat ecosystem services arising from habitat condition improvement. To avoid overestimating the beneficial impact of the change in non-traded carbon sequestration value following BNG habitat creation / reinstatement, this value has been calculated by summing the change in non-traded carbon sequestration value both lost and created.
- 2.2.9 Monetisation is based on the size of the area of loss, and biodiversity value of the habitats affected. Higher biodiversity value habitats (e.g., woodland, lowland meadows, heathland) have higher carbon sequestration monetised values. The higher biodiversity habitats are typically more difficult to recreate following completion of the construction phase, so loss and reinstatement of these habitats will result in a greater impact relative to lower value habitats (e.g., arable fields or modified grassland).

Table 2.1 Carbon sequestration of land use from EA WRPG Supplementary Guidance

Land use type	C seq rate (t/CO <sub>2</sub> e/ha/yr)
Woodland (deciduous)	4.97
Woodland (coniferous)	12.66
Arable land	0.10
Pastoral land	0.39
Grassland	0.39
Heathland & shrub	0.7
Urban	0

#### Natural Hazard Regulation

- 2.2.10 For natural hazard regulation, a monetised approach has been taken, which provided a quantitative comparison between options. The approach meets the minimum requirements set out in the EA WRPG supplementary guidance.

- 2.2.11 For the purposes of this assessment, natural hazard regulation has been taken to refer to regulation of flooding. Monetary values were sourced per broad habitat type from existing studies conducted in the UK. Values for woodland and wetlands/ floodplains broad habitat types were identified using the ENCA Services Databook<sup>11</sup>, as at the time of methodology development in 2021.
- 2.2.12 An annual monetary value was only derived for the flood regulating services associated with woodland (see **Table 2.2**). Values are also available in the ENCA Services Databook for wetland/open water habitats. However, these have not been used because the open water areas captured within the option extents are unlikely to be lost as habitat (e.g. some are reservoirs that will have altered management, but the reservoir will remain). Therefore, it was not considered realistic, with the data available, to include values for open water. Robust monetary values for other broad habitat types, and which could be considered comparable to the values in **Table 2.2**, are not currently available. As a result, the monetised estimate has been based only on woodland extents.

Table 2.2 Benefit Transfer Values: Natural Hazard Regulation<sup>12</sup>

Broad habitat type	Annual value	Reference
<b>Woodland- average</b>	£115 per ha	Forest Research (2018) & ENCA Services Databook
<b>Woodland- floodplain</b>	£221 per ha	Forest Research (2018) & ENCA Services Databook

## Water Purification

- 2.2.13 The EA WRPG supplementary guidance does not require the monetisation of Water Purification services, as these services are highly dependent on local factors (e.g. proximity to a water body) and there are limited tools available to provide accurate monetised assessment. Thus only a simplified quantitative assessment has been undertaken, based on proximity to watercourses (identified using Flood Zones 2 and 3).

## Water Regulation

- 2.2.14 The WRPG does not require the monetisation of Water Regulation services. A minimum quantitative approach has been taken which sets out the proposed volume of water supply achieved by each option. Beyond this, it is considered that this service is well represented by the Water Framework Directive (WFD) compliance assessment, so to avoid

<sup>11</sup> <https://www.gov.uk/guidance/enabling-a-natural-capital-approach-enca#enca-services-databook>

<sup>12</sup> References:

- Forest Research (2018). Valuing flood regulation services of existing forest cover to inform natural capital accounts.
- Morris & Camino (2011) UK National Ecosystem Assessment Economic Analysis Report, School of Applied Sciences, Cranfield University.



double counting, the WFD compliance assessment report should be referred to directly for further information about Water Regulation.

## 3. Assessment outcomes for the feasible options

### 3.1 Introduction

3.1.1 Wessex Water identified 86 feasible options, comprising 77 'supply side' (resource management) options and 9 'demand-side' (customer, distribution and production) options. This assessment covers the supply side options, on the assumption that the demand-side options will have no land-take requirements and hence no implications for BNG or associated natural capital.

3.1.2 Of the supply side options, options 41\_01 and 41\_06 are also excluded from the assessments, because they are related to drought options which have no associated land take. This leaves 75 feasible options that have been subject to assessment.

### 3.2 BNG (illustration of losses)

3.2.1 The results and RAG scores of the initial BNG calculation of the remaining 75 feasible options are presented in **Table 3.1**. The table identifies where an option contains Ancient Woodland (based on the Natural England Ancient Woodland Inventory).

3.2.2 There are 36 options altogether that contain Ancient Woodland within their boundary: four options have a 'red' score of 5 or 6, all of which contain Ancient Woodland within the boundary of the GIS. The other 32 options, if Ancient woodland could be avoided, would have a 'green' or 'amber' score. Option refinements should be considered, to reduce the total BNG scores and avoid Ancient Woodland.

