MOTT MACDONALD

Northumbrian Water - Water Resources Management Plan 2024

Environmental Report - Appendix G

October 2024

This page left intentionally blank for pagination.

Mott MacDonald
WeWork
80 George Street
Edinburgh EH2 3BU
United Kingdom

T +44 (0)131 221 2300
mottmac.com

Northumbrian Water - Water Resources Management Plan 2024

Environmental Report - Appendix G

October 2024

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	19/08/2022	S S-W / G S	M D	Ja F	First Draft for client comment
B	03/10/2022	S S	C S	I S	Draft for consultation
C	08/04/2024	G S	M D	A C	Update with new option assessments
D	18/04/2024	G S	J W	M D	Final for Issue
E	16/10/2024	Je F	T K	Ja F	Formatting updated, no material change in content

Document reference: 100104977-RP-BOT-Water Framework Directive Assessment | E |

Contents

Tables

G.1 Introduction

G.1.1 Overview

Water companies in England and Wales are required to produce a Water Resources Management Plan (WRMP) every five years. The WRMP sets out how a company intends to maintain the balance between supply and demand for water over a minimum of 25 years. In the development of a WRMP, water companies must follow the Environment Agency (EA) Water Resources Planning Guideline (WRPG)[1] and consider broader government policy objectives, ensuring the plan sets out how the company intends to maintain the balance between supply and demand for water over the long-term planning horizon and how to increase security of supply in each of the water resource zones making up its supply area.

This annex supports the Environment Assessment Report (EAR) that accompanies the Northumbrian Water Resource Management Plan (WRMP) submission to regulators. The annex presents the findings of the Water Framework Directive (WFD) assessment applied to the Northumbrian Water WRMP options.

G.1.2 Northumbrian Water WRMP24 Options

G.1.2.1 The outputs of the initial options identified six options for additional water supplies in the Northumbrian Water Ltd (NW) region. These options are shown in Table 1.1.

Table 1.1: Northumbrian Water WRMP24 Options

Option name	Description overview
BOT-TRA-001	Transfer (10Ml/d) from Warkworth WTW to Spring Hill Service Reservoir (SR). Transfer length approximately 56.7km. Tunnelling (micro-tunnelling/ horizontal directional drilling) highly likely to be required as the route crosses one railway, three major roads (A1068, A1 (twice)), six minor roads (B1340, B6347, B1341, B6349, B6353, B6525), 15 named rivers (River Coquet, Grange Burn, River Aln, Kittycarter Burn, Switcherdean Burn, Waren Burn, Chuckbridge Burn, Warenton Dean, Belford Burn, Middleton Burn, Kettle Burn, County Burn, Fenwick Burn, South Low, Allerdeanmill Burn), and numerous drainage channels.
BOT-TRA-002	Transfer (2Ml/d) from Hedgeley Service Reservoir to New Scots Quarry SR, with chemical dosing located at Hedgeley SR Transfer length approximately 13.7km. Tunnelling (micro-tunnelling/ horizontal directional drilling) potentially required as the route crosses one minor road (B6346), four rivers (River Breamish, Roddam Burn, Lilburn Bank, Wooler Water), and four drainage channels. The route follows the A697 road for a considerable length as elevation constraints result in this being the best route Option also requires reinforcement of existing network to support increased flow rates. The impact of this will be determined through network modelling which will be carried out in Phase 3. The results of network modelling have identified multiple changes to the existing network: • Twinning of existing crossing to provide resilience. – Railway crossing nr. Warkworth WTW

[1] Environment Agency (Apr 2023), Water Resources planning guideline. Available online at: https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline

Option name	Description overview
	– A1 at Alnwick – River Aln west of Alnwick • Pipe reinforcement (laying new pipe next to existing pipe and using both) – Section NW of Alnwick – From A697/B6354 junction to River Till crossing (west) – River Till crossing (east) to Ford pumping station (PS) • Pipe replacement between Milfield and A697/B6354 junction
BOT-TRA-004	Transfer (10Ml/d) from Wooler to Murton WTW Makes use of existing pipes from Wooler to Milfield. Pipe replacement required from Milfield to A697/B6354 junction. Pipe reinforcement required between A697/B6354 junction and River Till crossing (West), and between River Till crossing (east) and Ford PS. New pipeline from Ford to Murton WTW Transfer length approximately 9.66km. Tunnelling (micro-tunnelling/ horizontal directional drilling) potentially required as the route crosses one minor road (B6354), two named rivers (Dean Burn, Allerdeanmill Burn), and one drainage channel.
BOT-ABS-002	Abstraction (10Ml/d deployable output (DO) from a new borehole in Duddo, transfer in new pipeline to Felkington Mains, transfer using existing pipelines to discharge to Murton WTW New transfer pipeline length approximately 2.1km. Tunnelling (micro-tunnelling/ horizontal directional drilling) unlikely to be required as route follows the road B6354. Pipe replacement will be required between Thornton and Murton.
BOT-ABS-007	Recommission/refurbishment of a disconnected borehole (10Ml/d DO) in Fowberry. Transfer from Fowberry to new Wooler WTW through existing mains. No network reinforcement required. Only new pipe is the connection between the mains and the WTW, approximate length of 320m. Environmental mitigation: use of existing infrastructure with no need for network reinforcement. Use of new Wooler WTW (currently under construction).
Supplying Teesside Industrial Water	The 'Supplying Tees Industrial Water' option involves increasing the Blackwell abstraction licence back to pre- 2016 volumes (58,075 Ml/yr, 159 Ml/d), along with installing Eel Regs compliant eel screens at the Low Worsall intake and increasing the Low Worsall abstraction licence to 170Ml/d, with an annual limit of 62,000Ml (170*365days).

