UWF Grid Connection

Environmental Management Plan (2019)

Tab 3

Surface Water Management Plan

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UWF GRID CONNECTION

CONSTRUCTION PHASE SURFACE WATER MANAGEMENT PLAN

PREPARED FOR:

ECOPOWER DEVELOPMENTS LTD

PREPARED BY:

HYDRO-ENVIRONMENTAL SERVICES

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1. INTRODUCTION

1.1 Background

This document presents a Surface Water Management Plan and pollution prevention measures which will be implemented during the construction of the UWF Grid Connection, Co. Tipperary. The location of the UWF Grid Connection is shown on in black on **Figure A** (over).

This Surface Water Management Plan (SWMP) provides the water management framework for the appointed Contractors and Sub-contractors and it incorporates the mitigating principles described in the accompanying Environmental Impact Assessment Report (EIAR) submitted by Ecopower Developments Ltd (November 2019, refer to Chapter 11 – Water) to ensure that construction works are carried out with minimal impact on the surface water environment and in accordance with the mitigation measures and project design commitments made in the EIAR.

This report describes the existing geological and hydrological environment, and then sets out the water protection measures which will be implemented for surface water management during the construction of the UWF Grid Connection. The SWMP also outlines the surface water monitoring plan for the construction of the development.

The Surface Water Management Plan for the UWF Grid Connection was developed by Hydro-Environmental Services. This plan has been prepared in part through consultation with Inland Fisheries Ireland.

1.2 Description of the Development, Site and Topography

The UWF Grid Connection comprises the following main proposed elements:

- Mountphilips Substation near Newport, Co. Tipperary
- Mountphilips – Upperchurch 110kV Underground Cables (110kV UGC) – 30.5km
- Ancillary Works at the Mountphilips Substation site

The project comprises of a 110kV substation at Mountphilips near Newport, the Mountphilips – Upperchurch 110kV Underground Grid Connection (30.5km), 29km of which is along paved roads (mainly (22km) along the Regional Road R503) and Ancillary Works at the Mountphilips Substation site such as new permanent entrance, new permanent access road and associated drainage.

The Mountphilips Substation is proposed for a location 160m east of the existing Killonan - Nenagh 110kV line in agricultural grassland in Mountphilips townland, 2km north of Newport, Co. Tipperary. The Mountphilips Substation is located on a low-lying, north-south trending ridge with the slope of the site being to the west/southwest. The current land use is grassland. The elevation of the site is at approximately 70m OD. To facilitate construction and operational access to the Mountphilips Substation a new permanent access road will be constructed. This new access road will include new permanent crossings structures over field drains and a small headwater stream.

The 110kV UGC will connect the Mountphilips Substation to the Consented UWF Substation, through the installation of underground cables. The route of the underground cables, which is c.30.5km in length, will follow a generally west/east course along the local road network around Newport town, then along the R503, and then along the local road network, and then along a private paved road to the Consented UWF Substation location. The watercourses intersected range from drains / small headwater streams to larger rivers such as the Newport River, Clare River and Bilboa River.

