WATER FRAMEWORK DIRECTIVE (WFD) ASSESSMENT

FOR

A PROPOSED SHD DEVELOPMENT AIKENS VILLAGE (WOODSIDE) AND KILGOBBIN, STEPASIDE,

CO. DUBLIN

Report Prepared For

Ironborn Real Estate Limited

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Appendix A Water Framework Directive Matrix

1.0 INTRODUCTION

AWN Consulting Limited (AWN) has prepared this Water Framework Directive (WFD) Screening Assessment on behalf of Ironborn Real Estate Ltd for a strategic housing development at 2no. contiguous sites (c. 3.39 Ha), at 'Sector 3', Aikens Village in the Townlands of Woodside and Kilgobbin, Stepaside, Co. Dublin.

The development will consist of:

- 438no. 'Build-to-Rent' apartment units (154no. 1 bedroom units and 284no. 2 bedroom units) arranged in 9no. blocks ranging in height from 2 – 8 storeys over 2no. independent single level basements. Private patios / terraces and balconies are provided for some apartment units (not all units have a patio, terrace or balcony). Upper level balconies are proposed on elevations of all multi-aspect apartment buildings.
- Blocks A – D are located above Basement 1 (c. 6,002 sq. m gross floor area) and Blocks F – J are above Basement 2 (c. 5,058 sq. m gross floor area).
- Provision 1no. childcare facility (c. 514.9 sq. m gross floor area) in Block D.
- Provision of resident amenity space / communal areas (c. 1,455.7 sq. m gross floor area) in Block C and Block G.

And all associated and ancillary site development, infrastructural, landscaping and boundary treatment works including:

- New vehicular access to / from Basement 1 from Atkinson Drive and new vehicular access to / from Basement 2 from Thornberry Road.
- Provision of c. 9,799 sq. m public open space, including a public plaza onto Village Road and improvement works to existing open space area to the north of existing Griannan Fidh residential development.
- Provision of 350no. car parking spaces including basement parking, set down spaces for proposed childcare facility and repositioning of set down area on Atkinson Drive.
- Provision of 669no. bicycle parking spaces.
- Provision of 14no. motorcycle parking spaces.
- Communal bin storage and plant provided at basement level and additional plant provided at roof level.
- Provision of below ground wastewater storage tank (c. 500m3) and associated connection to the wastewater networks including ancillary above ground kiosk and appropriate landscaping on open space lands to the south of Griannan Fidh residential development...

This WFD Screening Assessment has been prepared in response to the requirements of the Water Framework Directive.

This report was prepared by Marcelo Allende (BSc, BEng), and Teri Hayes (BSc MSc PGeol EurGeol). Marcelo is a Water Resources Engineer with over 15 years of experience in environmental consultancy and water resources studies. Marcelo is an Environmental Consultant with AWN Consulting, a member of the International Association of Hydrogeologists (Irish Group) and a member of Engineers Ireland (MIEI). Teri is a hydrogeologist with over 25 years of experience in water resource management and impact assessment. She has a Masters in Hydrogeology and is a former President of the Irish Group of the Association of Hydrogeologists (IAH) and has provided advisory services on water related environmental and planning issues to both public and private sector bodies. She is qualified as a competent person as recognised by the EPA in relation to contaminated land assessment (IGI Register of competent persons www.igi.ie). Her specialist area of expertise is water resource

management eco-hydrogeology, hydrological assessment and environmental impact assessment.

1.1 Background

The site for proposed residential development is located approximately 700m south of the M50 in Aiken's Village, Stepaside, Dublin 18. The site is a brown field site currently used as a storage yard. The site is generally bounded by Thornberry Road to the north, by Atkinson Drive and the adjoining open space lands to the west, Sandyford Hall residential development adjacent Ferncarraig Avenue to the east and by Village Road and Griannan Fidh residential development to the south (Townland of Woodside). The site for proposed below ground wastewater storage tank is on open space lands generally bounded Griannan Fidh residential development to the north, Sandyford Hall residential development to the east and open space lands (including detention basin) to the south and west (Townland of Kilgobbin). The development site is gradually sloping from north west to south east, dropping from a level of c. 129 mOD to c. 121 mOD

The Ballyogan Stream (EPA Name: Barnaculla Stream) flows eastwards c. 170 m to the south of the subject site (Woodside). The proposed underground wastewater storage tank is located adjacent to the Ballyogan Stream on its north bank (refer to Figure 1.1 below). The Carrickmines Stream is located c. 350 m to the west of the site.

Figure 1.1 Site Location Map with hydrological environment

1.2 Legislative Context

The Water Framework Directive (WFD) 2000/60/EC aims to protect and enhance the quality of the water environment (both surface water and groundwater) across all European Union member states. It takes a holistic approach to the sustainable management of water by considering the interactions between surface (including transitional and coastal waters, rivers, streams and lakes), 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 districts (RBD), for which 'River Basin Management Plans' (RBMP) are developed by EU member states and environmental objectives are set. RBMPs are produced every six (6) years, in accordance with the river basin management planning cycle.

The WFD requires all EU member states to classify the current condition or 'status or potential' of surface and groundwater bodies and to set a series of objectives for maintaining or improving conditions so that water bodies maintain or reach 'good status or potential' during the next river basin management planning cycle. EPA and other stakeholders such as local authorities are the competent authority for implementing the WFD in Ireland. Article 4(1) of the WFD states "to ensure non-deterioration and the achievement of good surface water status":

- Surface waters: Good chemical and Good Ecological status/potentials
- Groundwater: Good Chemical and Good Quantitative status.

As part of its role, these authorities must consider whether proposals for new developments (other than where exemptions apply Article 4.4 -4.7) have the potential to:

- Cause a deterioration of a water body from its current status or potential; and/ or
- Prevent future attainment of good status or potential where not already achieved.

As a result, new developments that have the potential to impact on current or predicted WFD status are required to assess their compliance against the WFD objectives of the potentially affected water bodies.

The requirement to demonstrate compliance with the Article 4(1) test for "no deterioration" by a development was upheld by the High Court in the in Sweetman v An Bord Pleanala (2021 IEHC 16) "Bradan Beo case". The court relied on the *Weser judgement in terms of interpretation of Article 4. In that case, the CJEU concluded that:*

Article 4 required that Member states were required to refuse authorisation for a project (other than where exemptions apply) where it may cause deterioration of the status of a body or water or where it jeopardises the attainment of good water status.

- *"deterioration of the status" of the relevant water body includes a fall by one class of any element of the "quality elements" even if the fall does not result in the a fall of the classification of the water body as a whole;*

- *'Any deterioration' in quality elements in the lowest class constitutes deterioration; and*

- *Certainty regarding a project's compliance with the Directive is required at the planning consent stage; hence, where deterioration 'may' be caused, derogations under Article 4.7 of the WFD are required at this stage.*

While deterioration within a status class does not contravene the requirements of the WFD, (except for Drinking Water Directive parameters in drinking water protected areas), the WFD requires that action should be taken to limit within-class deterioration as far as practicable. For groundwater quality, measures must also be taken to reverse any environmentally significant deteriorating trend, whether or not it affects status or potential.

The *no deterioration* requirements are applied independently to each of the elements that come together to form the water body classification as required by Annex V of the Water Framework Directive and Article 4 of the Groundwater Daughter Directive.

The WFD requires *'Good Water Status'* for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'In 2009 the ERBD River Management Plan (RMP) 2009-2015 was published. In the ERBD RMP, the impacts of a range of pressures were assessed including diffuse and point pollution, water abstraction and morphological pressures (e.g. water regulation structures). The purpose of this exercise was to identify water bodies at risk of failing to meet the objectives of the WFD by 2015 and include a programme of measures to address and alleviate these pressures by 2015. This was the first River Basin Management planning cycle (2010-2015). The second cycle river basin management plan for Ireland is currently in place and will run between 2018-2022 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD).

