

Dŵr Cymru Welsh Water

Trebanos Wastewater Treatment Works: Headwall

Preliminary Water Environment Regulations Compliance Assessment

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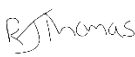
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1. Executive Summary

The Trebanos Wastewater Treatment Works Headwall Scheme (the ‘Proposed Scheme’) is part of a wider project to upgrade the built infrastructure at Trebanos Wastewater Treatment Works (WwTW). The Proposed Scheme consists of the provision of a new headwall, which will deliver environmental benefits to the water bodies and surrounding environment. Arup has been commissioned by Dŵr Cymru Welsh Water to produce a Preliminary Water Environment Regulations (WER) (also referred to as Water Framework Directive (WFD)) Compliance Assessment to support the submission of a Flood Risk Activity permit.

Trebanos is located in Swansea Valley, approximately 12km north-east of Swansea (National Grid Reference: SN 70920 02139). Relevant WFD water bodies to the Proposed Scheme are:

- ‘Tawe – confluence with Twrch to tidal limit’ surface water body (GB110059032180);
- ‘Swansea Canal’ artificial water body (GB71010503); and
- ‘Swansea Carboniferous Coal Measures’ groundwater body (GB41002G201000).

Owing to the potential to be directly or indirectly impacted by the Proposed Scheme components, Swansea Canal was screened out of further assessment. The baseline (screening) assessment resulted in screening in the ‘Tawe – confluence with Twrch to tidal limit’ surface water body and the ‘Swansea Carboniferous Coal Measures’ on the basis of hydrological connectivity. The ‘Tawe – confluence with Twrch to tidal limit’ water body has an overall status of ‘Moderate’, and ‘Swansea Carboniferous Coal Measures’ groundwater body has an overall status of ‘Poor’, owing to chemical elements.

Overall, the WER Scoping Assessment identified potential risks to the following receptors in WFD water bodies: biology, hydromorphology, water quality, and designated sites. A detailed assessment for each of the risks was conducted. For biology it was concluded that the Proposed Scheme will deliver minor, localised negative effects during construction, followed by minor, localised beneficial effects during operation. The Proposed Scheme presents an opportunity to improve local aquatic and riparian habits, thanks to the reduction of spills from Trebanos WwTW delivering improvements to water quality. With regards to hydromorphology, the Proposed Scheme will contribute to minor, localised changes to the riverbank at the new headwall, however this is not expected to constitute measurable change to WFD status at the water body scale. The construction is expected to present negligible effects to chemical elements with no measurable change to WFD status at the water body scale.

For protected sites, it is reasonable to conclude that no adverse impacts are predicted on the protected habitats. Likely, minor beneficial impacts are predicted as a result of improved physical infrastructure at Trebanos Wastewater Treatment Works, thanks to the anticipated reduction of spills leading to improved water quality.

This WER Assessment comprises a ‘living document’. The Proposed scheme is currently in detail design stage, whereas the wider upgrades to Trebanos WwTW are at an outline stage. The assessment of the wider scheme should be reviewed as additional design and construction detail is developed. Future updates to the assessment may be required as the Project progresses.

2. Introduction

2.1 Project background

Ove Arup & Partners Limited (Arup) have been commissioned by Dŵr Cymru Welsh Water (DCWW) to undertake a Preliminary Water Environment Regulations (WER) Compliance Assessment in support of the design of works to the outfall at Trebanos Wastewater Treatment Works (WwTw) (the 'Proposed Scheme').

This document reports on the compliance of the Proposed Scheme with the objectives of the Water Framework Directive 2000/60/EC (WFD) as transposed in England and Wales via the Water Environment (WFD) (England and Wales) Regulations (amended 2017).

2.2 Purpose of this report

The purpose of this report is to:

- identify the relevant water bodies that may be affected by the Proposed Scheme and collate the available baseline information;
- identify relevant scheme components with the potential to affect the water bodies at the site, together with any embedded mitigation measures integrated into the current design;
- undertake a preliminary scoping assessment to identify the likely impacts of the Proposed Scheme on the current status and status objectives of the relevant waterbodies (including identification of any additional mitigation requirements);
- identify any risks of non-compliance with water body objectives and associated requirements for further detailed impact assessment and/or mitigation design; and
- identify potential enhancement opportunities to support the delivery of water body objectives.

This report summarises the Proposed Scheme, outlines the assessment methodology and presents the assessment results. The assessment has been undertaken in accordance with relevant guidance (see Appendix A) and has involved a desk-based study using readily available baseline information and existing, publicly available site information.

The WER assessment comprises a 'living document' and should be updated as further design detail, including mitigation, becomes available. This will be considered in future iterations of the document.

2.3 Assumptions and limitations

The WFD water body classification data in this assessment has been taken from Natural Resources Wales' (NRW's) Water Watch Wales website for WFD Cycle 3 (2021)¹. These classifications are considered to provide the current best estimate of status and are the formal baseline against which the NRW will assess compliance with the 'no deterioration' objective.

The assessment in this document is based on the design information currently available for the Proposed Scheme. As such, the mitigation identified in this assessment as being required to mitigate the likely significant effects reported are based on this worst-case scenario where no or limited design information exists. It may be the case that as detailed design of the Proposed Scheme evolves, it becomes apparent that a lesser form of mitigation is required to achieve the same outcome. This will be detailed in future iterations of this assessment.

This document is living and should be updated as further design detail, including mitigation, becomes available and will be considered in future iterations of the document.

¹ Natural Resources Wales, 2023. 'Water Watch Wales'. Available at: <https://waterwatchwales.naturalresourceswales.gov.uk/en/> [Accessed 15th November 2023]

3. Legislative context

The Water Environment (Water Framework Directive) (England and Wales) Regulations (amended 2017) is currently the largest and most influential piece of UK legislation for the water environment and transposes the Water Framework Directive into English and Welsh law. NRW is the competent authority responsible for delivering the requirements of the WER in Wales.

The legislation takes an integrated approach to the sustainable management of water by considering the interactions between surface water, groundwater, and water-dependent ecosystems.

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

The WFD requires classification of the current condition or ‘status or potential’ of surface water and groundwater bodies and to set a series of objectives for maintaining or improving conditions so that water bodies reach and / or maintain ‘Good Status or Potential’. These overall Environmental Objectives are to:

- Prevent the deterioration of (and where possible enhance) the status of surface water bodies, ground water bodies and their ecosystems;
- Aim to achieve at least ‘Good’ status for all water bodies by 2015. Where this is not possible and subject to the criteria set out in the Directive, aim to achieve Good status by 2021 or 2027;
- Meet the requirements of WFD Protected Areas;
- Promote sustainable use of water as a natural resource;
- Conserve habitats and species that depend directly on water;
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to surface water (particularly the aquatic environment);
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Contribute to mitigating the effects of floods and droughts.

All new (and on-going) activities in the water environment need to be guided by the requirements of the WFD. This includes ensuring that no changes occur that cause a deterioration of current status of a water body or prevent the achievement of the future status objectives of a water body.

Further details regarding the water body status classification process, the requirements of WER Compliance Assessments, and relevant guidance is provided in Appendix A and B of this report.

4. Assessment methodology

4.1 Stage 1: Baseline assessment (screening)

Initial screening identifies relevant WFD water bodies located in the zone of influence (includes the physical footprint of the works and the surface water bodies that run through the site and the groundwater body that underlies the site). Water bodies are selected for inclusion at this early stage of the compliance assessment with reference to the relevant RBMP.