G.1.3 The Water Framework Directive Regulations

G.1.3.1 The Water Framework Directive (WFD) was introduced into UK law in 2003. The latest regulations are set out in The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[2] (known as the WFD Regulations). These regulations require all water bodies (both surface and groundwater) to achieve 'good status'. For surface water bodies good status is a function of good ecological status (biological, physico-chemical and hydromorphological elements and specific pollutants) and good chemical status (Priority Substances and Priority Hazardous Substances). For groundwater good status is a function of quantitative (surface water, groundwater dependent terrestrial ecosystems (GWDTE), saline intrusion and water balance) and chemical status (dependent surface water body, drinking water protected areas, GWDTE, saline intrusion and general chemical).

G.1.3.2 The WFD Regulations require that the water bodies experience no deterioration in status and no impediment is introduced which could prevent the achievement of future water body objectives

[2] The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Available online at: https://www.legislation.gov.uk/uksi/2017/407/contents/made

and good status. The WFD Regulations promotes long-term sustainable water management, with the key objectives of providing a high level of protection to the aquatic environment, including:

1. aquatic ecology
2. unique and valuable habitats
3. drinking water resources
4. bathing water

G.1.3.3 All the key objectives are integrated for each river basin with objectives 2, 3 and 4 above reflecting specific bodies of water that are designated for drinking water abstraction, supporting special wetlands, or bathing areas.

G.1.3.4 The WFD Regulations, regulation 13, sets out the “environmental objectives” for natural surface and groundwater bodies, and artificial water bodies (AWB) and heavily modified water bodies (HMWBs). Natural surface water bodies must, by 2015, adhere to good ecological and chemical status and groundwater bodies to good quantitative and chemical status. Artificial and HMWBs (A/HMWB) must achieve good ecological potential and good chemical status. Regulation 13 also sets out the principle of no deterioration, providing protection from the deterioration of water status/potential. The WFD Regulation, regulation 15, sets out the criteria for the designation of artificial or heavily modified water bodies.

G.1.3.5 Regulations 8 to 10 set out the protection of specific areas used for drinking water, shellfish water and protected areas, respectively.

G.1.3.6 Exemptions are defined within the WFD Regulations, with regulations 16 to 19 outlining the conditions under which the achievement of good status or potential may be phased or not be achieved, or under which deterioration may be allowed. Regulations 16 to 19 describe these distinct conditions. In summary:

- Regulation 16 allows an extension of the time limit so that good status or potential is, under certain conditions, achieved only after 2015.
- Regulation 17 allows the achievement of less stringent objectives under certain conditions.
- Regulation 18 allows the temporary deterioration of status in case of natural causes or "force majeure".
- Regulation 19 allows for deterioration of status or non-achievement of good status or potential under certain distinct conditions. If any options are identified as leading to a risk of water body scale deterioration that cannot be mitigated, then a regulation 19 derogation application would be needed. Where a regulation 19 exemption application is needed, various tests must be passed including:
  - The benefits of the option cannot be achieved by a significantly better environmental option.
  - All practicable steps have been taken to mitigate the adverse effects on the water body.
  - The reasons for the modifications or alterations are explicitly set out in the River Basin Management Plan (RBMP).
  - There is an overriding public interest in the proposed development and/or its benefits outweigh the benefits of delivering the WFD objectives.

G.1.3.7 The objectives of the WFD assessment are:

- To ensure there is no deterioration between WFD status class of any element in the water body as set out in WFD Regulation 13.
- To ensure no new impediments to attaining ‘Good’ WFD status or potential for the water body, or any assessed element, as set out in Regulation 13. In some water bodies it is

accepted that it is currently technically infeasible or disproportionately costly to achieve Good status or potential. If this is the case, the test is applied to current agreed objectives for the water body.

- To ensure that the planned programme of measures in the current cycle of RBMPs, to help attain the WFD objectives from the water body, are not compromised.

G.1.3.8 As well as these legally binding WFD objectives, other objectives set out in the RBMP should be reviewed to see if the options can assist in meeting the WFD objectives:

- Does the option assist in attaining the WFD objectives for the water body?
- Does the option assist in attaining the objectives associated with WFD protected areas?
- Does the option reduce treatment needed in the production of drinking water and look to work in partnership with others, promoting the requirements of Regulation 8?

G.1.4 Methodology

Approach to WFD assessment for WRMP24 Options

G.1.4.1 The All Company Working Group (ACWG) has developed a consistent framework for undertaking WFD Regulations assessments[3] to ensure that the WRMP supports the achievement of environmental objectives for water resources in the RBMPs by preventing deterioration and supporting achievement of protected area and water body status objectives, as well as not preventing a water body from reaching 'good' or 'good potential' status in the future. The assessment considers mitigation that would need to be put in place to protect water body status and WFD future objectives.

G.1.4.2 Two stages of assessment are completed under the ACWG WFD approach, an initial Level 1 basic screening (Section 1.3.3) and a Level 2 detailed impact screening (Section 1.3.4). These are completed using a spreadsheet assessment tool. Level 1 outcomes are automated based on option information and Level 2 outcomes are based on expert judgment. Further information on WFD classification and the approach adopted can be found in the ACWG WFD framework[3].

G.1.4.3 This framework was developed to ensure consistency in environmental assessment across water companies for SRO development across England and Wales. To ensure consistent comparison between WRMP options, the same framework has been used for the assessment of all WRMP options.