Table 3.1 BNG calculations for feasible options

Option	Area (ha)	Total ABHU		ABHU per unit area		Intersects ancient woodland?	Overall RAG score		Comments
		ABHU	Group	ABHU /ha	Group		Base score	Accounting for ancient woodland	
18.01	136.05	261.18	3	1.9	1	No	4	4	A relatively large Option which boosts the ABHU numbers; within the Option extent is mostly Cropland (which as a low ABHU) and hard-standing, as well as a small area of woodland (with high ABHU)
18.02	129.38	291.67	2	2.3	1	Yes	3	6	Long pipeline crossing predominantly cropland, with some neutral grassland and mixed woodland (including ancient woodland)
18.09	43.91	93.42	1	2.1	1	No	2	2	Mainly Cropland with smaller areas of woodland (with high ABHU)
18.10	1.75	3.49	1	2	1	No	2	2	Only Cropland mapped within the Option extent
18.26	44	88.13	1	2.0	1	Yes	2	6	New pipeline (and associated works) crossing predominantly cropland, with some developed land and broadleaved woodland (including ancient woodland)
18.27	8.38	16.76	1	2	1	No	2	2	Only Cropland mapped within the Option extent
18.28	0	0	0	0	0	Yes	0	0	Mapping shows large blocks of developed land, cropland and broadleaved woodland covered. However, scheme description suggests minimal, if any, disturbance to

Option	Area (ha)	Total ABHU		ABHU per unit area		Intersects ancient woodland?	Overall RAG score		Comments
		ABHU	Group	ABHU /ha	Group		Base score	Accounting for ancient woodland	
									habitats. Results have therefore been overwritten with zeroes
19.03	715.58	4142.73	3	5.8	2	Yes	5	6	Long new pipelines, and includes existing area of reservoir. Extensive areas of cropland, developed land, woodland (broadleaved and coniferous, including ancient woodland) and lakes covered, and some lowland heathland.
19.06	209.48	405.05	3	1.9	1	Yes	4	6	Long pipeline and new storage reservoirs. Predominantly cropland and developed land, with some broadleaved woodland (including ancient woodland)
19.07	209.55	405.19	3	1.9	1	Yes	4	6	Long pipeline and new storage reservoirs. Predominantly cropland and developed land, with some broadleaved woodland (including ancient woodland)
19.10	210.06	404.47	3	1.9	1	Yes	4	6	Long pipeline and new storage reservoirs. Predominantly cropland and developed land, with some broadleaved woodland (including ancient woodland)
19.11	218.93	422.51	3	1.9	1	Yes	4	6	Long pipeline and new storage reservoirs. Predominantly cropland and developed land, with some broadleaved woodland (including ancient woodland)

Option	Area (ha)	Total ABHU		ABHU per unit area		Intersects ancient woodland?	Overall RAG score		Comments
		ABHU	Group	ABHU /ha	Group		Base score	Accounting for ancient woodland	
<b>21.06</b>	104.18	223.2	3	2.1	1	Yes	4	6	Largely cereal crops, with some broadleaved woodland. 34km of pipeline, plus storage reservoirs and pumping stations. Majority of impact will be temporary.
<b>21.10</b>	46.29	101.13	1	2.2	1	Yes	2	6	New pipeline and new storage reservoir. Covers developed land, cropland and some broadleaved woodland (including ancient woodland)
<b>21.11</b>	15.82	45.44	1	2.9	1	No	2	2	Mainly Cropland with a small area of other neutral grassland (with a higher ABHU)
<b>21.12</b>	25.41	50.82	1	2	1	No	2	2	Only Cropland mapped within the Option extent
<b>21.13</b>	42.32	83.52	1	2.0	1	No	2	2	Largely cereal crops. 14km pipeline with service reservoirs and pumping station. Majority of impact will be temporary.
<b>21.14</b>	30.35	54.87	1	1.8	1	No	2	2	Predominantly cereal crops and developed land, with some mixed woodland and neutral grassland. 11km pipeline with pumping station. Majority of impact will be temporary.
<b>22.04</b>	0.49	0.98	1	2	1	No	2	2	Only Cropland mapped within the Option extent

Option	Area (ha)	Total ABHU		ABHU per unit area		Intersects ancient woodland?	Overall RAG score		Comments
		ABHU	Group	ABHU /ha	Group		Base score	Accounting for ancient woodland	
23.01	0.3	3.64	1	12.1	3	No	4	4	Only a small Pond area although the Pond itself has a high ABHU
25.01	291.21	208.51	3	0.7	1	Yes	4	6	Includes area of reservoir, and new pipeline. Predominantly developed land and cropland, with some broadleaved woodland (including ancient woodland)
25.03	94.88	194.6	2	2.1	1	No	3	3	Mainly Cropland with some hard-standing; also a small Pond that has a high ABHU
25.04	200.3	921.21	2	4.6	2	Yes	4	6	Includes new pipelines and service reservoirs. Predominantly cropland, with some woodland (broadleaved, mixed and coniferous, including ancient woodland), lowland heathland and developed land
25.05	128.86	271.89	2	2.1	1	Yes	3	6	Includes new pipelines and service reservoirs. Predominantly cropland, with some woodland (broadleaved and mixed, including ancient woodland) and developed land
26.17	55.85	148.47	2	2.7	1	No	3	3	Mainly Cropland with some hard-standing; also an area of woodland that has a high ABHU
27.04	2.19	4.39	1	2	1	No	2	2	Only Cropland mapped within the Option extent
30.02	10.31	20.63	1	2	1	No	2	2	Only Cropland mapped within the Option extent