The primary aim of the plan is that Water bodies identified as being '*At Risk'* of not achieving their environmental objectives need to have targeted measures implemented to achieve objectives under this Plan. 190 Areas for Action were identified across the 5 Local Authority regions. Within these 190 areas, a total of 726 water bodies were selected for initial actions during this RBMP cycle. There are 832 water bodies identified as being '*At Risk'* of not achieving their environmental objectives under this Plan that have not been included in the Areas for Action. For most of these water bodies, targeted actions will be undertaken in the third cycle RBMP from 2022-2027. The draft 3rd cycle RBMP has been reviewed in the context of ensuring mitigation measures comply with current and expected future measures required to be implemented for protection of water body status within the context of the proposed development.

1.3 Sources of Information

The following sources of information were used:

- Geological Survey of Ireland- online mapping (GSI, 2022),
- GSI - Geological Heritage Sites & Sites of Special Scientific Interest
- Ordnance Survey of Ireland (OSI),
- Teagasc subsoil database,
- National Parks and Wildlife services (NPWS, 2022) and,
- Environmental Protection Agency (EPA) – website mapping and database information. Envision water quality monitoring data for watercourses in the area;
- River Basin Management Plan for Ireland 2018-2021.
- Draft River Basin Management Plan for Ireland 2022-2027.
- Dún Laoghaire-Rathdown County Development Plan 2022-2028.
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW));
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie)
- South Dublin City Council (2005), Greater Dublin Strategic Drainage Study: Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council;
- 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA 532, 2001);
- National Parks and Wildlife Services (NPWS) – Protected Site Register;

- Drainage Design Report for Residential Development at Sector 3, Aiken's Village, Stepaside, Dublin 18. Kavanagh Burke Consulting Engineers, August 2022.
- Flood Risk Assessment. Sector 3, Aiken's Village, Stepaside, Dublin 18. JBA Consulting. August, 2022.
- Ground Investigation Report. Project Ironborn, Stepaside, Dublin 18. IGSL. July, 2018 (included as Appendix F of Drainage Design Report).

2.0 WATER FRAMEWORK DIRECTIVE (WFD) SCREENING

According to the EPA maps, the proposed development site lies within within the Avoca-Vartry Catchment 10 and Dargle-SC-010 WFD sub-catchment 10-5 (Carrickmines Stream 010 WFD River Sub Basin; EPA, 2022).

The Groundwater Body (GWB) underlying the site is the Wicklow GWB (EU Groundwater Body Code: IE_EA_G_076). Refer to Section 3.6 below for further information.

This WFD Screening has identified three (3) no. WFD surface water bodies and one (1) no. WFD groundwater bodies of relevance due to the close proximity and connection of these waterbodies during the construction and operation of the proposed development. To note there is no direct connection to surface water bodies during construction and only indirect connection through surface water drainage system during operation.

The water bodies are listed in Table 2-1 and the locations are presented in Figure 1.1 above. For each the most recent WFD status and risk score is provided (source EPA website - EPA Maps)

Table 2-1 *WFD water bodies located within the study area*

Type	WFD Classification	WFD Status (2013-2018)	WFD Risk	Waterbody Name / ID	Location
Surface Water	River	*Moderate*	*At Risk of Not Achieving Good Status*	Carrickmines Stream_010 (IE_EA_10C040350, 10_1497)	Located 170 m to the south of the proposed development site.
	River	*Moderate*	*At Risk of Not Achieving Good Status*	Carrickmines Stream_010 (IE_EA_10C040350, 09_1438)	Located 350 m to the north of the proposed development site.
Groundwater	Groundwater	Good	*Under Review*	Wicklow Groundwater Body (GWB) (IE_EA_G_076)	Groundwater body immediately underlying the proposed development site.

With consideration of the construction and operational phases of the proposed development site and taking into account the mitigation measures and techniques embedded within the project's design (as detailed in the EIA Screening Assessment) it is considered that all WFD water bodies identified in Table 2-1 should be carried through into the WFD Screening Assessment.

3.0 EXISTING ENVIRONMENT – WATER BODY STATUS

3.1 Topography

The development site is gradually sloping from north west to south east, dropping from a level of c. 129 mOD to c. 121 mOD. The Ballyogan Stream flows eastwards c. 170 m to the south of the subject site (Woodside). The proposed underground wastewater storage tank is located adjacent to the Ballyogan Stream on its north bank. The Carrickmines Stream is located c. 350 m to the west of the site (refer to Figure 1.1, above).

3.2 Land Use

The site is a brownfield development. Must of the surrounding land has been developed in the past years for residential uses. There are no licenced facilities in the surrounding area.

3.3 Water Body Status

3.3.1 Background to Surface Water Body Status

Under the WFD, surface water body status is classified on the basis of chemical and ecological status or potential. Ecological status is assigned to surface water bodies that are natural and considered by the EPA not to have been significantly modified for anthropogenic purposes (i.e., culverting). Ecological potential is assigned to artificial and man-made water bodies (such as canals), or natural water bodies that have undergone significant modification. The term ‘ecological potential’ is used as it may be impossible to achieve good ecological status because of modification for a specific use, such as navigation or flood protection. The ecological potential represents the degree to which the quality of the water body approaches the maximum it could achieve. The worst-case classification is assigned as the overall surface water body status, in a ‘one-out all-out’ system. This system is summarised below in Figure 3-1.

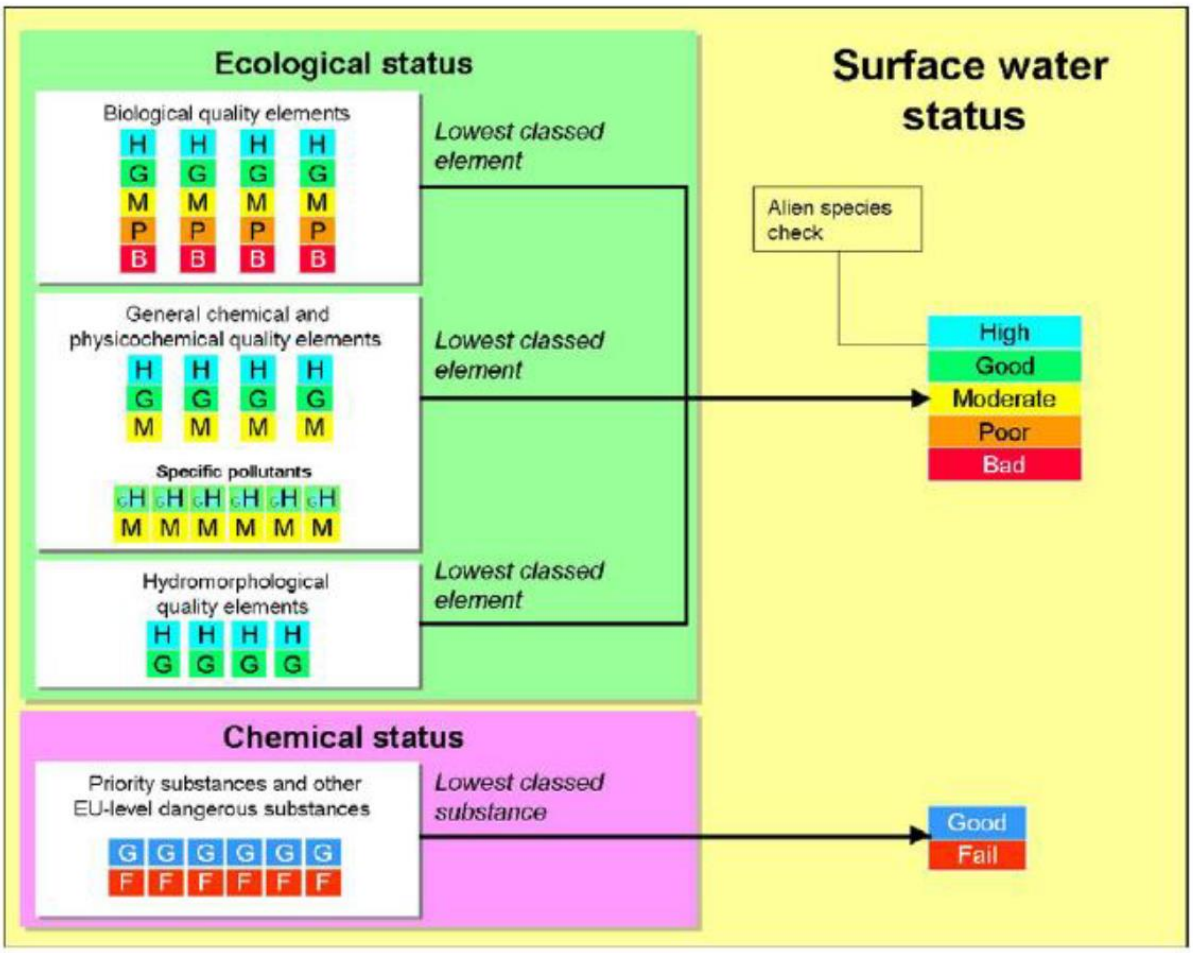

Figure 3.1 *WFD classification elements for surface water body status (Environmental Agency, 2015)*

3.3.2 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). 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 at good chemical status.