This stage has considered whether the scheme has the potential to impact on WFD water bodies. Where impact pathways have been considered possible, the proposed zone of influence has been established based on the scheme baseline.

Water body baseline

This has been established by identifying the WFD surface water and groundwater bodies potentially affected by the scheme and identifying their baseline condition, using a desktop assessment.

The desktop assessment has collated and reviewed the water body status and status objectives information for the relevant WFD water bodies based on NRW's Water Watch Wales website for WFD Cycle 3 (2021). This data is considered to provide the current best estimate of status and the formal baseline against which the Environment Agency will assess compliance with the 'no deterioration' objective in 2027.

The following datasets have also been used to establish the nature and existing condition of those watercourses located within WER water bodies that are affected by this scheme:

- Cycle 3 Western Wales RBMP 2021 water body status classification and status objectives data²;
- WFD Protected Area data²;
- The British Geological Society Interactive Map (see);³ and
- Designated Site and WFD Habitat Sensitivity information⁴.

Project baseline

Scheme components and activities that have the potential to permanently affect surface water and/or groundwater bodies, and that therefore have the potential to impact on WFD status, have been identified. This included the identification of all relevant embedded mitigation within the scheme design in Section 6.2.

Potential impacts may result from the activities required to construct the Proposed Scheme, or as a result of the scheme's design and operation.

4.2 Stage 2: Preliminary assessment (scoping)

Scoping comprises a more detailed assessment to identify risks from the scheme to receptors (within the zone of influence) on the relevant WFD water bodies and their quality elements. The aim of this assessment is to identify whether there is potential for deterioration in water body status or failure to comply with WER objectives for any of the water bodies identified in Stage 1 and establish whether further detailed assessment is required (see Section 7).

² Natural Resources Wales, 2023. 'Water Watch Wales'. Available at: <https://waterwatchwales.naturalresourceswales.gov.uk/en/> [Accessed 15th November 2023]

³ British Geological Society, 2023. Geology of Britain Viewer. Available at: <https://mapapps.bgs.ac.uk/geologyofbritain/home.html> [Accessed 15th November 2023].

⁴ Defra, 2023. Multi-Agency Geographic Information for the Countryside (MAGIC) Maps. Available at: <https://magic.defra.gov.uk/MagicMap.aspx>. [Accessed 15th November 2023]

5. Site

5.1 Site location

The site is located on the River Tawe in the village of Trebanos, in the Swansea Valley (National Grid Reference: SN 70920 02139). Trebanos lies between Portwarde and Clydach, approximately 12km to the north-east of Swansea. The Proposed Scheme is located at the Trebanos WwTW final effluent outfall. The nearest postcode is SA7 9JE.

5.2 Site description

5.2.1 Watercourses

As identified by Water Watch Wales⁵, the site is located on the ‘Tawe – confluence with Twrch to tidal limit’ river water body. It is designated as a natural river in the Western Wales River Basin District, in the ‘Tawe to Cadoxton’ management catchment, in the ‘Tawe’ operational catchment. The overall water body has ‘Moderate’ quality in Cycle 3 (2021).

The site is 300m from Swansea Canal, which runs alongside the River Tawe’s western flank. Swansea Canal is an artificial water body in the Western Wales River Basin District, in the ‘Tawe to Cadoxton’ management catchment, in the ‘Tawe Canals’ operational catchment. The overall water body has ‘Moderate’ quality in Cycle 3 (2021).

The site overlays the ‘Swansea Carboniferous Coal Measure’ groundwater body. This is a natural water body in the Western Wales River Basin District, in the ‘Tawe to Cadoxton’ management catchment, in the ‘Swansea Carboniferous Coal Measures’ operational catchment of South West Wales. The overall water body has ‘Poor’ quality in Cycle 3 (2021).

The groundwater on site is assessed ‘not at risk’ under the Groundwater Drinking Water Protected Areas with Risk assessment. There are no Nitrate Vulnerable Zones within 10km of the site.

5.2.2 Geology

The site overlays a bedrock of carboniferous sandstone from the Hughes Member⁶. Superficial deposits include alluvium of clay, silt, sand and gravel. Glaciofluvial ice contact deposits of sand and gravel have been identified within 300m of the site, to the east and west.

5.2.3 Topography

The site is located in a riverbed and floodplain. It is in a valley, circa 25m AOD, between hills to the east and west.

5.2.4 Land use

The land use of the site is a mix of grassland, built-up areas pertaining to a wastewater treatment works. Surrounding the site, there are residential areas, woodlands and agricultural land. The Clydach factory, an active nickel refinery, lies approximately 1.6km downstream of the site, to the south-west.

5.2.5 Designated sites

There are six Sites of Special Scientific Interest (SSSI) within 5km of the study area. These are:

- Cefn Gwrhyd, Rhydyfro;
- Coed Cwm Du, Cilmaengwyn;

⁵ Natural Resources Wales, 2022. Water Watch Wales. Available at: <https://waterwatchwales.naturalresourceswales.gov.uk/> [Accessed 15th November 2023]

⁶ Defra, 2023. Geology Viewer. Available at: <https://geologyviewer.bgs.ac.uk/> [Accessed 15th November 2023]

- Cilybebyll;
- Fforest Goch Bog;
- Glais Moraine; and
- Frondeg.

Glais Moraine SSSI lies approximated 2km downstream of the site; it is hydrologically connected via the River Tawe, and may be hydrologically connected to Swansea Canal which runs to the west of Glais Moraine SSSI. This designated site is therefore included in the Baseline assessment (Section 7).

There are none of the following designations within 5km of the site: no National Nature Reserves, no Ramsar Sites, no Special Areas of Conservation (SAC), no Special Protection Areas (SPA).

5.2.6 Ecology and biodiversity

The presence of Japanese Knotweed, an invasive non-native species, is noted at the site. The River Tawe is appreciated by the local angling community. The Tawe and Tributaries Angling Association permits angling with rod and line for trout, sewin & salmon from Pontardawe Bridge upstream to the River Tawe source at Llyn-y-Fan Fawr.

6. Proposed Scheme

6.1 Design description

The Proposed Scheme aims to deliver improvements and upgrades to Trebanos WwTW. The following structures have been proposed:

- A new storm outfall;
- A concrete chamber ; and
- A new pipe headwall.

The alignment of the outfall lies adjacent to the existing final effluent pipe near to the River Tawe before rerouting to the north to finally run parallel to the final effluent pipe.

6.2 Construction phase mitigation

An Environmental Action Plan (EAP) will be prepared in advance of construction, outlining environmental risks and constraints within the site and will define best practice and mitigation measures required for inclusion within the construction phase work method statements, to ensure compliance with relevant environmental legislation, consents, and approvals.

The EAP will include measures to avoid and minimise impacts to the water environment during construction of the Proposed Scheme, in alignment with the Environment Agency's best practice guidance including adherence with the Safety, Health, Environment and Wellbeing Code of Practice (CoP) guidance which relates to risks associated with pollution and biosecurity requirements. For the basis of this assessment, it is assumed that relevant environmental good practice advice set out in the Pollution Prevention Guidelines (PPG) and its replacement Guidance for Pollution Prevention (GPP⁷) document series will be implemented on site during the construction phase. Key aspects of the PPGs and GPPs that should be considered are summarised in the following sections.