Option	Area (ha)	Total ABHU		ABHU per unit area		Intersects ancient woodland?	Overall RAG score		Comments
		ABHU	Group	ABHU /ha	Group		Base score	Accounting for ancient woodland	
<b>31.02</b>	98.55	701.14	3	7.1	3	No	6	6	Approx half of the Option extent is covered by Lakes / Ponds which have high ABHU and the remainder is Cropland with low ABHU
<b>32.03</b>	154.81	305.81	3	2	1	No	4	4	Mostly Cropland within the Option extent with a small area of coniferous woodland
<b>32.13</b>	94.32	196.65	2	2.1	1	No	3	3	Mainly Cropland (with a low ABHU) with a small area of woodland
<b>32.24</b>	116.08	232.15	3	2	1	No	4	4	Only Cropland mapped within the Option extent (Cropland has a low ABHU but the Option extent is relatively large which boosts the RAG score)
<b>32.36</b>	125.14	252.83	2	2.0	1	Yes	3	6	Reservoir, with new pipelines and WTW. Almost all cropland, with some broadleaved woodland (including ancient woodland)
<b>33.01</b>	18.22	123.51	1	6.8	3	Yes	4	6	Includes ASR, pipelines (including discharge pipeline to Poole Harbour), treatment works and new storage reservoir. Crosses cropland, mixed woodland (including ancient woodland), and high distinctiveness habitats including lowland heathland and saltmarsh
<b>34.08</b>	97.06	233.89	1	2.4	1	Yes	2	6	New boreholes, treatment works, pipeline, service reservoir. Predominantly cropland, and areas of broadleaved woodland (including ancient woodland) and developed land

Option	Area (ha)	Total ABHU		ABHU per unit area		Intersects ancient woodland?	Overall RAG score		Comments
		ABHU	Group	ABHU /ha	Group		Base score	Accounting for ancient woodland	
<b>34.09</b>	34.9	51.91	1	1.5	1	No	2	2	Mainly Cropland (with a low ABHU) with some hard standing
<b>34.1</b>	18.89	23.32	1	1.2	1	No	2	2	Mainly Cropland (with a low ABHU) with some hard standing
<b>34.11</b>	16.71	41.16	1	2.5	1	No	2	2	Mostly Cropland with a low ABHU; a small area of woodland with a high ABHU and some hard-standing
<b>36.02</b>	302.16	567.1	3	1.9	1	Yes	4	6	Desalination plans with new pipelines, upgraded to pumping stations and new service reservoirs. Predominantly cropland and developed land, with some broadleaved woodland (including ancient woodland) and saltmarsh (high distinctiveness habitat)
<b>37.05</b>	47.35	351.56	3	7.4	3	No	6	6	Over half of the Option extent is Lakes / Ponds that score high ABHU; the rest of the Option is Cropland with a low ABHU
<b>37.06</b>	35.72	71.43	2	2	1	No	3	3	Only Cropland mapped within the Option extent (with low ABHU)
<b>37.07</b>	92	90.83	2	1	1	No	3	3	Only Cropland and hard-standing mapped within the Option extent
<b>37.10</b>	24.67	46.97	2	1.9	1	No	3	3	Only Cropland and hard-standing mapped within the Option extent



Option	Area (ha)	Total ABHU		ABHU per unit area		Intersects ancient woodland?	Overall RAG score		Comments
		ABHU	Group	ABHU /ha	Group		Base score	Accounting for ancient woodland	
<b>38.01</b>	6.36	12.72	1	2	1	No	2	2	Only Cropland mapped within the Option extent (with low ABHU)
<b>38.04</b>	1.63	0.38	1	0.2	1	No	2	2	Small area of Cropland (with low ABHU) with some hard-standing
<b>38.06</b>	2.8	5.6	1	2	1	No	2	2	Only Cropland mapped within the Option extent (with low ABHU)
<b>38.11</b>	0.39	3.08	1	7.9	3	No	4	4	Only woodland mapped with the Option extent (high ABHU)
<b>38.12</b>	0.26	0	1	0	1	No	2	2	Very small area of Cropland with low ABHU and some hard-standing; too small to register in the Biodiversity metric
<b>39.01</b>	0.04	0.08	1	2	1	No	2	2	Small area of Cropland with low ABHU
<b>39.02</b>	0	0	1	0	1	No	2	2	Very small area of Cropland with low ABHU; too small to register in the Biodiversity metric
<b>52.02</b>	77.97	71.54	1	0.9	1	No	2	2	Option 37_20 has been used as a proxy for this option (although there are some differences between the options)
<b>52.03</b>	77.97	71.54	1	0.9	1	No	2	2	From a BNG perspective, this option is the same as 52_02