3.3.3 Ecological Status

Ecological status or potential is defined by the overall health or condition of the watercourse. This is assigned on a scale of High, Good, Moderate, Poor or Bad, and on the basis of four classification elements or 'tests', as follows:

- **Biological:** This test is designed to assess the status indicated by a biological quality element such as the abundance of fish, invertebrates or algae and by the presence of invasive species. The biological quality elements can influence an overall water body status from Bad through to High.
- **Physico-chemical:** This test is designed to assess compliance with environmental standards for supporting physicochemical conditions, such as dissolved oxygen, phosphorus and ammonia. The physicochemical 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.

- **Hydromorphology:** For natural, this test is undertaken when the biological and physicochemical tests indicate that a water body may be of High status. It specifically assesses elements such as water flow, sediment composition and movement, continuity, and structure of the habitat against reference or 'largely undisturbed' conditions. If the hydromorphological elements do not support High status, then the status of the water body is limited to Good overall status. For artificial or highly modified waterbodies, hydromorphological elements are assessed initially to determine which of the biological and physico-chemical elements should be used in the classification of ecological potential. In all cases, assessment of baseline hydromorphological conditions are an important factor in determining possible reasons for classifying biological and physicochemical elements of a water body as less than Good, and hence in determining what mitigation measures may be required to address these failing water bodies.

3.4 Surface Water Quality

Hydrological Environment

The proposed development site is located within the former Eastern River Basin District (ERBD, now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD).

According to the EPA maps, the proposed development site lies within the Avoca-Vartry Catchment (Hydrometric Area 10) and the Dargle sub-catchment (Dargle-SC-010, 10-5). The current EPA watercourse mapping does not include any existing streams within the proposed development site boundaries, a review of the historical mapping records provided within the GeoHive website do not indicate any watercourses within the site.

The closest mapped stream is the Ballyogan Stream which is located c. 170 m to the south of the subject site (Woodside). The proposed underground wastewater storage tank is located adjacent to the Ballyogan Stream on its north bank (refer to Figure 1.1 above). The Carrickmines Stream is located c. 350 m to the west of the site. The Ballyogan joins the Carrickmines Stream c. 2.8 Km to the southeast of the site after crossing the M50 motorway. The Carrickmines Stream joins the Shanganagh River at Cherrywood which in turns outfalls into the Irish Sea (Southwestern Irish Sea – Killiney Bay coastal waterbody) c. 7.3 km from the subject site.

Surface Water Quality

Figure 3.2 below presents the EPA quality monitoring points in the context of the site and other regional drainage settings.

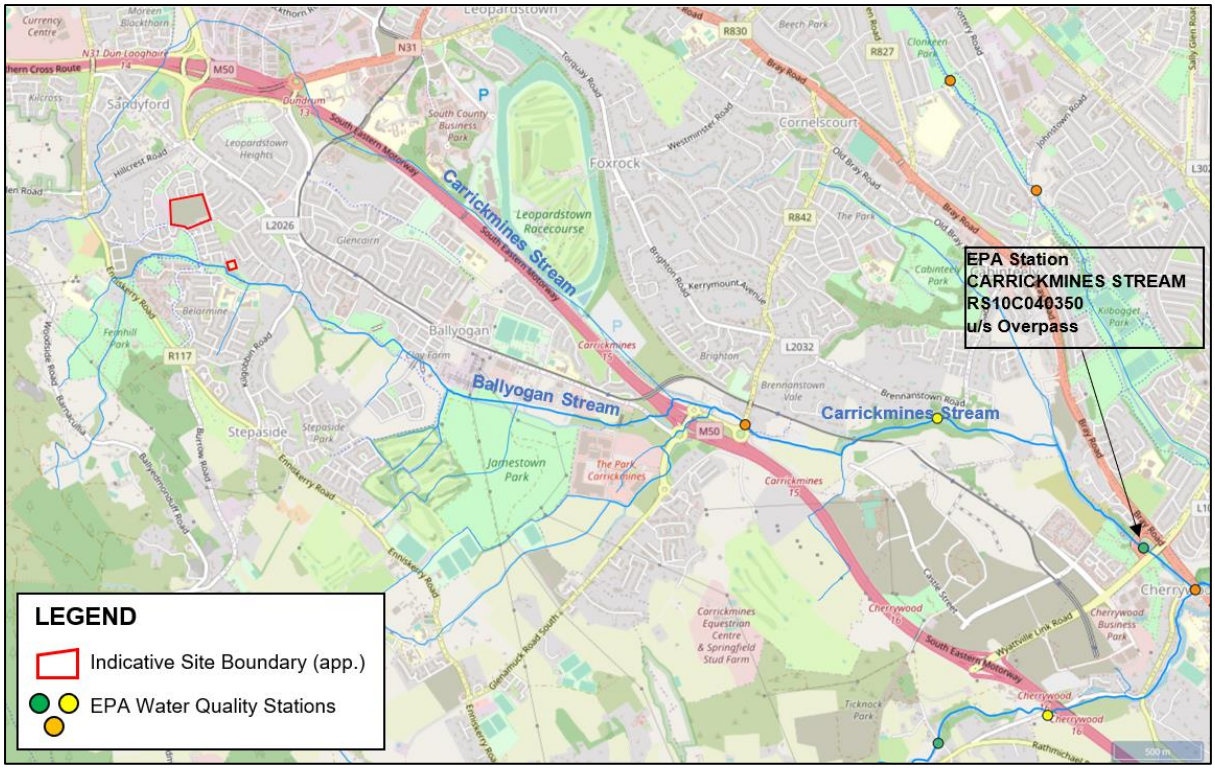

Figure 3.2 Surface Water Quality Monitoring Point (EPA,2022) (Site location boundary approximated, indicative only; *active* monitoring point locations shown)

Surface water quality is monitored periodically by the EPA at various regional locations along principal and other smaller watercourses. With reference to the site setting, the nearest active EPA monitoring station is situated along the Carrickmines Stream to the southeast of the site (u/s Overpass, c. 5.6 km from the proposed development). The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.

There is one water quality monitoring station located on the Carrickmines Stream downstream of the proposed site which have quality ratings available within the last ten years. This is *u/s Overpass* (RS10C040350) which obtained a Q4 – *Good Status* (2020). According to the EPA River Quality Survey in the Carrickmines Stream (source: https://epawebapp.epa.ie/qvalue/webusers/), the macroinvertebrate fauna indicated a welcome improvement to good ecological conditions in June 2020 the first time since monitoring commenced at this site in 2006, however excessive siltation of the substratum was observed.

In accordance with the WFD, each river catchment within the former RBD was assessed by the EPA and a water management plan detailing the programme of measures was put in place for each. Currently, the EPA classifies the WFD Ecological Status for the Carrickmines Stream waterbody as having '*Moderate Status'* (2013-2018) with a current WFD River Waterbody risk score of 1a, '*At risk of not achieving good status'.* This waterbody is classed as *'Moderatye Status'* (2013-2018) based on current monitoring. Figure 3.3 presents the river waterbody risk EPA map.