Level 1 – basic screening

G.1.4.4 The first stage of WFD assessment was completed for all options. The Level 1 assessment followed the ACWG methodology set out in the framework and shown below:

- The affected water bodies are identified.
- The option is reviewed for activities taking place in each water body.
- Possible impacts from the option are identified. Predetermined scores for each activity (as set out in the ACWG framework) in a water body are applied, using a 6-point scale from -2 to 3 (shown in Table 1.2).
- Embedded mitigation measures (those already included in the scheme design) are applied. Where this embedded mitigation would remove the potential impact from an activity, the impact score is adjusted using professional judgement and justification provided.
- A maximum screening score for the water body is then calculated. Where this maximum screening score identifies water bodies with a maximum score of -2 to 1, these are 'screened

[3] All Company Working Group (Nov 2020), WFD: Consistent framework for undertaking no deterioration assessments.

out' and do not proceed to further assessment. If the maximum impact score is greater than 1 then the water body is 'screened in' and assessed at level 2. This is known as detailed impact screening (please refer to section 1.3.4).

G.1.4.5 The scoring system used is set out below in Table 1.2.

Table 1.2: Impact scoring system used for WFD assessments

Impact	Score	Description
Very beneficial	-2	Impacts that, taken on their own, have the potential to lead to the improvement in the ecological status or potential of a WFD quality element for the entire water body.
Beneficial	-1	Impacts that, when taken on their own, have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the water body or any quality elements.
No/minimal	0	No measurable change in the quality of the water environment or the ability for target WFD objectives to be achieved.
Minor	1	Impacts that, when taken on their own, have the potential to lead to a minor localised, short-term and fully reversible effect on one or more of the quality elements but would not result in the lowering of WFD status. Impacts would be very unlikely to prevent any target WFD objectives from being achieved.
Moderate adverse	2	Impacts that, when taken on their own, have the potential to lead to a widespread or prolonged effect on the quality of the water environment that may result in the temporary reduction in WFD status. Impacts have the potential to prevent target WFD objectives from being achieved.
Major adverse	3	Impacts when taken on their own have the potential to lead to a significant effect and permanent deterioration of WFD status. Potential for high impact on preventing target WFD objectives from being achieved.

G.1.4.6 The outcomes for the Northumbrian Water WRMP options are summarised in Section 2 and Annex A. Where water bodies and option impacts were 'screened in' for further assessment, a Level 2 assessment has been undertaken.

WFD ACWG Level 2 – detailed impact screening

G.1.4.7 The second stage of WFD assessment is more detailed. These Level 2 assessments have been completed for the options that were screened in at Level 1. The Level 2 assessment includes the following steps:

- For each water body where a risk of deterioration has been identified in Level 1, a detailed assessment is undertaken on the potential for impacts on each WFD quality element, from each activity proposed as part of the option. Each activity is assessed against each WFD status element and a score (using the same criteria set out in Table 1.2) is assigned using professional judgement.
- A ranking of confidence in the assessment is given (low, medium or high), for the WFD baseline data and around the design certainty. These confidence levels are assigned for each assessment, based on the quality and availability of physical data and on the amount of design information for the option at the time of assessment (note, confidence/certainty expected to be low during this initial WRMP assessment and to increase over time). The criteria for these confidence levels are set out in the ACWG framework and provided in Table 1-3. For options, where the confidence levels are medium or low, the requirements for further data collection or design detail are set out in order to raise this confidence level in the future will be listed.
- Further mitigation is identified.
- A post mitigation impact scope is also assigned based professional judgement of the impact once the proposed further mitigation, or suitable alternative, has been included in the design.
- Where the assessment certainty is medium or low, further investigations are identified which would improve the certainty of the assessment outcomes.

Table 1.3: Confidence levels used in the level 2 assessment

Confidence level	Description
Low	Limited data and evidence available, based mainly or completely on expert judgement with many assumptions. Preliminary design information only, detailed information on location/routes, construction methods etc not yet available.
Medium	Some data and evidence available, based partially on professional judgment with some assumptions. Design progressed but some assumptions made on construction methods etc.
High	Lots of appropriate data and evidence available, minimal assumptions needed. Design advanced minimal assumptions needed.

G.1.4.8 The WFD Level 2 assessment outcomes for the selected options are summarised in Section 3 and the full assessments are presented in Annex B.

G.1.4.9 Where water bodies and option impacts have been identified, recommendations have been made for increasing the confidence in the assessment. This is expected to be achieved by increasing the level of detail available during option development and the pre-application design process when development consent is sought.

Cumulative and in-combination effects

G.1.4.10 The ACWG WFD assessment process, described in Section 1.4.1, is designed to identify where an individual option contained within WRMP24 would lead to a direct risk of deterioration to a specific water body (i.e. option compliance). There is also the need to consider the potential risk of deterioration posed by the WRMP24 as a whole (cumulative effects), to identify whether more than one option included in the WRMP24 could lead to an increase in deterioration risk to one, or more, water bodies. The NW WRMP consists of a single supply side option (Supplying Teesside Industrial Water) and some demand side options. WFD assessment is not required for demand management options as they do not have significant adverse effects on WFD. Therefore, the NW does not require additional assessment of the cumulative effects.

G.1.4.11 The in-combination effects assessment is undertaken to determine the combined impact of the NW option activities along with any relevant planning projects and/or other water company options identified on impacted water bodies.

G.1.4.12 Nationally significant infrastructure projects (NSIPs) and local plans have been identified within the NW operating area. Hereafter, these will be collectively referred to as ‘planning projects’. For each planning project, an assessment is made on whether the project could lead to impacts on WFD water bodies. This review makes use of any existing WFD assessments which have been carried out for the planning application. For other planning allocations or applications where no WFD assessment has been carried out, professional judgement is used to identify the potential for impacts on WFD. Any planning projects where no risk of deterioration is identified are screened out of the assessment, and the remaining planning projects are passed into the next stage of the assessment. The list of NSIPs considered in this assessment is set out in the Strategic Environmental Assessment (SEA) report. Of these only the following NSIPs are considered relevant to WFD.