Option	Area (ha)	Total ABHU		ABHU per unit area		Intersects ancient woodland?	Overall RAG score		Comments
		ABHU	Group	ABHU /ha	Group		Base score	Accounting for ancient woodland	
54.01	374.26	372.87	3	1.0	1	Yes	4	6	Predominantly developed land and cereal crops, with a small amount of broadleaved woodland Includes the whole area of the reservoir in addition to the transfer.
54.03	386.49	389.97	3	1.0	1	Yes	4	6	Predominantly developed land and cereal crops, with a small amount of broadleaved woodland Includes the whole area of the reservoir in addition to the transfer.
54.04	760.75	762.84	3	1.0	1	Yes	4	6	A combination of 54_01 and 54_03
54.05	291.21	208.51	3	0.7	1	Yes	3	6	From a BNG perspective, this option is the same as 25_01
54.06	374.26	372.87	3	1.0	1	Yes	4	6	From a BNG perspective, this option is the same as 54_01
54.07	386.49	389.97	3	1.0	1	Yes	4	6	From a BNG perspective, this option is the same as 54_03
54.08	760.75	762.84	3	1.0	1	Yes	4	6	A combination of 54_06 and 54_07
55.01	151.78	336.46	3	2.2	1	Yes	4	6	Predominantly cereal crops, with some neutral grassland and broadleaved woodland.  New 43km main, plus booster station. Majority of impact will be temporary.

Option	Area (ha)	Total ABHU		ABHU per unit area		Intersects ancient woodland?	Overall RAG score		Comments
		ABHU	Group	ABHU /ha	Group		Base score	Accounting for ancient woodland	
55.03	95.05	326.44	3	3.4	2	Yes	5	6	Predominantly arable land, but also woodland (mixed, coniferous and broadleaved) and lowland heathland.  New mains and service reservoirs
55.05	136.24	286.29	3	2.1	1	Yes	4	6	Predominantly arable land, but also some woodland (mixed and broadleaved).  New mains and service reservoirs
55.09	61.21	123.36	2	2.0	1	Yes	3	6	Predominantly cereal crops, with a small extent of broadleaved woodland  New mains and service reservoirs
55.10	44.77	95.49	1	2.1	1	No	2	2	Predominantly cereal crops. New main, pumping station and service reservoir
55.11	27.87	54.34	1	1.9	1	No	2	2	All cereal crops and developed land. New main and pumping station
55.12	104.18	223.18	3	2.1	1	Yes	4	6	Predominantly cereal crops, with some broadleaved woodland. New pipelines and storage reservoirs
56.01	15.83	39.41	1	2.5	1	No	2	2	Cereal crops, developed land and broadleaved woodland. New boreholes, treatment works, pipeline and storage

Option	Area (ha)	Total ABHU		ABHU per unit area		Intersects ancient woodland?	Overall RAG score		Comments
		ABHU	Group	ABHU /ha	Group		Base score	Accounting for ancient woodland	
<b>58.01</b>	119.91	221	3	1.8	1	Yes	4	6	Largely arable land and developed land, with a small amount of broadleaved woodland. Pipeline and new storage at storage reservoirs
<b>59.01</b>	5.91	17.91	1	3.0	2	No	3	3	Cereal crops and some neutral grassland. Pipeline and permanent infrastructure
<b>70.01</b>	87.91	181.55	2	2.1	1	Yes	3	6	A combination of 18_26 and 18_09
<b>70.02</b>	113.32	232.37	3	2.1	1	Yes	4	6	A combination of 18_26, 18_09 and 21_12
<b>70.03</b>	253.76	494.19	3	1.9	1	Yes	4	6	A combination of 58_01, 55_10, 55_11 and 55_09
<b>70.04</b>	192.55	370.83	3	1.9	1	Yes	4	6	A combination of 58_01, 55_10 and 55_11
<b>70.05</b>	360.1	703.82	3	2.0	1	Yes	4	6	A combination of 58_01, 55_10, 55_11, 21_13, 25_03 and 21_14
<b>70.06</b>	129.68	295.31	3	2.3	1	Yes	4	6	A combination of 23_01 and 18_02
<b>70.07</b>	89.38	179.55	2	2.0	1	No	3	3	A combination of 21_13, 21_14 and 34_11