6.2.1 Pollution control

It is assumed that best practice will be adopted in line with Guidance for Pollution Prevention (GPP) 5: Works and maintenance in or near water to minimise the risk of silt pollution to nearby watercourses during construction activities. This will involve the application of appropriate measures, where necessary, to avoid or control silt runoff. For example, this may include:

- Seeding or covering exposed ground and sediment stockpiles;
- Only removing vegetation from areas that need to be exposed in the near future;
- Minimising the amount of time soil stockpiles are exposed for;
- All plant and wheel washing to be carried out in a designated area at least 10m from any water body or surface drain; and
- Any runoff water containing sediments or other pollutants to be treated appropriately before discharge back to the water environment.

6.2.2 Spillages

A pollution risk assessment should be carried out for the proposed scheme ahead of construction, considering both the storage and transportation of materials used. This would identify potentially hazardous materials or activities and assess the probability and magnitude of potentially harmful effects. From this, a pollution

⁷ GPPs withdrawn in 2018 but in the absence of replacement guidance, this is still referred to as industry best practice.

incident response plan (see GPP 21: Pollution incident response planning) should be compiled, identifying the specific measures needed to reduce the likelihood of a spillage happening, and implemented, to minimise the impact of any spills that may occur.

6.2.3 Minimising disturbance

Appropriate measures should be included within the work method statements and adhered to, to reduce potential environmental impacts of an in-channel construction activities. This includes measures to:

- Minimise the footprint of any in channel works as far as reasonable possible to reduce the degree of physical disturbance of the existing riverbed and banks;
- Reinststate any impacted benthic or marginal habitats where necessary;
- Reduce associated noise, vibration, and any artificial lighting impacts where possible; and
- Control the timing of works so that any in-channel works are programmed to take place outside of sensitive times of year for juvenile fish and migratory fish.

Works within the watercourse should be avoided between the 15th October and 15th May to avoid impacting migratory fish, however this will be subject to the species of fish present – namely trout, sewin and salmon – and their migratory periods.

6.2.4 Biosecurity

Good biosecurity practices are vital for preventing the spread of invasive non-native species (INNS) and pathogens such as waterborne fish diseases. In particular, the presence of Japanese knotweed is noted on site. Measures should be adopted to minimise the risk of construction activities leading to the spread of INNS or pathogens.

To avoid the spread of invasive species the following measures should be detailed within the EAP and be adhered to during construction:

- Contractor's Ecologist to undertake toolbox talks for any INNS prior to works starting to all workers on site. Toolbox talks are to be signed by site workers who have received the briefing;
- Ensure all site teams are briefed in EA 'Check, Clean, Dry' procedure and will be made aware of areas on site where INNS are known to be present; and
- Avoid working in areas where INNS are present. Where this is not possible, appropriate biosecurity measures are to be developed, adopted, and implemented.

Any potential additional measures will be specified during the detailed design phase, prior to construction.

7. Baseline assessment (screening)

7.1 Overview

A baseline assessment has been undertaken to identify the relevant WFD water bodies that could be affected by the Proposed Scheme. This screening assessment collates the latest available WFD baseline data in order to inform the scoping assessment (Section 8) of the likely effects of the Proposed Scheme on WFD status and objectives.

7.2 Relevant water bodies

The Proposed Scheme located is within the 'Tawe to Cadoxton' WFD management catchment, in the 'Tawe' WFD operational catchment, in the Western Wales River Basin District (RBD).

The site is located within one WER surface water body and one WER groundwater body. It is also adjacent to one artificial surface water body. These are:

- 'Tawe – confluence with Twrch to tidal limit' surface water body (GB110059032180);
- 'Swansea Canal' artificial water body (GB71010503); and
- 'Swansea Carboniferous Coal Measures' groundwater body (GB41002G201000).

The WER status, status objectives and programme of measures derived by Natural Resources Wales for water bodies located within this RBD are outlined within the current Cycle 3 Western Wales RBMP.

7.3 Tawe – confluence with Twrch to tidal limit water body

The 'Tawe – confluence with Twrch to tidal limit' water body (GB110059032180) is designated as a natural river. The water body has a length of 28.8km.

In Cycle 3 Western Wales RBMP, the 'Tawe – confluence with Twrch to tidal limit' water body has an Overall Status of 'Moderate' with an Ecological Status of 'Good' and a Chemical Status of 'Moderate'. A breakdown of the current status and status objectives for the 'Tawe – confluence with Twrch to tidal limit' water body are provided in Table 7-1.

Table 7-1: Summary of 2019 WER status for the 'Tawe – confluence with Twrch to tidal limit'

Water body name/Classification Item	Description, notes or more information
Water body name	Tawe – confluence with Twrch to tidal limit
Water body ID	GB110059032180
Water body length	28.8km
Ecological	Good
Biological quality elements	
Invertebrates	Good
Fish	High
Macrophyte and phytobenthos combined	Good
Macrophyte sub-element	High
Phytobenthos sub-element	Good
Acid neutralising capacity	High
Physico-chemical quality elements	
Ammonia	High

Water body name/Classification Item	Description, notes or more information
Biological Oxygen Demand Dissolved Oxygen pH Phosphorus Temperature <i>Hydromorphological supporting elements</i> Hydrodrological regime Morphology	High High High High High Not High Not High
Chemical <i>Specific pollutants</i> <i>Priority hazardous substances</i> <i>Priority substances</i>	Moderate High High High
WER protected areas within 5km	Glais Moraine SSSI
RNAG	Fluoranthene (diffuse source and point source) Nickel and its components (point source)

7.4 Swansea Canal water body

The ‘Swansea Canal’ water body (GB71010503) is designated as artificial, with a length of approximately 12.8km.

In Cycle 3 Western Wales RMBP, the ‘Swansea Canal’ water body has an Overall Status of ‘Moderate’ with an Ecological Status of ‘Moderate’ and a Chemical Status of ‘High’. A breakdown of the current status and status objectives for the ‘Swansea Canal’ water body are provided in Table 7-2.

Table 7-2: Summary of 2019 WER status for the ‘Swansea Canal’

Water body name/Classification Item	Description, notes or more information
Water body name	Swansea Canal
Water body ID	GB71010503
Water body length	12.8km
Ecological <i>Biological quality elements</i> <i>Physico-chemical quality elements</i> Ammonia Dissolved Oxygen pH Phosphorus Temperature	Moderate Not assessed High High High High High
Chemical	High
WER protected areas within 5km	Glais Moraine SSSI

Water body name/Classification Item	Description, notes or more information
RNAG	Not stated

7.5 Swansea Carboniferous Coal Measures groundwater body

The ‘Swansea Carboniferous Coal Measures’ groundwater body has a surface area of 1969.1km². It is designated as natural.

In Cycle 3 Western Wales RMBP, the ‘Swansea Carboniferous Coal Measures’ groundwater body has an Overall Status of ‘Poor’, with a driving element of groundwater and surface water chemistry. A breakdown of the current status and status objectives for the ‘Swansea Canal’ water body are provided in Table 7-3.