- H2 Teesside (at pre-application)
- The Net Zero Teesside project (decision pending)
- Tees CCPP (Decided)

G.1.4.13 The in-combination effects assessment also includes consideration of the BVP options with neighbouring water company WRMPs. The results from the published draft WRMP BVP have been used in this report to consider the cumulative effects of the other water companies. A single option from Yorkshire Water: DV7a(vi) (Tees to Yorkshire transfer Strategic Resource Option) was identified, which has the potential to lead to in-combination effects. The Tees to

Yorkshire transfer scheme will transfer water from the River Tees to the River Ouse. The pipeline covers a large geographical area and until construction plans are available it is not possible to identify if works in proximity to NW option will coincide, although it is assumed that option is likely to be operational in same water bodies. Further in-combination assessment is required once further information is available.

Limitations and assumptions

G.1.4.14 As the options set out in the WRMP are still in the early stages of design development a precautionary approach has been exercised because of residual uncertainty. The WFD assessment has the following limitations and assumptions:

G.1.4.15 The RBMPs were updated in 2021, and 2019 WFD baseline data released in late 2020 is now the current baseline. WFD 2019 data has been used for the assessment of all options.

G.1.4.16 Assessment assumes pipelines are underground (directionally drilled or pipe-jacked beneath any larger watercourses, roads or railways and by bypass and trenching under small roads and watercourses) and therefore will not cross watercourses above ground or cause direct impacts.

G.1.4.17 The geographical extent of the WFD assessment has been limited to the water bodies where abstractions take place. There is potential for some effects continuing downstream of the abstraction point, although it is assumed these would become increasingly limited to ‘negligible’ with distance. This assumption will need to be reviewed as additional hydrological studies are undertaken.

G.2 Water Framework Directive findings (Level 1 WFD)

G.2.1 Transfers

Warkworth WTW to Berwick Upon Tweed Transfer

G.2.1.1 The Level 1 WFD assessment covered 24 water bodies potentially impacted by the option. The outcome for 21 water bodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any water bodies. The outcome for three water bodies indicated further assessment would be necessary for the option, because of the reduction in existing discharge and the construction and presence of below ground infrastructure close to sensitive features. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020.*

Table 2.1: WFD Level 1 assessment outcomes for Warkworth WTW to Berwick Upon Tweed Transfer

Warkworth WTW to Berwick Upon Tweed Transfer	
Option ID	BOT-TRA-001
Option Description	Transfer from Warkworth WTW to Springhill Service Reservoir
Number of water bodies passing WFD assessment	21
Water bodies passing WFD assessment	GB103022076720: Tyelaw Burn Catchment (trib of Coquet); GB510302203300: ALN; GB103022076350: Aln from Edlingham Burn to Tidal Limit; GB103022076280: Cawledge Burn Catchment (trib of Aln); GB103022076360: Rennington Burn from Source to N Sea; GB103022076370: Embleton Burn form Source to N Sea; GB103022076400: Brunton burn from Source to N Sea; GB103022077070: Long Nanny from Source to N Sea; GB103022076411: Waren Burn from Source to N Sea; GB103022076430: Newlands Burn Catchment (trib of Waren Burn); GB103022076460: Belford Burn from Source to Ross Low; GB103022076470: Ross Low from Source to Eldwick Burn; GB103022076480: Elwick Burn from Source to Ross Low; GB103022076490: Fenham Burn Catchment (to N Sea); GB103022076490: Fenham Burn Catchment (to N Sea); GB103021073222: South Low from Haggerston Bridge to N Sea; GB103021073221: South Low from Source to Haggerston Bridge; GB103021073240: North Low from Berrington Burn to N Sea; GB103021073230: Berrington Burn from Source to North Low; GB103021073260: North Low from Source to Berrington Burn; GB103021073240: North Low from Berrington Burn to N Sea
Number of water bodies requiring further WFD assessment	3
Water bodies failing WFD assessment	GB510302203000: COQUET; GB103022076693: Coquet from Forest Burn to Tidal Limit; GB40302G700200: Northumberland Carboniferous Limestone and Coal Measures (GW)

Warkworth Network to Berwick Upon Tweed Transfer

G.2.1.2 The Level 1 WFD assessment covered 14 water bodies potentially impacted by the option. The outcome for seven water bodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any water bodies. The outcome for seven water bodies indicated further assessment would be necessary for the option, because of the construction and presence of below ground infrastructure close to sensitive features. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020.*

Table 2.2: WFD Level 1 assessment outcomes for Warkworth Network to Berwick Upon Tweed Transfer

Warkworth Network to Berwick Upon Tweed Transfer	
Option ID	BOT-TRA-002
Option Description	Cross connection between the Warkworth and Berwick Upon Tweed networks to transfer water from Warkworth WRZ to Berwick Upon Tweed WRZ. Includes reinforcement of the existing networks to support the transfer. Includes TRA-004 as part of option
Number of water bodies passing WFD assessment	7
Water bodies passing WFD assessment	GB102021072950: Glen from College Burn to Till; GB102021073050: Till from Glen to River Tweed; GB102021072970: Till (Nthumb); GB40302G700200: Northumberland Carboniferous Limestone and Coal Measures (GW); GB40302G703800: Northumberland Devonian and Lower Carboniferous (GW); GB40202G700100: Till Devonian and Lower Carboniferous (GW); GB40302G703700: Till Fell Sandstone (GW)
Number of water bodies requiring further WFD assessment	7
Water bodies failing WFD assessment	GB103022076693: Coquet from Forest Burn to Tidal Limit; GB103022076350: Aln from Edlingham Burn to Tidal Limit; GB102021073041: Till from Linhope Burn to Roddam Burn; GB102021072860: Roddam Burn; GB102021072900: Lilburn Burn; GB102021072930: Wooler Water from Harthope Burn to Till; GB103021073260: North Low from Source to Berrington Burn