### 3.3 Natural Capital assessment

- 3.3.1 The results of the Natural Capital calculations are presented for all feasible options in **Table 3.2**.
- 3.3.2 Across all feasible options, losses of the climate regulation service have been valued at between £0 and -£14,191 per year per option (up to -£338 per year per hectare). The greatest losses relate to those options covering areas of woodland.
- 3.3.3 Losses of the natural hazard regulation service (with a focus on flooding) have been valued at between £0 and -£3,748 per year per option (up to -£115 per year per hectare). As with climate regulation, the greatest losses relate to those options covering areas of woodland. Greater losses would in particular be associated with woodland in the floodplain, although this accounts for only a limited extent of nine options.
- 3.3.4 As explained in **Section 2**, the water purification ecosystem service has not been quantified. However, in general, options that score highly for climate regulation or natural hazard regulation may also be expected to score highly for water purification, since similar habitats (e.g. woodland and wetland) are expected to provide that ecosystem service most effectively. This may particularly be the case where woodland or wetland habitats provide a buffer alongside a watercourse (e.g. those identified as extending in to the floodplain, in **Table 3.3**).
- 3.3.5 An indication of the benefit to the provision of the water regulation service has been provided using the deployable output of each option as a proxy. The deployable output ranges from a gain of 2.5 to 70 MI/d for individual options.
- 3.3.6 This assessment has been based purely on the GIS information available. It is possible that, when individual options are considered in more detail, losses of high-value habitats such as woodland, and of development within the floodplain, could be avoided or minimised.

Table 3.2 Natural Capital Assessments of feasible options

Option ID	Climate regulation			Natural hazard regulation		Area in floodplain*		Water regulation (DO, MI/d)
	C seq (t CO2e/yr)	C seq (£/yr)	C seq (£/yr/ha)	Total (£/yr)	flood regulation (£/yr/ha)	Total (ha)	Woodland (ha)	
<b>18_01</b>	-17.1	-1159.8	-8.5	-78.0	-0.6	54.9	0.0	+6
<b>18_02</b>	-19.3	-1315.4	-10.2	-98.3	-0.8	23.4	0.0	+20
<b>18_09</b>	-9.2	-627.7	-14.3	-107.2	-2.4	0.8	0.0	+8
<b>18_10</b>	-0.2	-12.7	-7.3	0.0	0.0	0.0	0.0	+6
<b>18_26</b>	-5.9	-404.5	-9.2	-31.3	-0.7	2.4	0.0	+7
<b>18_27</b>	-0.9	-61.0	-7.3	0.0	0.0	0.0	0.0	+1.15
<b>18_28</b>	-85.4	-5809.0	-119.1	-1947.5	-39.9	0.7	0.0	+3
<b>19_03</b>	-208.7	-14191.1	-19.8	-3748.4	-5.2	22.6	0.2	+10
<b>19_06</b>	-31.7	-2156.6	-10.3	-273.9	-1.3	31.4	0.0	+15
<b>19_07</b>	-31.7	-2157.1	-10.3	-273.9	-1.3	31.6	0.0	+30
<b>19_10</b>	-31.7	-2154.4	-10.3	-273.9	-1.3	31.8	0.0	+15
<b>19_11</b>	-32.6	-2220.1	-10.1	-273.9	-1.3	32.2	0.0	+30
<b>21_06</b>	-24.2	-1648.9	-15.8	-404.5	-3.9	11.8	0.9	+14

Option ID	Climate regulation			Natural hazard regulation		Area in floodplain*		Water regulation (DO, MI/d)
	C seq (t CO2e/yr)	C seq (£/yr)	C seq (£/yr/ha)	Total (£/yr)	flood regulation (£/yr/ha)	Total (ha)	Woodland (ha)	
21_10	-30.9	-2099.5	-45.4	-644.7	-13.9	1.0	0.0	+6
21_11	-0.9	-62.1	-3.9	0.0	0.0	0.0	0.0	+0.5
21_12	-2.7	-184.9	-7.3	0.0	0.0	0.0	0.0	+3
21_13	-4.5	-303.8	-7.2	0.0	0.0	2.7	0.0	+15
21_14	-4.4	-302.4	-10.0	-39.1	-1.3	0.0	0.0	+6
22_04	-0.1	-3.6	-7.3	0.0	0.0	0.0	0.0	+1.63
23_01	0.0	-2.2	-7.3	0.0	0.0	0.6	0.0	+4
25_01	-15.9	-1079.2	-3.7	-119.4	-0.4	39.7	0.0	+35
25_03	-9.8	-665.2	-7.0	0.0	0.0	10.2	0.0	+4
25_04	-141.9	-9649.6	-49.4	-2389.4	-12.2	28.7	0.8	+14
25_05	-38.4	-2611.0	-20.3	-603.9	-4.7	17.0	0.0	+10
26_17	-45.6	-3098.5	-55.5	-952.6	-17.1	1.5	0.0	+4.5
27_04	-0.2	-16.0	-7.3	0.0	0.0	0.0	0.0	+5
30_02	-1.1	-75.0	-7.3	0.0	0.0	5.2	0.0	+2
31_02	-5.2	-350.3	-3.6	0.0	0.0	100.9	0.0	+5.4