Table 7-3: Summary of 2019 WER status for the ‘Swansea Carboniferous Coal Measures’

Water body name/Classification Item	Description, notes or more information
Water body name	Swansea Carboniferous Coal Measures
Water body ID	GB41002G201000
Water body surface area	1969.1km ²
Overall water body <i>Quantitative</i> <i>Chemical (GW)</i>	Poor Good Poor
Chemical	High
WER protected areas within 5km	Glais Moraine SSSI
RNAG	Chemical Dependent Surface Water Body Status

7.6 Screening conclusions

The ‘Tawe – confluence with Twrch to tidal limit’ and the ‘Swansea Carboniferous Coal Measures’ water bodies have been screened into the next stage of the assessment on the basis that the proposed works have the potential to impact the WER status of the water body.

The ‘Swansea Canal’ water body has been screened out of the next stage of the assessment on the basis that the Proposed Scheme is not hydrologically connected to this adjacent water body, so the Proposed Scheme is unlikely to impact the WER status of Swansea Canal.

8. Scoping assessment

8.1 Overview

A scoping assessment has been undertaken to establish the likely impacts of the Proposed Scheme on the WFD status elements of the screened-in water bodies and WER compliance risks. This assessment has considered relevant design elements embedded within the latest Proposed Scheme design.

Impacts have been considered with regard to the risk of the Proposed Scheme:

- Causing a deterioration in current status of the water body; and/or
- Preventing the future achievement of water body status objectives.

The assessment process for determining the potential risk of status deterioration uses the following traffic light rating system to assign the magnitude of the likely effect anticipated on each of the quality elements of the affected water bodies:

- **Dark Blue:** Beneficial effect of a scale sufficient to increase status class for the quality element at water body scale.
- **Light Blue:** Minor/localised beneficial effect resulting in a localised improvement but insufficient to increase status class for the quality element at water body scale.
- **Green:** No measurable change to (or effect on) status class for the quality element at water body scale.
- **Yellow:** Minor localised adverse effect when balanced against mitigation included in the design – insufficient to affect status class for the quality element at water body scale.
- **Amber:** Adverse effect is possible when balanced against mitigation included in the design – the extent of effect is uncertain, and there remains a potential to affect status class for the quality element at water body scale. Additional mitigation and residual effects need to be considered.
- **Red:** Adverse effect of sufficient scale to impact on status class for the quality element at a water body scale (certain). Additional mitigation or re-design required to avoid non-compliance.

Any adverse effect rating (yellow, amber, or red) would qualify the relevant WER status element/receptor to be taken forward to the detailed assessment stage.

8.2 Impact assessment for the ‘Tawe – confluence with Twrch to tidal limit’ Water Body

8.2.1 Potential impacts on current status

The assessment has considered the key components of the Proposed Scheme that have the potential to impact upon the current status of the ‘Tawe – confluence with Twrch to tidal limit’ water body. These are outlined in the following sections.

Biological status

There is potential for direct and indirect impacts of the works to protected species and habitat loss on the channel banks and in the riparian zone. Pre-construction ecology surveys will be undertaken to determine the presence of protected species and likely impacts and mitigation.

There may be minor, localised impacts to fish and the aquatic environment through changes in flow, geomorphology, and sediment mobilisation from site runoff during the construction phase of the Proposed Scheme. Providing that mitigation is followed and implemented correctly, biological status elements are not anticipated to be impacted by the construction of the Proposed Scheme; and any minor impacts would be temporary in nature.

For operation, no impacts upon biological status are anticipated. The addition of a new pipe headwall, a concrete chamber and a new storm outfall does not propose to change the current operations of the WwTW. The greater flow rate of treated final effluent planned as part of the main WwTW scheme will reduce the frequency of spills from the WwTW, thus improving the water quality of the receiving water bodies. This improvement will bring minor, localised beneficial effects to the riparian habitat and to biological life.

Hydromorphological supporting elements

The addition of a new pipe headwall, a concrete chamber and a new storm outfall is anticipated to incur minor, localised changes to the quantity and dynamics of flow, river width and depth variation and the structure and substrate of the riverbed downstream. The new structure has been designed to be in alignment with the existing riverbank, as per best practise from Sewers For Adoption 8, to minimise the potential for changes in hydromorphology. The new structure may have minor, localised effects on hydromorphology.

Flood risk has been assessed with the proposed works in the floodplain. According to NRW's Flood Risk Mapping, the alignment of the outfall and the proposed structures associated with it do not lie in areas reported to be at risk of flooding from surface waters. The land to the north of the alignment is largely at low risk of flooding, with areas of high and medium risk. The proposed outfall, including the concrete chamber, lies largely in areas reported to be at low risk of flooding from rivers. Towards the southern end of the alignment, the proposed storm outfall lies in a medium risk area. The new headwall lies in an area of high flood risk from rivers.

Temporary changes to flow are anticipated during construction of the new headwall, concrete chamber and storm outflow, with the utilisation of a cofferdam (or alternative) and the provision of drain pumps on the upstream side of the cofferdam to keep the works area dry. Consideration to the potential impact to aquatic species will be necessary, requiring a pre-construction survey to be completed, and work to be conducted outside of the fish spawning season.

The adherence to measures outlined in Section 6.2 and environmental good practice should prevent significant or permanent adverse effects when implemented correctly. Considering the scope of works, these effects are anticipated to be negligible.

Physico-chemical status

The installation of a new pipe headwall, a concrete chamber and a new storm outfall may temporarily affect water quality through the mobilisation of fine sediments or pollution spillages to the river channel.

The use of in-situ concrete at the headwall and chamber location is likely to be required for the construction of the headwall base slab, steps or some ancillary parts of the structures, which may temporarily affect water quality. To ensure that water contaminated with concrete is not released to the wider water environment areas, areas where concrete pouring is taking place should be isolated from river flow to prevent accidental release. Contaminated water within these areas should be pumped to a suitable treatment solution or to a tanker for disposal offsite at a licensed facility. A precast headwall and chamber will reduce the amount of concrete pour required at the site.

The adherence to measures outlined in Section 6.2 and environmental good practice should prevent significant or permanent adverse effects when implemented correctly. Considering the scope of works, these effects are anticipated to be negligible.

Specific pollutants & chemical status

The installation of a new pipe headwall, a concrete chamber and a new storm outfall may temporarily affect physico-chemical, specific pollutant and chemical quality elements due to sediment mobilisation and accidental spillage of pollutants (e.g., fuel leakage from storage or plant) during construction only. The adherence to measures outlined in Section 6.2 and environmental good practice should prevent significant or permanent adverse effects when implemented correctly. Considering the scope of works, these effects are anticipated to be negligible.

Permanent operational impacts and footprint

For permanent operational impacts and footprint, the Proposed Scheme would deliver minor, localised improvements to the biological elements of the ecological status. The new infrastructure may cause minor impacts to the hydromorphology by altering the riverbank of the River Tawe at the new outfall structure. There should be no impact and no interaction on current WER status or achievement of objectives during operation. Any changes to design may require an update to this part of the assessment. Should the proposed works require significant modifications to the pumping station and/or pipework further assessment and mitigation would likely be required.

Summary of potential impacts on current status

A summary of the potential impacts on the current WER status are presented in Table 8-1.