Watchlaw to Murton transfer

G.2.1.3 The Level 1 WFD assessment covered five water bodies potentially impacted by the option. The outcome for five water bodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any water bodies. The outcome for one water body indicated further assessment would be necessary for the option, because of the construction and presence of below ground infrastructure close to sensitive features. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.3: WFD Level 1 assessment outcomes for Watchlaw to Murton transfer

Watchlaw to Murton transfer	
Option ID	BOT-TRA-004
Option Description	Transfer from Wooler to Murton WTW Makes use of existing pipes from Wooler to Milfield. Pipe replacement required from Milfield to A697/B6354 junction. Pipe reinforcement required between A697/B6354 junction and River Till crossing (West), and between River Till crossing (east) and Ford PS. New pipeline from Ford to Murton WTW (gravity) Transfer length approximately 9.66km. Tunnelling (micro-tunnelling/horizontal directional drilling) potentially required as the route crosses one minor road (B6354), two named rivers (Dean Burn, Allerdeanmill Burn), and one drainage channel.
Number of water bodies passing WFD assessment	5
Water bodies passing WFD assessment	GB102021073050: Till from Glen to River Tweed; GB102021072970: Till (Nthumb); GB40202G700100: Till Devonian and Lower Carboniferous (GW); GB40302G703700: Till Fell Sandstone (GW); GB40302G700200: Northumberland Carboniferous Limestone and Coal Measures (GW)
Number of water bodies requiring further WFD assessment	1
Water bodies failing WFD assessment	GB103021073260: North Low from Source to Berrington Burn

G.2.2 Borehole Abstractions

New Borehole at Duddo

G.2.2.1 The Level 1 WFD assessment covered six water bodies potentially impacted by the option. The outcome for four water bodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any water bodies. The outcome for two water bodies indicated further assessment would be necessary for the option, because of the increase in groundwater abstraction above recent actual. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020.*

Table 2.4: WFD Level 1 assessment outcomes for New Borehole at Duddo

New Borehole at Duddo	
Option ID	BOT-ABS-002
Option Description	Abstraction (10Ml/d DO) from a new borehole in Duddo, transfer in new pipeline to Felkington Mains, transfer using existing pipelines to discharge to Murton WTW New transfer pipeline length approximately 2.1km. Tunnelling (micro-tunnelling/ horizontal directional drilling) unlikely to be required as route follows the road B6354 Pipe replacement will be required between Thornton and Murton.
Number of water bodies passing WFD assessment	4

New Borehole at Duddo	
Water bodies passing WFD assessment	GB102021073060: Newbiggin Dean Catch (trib of Tweed); GB103021073260: North Low from Source to Berrington Burn; GB102021073070: Horncliffe Mill Burn; GB40302G700200: Northumberland Carboniferous Limestone and Coal Measures (GW)
Number of water bodies requiring further WFD assessment	2
Water bodies failing WFD assessment	GB102021073050: Till from Glen to River Tweed; GB40302G703700: Till Fell Sandstone (GW)

Fosberry Borehole Abstraction

G.2.2.2 The Level 1 WFD assessment covered two water bodies potentially impacted by the option. The outcome for both water bodies indicated further assessment would be necessary for the option because of the increase in groundwater abstraction above recent actual. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020.*

Table 2.5: WFD Level 1 assessment outcomes for Barsham to Blyth Transfer Main

Fosberry Borehole Abstraction	
Option ID	BOT-ABS-007
Option Description	Recommission/refurbishment of a disconnected borehole (10Ml/d DO) in Fowberry. Transfer from Fowberry to new Wooler WTW through existing mains. No network reinforcement required. Only new pipe is the connection between the mains and the WTW, approximate length of 320m Environmental mitigation: use of existing infrastructure with no need for network reinforcement. Use of new Wooler WTW (currently under construction).
Number of water bodies passing WFD assessment	0
Water bodies passing WFD assessment	N/A
Number of water bodies requiring further WFD assessment	2
Water bodies failing WFD assessment	GB102021073042: Till from Roddam Burn to Glen; GB40302G703700: Till Fell Sandstone (GW)

G.2.3 Surface Water Abstractions

Supplying Teesside Industrial Water

G.2.3.1 The Level 1 WFD assessment covered five water bodies potentially impacted by the option. The outcome for three of these water bodies indicated further assessment would be necessary for the option because of the increase in surface water abstractions. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020.*

Table 2.6: WFD Level 1 assessment outcomes for Supplying Tees Industrial Water

Supplying Teesside Industrial Water	
Option ID	Supplying Teesside Industrial Water
Option Description	Supplying Teesside Industrial Water
Number of water bodies passing WFD assessment	2
Water bodies passing WFD assessment	GB40301G702000: Tees Sherwood Sandstone (GW) GB40301G704000: Skerne Magnesian Limestone (GW)
Number of water bodies requiring further WFD assessment	3
Water bodies failing WFD assessment	GB103025072595: Tees from Skerne to Tidal Limit GB103025072190: Tees from River Greta to River Skerne GB510302509900: TEES

G.3 Water Framework Directive findings (Level 2 WFD)

G.3.1 Overview

G.3.1.1 For the options which are included in the NW WRMP plan, a Level 2 assessment has been carried out where required under the Level 1 assessment.

G.3.2 Supplying Teesside Industrial Water

G.3.2.1 For this option two river water bodies and one transitional water body were identified as requiring further assessment: GB103025072190 - Tees from River Greta to River Skerne, GB103025072595 - Tees from Skerne to Tidal Limit and GB510302509900: TEES. A summary of the Level 2 WFD assessment is included in Table 3-1.