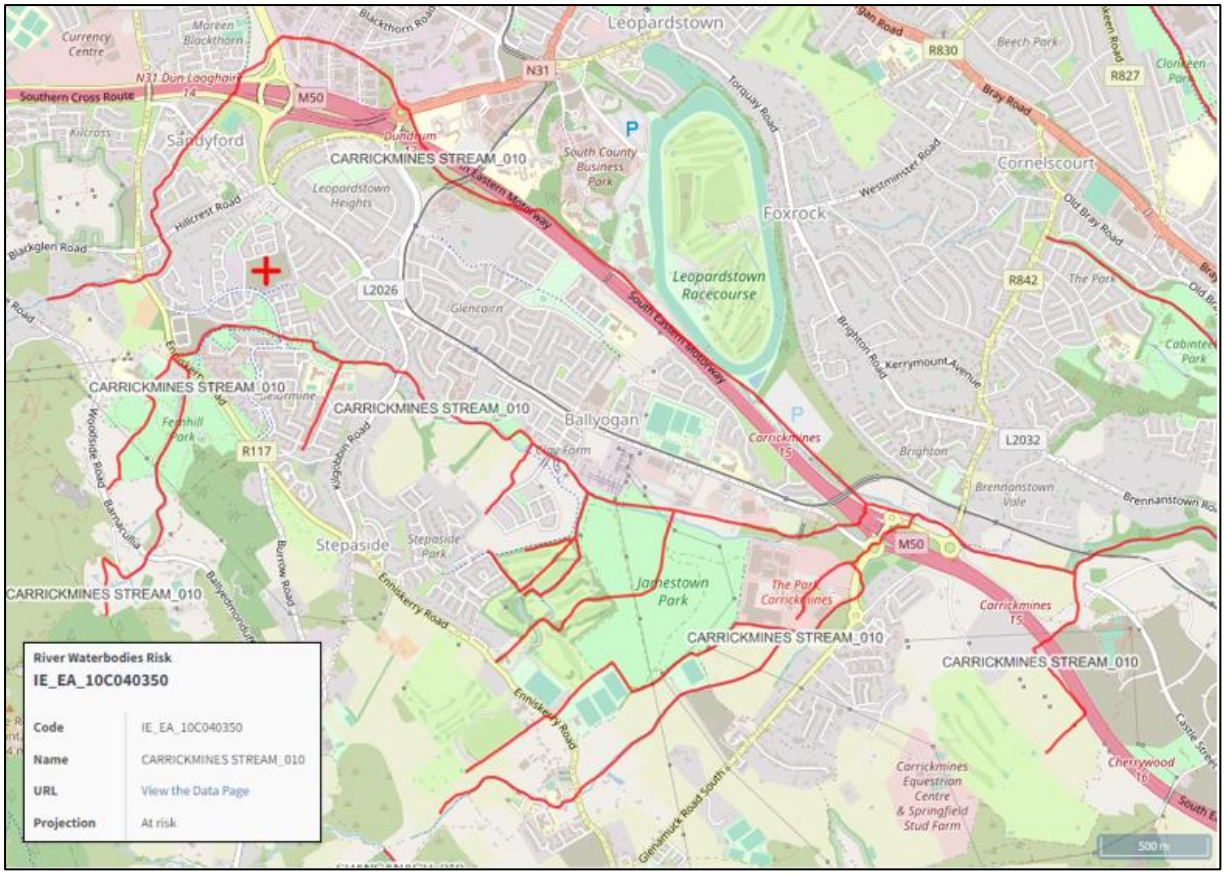

Figure 3.3 River Waterbody Score - 1a 'At risk of not achieving good status, WFD Ecological Status: Poor. (Site location indicated with red cross).

As a whole, the Dargle Subcatchment (Dargle_SC_010) is considered to have an ecological status of *Moderate* to *High*. This is based on current monitoring carried out at this catchment level along the subcatchment refer to Figure 3.4 below.

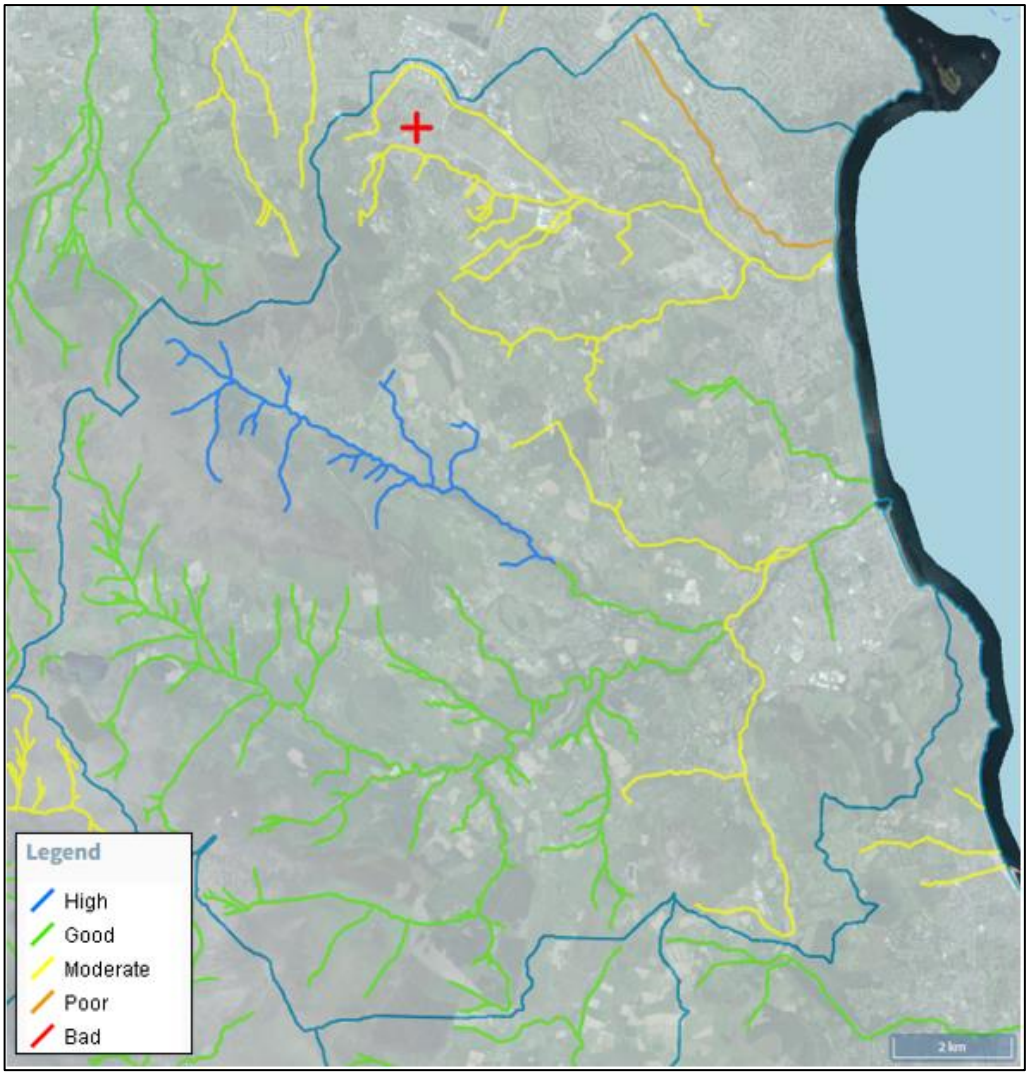

Figure 3.4 *Surface Water Quality for the Dargle Catchment (Dargle_SC_010), EPA, 2022.*

The inputting surface waterbodies into this catchment are the Carrickmines_Stream_010, Dargle_010, Dargle_030, Glencullen_010, Kill of the Grange_010, Kilmacanoge_010 and Shanganagh_010 (which is receptor of the Carrickmines Stream). The majority of these waterbodies are classed as *Moderate, Good* and *High*.

Based on the available monitoring data for the Carrickmines_Stream_010, this is classed as *Moderate* due to its Biological (Invertebrate) Status or Potential. Monitoring is undertaken annually at this location.