Table 8-1: Potential effects of the Proposed Scheme on current WER status of the 'Tawe – confluence with Twrch to tidal limit' water body

Component of Proposed Scheme	Ecological status elements				Chemical status
	Biological	Hydromorphological	Physico-chemical	Specific pollutants	
Construction	Minor impacts	Minor impacts	Negligible	Negligible	Negligible
Permanent operation and footprint	Minor benefits	Minor impacts	No impact anticipated	No impact anticipated	No impact anticipated

8.2.2 Potential impacts on future status objectives

The Cycle waterbodies 3 Western Wales RBMP identifies objectives to support the achievement of future ecological status. The Cycle 3 Western Wales RBMP also identifies measures and actions to address pressures on the current status and to support the achievement of future status objectives. The next stage of development should ensure that the Proposed Scheme will not prevent the implementation of the Waterbody Level Measure Actions for the 'Tawe – confluence with Twrch to tidal limit' water body.

The Proposed Scheme is not anticipated to prevent the implementation of future status objectives identified for the 'Tawe – confluence with Twrch to tidal limit' water body. This water body has a current overall status of 'Moderate'. The proposed works at WwTW will reduce the frequency of storm overflow spills from the adjacent WwTW, which will contribute to minor, localised beneficial impacts to the biological element of the ecological status. Therefore, the Proposed Scheme will not hinder but contribute to achieving a 'Good' overall status. The waterbody's RNAGs cannot be addressed as part of the Proposed Scheme, as the RNAGs are catchment-wide and from other sources, which include point sources of nickel and fluoranthene, as well as diffuse sources of fluoranthene. If there is any change to the proposals, then further assessment will determine if the Proposed Scheme has the potential to inhibit the achievement of the water body's status objectives.

8.3 Impact assessment for the 'Swansea Carboniferous Coal Measures' Groundwater Body

8.3.1 Potential impacts on current status

The assessment has considered the key components of the Proposed Scheme that have the potential to impact upon the current status of the 'Swansea Carboniferous Coal Measures' groundwater body.

Potential construction activities and risks include sheet piling if required for the cofferdams. It is assumed appropriate environmental mitigation measures will be developed and implemented through a Construction Environmental Management Plan and associated method statements. Best working practices (e.g., GPP5) will be implemented during the construction phase and included in the Construction Environmental Management Plan to minimise the risks posed by activities to the water environment. Any impacts to

groundwater quantity are likely to be localised and temporary in nature and not affect the wider groundwater body. Therefore, in terms of the potential effects of the proposed works on the WER status and objectives for the ‘Swansea Carboniferous Coal Measures’ groundwater body are assumed to be negligible effect with no measurable change to status at water body scale.

Permanent operational impacts and footprint

For permanent operational impacts and footprint, further assessment of the operational impacts and permanent footprint of the proposed works is not provided at this stage for the ‘Swansea Carboniferous Coal Measures’ groundwater body. There should be no impact and no interaction on current WER status or achievement of objectives during operation. Any changes to design may require an update to this part of the assessment. Should the proposed works require significant modifications to the pumping station and/or pipework further assessment and mitigation would likely be required.

9. Opportunities for enhancement

Although no adverse effects on WER status elements or risks of non-compliance have been identified, there is still an opportunity for the Proposed Scheme to contribute to the improvement in the WER status of the water body. However, given the scale of the project relative to the water bodies, the opportunity for enhancement is limited.

The installation of a new storm outfall, a concrete chamber and a pipe headwall presents an opportunity to improve water quality and fish habitat, which may provide additional benefits to the local angling community.

There are multiple chemical elements including priority hazardous substances above environmental quality standards in the water body affecting the catchment arising from nickel refining activities possibly associated with Clydach factory, or other past and present mining activities. Other sources are currently unknown, but under investigation. These issues will not be addressed by the project and may mean that the proposed enhancement measures would have a very limited impact on WER status as they would not be able to address the root cause of failure in this water body.

During the development of the Proposed Scheme's detailed design, consideration should be given to improving the riparian habitat by planting buffer strips to contribute to water quality improvements. Noting the presence of Japanese Knotweed, an INNS, good biosecurity practices should contain, or reduce where relevant, the hazards associated with INNS. There is an opportunity to treat or remove the INNS to enhance the bankside habitat. Improvements to bankside habitat can also contribute to erosion protection and reduce the input of sediment, thus improving water quality.

10. Conclusions

The screening stage identified three waterbodies, the 'Tawe – confluence with Twrch to tidal limit' water body, the 'Swansea Canal' water body and the 'Swansea Carboniferous Coal Measures' groundwater body, where the Proposed Scheme could potentially have an impact on WFD status. The 'Swansea Canal' water body was screened out of further assessment due to lack of hydrological connectivity with the Proposed Scheme. The 'Tawe – confluence with Twrch to tidal limit' and the 'Swansea Carboniferous Coal Measures' water bodies were screened into the preliminary scoping assessment, due to it having the potential to be directly or indirectly impacted by various components of the Proposed Scheme.

Based on the information available, the preliminary scoping assessment has identified that there is likely to be a negligible effect with no measurable change to status at water body scale for the 'Tawe – confluence with Twrch to tidal limit' and the 'Swansea Carboniferous Coal Measures' water bodies in terms of current WER status and in the achievement of 'Good' overall status of WER elements with regards to temporary construction activities and permanent operations.

Glais Moraine SSSI is located approximated 2km downstream of the site; it is hydrologically connected via the River Tawe, therefore the mitigation measure contained within the Proposed Scheme must be carefully adhered to avoid any impacts to the designated site. There are opportunities to enhance the fish habitat, with benefits to the local angling community. Good biosecurity practices are also noted to address the presence of Japanese Knotweed. To minimise disturbance to migratory fish, works should be avoided between 15th October and 15th May, subject to the species of fish present and their migratory periods.

For permanent operational impacts and footprint, the Proposed Scheme is anticipated to provide minor beneficial effect to biology element, and minor, localised impact to hydromorphology. There should be no significant impact on current WER status or achievement of objectives during operation. Any changes to design may require an update to this part of the assessment. Should the proposed works require significant modifications to the pumping station and/or pipework further assessment and mitigation may be required.

The identification for opportunities for enhancement from the upgrade at this stage is high-level and feasibility will need to be further determined as the project develops and as detailed design information is made available.

This WER Assessment comprises a 'living document'. Should further design information and mitigation become available as the project develops, then this document should be updated and revised. This may result in a detailed assessment being required should further detail change the outcomes.

Appendix A: Background information – WER status determination and compliance assessment process

A.1 Determination of WER Status

A.1.1 Introduction

Surface water bodies and groundwater bodies are defined within WER legislation. There are three types of surface water body, as follows:

- Natural water bodies;
- Heavily modified water bodies (HMWBs); and,
- Artificial water bodies (AWBs).

The Overall Status of natural surface water bodies is determined on the basis of their Ecological Status and Chemical Status. The overall status of heavily modified and artificial water bodies is classified based on their ecological potential and chemical status. The overall status of groundwater bodies is determined on the basis of their Quantitative Status and Chemical Status.

Groundwater bodies are defined within WER legislation as Groundwater Management Units (GWMU) and Water Resource Management Units (WRMU) and their status is determined on the basis of quantitative and chemical sub-elements.

The means by which these determinations are made for both surface water and ground water bodies is described in this section.