GB103025072190 - Tees from River Greta to River Skerne

G.3.2.2 This water body is upstream of GB103025072595 – Tees from Skerne to Tidal Limit and GB510302509900: TEES The Level 2 WFD assessment for the Tees from River Greta to River Skerne water body identified potential adverse impacts (impact score 2) to biological quality elements (invertebrates and macrophytes and phytobenthos), hydromorphological supporting elements (hydrological regime and mitigation measures assessment) and physicochemical quality elements (ammonia, dissolved oxygen, pH and phosphate). This is due to the proposed increase in licence of the surface water abstraction (Blackwell).

G.3.2.3 The RNAG status for the Tees from River Greta to River Skerne river water body relates to invertebrates, temperature and perfluorooctane sulphonate (PFOS) due to ‘sector under investigation’, polybrominated diphenyl ethers (PBDE) and mercury and its compounds due to ‘no sector responsible’, mitigation measures assessment due to ‘local and central government’ and ‘urban and transport’. This option could affect the reason for not achieving good for invertebrates as it could make addressing the existing issues more challenging.

G.3.2.4 The abstraction has previously operated at this greater licence quantity (in the 2000s), but no WFD status information is available for that period. Therefore, further assessment is required to ensure identified flow requirements downstream of abstraction location are still met under scheme. If it is found that the flow requirements are not met, then mitigation in the form of appropriate flow constraints or flow support will be explored / implemented as required, perhaps through an increased contribution from the Tyne Tees tunnel.

G.3.2.5 Further investigations are assumed to be undertaken at an appropriate time, in line with the date the option is required for the plan. These investigations are required to confirm this assessment and could include:

- Hydrological and hydroecological assessment of the impacts of the reinstated abstraction on water course flow, hydromorphology.
- Water quality investigations including the determining the concentration of key physiochemical parameters.
- Investigating whether reductions in flow could lead to any obstruction of fish passages.
- Investigating details of abstraction conditions

- A review of all baseline WFD and ecological data, including the results of any surveys already undertaken as part of this scheme, and gathering further information about the option (particularly regarding abstraction conditions).

G.3.2.6 Following further investigation, design development and implementation of any resultant targeted mitigation, it is anticipated that the WFD non-compliance risk will remain as minor (impact score 1) and, therefore for this water body, this option is assessed to be WFD compliant.

GB103025072595 – Tees from Skerne to Tidal Limit

G.3.2.7 This water body is downstream of GB103025072190 - Tees from River Greta to River Skerne and upstream of GB510302509900: TEES. The Level 2 WFD assessment for the Tees from Skerne to Tidal Limit identified potential adverse impacts (impact score 2) to biological quality elements (fish, invertebrates and macrophytes and phytobenthos), hydromorphological supporting elements (hydrological regime and mitigation measures assessment) and physicochemical quality elements (ammonia, dissolved oxygen, pH and phosphate). This is due to the proposed reinstatement of the surface water abstraction at Lower Worsall and the increase in licence at the Blackwell abstraction in the upstream water body.

G.3.2.8 The RNAG status for the Tees from Skerne to Tidal Limit river water body relates to macrophytes and phytobenthos and phosphate due to 'pollution from waste water and from towns, cities and transport', mitigation measures assessment due to 'physical modifications' and fish, PBDE, mercury and its compounds and temperature due to 'no sector responsible'. This option could affect the reason for not achieving good status for fish, macrophytes and pythobenthos and phosphate as it could make addressing the existing issues more challenging. The option has potential to impede reaching GES / GEP if appropriate mitigation is not implemented. The proposed objective for macrophytes and pythobenthos has potential to be impeded by the option if appropriate mitigation is not implemented also.

G.3.2.9 The proposed abstraction(s) have previously operated at the proposed licence quantities (in the 2000s), but no WFD status information is available for the period they were operational. Therefore, it cannot be determined if reinstated higher abstraction rates at both Blackwell and Lower Worsall sources are sustainable on the Tees. Further assessment is required to ensure identified flow requirements downstream of the abstraction locations are still met under the scheme. If it is found that the flow requirements are not met then mitigation in the form of implementing appropriate flow constraints or flow support will be explored / implemented as required, perhaps through an increased contribution from the Tyne Tees tunnel.

G.3.2.10 Mitigation is proposed in the form of ensuring identified flow requirements downstream of abstraction location (127Ml/d of Blackwell) are still met under the scheme and if not, appropriate compensation flow is required, perhaps through increased contribution from the Tyne Tees tunnel.

G.3.2.11 The option has potential to impede reaching GES / GEP if appropriate mitigation is not implemented. The proposed objective for macrophytes and pythobenthos has potential to be impeded by the option if appropriate mitigation is not implemented also.

G.3.2.12 Further investigations are assumed to be undertaken at an appropriate time, in line with the date the option is required for the plan. These investigations are required to confirm this assessment and could include:

- Hydrological and hydroecological assessment of the impacts of the reinstated abstraction on water course flow, hydromorphology.
- Water quality investigations including the determining the concentration of key physiochemical parameters.

- Investigating whether reductions in flow could lead to any obstruction of fish passages.
- Investigating details of abstraction conditions

G.3.2.13 A review of all baseline WFD and ecological data, including the results of any surveys already undertaken as part of this scheme, and gathering further information about the option (particularly regarding abstraction conditions).

G.3.2.14 Following further investigation, design development and implementation of any resultant targeted mitigation, it is anticipated that the WFD non-compliance risk will remain as minor (impact score 1) and, therefore for this water body, this option is assessed to be WFD compliant.

GB510302509900: TEES

G.3.2.15 This water body is downstream of GB103025072190 - Tees from River Greta to River Skerne and GB103025072595 - Tees from Skerne to Tidal Limit. The Level 2 WFD assessment for the TEES transitional water body identified potential adverse impacts (impact score 2) to biological quality elements (angiosperms, fish, invertebrates, macroalgae and phytoplankton), hydromorphological supporting elements (hydrological regime and mitigation measures assessment) and physicochemical quality elements (dissolved inorganic nitrogen and dissolved oxygen). This is due to the proposed reinstatement of the surface water abstraction at Lower Worsall and the increase in licence at the Blackwell abstraction, both in upstream water bodies and the potential implications on freshwater flow into Tees estuary.