Option ID	Climate regulation			Natural hazard regulation		Area in floodplain*		Water regulation (DO, MI/d)
	C seq (t CO2e/yr)	C seq (£/yr)	C seq (£/yr/ha)	Total (£/yr)	flood regulation (£/yr/ha)	Total (ha)	Woodland (ha)	
<b>32_03</b>	-16.4	-1114.3	-7.2	-0.6	0.0	46.4	0.0	+22
<b>32_13</b>	-16.6	-1127.4	-12.0	-194.1	-2.1	3.9	0.4	+19.4
<b>32_24</b>	-12.4	-844.6	-7.3	0.0	0.0	106.3	0.0	+13.4
<b>32_36</b>	-15.5	-1051.5	-8.4	-49.0	-0.4	1.9	0.0	+17.6
<b>33_01</b>	-13.8	-940.9	-51.6	-401.5	-22.0	4.1	1.5	+18
<b>34_08</b>	-53.2	-3615.2	-37.2	-1086.9	-11.2	15.2	0.5	+15
<b>34_09</b>	-2.8	-188.9	-5.4	0.0	0.0	19.9	0.0	+12
<b>34_10</b>	-1.2	-84.8	-4.5	0.0	0.0	0.2	0.0	+4
<b>34_11</b>	-13.4	-911.1	-54.5	-352.2	-21.1	2.1	0.6	+14.4
<b>36_02</b>	-40.9	-2778.9	-9.2	-321.4	-1.1	68.0	0.0	+30
<b>37_05</b>	-2.3	-157.6	-3.3	0.0	0.0	72.6	0.0	+5
<b>37_06</b>	-3.8	-259.9	-7.3	0.0	0.0	22.3	0.0	+3.5
<b>37_07</b>	-4.9	-330.4	-3.6	0.0	0.0	38.7	0.0	+4
<b>37_10</b>	-2.5	-170.9	-6.9	0.0	0.0	12.9	0.0	+5
<b>38_01</b>	-0.7	-46.3	-7.3	0.0	0.0	0.0	0.0	+4.45



Option ID	Climate regulation			Natural hazard regulation		Area in floodplain*		Water regulation (DO, MI/d)
	C seq (t CO2e/yr)	C seq (£/yr)	C seq (£/yr/ha)	Total (£/yr)	flood regulation (£/yr/ha)	Total (ha)	Woodland (ha)	
<b>38_04</b>	0.0	-1.4	0.8	0.0	0.0	1.8	0.0	+0.96
<b>38_06</b>	-0.3	-20.4	-7.3	0.0	0.0	0.0	0.0	+6
<b>38_11</b>	-1.9	-130.2	-338.0	-44.3	-115.0	0.0	0.0	+6
<b>38_12</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	+6
<b>39_01</b>	0.0	-0.3	-7.3	0.0	0.0	0.0	0.0	+5
<b>39_02</b>	0.0	0.0	-7.3	0.0	0.0	0.0	0.0	+2.5
<b>52.02</b>	-3.5	-241.0	-3.2	0	0	8.8	0	+12.5
<b>52.03</b>	-3.5	-241.0	-3.2	0	0	8.8	0	+25
<b>54.01</b>	-27.9	-1900.6	-5.1	-310.7	-0.8	27.4	0.9	+35
<b>54.03</b>	-29.4	-2002.4	-5.2	-320.0	-0.8	38.3	1.0	+35
<b>54.04</b>	-57.4	-3903.0	-10.3	-630.7	-1.7	65.7	1.9	+70
<b>54.05</b>	-15.9	-1079.2	-3.7	-119.4	-0.4	39.7	0	+17.5
<b>54.06</b>	-27.9	-1900.6	-5.2	-310.7	-0.8	27.4	0.9	+17.5
<b>54.07</b>	-29.4	-2002.4	-5.3	-320.0	-0.8	38.3	1.0	+17.5
<b>54.08</b>	-57.4	-3903.0	-10.3	-630.7	-1.7	65.7	1.9	+35

Option ID	Climate regulation			Natural hazard regulation		Area in floodplain*		Water regulation (DO, MI/d)
	C seq (t CO2e/yr)	C seq (£/yr)	C seq (£/yr/ha)	Total (£/yr)	flood regulation (£/yr/ha)	Total (ha)	Woodland (ha)	
<b>55.01</b>	-21.8	-1479.9	-9.8	-201.4	-1.3	31.3	1.0	+10
<b>55.03</b>	-63.7	-4333.3	-49.2	-1474.4	-16.8	13.7	1.8	+8
<b>55.05</b>	-39.2	-2663.0	-19.5	-768.1	-5.6	17.0	1.6	+5.5
<b>55.09</b>	-10.6	-723.7	-11.8	-127.1	-2.1	3.0	0.2	+12
<b>55.1</b>	-4.3	-291.5	-7.3	0	0	0.9	0	+8
<b>55.11</b>	-2.9	-197.7	-7.1	0.0	0.0	0.5	0.0	+5
<b>55.12</b>	-24.2	-1648.9	-15.8	-375.8	-3.6	13.9	0.6	+7
<b>56.01</b>	-13.3	-906.4	-57.2	-324.1	-20.5	2.1	0.4	+7
<b>58.01</b>	-16.6	-1131.2	-9.4	-261.2	-2.2	12.6	1.1	+15
<b>59.01</b>	-0.9	-63.1	-10.7	0	0	0.6	0	+5
<b>70.01</b>	-15.2	-1032.2	-23.5	-138.4	-3.2	3.1	0	+7
<b>70.02</b>	-17.9	-1217.1	-30.8	-138.4	-3.2	3.1	0	+7
<b>70.03</b>	-34.5	-2344.2	-35.6	-388.3	-4.3	17.1	1.4	+15
<b>70.04</b>	-23.8	-1620.5	-23.8	-261.2	-2.2	14.1	1.1	+15
<b>70.05</b>	-42.5	-2891.9	-48.0	-300.3	-3.5	27.0	1.1	+15