A.1.2 Surface water bodies

A.1.2.1 Ecological status

Ecological Status is defined by the overall quality of the structure and functioning of aquatic ecosystems associated with surface waters, i.e., the condition of the watercourse. This is assigned on a scale of high, good, moderate, poor or bad, and on the basis of four classification elements or ‘tests’, as follows:

- Biological - this test is designed to assess the status indicated by a biological quality elements such as fish, invertebrates, macrophytes or phytobenthos (diatoms). The biological quality elements can influence an overall water body status from bad through to high. It is also important to note that the presence of invasive species prevents a water body from achieving high status when all other elements attain high;
- Physico-chemical - this test is designed to assess the status indicated by physico-chemical quality elements such as dissolved oxygen, phosphorus, and ammonia, against environmental standards. The physico-chemical quality elements can only influence an overall water body status from moderate through to high;
- Specific pollutants - this test is designed to assess compliance with environmental standards for concentrations of specific pollutants, such as zinc, cypermethrin or arsenic. As with the physico-chemical test, the specific pollutant assessment can only influence an overall water body status from moderate through to high; and,
- Hydromorphology - for natural surface water bodies this test is undertaken by the Environment Agency during classification when the biological and physico-chemical tests indicate that a water body may be of ‘High’ Overall Status. It specifically assesses hydromorphological quality elements such as water flow, sediment composition and movement, continuity, and structure of the habitat against reference or ‘largely

undisturbed’ conditions. If the hydromorphological quality elements do not support high Ecological Status, then the status of the water body is limited to good Overall Status. Hydromorphological assessments are used to determine ‘High’ Overall Status only and are not to be used to drive a water body status class below good. The ‘does not support good’ classification should be reported for the purposes of identifying water bodies which fail the flow test.

The worst-case classification is assigned as the overall surface water body status, in a ‘one-out all-out’ system. This system is summarised in Figure A-1.

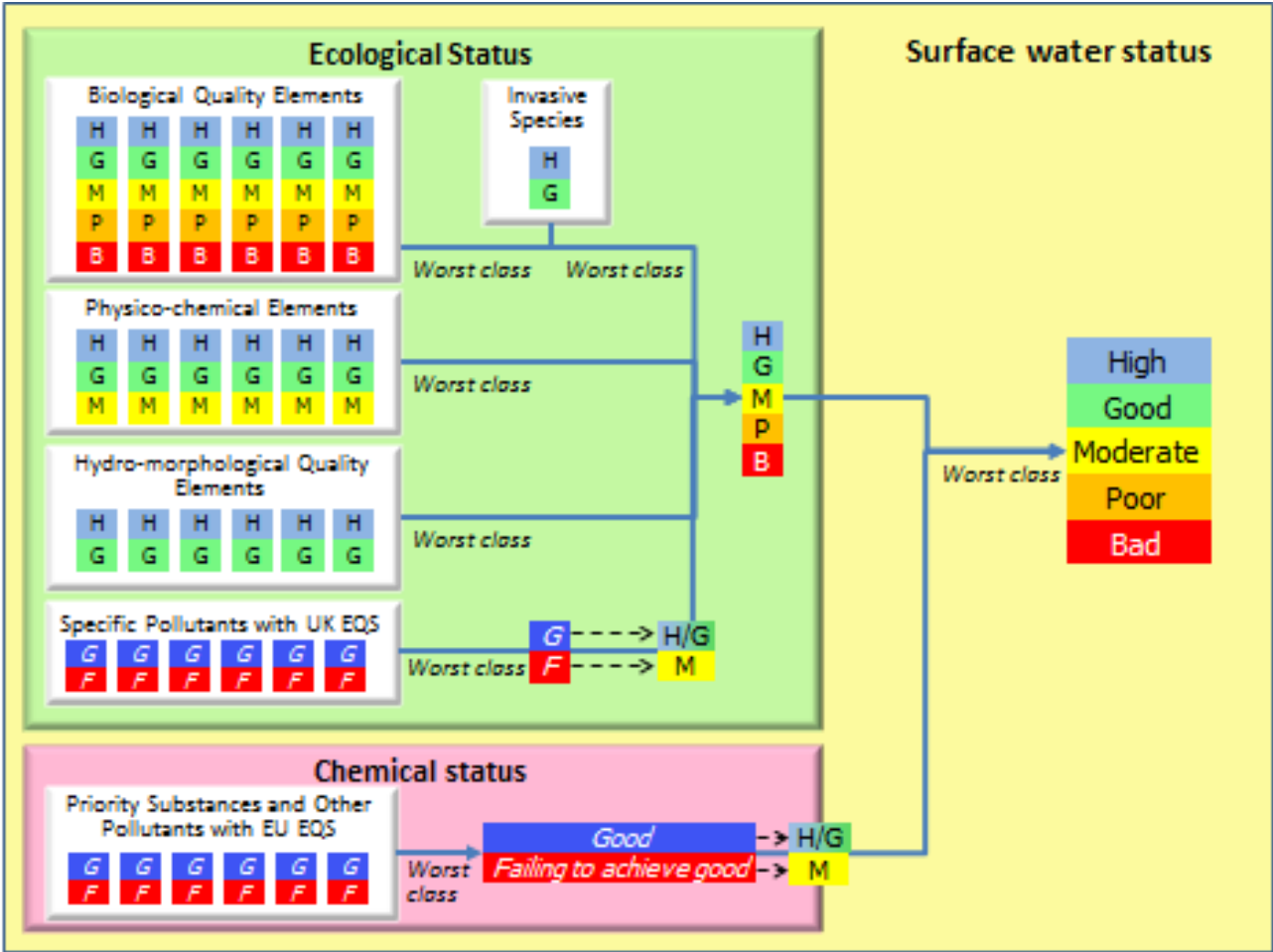


Figure A-1: Ecological status classification process (Source: Environment Agency, 2015)

A.1.2.2 Chemical status

Chemical Status is defined by compliance with environmental standards for chemicals that are priority substances and/or priority hazardous substances, in accordance with the Environmental Quality Standards Directive (2008/105/EC)⁸. This is assigned on a scale of good or fail.

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

A.1.2.3 Ecological potential for heavily modified (and artificial) water bodies

⁸ Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008; on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Strasbourg, European Parliament and European Council

Ecological Potential is assigned to AWB (such as reservoirs and canals), or natural water bodies which, as a result of physical alterations by human activity, are substantially changed in character. The latter are termed HMWB. The term ‘ecological potential’ is used to classify AWBs and HMWBs as it may be impossible for these water bodies to achieve good Ecological Status (GES) because of their creation or modification for a specific use, such as navigation, water supply or flood protection. The Ecological Potential of an AWB or HMWB represents the degree to which the quality of the water body approaches the optimum condition it could achieve given its artificial or heavily modified state.

AWB and HMWB are subject to an additional set of rules that need to be implemented prior to running the one-out-all-out process. These rules determine which biological quality elements should be used in the water body Ecological Potential classification. Under normal circumstances, AWB and HMWB are classified according to an assessment of mitigation measures, which defines good Ecological Potential (GEP) in water bodies where all applicable mitigation is in place, and moderate ecological potential in water bodies where some or all relevant mitigation is missing. However, to prevent AWB and HMWB being incorrectly classified as good potential in situations where all mitigation is in place, but other pressures are causing an impact (e.g., nutrient enrichment or pollution from toxic substances), the methodology adopted in the UK additionally considers biological indicators providing they are not sensitive to the heavily modified nature of the water body.

AWB and HMWB hydromorphological elements are assessed using a three-stage process, firstly looking at flow, then mitigation measures and biological quality elements.

Flow conditions are assessed initially on a fail or pass basis to determine which of the biological and physico-chemical quality elements should be used in the classification of Ecological Potential.