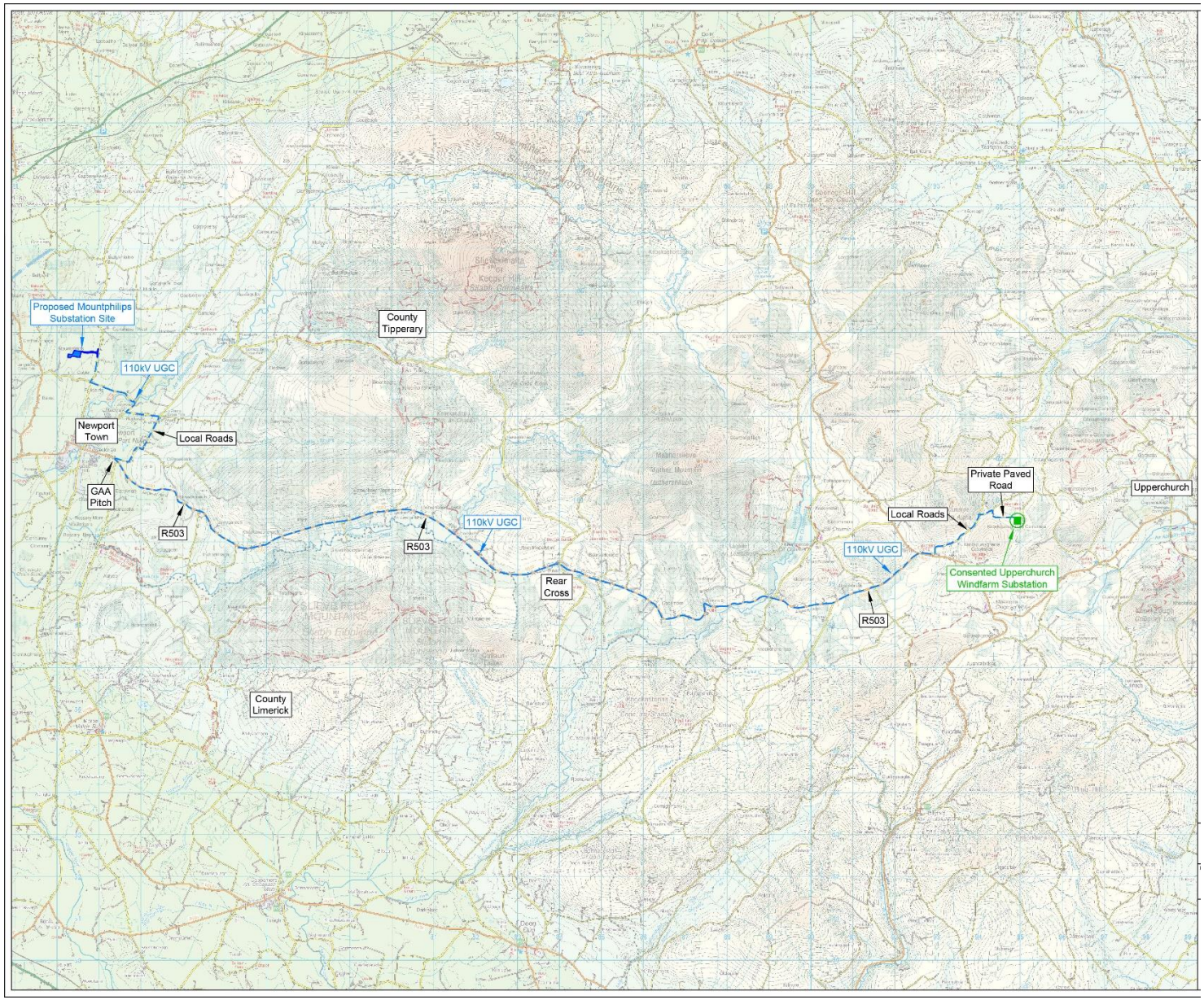


Figure A: Site Location Map

1.3 Description of Watercourses at Construction Works Areas

There is a total of 68 no. watercourses within the construction works areas associated with the UWF Grid Connection;

- 3 no. of these are at the Mountphilips Substation site (2 no. of these watercourses are new permanent crossings located along the new access road to Mountphilips Substation, the remaining 1 no. watercourse crossing is a temporary crossing between Mountphilips and the End Masts);
- 63 no. watercourse crossings are located along the route of the 110kV UGC on the public road network (road numbers: L2166-10, L6013-0, L2156-0, L2157-0, L6009-0, R503, L2264-50, L6188-0);
- the remaining 2 no. are existing culverts located along the paved private road between the local road network and the location of the Consented UWF Substation on the eastern extremity of the 110kV UGC.

The 65 no. existing watercourse crossings along the 110kV UGC where it occurs outside of the Mountphilips Substation site (i.e. between the Mountphilips Substation site entrance and the Consented UWF Substation location) are summarized in Table 1 below.