The main pressure associated with the Dargle Catchment (Dargle_SC_010) as well as the Carrickmines Stream is mainly agriculture Urban Run-off, Urban Wastewater, Anthropogenic Pressures and Hydromorphology, based on the WFD Cycle 2 report produced by the EPA in January 2019 (www.catchments.ie).

3.5 Background to Groundwater Body Status

Under the WFD, groundwater body status is classified on the basis of quantitative and chemical status. Status is assessed primarily using data collected from the EPA monitoring network; therefore, the scale of assessment means that groundwater status is mainly influenced by larger scale effects such as significant abstraction or widespread/ diffuse pollution. The worst-case classification is assigned as the overall

groundwater body status, in a 'one-out all-out' system. This system is summarised in Figure 3.6 below.

3.5.1 Quantitative Status

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

- **Saline or other intrusions:** 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 (GWDTEs):** This test is designed to identify groundwater bodies where groundwater abstraction is leading to "significant damage" to associated GWDTEs (with respect to water quantity).
- **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, as well as the rate of flow required to meet the ecological needs of associated surface water bodies and GWDTEs.

3.5.2 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 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 ormore groundwater abstractions.
- **Surface water:** This test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the chemical status of associated surface water bodies.
- **Groundwater Dependent Terrestrial Ecosystems (GWDTEs):** This test is designed to identify groundwater bodies where groundwater abstraction is leading to "significant damage" to associated GWDTE's (with respect to water quality).
- **Drinking Water Protected Areas (DrWPAs):** This test is designed to identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WFD or at risk of failing in the future.
- **General quality assessment:** This test is designed to identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater.

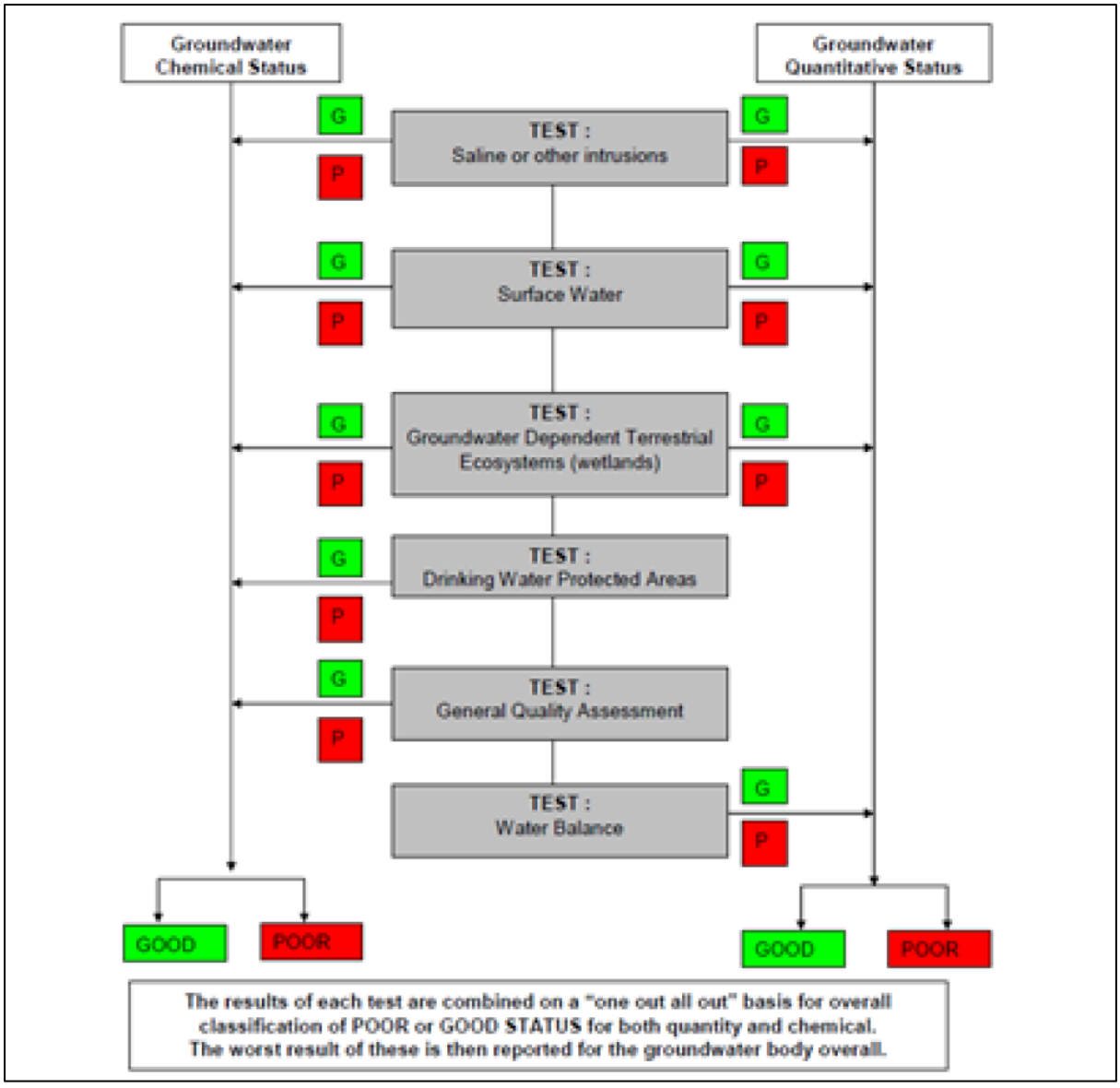

Figure 3.6 *WFD classification elements for groundwater body status (Environmental Agency, 2015)*

3.6 Groundwater Water Status

Aquifer Classification

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km^2), well yield (m^3/d), specific capacity ($m^3/d/m$) and groundwater throughput (mm^3/d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

The bedrock aquifer underlying the site according to the GSI (www.gsi.ie/mapping) National Draft Bedrock Aquifer Map is classified as a (*Pl*) *Poor Aquifer - Generally Unproductive except for Local Zones* on the eastern portion of the site.

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/ fractures, the main feature that protects groundwater from contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of/ or of mixtures of peat, sand, gravel, glacial till, clays or silts).

Groundwater Vulnerability is a term used to represent the natural ground characteristics that determine the ease with which groundwater may be contaminated by human activities. The GSI currently classifies the aquifer vulnerability in the region of the subject site as '*High (H)'* to '*Extreme (E)*' which indicates an overburden depth of 0-5m of low permeability soil present. Local site investigation carried out in 2018 is consistent with this classification as granite bedrock was encountered at depths between 2.7m and 4.2mbgl. As such the vulnerability at the site is considered to be *High to Extreme* vulnerability following the GSI classification system for aquifer vulnerability assessment.

Groundwater Quality

The Water Framework Directive (WFD) 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater, transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present. 'Good Status' was to be achieved in all waters by 2015, as well as maintaining 'high status' where the status already exists. The EPA co-ordinates the activities of the River Basin Districts, local authorities and state agencies in implementing the directive, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland.

The Groundwater Body (GWB) underlying the site is the Wicklow GWB (EU Groundwater Body Code: IE_EA_G_076). Currently, the EPA (2022) classifies the Wicklow GWB as having *'Good Status'*, with a Ground Waterbody Risk score of *'under review'*. The Wicklow GWB has a *Good Status* for chemical and quantitative categories. Therefore, the overall status is considered *Good*.

During the site investigation carried out in July 2018, no groundwater ingress was observed during the course of drilling. However, water levels of 2.9 and 4.2 mbgl were recorded at 2 no. locations with installed standpipes on completion of drilling (BH7 and BH8). Site investigations did not include groundwater monitoring.

4.0 ASSESSMENT METHODOLOGY

4.1 Introduction

As stated above (Section 1.2) proposed developments that have the potential to impact on current or predicted WFD status are required to assess their compliance against the objectives defined for potentially affected water bodies.

4.2 No Deterioration Assessment

The no deterioration baseline for each water body is the status that is reported in Section 3.4 Surface Water Quality and Section 3.6 Groundwater Quality. There are no '*high status'* waterbodies within the study area, while the underlying bedrock aquifer is considered '*Good status'*.