Where the flow conditions are unaffected by the physical modification (flow conditions pass), the water body Ecological Potential is determined by the worst of either the mitigation measures assessment, or any element that is not sensitive to the modified nature of the water body.

Where the flow conditions are significantly impacted by the physical modification (flow conditions fail), the water body Ecological Potential is determined by the worst of any of the mitigation measures assessments or the assessment of biological quality elements, physico-chemical quality elements or specific pollutants.

Where a water body is designated as artificial or heavily modified for water resources usage, either solely or jointly with other uses, the flow condition is assumed to be good (pass).

A.1.2.4 Groundwater bodies

Under the WER, groundwater body Overall Status is classified on the basis of Quantitative Status and Chemical Status. The groundwater bodies are separated into GWMU and WRMU. GWMU are sub-divisions of the groundwater to aid the resource assessment process. WRMU are sub-divisions according to the water resource availability and the management of water.

The worst-case classification dictates the Overall Status, via a ‘one-out all-out’ system. This system is summarised below in Figure A-2.

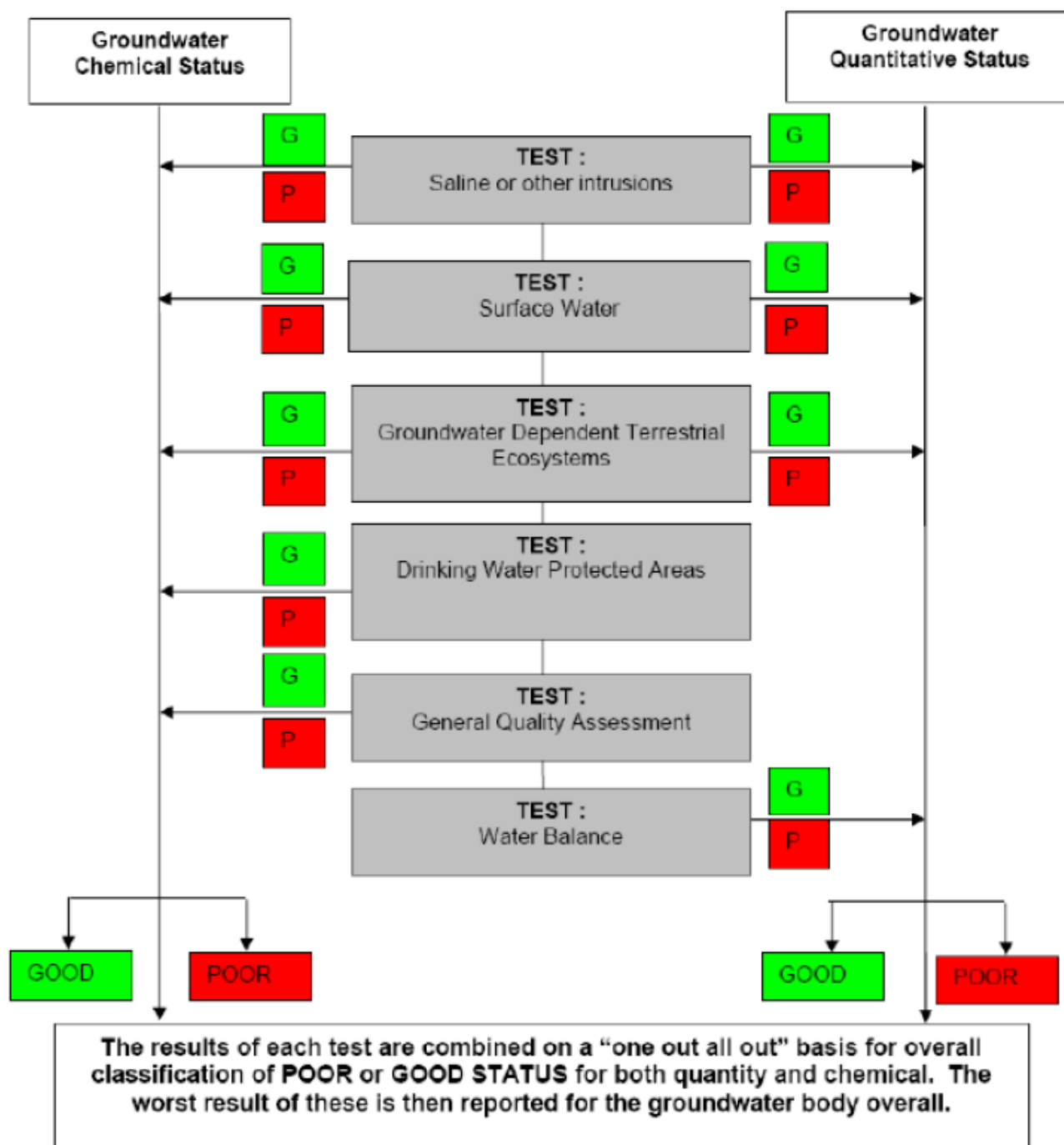


Figure A-2: Groundwater body status classification (Source: UKTAG, 2012)

A.1.2.5 Quantitative status

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

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

- Surface water - this test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the Ecological Status of associated surface water bodies;
- Groundwater Dependent Terrestrial Ecosystems (GWDTE) - this test is designed to identify groundwater bodies where groundwater abstraction is leading to significant damage to associated GWDTE; and,
- Water balance - this test is designed to identify groundwater bodies where groundwater abstraction exceeds the ‘available groundwater resource’, defined as the rate of overall recharge to the groundwater body itself less the rate of flow required to meet the ecological needs of associated surface water bodies and GWDTE.

A.1.2.5.1 Chemical status

Chemical Status is defined by the concentrations of a range of key pollutants, by the quality of groundwater feeding into watercourses and water-dependent ecosystems and by the quality of groundwater available for drinking water purposes. This is assigned on a scale of good or poor, and on the basis of five classifications elements or ‘tests’, as follows:

- Saline or other intrusions - this test is designed to identify groundwater bodies where the intrusion of poor-quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions;
- Surface water - this test is designed to identify groundwater bodies where groundwater is leading to a significant diminution of the Chemical Status of associated surface water bodies;
- GWDTE - this test is designed to identify groundwater bodies where groundwater is leading to significant damage to associated GWDTE;
- Drinking Water Protected Areas (DrWPA) - this test is designed to identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WER or at risk of failing in the future. The aim is no deterioration in quality of waters for human consumption; and,
- General quality assessment - this test is designed to identify groundwater bodies where widespread deterioration in quality has, or will, compromise the strategic use of groundwater. The aim is no significant impairment of human use of groundwater and no significant environmental risk from pollutants across a groundwater body. Status is assessed primarily using data collected from the Environment Agency monitoring network; therefore, the scale of assessment means that groundwater status is mainly influenced by larger scale effects such as significant abstraction or widespread diffuse pollution.

A.1.2.6 Environmental standards

Under the WER, a range of environmental standards and condition limits are applied in order to help the classification of water body status and the setting of status objectives via the RBMP process. These environmental standards define the range of environmental conditions that support “healthy” aquatic life. For instance, standards are set for the composition of biological communities, the physico-chemical water quality parameters, the concentration of pollutants, and the level of flows in rivers (as described above).

These standards⁹ inform Natural Resources Wales on the implementation of the RBMP process, including the identification of measures required to support the achievement of the GES / GEP objectives, as well as underpinning efforts to protect the water environment by helping to regulate activities that could cause adverse impacts.