Option ID	Climate regulation			Natural hazard regulation		Area in floodplain*		Water regulation (DO, MI/d)
	C seq (t CO2e/yr)	C seq (£/yr)	C seq (£/yr/ha)	Total (£/yr)	flood regulation (£/yr/ha)	Total (ha)	Woodland (ha)	
<b>70.06</b>	-19.4	-1317.6	-17.4	-98.3	-0.8	24.0	0	+4
<b>70.07</b>	-22.3	-1517.4	-71.7	-391.3	-22.4	4.82	0.6	+14.4

\* Defined as land within Flood Zone 2 or 3

## 4. Assessment outcomes of the Preferred Programme

### 4.1 Introduction

4.1.1 This section presents the BNG and natural capital assessments for the preferred programme in Wessex Water's WRMP24. The preferred programme included 11 options. Of these, five are assumed to involve no new land take (being demand or drought permit options) and hence have no implications for BNG or natural capital. The remaining supply options are assessed below.

### 4.2 BNG

4.2.1 Two preferred options included Ancient Woodland within the Option boundary (based on the Natural England Ancient Woodland Inventory): 70\_01 and 70\_06. These are a result of proposed pipeline routes intersecting Ancient Woodland, but it is anticipated that the pipelines could be re-routed to avoid those areas.

4.2.2 **Table 3.1** should be referred to for the losses associated with each of the options in the preferred programme, which was calculated for the whole land take as defined by the available GIS. This section considers the BNG that would be achieved in addressing the losses.

4.2.3 Net gain is only required for permanent habitat loss, defined as a period of greater than two years. The losses associated with each of the preferred options has been separated in to "temporary" (any pipelines) and "permanent" (all other infrastructure), using simple approximations in GIS. The net gain requirements have then been calculated only for the "permanent" losses. This could only be achieved insofar as the GIS allowed, and therefore it is likely that some areas of only temporary loss may still be included with the net gain calculations.

4.2.4 The estimated habitat creation requirements for the permanent losses are presented in **Table 4.1**. These are simple estimates are based on meeting trading requirements from the baseline habitats present at each site (as assessed in **Section 3**), to provide an indication of the likely habitat types and area requirements associated with each option.

Table 4.1 Estimated BNG Requirements for Preferred Options

Preferred option	Losses				Gains		
	Permanent		Temporary		Estimated BNG requirements- permanent impacts only		
	Area (ha)	ABHU	Area (ha)	ABHU	Habitat type	Hectares (per habitat type)	total hectares (per option)
<b>22_04</b>	0.49	0.98	0	0	Other neutral grassland	0.23	0.23
<b>39_01</b>	0.04	0.08	0	0	Other neutral grassland	0.02	0.02
<b>39_02</b>	6.25	12.49	0	0	Other neutral grassland	3.0	3.0
<b>59_01</b>	2.64	11.37	3.27	6.54	Other neutral grassland	2.7	2.7
<b>70_01</b>	16.70	32.51	70.94	191.92	Other neutral grassland	7.70	7.70
<b>70_06</b>	2.71	11.51	126.97	402.52	Ponds	0.68	2.53
					Other neutral grassland	1.85	

### 4.3 Natural Capital

- 4.3.1 **Table 3.2** should be referred to for the losses associated with each of the options in the preferred programme, which was calculated for the whole land take as defined by the available GIS. This section considers the natural capital that would be achieved in delivering BNG for permanent infrastructure components of the preferred plan (as explained in Section 4.1).
- 4.3.2 The results of the Natural Capital gain calculations are presented in **Table 4.2**. The table presents the permanent losses (as a result of loss of habitat lost to development), and the associated gains (resulting from the off-site habitat creation that would be required to achieve BNG), associated only with permanent infrastructure. The 'gain' values are calculated from the areas of off-site habitat creation identified in **Table 4.1**.