4.2.1 Surface Water No Deterioration Assessment

Table 4.1 below presents the matrix used to assess the effect of the proposed development on surface water status or potential class. It ranges from a major beneficial effect (i.e., a positive change in overall WFD status) through no effect to deterioration in overall status class. The colour coding used in Table 4.1 is applied to the spreadsheet assessment in Appendix A.

Table 4-1 *Surface Water Assessment Matrix*

Effect	Description/ Criteria	Outcome
Major Beneficial	Impacts that taken on their own or in combination with others have the potential to lead to the improvement in the ecological status or potential of a WFD quality element for the entire waterbody	Increase in status of one or more WFD element giving rise to a predicted rise in status class for that waterbody.
Minor/ localised beneficial	Impacts when taken on their own or in combination with others have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the waterbody or any quality elements	Localised improvement, no change in status of WFD element
No Impact	No measurable change to any quality elements.	No change
Localised / temporary adverse effect	Impacts when taken on their own or in combination with others have the potential to lead to a minor localised or temporary deterioration that does not affect the overall WFD status of the waterbody or any quality elements. Consideration will be given to habitat creation measures.	Localised deterioration, no change in status of WFD element when balanced against mitigation measures embedded in the project.
Adverse effect on class of WFD element	Impacts when taken on their own or in combination with others have the potential to lead to the deterioration in the WFD status class of one or more biological quality elements, but not in the overall status of the waterbody. Consideration will be given to habitat creation measures.	Decrease in status of WFD element when balanced against positive measures embedded in the project.

Adverse effect on overall WFD class of waterbody	Impacts when taken on their own or in combination with others have the potential to lead to the deterioration in the ecological status or potential of a WFD quality element, which then lead to a deterioration of status/potential of waterbody.	Decrease in status of overall WFD waterbody status when balanced against positive measures embedded in the project.

4.2.2 Groundwater No Deterioration Assessment

Table 4.2 below presents the matrix used to assess the effect of the proposed development on groundwater status class. It ranges from a beneficial effect but no change in status to deterioration in overall status class. The colour coding used in Table 4.2 is applied to the spreadsheet assessment in Appendix A.

Table 4-2 *Groundwater Assessment Matrix*

Magnitude of Impact of the proposed development on WFD Element	**Effect on WFD Element within the assessment boundary**	**Effect on Status of WFD element at the Groundwater Body Scale**
Impacts lead to beneficial effect	Combined impacts have the potential to have a beneficial effect on the WFD element.	Improvement but no change to status of WFD element
No measurable change to groundwater levels or quality.	No measurable change to WFD elements.	No change and no deterioration in status of WFD element
Impacts when taken on their own have the potential to lead to a minor localised or temporary effect	Combined impacts have the potential to lead to a minor localised or temporary adverse effect on the WFD element.	Combined impacts have the potential to lead to a minor localised or temporary effect on the WFD element. No change to status of WFD element and no significant deterioration at groundwater body scale.
Impacts when taken on their own have the potential to lead to a widespread or prolonged effect.	Combined impacts have the potential to have an adverse effect on the WFD element.	Combined impacts have the potential to have an adverse effect on the WFD element, resulting in significant deterioration but no change in status class at groundwater body scale.
Impacts when taken on their own have the potential to lead to a significant effect.	Combined impacts in combination with others have the potential to have a significant adverse effect on the WFD element.	Combined impacts in combination with others have the potential to have an adverse effect on the WFD element AND change its status at the groundwater body scale

4.3 Future Status Objectives

RBMPs are used to outline water body pressures and the actions that are required to address them. The future status objective assessment considers the ecological potential of a surface water body and the mitigation measures that defined the ecological potential. Assessments in this project are based on mitigation measures defined in the Outline CEMP and EIAR which will not impact on the WFD status and risk as well as the objectives set out in the 2nd Cycle RBMP 2018-2021 and *draft* 3rd Cycle RBMP 2022-2027. The assessment considers whether the proposed development has the potential to prevent the implementation or impact the effectiveness of the defined measures.

5.0 WATER FRAMEWORK DIRECTIVE ASSESSMENT

5.1 General Approach and Project Details

The WFD Assessment uses a spreadsheet tool to assess the effects of the proposed development on each of the WFD elements (biological, physico-chemical and hydromorphological surface water elements, and quantitative and chemical groundwater elements).

Both the surface water assessment and the groundwater assessment examine the potential effects of the proposed development, which includes the construction and operation of data centre buildings and associated services. A full description of the proposed development is detailed in the EIA Screening.

In terms of the construction phase, a Construction Management Plan has been prepared for planning which details project-specific construction methodologies. A project-specific CEMP will be prepared and maintained by the appointed contractors during the construction phase of the proposed project. The CEMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the CEMP. At a minimum, the manual will be formulated in consideration of the standard best international practice including, but not limited, to:

- CIRIA, (2001), *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532)* Construction Industry Research and Information Association;
- CIRIA (2002) *Control of water pollution from construction sites: guidance for consultants and contractors (SPI56)* Construction Industry Research and Information Association;
- CIRIA (2005), *Environmental Good Practice on Site* (C650); Construction Industry Research and Information Association;
- BPGCS005, *Oil Storage Guidelines*;
- CIRIA 697 (2007), *The SUDS Manual*; and
- *UK Pollution Prevention Guidelines,* (PPG) UK Environment Agency, 2004.

In terms of the operational phase, the proposed development does not require any bulk chemical storage.

It is proposed that all surface water run-off during the construction and operational phases will be treated and attenuated. In accordance with the requirement of The Greater Dublin Strategic Drainage Study, GDSDS, (DCC 2005) the post development run-off volumes from the site are to match the pre-development levels. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to

ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented.

The SuDS proposals comprise two aspects. The first of these is to reduce the run-off from the site to pre-development greenfield rates**.** The surface water runoff generated from the proposed development will discharge from site through an existing storm water drainage network and through an existing flow control device (limiting the site runoff to a greenfield rate) using an existing connection to the Local Authority storm water drainage network along Village Road. This outfall sewer continues through the park area (west of the Village Road) for approximately 215m before discharging to the Ballyogan Stream via a headwall.

The second aspect of a SuDS protocols is to enhance, as far as is practical, the overall surface water quality. The SuDS features comprise green roofs, permeable paving, petrol interceptors and an underground attenuation system. These features will be provided to cater for up to a 1-in-100 year rainfall event and 20% climate change. In addition, as part of the design, vortex type silt trap/debris separator and the proprietary petrol interceptor are proposed to remove any silts, debris and possible hydrocarbons before the storm water runoff leaves the site and enters Local Authority drainage.

Currently, there is a risk of flooding from the foul water system due to the current capacity of the local network. In order to reduce the risk of flooding from the foul water system, upgrades to the network are required. An underground overflow storage tank with a volume of 500m³ has been proposed to reduce the foul discharge during extreme storm events therefore reducing the flood risk. The tank will provide additional capacity in the wastewater network facilitating this development and others in the area to avoid downstream flooding as a result of storm water inflow through urban development creep entering the foul system. The site of the storage tank is at low risk of flooding. The underground concrete foul storage tank is located adjacent to the Ballyogan Stream (refer to Figure 1.1 above) and is proposed to provide overflow storage to reduce the volume contributing to the treatment plant caused by surface water entering the foul system during extreme storm events. Therefore, flooding from the foul water system can occur if the system capacity is exceeded.

The 500m^3 underground foul tank is designed to reduce the foul discharge during extreme storm events, thereby reducing the flood risk from the foul water network. In the event that this tank potentially fails, a worst-case scenario is considered, where the overflow from the foul network is discharged directly into the stream. The foul peak flow estimated from the development is 14.092 l/s (Drainage Design Report, Kavanagh Burke, 2022).

The area surrounding the tank will be landscaped in order to provide a localised temporary detention basin in case of the pumping system fail. Details are to be agreed with DLRCC.

It should be noted that the development site will not contribute to the potential stormwater overflow to be collected and stored by the foul tank since, as explained above, its surface water drainage is designed to cater for up to a 1-in-100 year rainfall event and 20% climate change.