G.3.2.16 The RNAG status for the TEES transitional water body relates to angiosperms, macroalgae and mitigation measures assessment due to ‘physical modifications’, dissolved inorganic nitrogen and macroalgae due to ‘pollution from rural areas’ and ‘pollution from waste water’, dissolved inorganic nitrogen, macroalgae and tributyltin compounds due to ‘pollution from towns, cities and transport’, and benzo(g-h-i)perylene, cypermethrin, fish, mercury and its compounds and PBDE due to ‘sector under investigation’ or ‘no sector responsible’. This option could affect the reason for not achieving good status for dissolved inorganic nitrogen and macroalgae, as it could make addressing the existing issues more challenging. The option has potential to impede reaching GES / GEP if appropriate mitigation is not implemented. The proposed objectives for angiosperms, macroalgae and dissolved inorganic nitrogen may potentially be impeded by the option if appropriate mitigation is not implemented also.

G.3.2.17 As with the two upstream river water bodies (GB103025072190 - Tees from River Greta to River Skerne, GB103025072595 - Tees from Skerne to Tidal Limit) further assessment is required to ensure identified flow requirements downstream of abstraction locations are still met under scheme. If it is found that the flow requirements are not met then mitigation in the form of implementing appropriate flow constraints or flow support will be explored / implemented if required, perhaps through an increased contribution from the Tyne Tees tunnel.

G.3.2.18 Further investigations are assumed to be undertaken at an appropriate time, in line with the date the option is required for the plan. These investigations are required to confirm this assessment and could include:

- Hydrological and hydroecological assessment of the impacts of the reinstated abstraction on water course flow and hydromorphology
- Water quality investigations including determining the concentration of key physiochemical parameters,
- Investigating whether reductions in flow could lead to any obstruction of fish passages.
- Investigating details of abstraction conditions

G.3.2.19 A review of all baseline WFD and ecological data, including the results of any surveys already undertaken as part of this scheme, and gathering further information about the option (particularly regarding abstraction conditions) is advised.

G.3.2.20 Following further investigation, design development and implementation of any resultant targeted mitigation, it is anticipated that the WFD non-compliance risk will remain as minor (impact score 1) and, therefore for this water body, this option is assessed to be WFD compliant.

G.3.2.21 It should be noted that the river Tees has been included in an Asset Management Plan 8 (AMP8) Water Industry National Environment Programme (WINEP) no deterioration assessment. This assessment will include modelling required to determine what the potential changes in flow volume and frequency may be while maintaining sustainability in the Tees. Therefore, pending the outcome of this investigation, subsequent amendment of the WFD assessment may be required.

Table 3.1: *Supplying Teesside Industrial Water* WFD Level 2 assessment

Water body ID	Water body Name	Maximum Level 2 Impact score	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Mitigation measures	Post mitigation impact score	Deterioration between status classes	Impediments to Good Ecological Status (GES) or Good Ecological Potential (GEP)	Compromises water body objectives	Assists attainment of water body objectives
GB103025072190	Tees from River Greta to River Skerne	2	Low	Low	Review the network to document the upstream water use as part of the AMP8 WINEP investigation. Potential requirement to review all additional baseline ecological WFD data if the above assessment identifies a possible impact. Further investigation of any obstructions to fish passage (weirs etc.) should be reviewed to confirm potential reductions in flow as a result of abstraction does not inhibit fish passage. Further information about option, including details on abstraction conditions (HOF etc).	Ensuring identified flow requirements downstream of abstraction location are still met under scheme. If not, appropriate compensation flow is required, perhaps through increased contribution from the Tyne Tees tunnel.	1	Possible	Possible	No	No
GB103025072595	Tees from Skerne to Tidal Limit	2	Low	Low	Review the network to document the upstream water use as part of the AMP8 WINEP investigation. Potential requirement to review all additional baseline ecological WFD data if the above assessment identifies a possible impact. Further investigation of any obstructions to fish passage (weirs etc.) should be reviewed to confirm potential reductions in flow as a result of abstraction does not inhibit fish passage. Further information about option, including details on abstraction conditions (HOF etc).	Ensuring identified flow requirements downstream of abstraction location are still met under scheme. If not, appropriate compensation flow is required, perhaps through increased contribution from the Tyne Tees tunnel.	1	Possible	Possible	Possible	No
GB510302509900	TEES	2	Low	Low	Review the network to document the upstream water use as part of the AMP8 WINEP investigation. Potential requirement to review all additional baseline ecological WFD data if the above assessment identifies a possible impact. Further investigation of any obstructions to fish passage (weirs etc.) should be reviewed to confirm potential reductions in flow as a result of abstraction does not inhibit fish passage. Further information about option, including details on abstraction conditions (HOF etc).	Ensuring identified flow requirements downstream of abstraction location are still met under scheme. If not, appropriate compensation flow is required, perhaps through increased contribution from the Tyne Tees tunnel.	1	Possible	Possible	Possible	No

G.4 In-combination effects

G.4.1.1 In addition to the one selected supply-side NW WRMP option, other planning projects could lead to potential in-combination effects to some water bodies. As stated in Section 1.4.4, three NSIPs have been identified in the NW operating area:

- H2 Teesside (at pre-application)
- The Net Zero Teesside project (decision pending)
- Tees CCPP (Decided)

G.4.1.2 Tees CCPP NSIP does not directly impact any water bodies which are assessed in the Supplying Teesside Industrial Water option and has a small (relative to water body scale) red line boundary[4]. As such it is not included in the in-combination effects assessment.