Table 4.2 Estimated Natural Capital losses and gains associated with permanent infrastructure in the Preferred Options

Option	Climate regulation			Natural hazard regulation			Water regulation
	Total losses (£/year)	Total gains (£/year)	Net gain (£/year)	Total losses (£/year)	Total gains (£/year)	Net gain (£/year)	DO gain, MI/d
22_04	4	6	3	0	0	0	1.63
39_01	0	1	0	0	0	0	5
39_02	0	81	81	0	0	0	2.5
59_01	39	73	34	0	0	0	5
70_01	118	208	90	0	0	0	7
70_06	37	50	13	0	0	0	4

- 4.3.3 The assessment in **Table 4.2** shows that delivery of BNG would also result in a modest increase in ecosystem service delivery for climate regulation. This is because the higher value habitats (from a BNG perspective) tend also to achieve higher unit values for ecosystem service delivery. In this case, the increase is largely driven by assumed creation of new areas of neutral grassland, delivering higher levels of climate regulation compared to cropland.
- 4.3.4 The natural hazard regulation benefits are calculated only in relation to woodland (as set out in the method in Section 2), and as none of the gain calculations have incorporated woodland, no benefit is therefore recognised. However, the gain could be delivered with other habitats if appropriate, and it is possible that some net gain to natural hazard regulation could therefore be achieved in practice.

- 4.3.5 The benefits to water regulation shown are the Deployable Output of each option.
- 4.3.6 Insufficient information is available to calculate potential gains of the water purification service. It is likely that the creation of new areas of grassland or other habitats, for the delivery of BNG, would provide a water purification service, compared to existing areas of cropland. The extent of benefit will depend on local factors such as proximity to watercourse of the new habitat, and baseline water quality at that location.

## 5. Summary

- 5.1.1 This report presents the Biodiversity Net Gain and Natural Capital Assessments that have been undertaken for Wessex Waters' Revised Draft WRMP24. The assessments are in line with relevant guidance, notably the WRPG 2024 Supplementary Guidance on Environment and Society in Decision-making.

### **Biodiversity Net Gain**

- 5.1.2 For all feasible options, this report presents an estimated loss of area-based habitat units, assuming all habitats within the Option boundary are cleared. For the preferred options, it also presents the estimated off-site habitat creation requirements for each Preferred Option to achieve 10% BNG for permanent habitat loss (excluding temporary impacts associated with pipeline laying).
- 5.1.3 The BNG assessment was based on Option boundaries digitised from the scope books, and broad-level habitat data using the Biodiversity Metric V3.1. Given the data limitations, this assessment is high-level only, and gives an estimate of likely BNG requirements. Further BNG assessment based on detailed and field-based data would provide a comprehensive BNG calculation of the Preferred Options. This will be needed to identify on- and off-site areas for each Preferred Option to achieve BNG. Further investigation may also allow identification of 'super' BNG sites that can deliver BNG for several Preferred Options.

### **Natural Capital Assessments**

- 5.1.4 The BNG data, in terms of habitat areas, has then been used to calculate associated losses and gains of natural capital. In line with the BNG assessment, the assessment of feasible options has only considered losses, while for the preferred options, the natural capital gains (that would result from delivering BNG required as a result of permanent habitat loss) have also been considered. The assessment has considered the five ecosystem services required by the WRPG Supplementary Guidance, including biodiversity, climate regulation, natural hazard regulation, water regulation and water purification.



# Appendix A Translation of CORINE habitats into the Biodiversity Metric V3.1 for this assessment

CORINE Habitat Type	Biodiversity Metric Habitat Type			
	Level 3	Broad Habitat	Habitat Type	Condition
Pastures	Cropland	Cereal Crop	N/A	Low
Non-irrigated arable land	Cropland	Cereal Crop	N/A	Low
Broad-leaved forest	Woodland and Forest	Other woodland: broad-leaved	Moderate	Low
Discontinuous urban fabric	Urban	Developed land; sealed surface	N/A	Low
Sport and leisure facilities	Urban	Developed land; sealed surface	N/A	Low
Land principally occupied by agriculture, with significant areas of natural vegetation	Cropland	Arable field margins tussocky	N/A	Low
Coniferous forest	Woodland and Forest	Other coniferous woodland	Moderate	Low
Transitional woodland-shrub	Heathland and scrub	Mixed scrub	Moderate	Low
Water bodies	Lakes	Ponds (priority habitat)	Moderate	Low
Industrial or commercial units	Urban	Developed land; sealed surface	N/A	Low
Mixed forest	Woodland and Forest	Other woodland: mixed	Moderate	Low
Natural grasslands	Grassland	Other neutral grassland	Moderate	Low
Moors and heathland	Heathland and scrub	Lowland Heathland	Moderate	Low
Mineral extraction sites	Urban	Developed land; sealed surface	N/A	Low

CORINE Habitat Type	Biodiversity Metric Habitat Type			
	Level 3	Broad Habitat	Habitat Type	Condition
<b>Dump sites</b>	Urban	Developed land; sealed surface	N/A	Low
<b>Salt marshes</b>	Coastal saltmarsh	Saltmarshes and saline reedbeds	Moderate	Low
<b>Construction sites</b>	Urban	Developed land; sealed surface	N/A	Low
<b>Airports</b>	Urban	Developed land; sealed surface	N/A	Low
<b>Road and rail networks and associated land</b>	Urban	Developed land; sealed surface	N/A	Low
<b>Intertidal flats</b>	Intertidal sediment	Littoral mixed sediment	Moderate	Low