Key activities for the WFD assessment are as follows:

- **Ground Works:** It is known that ground works will comprise excavation and levelling for foundations, piling (if required) and laying of associated services for the data centre buildings and movement of soil for landscaping purposes.
- **Dewatering:** It is known that no groundwater dewatering or abstraction is required as part of the proposed development. This is based on the available site investigations for the proposed development site, refer to the Ground

Investigation Report (IGSL, 2018) included as Appendix F of the Drainage Design Report.

- **Construction Environmental Management Plan (CEMP):** It is known that suitable plans will be put in place through the project-specific CEMP (secured in the development consent order) in order to reduce risks to the environment.
- **Surface Water Run-off:** It is known that drainage from the proposed development will not have an impact on surface water run-off (and therefore water quality) into the Carrickmines Stream WFD water body due to the implementation of the proposed SuDS techniques across the site.

For surface water, the potential effects identified are as a result of:

- Increased run-off and sediment loading;
- Temporary land-take during the construction phase;
- Pollution due to accidential discharges or spillages during the construction phase;
- Scour during the construction phase;
- Permanent land take (increased hardstanding area) during the operational phase; and
- Accidental discharges and spills during the operational phase, including potential overflow from the underground foul water tank.

For groundwater, the potential effects identified are as a result of:

- Pollution due to discharges or spillages during the construction phase;
  - Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates) – arising from excavation and ground disturbance;
  - Cement/concrete (increase turbidity and pH) – arising from construction materials;
  - Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage;
  - Wastewater (nutrient and microbial rich) – arising from poor on-site toilets and washrooms.
- Excavation of soil and near-surface rock head will be required for levelling of the site to render it suitable for building the building platform. Local removal and reinstatement (including infilling) of the 'protective' topsoil and subsoil cover across the development area at the site will not change the overall vulnerability category for the site which is already *'high to extreme'*. Capping of significant areas of the site by hardstand/ building following construction and installation of drainage will minimise the potential for contamination of the aquifers beneath the site.
- Piling and below ground working causing mobilisation of contaminants during the construction and operational phases.

Appendix A contains the surface water and groundwater assessments where the above potential effects are considered. The colour coded system referred to in Table 4-1 and Table 4-2 above is used to give a visual impression of the assessment.

5.1.1 Summary of Source-Pathway-Receptor (S-P-R) Model

The table below (Table 5.1) describes the S-P-R model for the site and includes the robust mitigation and design measures which will be incorporated into the proposed development throughout the construction and operational phases.

Table 5.1 *Pollutant Linkage Assessment (with mitigation)*

Source	Pathways	Receptors considered	Risk of Impact	Mitigation Measures
Construction Impacts (Summary)				
Unmitigated leak from an oil tank to ground/ unmitigated leak from construction vehicle (1,000 litres worst case scenario).	Bedrock protected by <5m low permeability overburden. Low fracture connectivity within the granite will limit any potential for offsite migration.	Granite bedrock aquifer (Poor Aquifer)	Low risk of migration through poorly connected fracturing within the granite rock mass (Poor Aquifer). No likely impact on the status of the aquifer/off site migration due to mitigation measures (i.e. CEMP), low potential loading, natural attenuation within overburden and discrete nature of fracturing reducing off site migration.	The project-specific CEMP will include robust mitigation measures to protect the underlying hydrogeological environment. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development. These include management of soils, re-fuelling machinery and chemical handling and control of water during the construction phase.
Discharge to ground of runoff water with High pH from cement process/ hydrocarbons from construction vehicles/run-off containing a high concentration of suspended solids	Indirect pathway to hydrological environment via stormwater drainage	Hydrological environment (Ballyogan and Carrickmines Streams)	No perceptible risk due to the implementation of the mitigation measures (included in CEMP).	
Operational Impacts (Summary)				
Discharge of untreated water off-site	Indirect pathway to hydrological environment via surface water drainage system	Hydrological environment (Ballyogan and Carrickmines Streams)	No perceptible risk due to the implementation of the mitigation and design measures which includes SuDS techniques and the use of interceptors along the drainage system.	The proposed development is designed to ensure the protection of the hydrological environment such as delivery and distribution and use of oil interceptors on the stormwater system and the use of SuDS techniques. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented.

Overflow from underground foul tank to Ballyogan Stream (14.092 l/s worst case scenario)	Direct pathway to hydrological environment	Hydrological environment (Ballyogan and Carrickmines Streams)	No perceptible risk due to the implementation of the mitigation and design measures which includes a detention basin in case of the pumping system fail.	The area surrounding the tank will be landscaped in order to provide a localised temporary detention basin to contain the receiving peak flow in case of the pumping system fail. Details are to be agreed with DLRCC.

5.2 No Deterioration Assessment

5.2.1 Hydrological Environment

The proposed development has an indirect hydrological connection to the Ballyogan Stream (Carrickmines Stream_010 WFD surface waterbody) as the proposed stormwater drainage discharges into an existing public sewer which ultimately discharges to the Ballyogan Stream and ultimately into the Irish Sea.

There are mitigation and design measures which will be implemented during the construction phase to protect the hydrological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment.

There is no dewatering required for the proposed development. As such the proposed development will not have an impact on the quantitative aspects in consideration of water body status.

The project-specific CEMP which the works Contractor will develop will implement strict mitigation measures to ensure the protection of the hydrological (and hydrogeological) environment during construction which will ensure that there will be no negative impact on the quantitative or qualitative or morphology of the nearby watercourses.

The CEMP and the project-specific CEMP as well as mitigation measures set out in the EIA Screening Assessment and mentioned above will mitigate potential impacts on the surrounding hydrological environment from accidental spillages during construction.

There is no direct hydrological connection during the construction phase to the off-site waterbodies.

There are limited discharges of water during the operational phase to any open waterbody/ watercourse and no long-term groundwater dewatering for the proposed development. The discharges will be adequately treated via SuDS measures, hydrobrake (or equivalent) and oil/water interceptor to ensure there is no long-term negative impact to the WFD water quality status of the receiving watercourse. The SuDS and proposed measures have been designed in detail with the ultimate aim of protecting the hydrological (& hydrogeological) environment. The SuDS and project design measures will be maintained correctly as per specifications to ensure long-term/ on-going integrity of same.

The underground tank will be provide with a localised temporary detention basin in case of the pumping system fail. Details are to be agreed with DLRCC.

There are no proposed diversions of any drainage ditches or waterbodies as part of the proposed development.

There is no dewatering associated with the construction and operational phases, hence there is no impact on the hydrological environment in terms of baseflow.

Overall, the potential effects on the WFD status to the waterbodies are considered *no impact i.e. no change to the WFD status or elements in terms of the hydrological environment*.

5.2.2 Wicklow Groundwater Body (GWB)

The proposed development does not involve groundwater dewatering, which limits the potential construction impacts of the proposed development on the underlying groundwater body. During operation there is no current proposal for dewatering.

For the construction phase, there are mitigation and design measures which will be implemented during this phase to protect the hydrogeological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of the underlying bedrock aquifer long-term and as such will not impact on trends in water quality and over all status assessment.

There will be limited impact on the surrounding hydrogeological environment from the activity of dewatering as there is no dewatering required for the proposed development. As such the proposed development will not have an impact on the quantitative aspects in consideration of water body status.

The project-specific CEMP which the works Contractor will develop will implement strict mitigation measures to ensure the protection of the hydrogeological environment during construction which will ensure that there will be no negative impact on the quantitative or qualitative of the underlying bedrock granite aquifer (Wicklow GWB).

In terms of the operational phase, the risk to the aquifer is considered to be low due to the use of oil interceptors on the stormwater system prior to discharge from the site.

Overall, the potential effects on the WFD status to the waterbodies are considered *no impact i.e. no change to the WFD status or elements in terms of the underlying hydrogeological environment*.