A.1.3 WER Assessment requirements for new developments

⁹ The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015

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

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

A ruling by the European Union Court of Justice on 1 July 2015¹⁰ has significant implications for projects that may impact water bodies, namely:

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

A.1.4 Guidance

Whilst there is no established methodology for assessing compliance with WER legislation, the WER Compliance Assessment will be based upon expert judgement, established best practice and consultation with Natural Resources Wales and will be undertaken in accordance with relevant guidance¹¹ and the recent advisory guidance provided by The Planning Inspectorate¹².

¹⁰ Case 461/13 Bund für – Umwelt Und Naturschutz Deutschland v Bundesrepublik Deutschland ('the Bund case') concerning the interpretation of Article 4(1)(a)(i) to (iii) of the Water Framework Directive 2000/60/EC (WFD)

¹¹ Environment Agency, 2010. *Assessing new modifications for compliance with WFD: detailed supplementary guidance*.

¹² The Planning Inspectorate, 2017. *Advice note eighteen: The Water Framework Directive*.

Appendix B: WER Assessment Process

B.1 WER Assessment Process

B.1.1 Overview

WER Compliance Assessment is undertaken as an iterative, stepped process, which typically includes the following:

- Step 1: Baseline assessment (screening);
- Step 2: Preliminary assessment (scoping);
- Step 3: Detailed impact assessment (where required); and,
- Step 4: Application of Article 4.7 (where applicable).

These key process steps are described in further detail in the following sections. Consultation with regulatory authority should be undertaken to share the findings of each step, where necessary/applicable.

B.1.2 Baseline assessment (screening)

The key objective of the baseline (screening) assessment is to identify the relevant WER surface water and groundwater bodies (including any undesignated tributary watercourses) potentially affected by the proposed development and to establish their baseline condition.

The water body baseline condition of relevant water bodies has been identified via desk-top assessment, utilising readily available information and environmental, asset and operations data obtained from relevant stakeholders, including the Environment Agency, Natural England, and Severn Trent Water.

WER baseline datasets have been obtained from the Environment Agency's Catchment Data Explorer website^{Error! Bookmark not defined.}. This includes:

- RBMP Cycle 3 current status and status objectives data;
- WER Protected Areas data;
- RNAG data; and,
- Measures data.

The Cycle 3 2019 WER water body status data has been used to inform the assessment. This data is considered to provide the current best estimate of status and the formal baseline against which the Environment Agency will assess compliance with the 'no deterioration' objective. Where baseline data is limited, professional judgement has been used in the assessment and a precautionary approach taken with regard to screening.

The relevant WER water bodies present within the potential zone of influence of the proposed development are taken through to the subsequent preliminary assessment (scoping) stage.

B.1.3 Preliminary assessment (scoping)

The objective of the preliminary (scoping) assessment is to establish the relevant likely effects of the proposed development on the WER status elements of the relevant WER surface water and groundwater bodies. This includes identification of potential impact types and any relevant mitigation measures embedded within the design of proposed development at this stage.

The preliminary assessment considers both the beneficial and adverse effects of the relevant elements of the proposed development and applies a risk-based method in line with existing EA guidance.

Effects are considered with regard to the risk of the proposed development causing a deterioration in current status and/or a failure to achieve status objectives. The assessment identifies those scheme components / impacts that pose a risk current status or status objectives and thus may require more detailed impact assessment.

The preliminary assessment therefore comprises two parts, as follows:

- Likely effects on current status or potential, involving:
 - identification of relevant scheme components with potential to impact upon water body status;
 - identification of likely potential impact and magnitude of effects of the relevant scheme components on the current status of the water body (taking account of any ‘embedded’ mitigation; and
 - identification of potential risks of deterioration in current status and associated requirements for additional mitigation and/or further detailed assessment.
- Likely effects on status objectives, involving:
 - scoping of the relevant scheme components to identify where the proposed development may pose a risk of worsening existing pressures responsible for current status failures (RNAGs) and/or prevent the implementation of measures identified by the Environment Agency to address existing status failures; and
 - scoping of relevant scheme components against any available EA HMWB/ AWB ‘mitigation measure assessment’ outputs, in order to identify where the proposed development may pose a potential risk of inhibiting the implementation of measures derived to mitigate the impacts of existing physical modifications and operational regimes to support the achievement of good Ecological Potential objectives.

B.1.4 Detailed impact assessment

Where deemed required, the objective of the detailed impact assessment is to establish the nature and anticipated magnitude of the effects of relevant elements of the proposed development on the WER quality elements of the surface water and groundwater bodies affected. These effects are considered in terms of the potential for deterioration of current status and/or the prevention of status objectives. This detailed assessment may be based on targeted baseline surveys, monitoring or modelling assessments completed at the impact sites.

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

- Assessment of effects on current status of quality element; and,
- Assessment of effects on status objectives, with regards to any water body RNAG or measures/actions identified as potentially being at risk from the proposed development under the preceding preliminary (scoping) assessment. This is done via expert judgement and consultation with the Environment Agency, based on the currently available information.

Where significant effects are identified with regard to the risk of status deterioration and/or the prevention of status objectives, the assessment should identify ‘further mitigation’ required in order to avoid and/or minimise risks and the residual effects on quality elements at the water body scale.

The detailed impact assessment will also identify if Article 4.7 tests need to be prepared for affected water bodies, where a residual risk to status deterioration and/or prevention of future status objectives has been identified.

A detailed impact assessment has not been deemed required for the proposed development, based on the information available at this stage.

B.1.5 Article 4.7 tests

Article 4.7 of the WER states that Member States will not be in breach of the Directive when failure to meet its environmental objectives is the result of either new modifications to the physical characteristics of a water body or as a result of new human sustainable development, on the proviso that the modifications or new development proposed are compliant with the four key conditions listed below. In doing so, Article 4.7 provides a means whereby a derogation for a proposed modification or sustainable development may be granted where it meets these four conditions.

1. All practicable steps have been taken to mitigate the adverse impact on the status of the water body;
2. The reasons for the modifications or alterations are of overriding public interest and/or the benefits to the environment and to society of achieving the objectives are outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development; and
3. The beneficial objectives served by the modifications or alterations of the water body cannot for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option.
4. The reasons for the modifications or alterations are clearly identified to the Environment Agency, so that they can be specifically set out and explained in the relevant RBMP (as required under Article 13).

Article 4.7 tests are not deemed required for the proposed development, based on the information available at this stage.

Appendix C: Abbreviations

Abbreviation	Name
AOD	Above Ordnance Datum
AWB	Artificial Water Body
DrWPA	Drinking Water Protected Areas
EAP	Environmental Action Plan
GEP	Good Ecological Potential
GES	Good Ecological Status
GPP	Guidance for Pollution Prevention
GWDTE	Groundwater Dependent Terrestrial Ecosystem
GWMU	Groundwater Management Units
HMWB	Heavily Modified Water Body
INNS	Invasive non-native species
PPG	Pollution Prevention Guidelines
RBD	River Basin District
RBMP	River Basin Management Plan
RNAG	Reasons for Not Achieving Good
SAC	Special Areas of Conservation
SSSI	Site of Special Scientific Interest
SPA	Special Protected Areas
WER	Water Environment Regulations
WFD	Water Framework Directive
WRMU	Water Resources Management Units
WwTW	Waterwater Treatment Works