G.4.1.3 Table 4.1 summarises a high level in-combination effects assessment of these planning projects and the one supply-side NW option based upon available information.

Table 4.1: Potential in-combination effects for the NW plan

Water body name and ID	Options	Comments
GB510302509900 : TEES	• Supplying Teesside Industrial Water • H2 Teesside • The Net Zero Teesside Project	NW WRMP option Supplying Teesside Industrial Water identifies a risk to this water body as a result of the increased abstraction in upstream water bodies. Other activities in this water body include the H2 Teesside planning project, which does not as of time of writing, have a WFD assessment available. Using currently available information[5], option activities are expected to primarily involve below ground construction activity as part of the construction work required for the project. In this respect, it is considered a low risk option to surface water. However, contemporary assessment of the expected impact of the scheme on groundwater and linked surface waters based on recent actual data has been recommended in line with a precautionary approach, to ensure no in-combination effects. Other activities also include The Net Zero Teesside Project, for which an appropriate WFD assessment has been completed[6], concluded no risk of deterioration in WFD status provided recommended mitigation is implemented. No in-combination risk of WFD deterioration is expected. Risk to water body remains as **minor localised**

[4] Sembcorp, Tees CCPP project Volume 1 Chapter 6 Contaminated Land, Water and Flood Risk (Nov 2017). Available online at: Normal template (planninginspectorate.gov.uk)

[5] Dept. for Energy Security & Net Zero and Dept. for Business, Energy & Industrial Strategy. H2 Teesside Project: hydrogen generation and distribution section 35 direction, Planning Act 2008 (Dec 2022). Available online at: H2 Teesside Project: hydrogen generation and distribution: section 35 direction, Planning Act 2008 - GOV.UK (www.gov.uk)

[6] AECOM. The Net Zero Teesside Project ES Vol III Appendix 9C WFD assessment (Oct 2022). Available online at: Ross Taylor Report Teesside Net Zero 2019-11-20 (planninginspectorate.gov.uk)

Water body name and ID	Options	Comments
		impact (impact score 1) as per Supplying Teesside Industrial Water Level 2 assessment post mitigation.
GB40301G702000: Tees Sherwood Sandstone	Supplying Teesside Industrial Water H2 Teesside (at pre-application) The Net Zero Teesside Project	NW WRMP option Supplying Teesside Industrial Water identifies a risk to this water body as a result of potential below ground construction activity associated with the reinstatement of abstractions at Low Worsall. Other option activities in this water body include the H2 Teesside planning project, which does not as of time of writing, have a WFD assessment available. Using currently available information, option activities are expected to primarily involve below ground construction activity as part of the construction work required for the project. In this respect, it is considered a low risk option. However, assessment of the expected impact of the scheme on groundwater and linked surface waters based on recent actual data has been recommended in line with a precautionary approach, to ensure no in-combination effects on WFD. The Net Zero Teesside Project, of which an appropriate WFD assessment has been completed, concluded no risk of deterioration in WFD status provided recommended mitigation is implemented. No in-combination risk of WFD deterioration is expected. Risk to water body remains as **minor localised impact (impact score 1)** as per Supplying Teesside Industrial Water Level 2 assessment post mitigation.

G.4.1.4 In addition to the three identified NSIPs, one Yorkshire Water WRMP option was identified within the NW operating area: DV7a(vi) Tees to Yorkshire Pipeline Strategic Resource Option. This option has a large area of influence owing to the size of the proposed transfer. As there is no published documentation on this option, a full in-combination effects assessment cannot be undertaken with the current level of information. Despite this, it is assumed likely that the option will impact at least one water body identified in the Supplying Teesside Industrial Water option as the Yorkshire Water option includes an abstraction from the Tees. Further assessment is required to determine if this option could lead to a potential in-combination effect if taken forward in the same time period as the NW WRMP option.

G.5 Conclusions

G.5.1 Summary Level 1 assessment

G.5.1.1 For the Northumbrian Water WRMP24, six options have been subject to a Level 1 WFD assessment. The Level 1 WFD assessments indicated that all options are anticipated to have potential adverse effects on water bodies:

- BOT-ABS-002
- BOT-ABS-007
- BOT-TRA-001
- BOT-TRA-002
- BOT-TRA-004
- Supplying Teesside Industrial Water

G.5.1.2 Level 2 WFD assessments would be required for all the options should they be included in a future plan. These Level 2 assessments may be required at a later date however, at present, only one option 'Supplying Teesside Industrial Water' is included in a Plan for Northumbrian Water WRMP24. Therefore, only this option has been assessed Level 2.

G.5.2 Summary Level 2 assessments

G.5.2.1 One Level 2 assessment was completed for the Supplying Teesside Industrial Water option due to the reinstatement of a historical abstraction and the increase of an existing abstraction. If the recommended further investigations and mitigation is implemented, as assumed in the assessment, the option can be considered WFD compliant.

G.5.3 Summary in-combination effects assessment

G.5.3.1 Two water bodies identified in the Supplying Teesside Industrial Water option WFD assessments are also impacted by other planning activities (NSIPs). Despite this, no in-combination effects are anticipated provided appropriate mitigation for all options is implemented. Risk to these water bodies remains as minor localised and the options remain WFD compliant, however contemporary analysis will be considered to confirm this conclusion in line with a precautionary approach.

G.5.3.2 Additional assessment is also required to understand potential in-combination effects between one Yorkshire Water WRMP option and the Supplying Teesside Industrial Water option. Once further option information is published or provided to NW, this additional assessment can be carried out.

A. WFD Level 1 output tables

The Northumbrian Water WFD Level 1 outputs can be provided upon request.

B. WFD Level 2 output tables

The Northumbrian Water WFD Level 2 outputs can be provided upon request.