5.3 Future Good Status

Currently, the EPA classifies the WFD Ecological Status for the Ballyogan waterbody as having '*Moderate Status'* (2013-2018) based on current monitoring with a current WFD River Waterbody risk score of 1a, '*At risk of not achieving good status'.* The Ballyogan Stream is grouped with the Carrickmines Stream_010 waterbody. Therefore, the objective is currently not being achieved. The main pressure associated with the Ballyogan Stream (Carrickmined Stream_010) is mainly urban run-off based on the WFD Cycle 2 report produced by the EPA in January 2019 (www.catchments.ie).

As mentioned above, the main pressure is run-off. The discharges associated with the proposed development will be treated and attenuated in order to reduce the run-off from the site to pre-development greenfield rates. The surface water runoff generated from the proposed development will discharge from site through an existing storm water drainage network and through an existing flow control device (limiting the site runoff to a greenfield rate) using an existing connection to the Local Authority storm water drainage network along Village Road. Therefore, the proposed development will not have any discharges which will hinder catchment improvement measures.

The 2nd cycle of the RBMP 2018-2021 does not include the Dargle Subcatchment or the Carrickmines River as an Area for Action, and therefore has not been highlighted for restoration by the *draft* 3rd cycle of the RBMP 2022-2027. However, the key objective for this waterbody is to have a *Good* status by 2027.

The objective of the Wicklow GWB is Good for 2018. Therefore, the objective is currently being met.

At present there are no local targeted measures within the catchments to maintain or achieve improvements to the status of the water bodies. However, the following are some pressures associated with waterbody catchments:

- Physical Modifications.
- Management of pollution from agricultural activities.
- Management of pollution from sewage and waste water.
- Management of pollution from urban environments.
- Changes to natural flow and levels of water.
- Managing invasive non-native species.

Based on the above information it is not considered that any of the aspects of the proposed development will prevent the WFD objectives from being achieved or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

6.0 CONCLUSIONS

The WFD assessment indicates that, based on the current understanding of the proposed development, there is no potential for adverse or minor temporary/ long-term or localised effects on the Ballyogan or Carrickmines surface water body. Therefore, it has been assessed that the proposed development will not cause any significant deterioration or change in water body status or prevent attainment, or potential to achieve, future good status or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

The WFD assessment indicates that there is no potential for adverse or minor temporary or localised effects on the Wicklow groundwater body. Therefore, it has been assessed that it is unlikely that the proposed development will cause any significant deterioration or change in water body status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

No further assessment of WFD is recommended given that no significant deterioration or change in water body status is expected based on the current understanding of the proposed development during construction and operation.

7.0 STUDY LIMITATIONS

The conclusions and recommendations listed above are based on our current understanding of the site. This has been formed from review of historical maps, review of current and previous environmental and engineering reports for the proposed development site. This information is taken as being accurate and true.

Public databases held by the EPA, GSI, OPW, NPWS and OSI have been consulted and the most recent available data has been referenced.

No subsurface or destructive testing was carried out as part of this assessment.

8.0 REFERENCES

- EPA, (2022). Environmental Protection Agency, on-line mapping; Available on-line at: http://gis.epa.ie/Envision [Accessed: 23-08-2022].
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- OPW, (2020). The National Preliminary Flood Risk Assessment (PFRA) Overview Report; Flood Relief & Risk Management Division, Engineering Services, Office of Public Works (OPW).
- OPW, (2022). Office of Public Works; Available on-line at: www.opw.ie [Accessed: 23-08-2022].
- Ordnance Survey of Ireland (OSI)
- Teagasc subsoil database
- River Basin Management Plan for Ireland 2018-2021.
- *Draft* River Basin Management Plan for Ireland 2022-2027.
- Dun Laoghaire Rathdown County Development Plan 2022-2028.
- *Draft* Fingal County Development Plan 2023-2029 – with special attention to the water-related policies.
- Kavanagh Burke Consulting Engineers (2022). Drainage Design Report for Residential Development at Sector 3, Aiken's Village, Stepaside, Dublin 18, which accompanies planning application.
- JBA Consulting (2022). Flood Risk Assessment. Sector 3, Aiken's Village, Stepaside, Dublin 18, which accompanies planning application.
- Ground Investigation Report. Project Ironborn, Stepaside, Dublin 18. IGSL. July, 2018 (included as Appendix F of Drainage Design Report).

APPENDIX A

WATER FRAMEWORK DIRECTIVE ASSESSMENT MATRIX

Risk screening of potential to cause deterioration of current WFD status

	Surface Water	Scheme Elements	**Data Centre Development**						Mitigation Measures	Overall Impact with mitgation measures
	Carrickmines Stream_10	Phase (Construction/ Operation)	Construction	Construction	Construction	Construction	Operation	Operation		
	Dargle_SC_010	Identified Quantitative Impacts	Increased run-off and sediment loading	Temporary land-take during the construction phase	Pollution due to accidental discharges or spillages during the construction phase	Scour during the construction phase	Increase in Hardstanding	Storage of Fuel		
WFD Status	Macrophytes and phytobenthos - combined	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	**Construction:** The project-specific CEMP will include robust mitigation measures to protect the underlying hydrogeological environment. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development. These include management of soils, re-fuelling machinery and chemical handling and control of water during the construction phase. **Operation:** The proposed development is designed to ensure the protection of the hydrological environment such as delivery and distribution and use of oil interceptors on the stormwater system and the use of SuDS techniques. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented. The area surrounding the underground foul tank will be landscaped in order to provide a localised temporary detention basin to contain the receiving peak flow in case of the pumping system fail. Details are to be agreed with DLRCC	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Macroinvertebrates		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Fish		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
Physio-Chemical Status	Total Ammonia	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Total Nitrogen		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Ortho-Phosphate		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
Hydromorphological Elements	Quantity and dynamics of river flow	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Connection to Groundwater		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	River continuity		Not Applicable.	Not Applicable.	Not Applicable.	Not Applicable.	Not Applicable.	Not Applicable.		Not Applicable.
	River depth and width variation bed		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Structure and substrate of river bed		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Structure of riparian zone		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status

Risk screening of potential to cause deterioration of current WFD status								
	Groundwater	Scheme Elements	**Data Centre Development**				Mitigation Measures	Overall Impact
	IE_EA_G_076	Phase (Construction/ Operation)	Construction	Construction	Operation	Operation		
	Wicklow GWB	Identified Quantitative Impacts	Increased run-off and sediment loading	Pollution due to accidental discharges or spillages during the construction phase	Increase in Hardstanding	Storage of Fuel		
Quantitative Elements	**Saline or other intrusions.** To identify groundwater bodies where the intrusion of poor quality water as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	To Note: No direct discharge to ground or signifcant abstraction. **Construction:** The project-specific CEMP will include robust mitigation measures to protect the underlying hydrogeological environment. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development. These include management of soils, re-fuelling machinery and chemical handling and control of water during the construction phase. No signficant dewatering is required which could impact on quantitaive status. **Operation:** The proposed development is designed to ensure the protection of the underlying hydrogeological environment such as use of oil interceptors on the stormwater system and prior to discharge from the site and the use of SuDS techniques. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented. No signficant abstraction is required which could impact on quantitaive status.	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Surface water. To assess the impact of groundwater abstractions on the ecological status of surface water bodies.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Groundwater Dependent Terrestrial Ecosystems (GWDTE's) To assess the impact of groundwater abstractions on the condition of GWDTE'S.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Water balance To identify groundwater bodies where abstractions exceed the available resource.		Not Applicable (no dewatering anticipated)	Not Applicable (no dewatering anticipated)	Not Applicable (no water supply from borehole anticipated)	Not Applicable (no water supply from borehole anticipated)		Not Applicable
Chemical Elements	**Saline or other intrusions.** To identify groundwater bodies where the intrusion of poor quality water as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Surface water. To assess the impact of groundwater abstractions on the ecological status of surface water bodies.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Groundwater Dependent Terrestrial Ecosystems (GWDTE's) To assess the impact of nutrient concentrations in groundwater (primarily phosphates) on GWDTE's.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Drinking Water Protected Areas (DrWPAs) To identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WFD or at risk of failing in the future.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	General quality assessment To identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status