Table 1: Existing watercourse crossings along the route of the 110kV UGC outside the Mountphilips Substation site (*roads listed from west to east)*

Road No.	No. of culverts	No. of bridges	Potential culvert replacement
L-2166-10	1	0	0
L-6013-0	1	1	0
L2156-0	0	1	0
L2157-0	0	0	0
L6009-0	0	2	0
R-503	41	11	12
L-2264-50	3	0	1
L-6188-0	2	0	0
Private paved road	2	0	0

1.4 Outline of the Surface Water Management Plan

This document aims to set out the procedures and operations to be utilised on the UWF Grid Connection project to mitigate against any water related environmental impacts. The Project Design Environmental Protection Measures and best practice measures outlined herein will be employed on site during the construction phase of the project.

The main areas of water related concerns covered by this document are:

a) Measures for protection of surface water quality during watercourse crossing works, earthworks, and overburden storage
b) Measures for protection of surface water quality during fuel usage and storage, and during the use of cement based compounds;
c) Measures for protection of surface water quality when working at or near existing streams / watercourses;
d) Design of new permanent watercourse crossing structures to prevent flood risk; and,
e) Protection of local surface water supplies during construction works.

1.5 SWMP Report Status

The SWMP is considered a live document and will be modified over time as detailed contractor methods of work are developed. If the development is permitted an updated version of this document will be issued to all parties involved in the construction process as necessary.

1.6 Relevant Legislation & Guidance

All surface water control measures relating to the UWF Grid Connection will be constructed using best practice and in conformance with the requirements of the relevant regulatory authorities. The key legislation which will be adhered to are defined as follows:

- Water Framework Directive (2000/60/EC);
- Local Government (Water Pollution) Act, 1977–1990;
- Water Quality (Dangerous Substances) Regulations, 2000;
- Arterial Drainage Act, 1945;
- S.I. No. 41 of 1999 Protection of Groundwater Regulations, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);
- S.I. No. 249 of 1989 Quality of Surface Water Intended for Abstraction (Drinking Water), resulting from EU Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water in the Member States (repealed by 2000/60/EC in 2007);
- S.I. No. 439 of 2000 Quality of Water intended for Human Consumption Regulations and S.I. No. 122 of 2014 European Communities (Drinking Water) Regulations;
- S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations; and,
- S.I. No. 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010.

1.7 Drainage and Surface water Quality Management Guidance Documentation

The key drainage and water quality guidance documentation relevant to this project are defined set out as follows:

Watercourse crossing works guidance

- Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters;
- NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes;
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. Eastern Regional Fisheries Board,
- OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts.

Pollution Prevention Guidance Notes (PPGs):

- PPG01 General guide to the prevention of water pollution;
- PPG02 Above ground oil storage tanks;
- PPG05 Works in near or liable to affect watercourses;
- PPG06 Working at construction and demolition sites;
- PPG07 Refuelling Facilities;
- PPG11 Preventing pollution at industrial sites;
- PPG18 Control of spillages and fire fighting run-off;
- PPG20 Dewatering underground ducts and chambers;
- PPG21 Pollution Incident Response Planning;
- PPG23 Maintenance of Structures over Water; and,
- PPG26 Pollution Prevention Storage and Handling of Drums & Intermediate Bulk Containers.

Construction Industry Research and Information Association (CIRIA):

- CIRIA Report C502 Environmental Good Practice on Site;
- CIRIA Report C532 Control of Water Pollution from Construction Sites;
- CIRIA Report C648 Control of Pollution from Linear Construction Project; Technical Guidance;
- CIRIA Handbook C650 Environmental good practice on site;
- CIRIA Handbook C651 Environmental good practice on site checklist;
- CIRIA Report C609 - SuDS – hydraulic, structural & water quality advice; and,
- CIRIA Report C697 – The SuDS Manual.

2. EXISTING HYDROLOGICAL REGIME

2.1 Introduction

The existing geological and hydrological environment along the route is assessed in Chapter 10 (Soils) and Chapter 11 (Water) of the EIAR (Ecopower Developments Ltd, 2019) for the UWF Grid Connection. Only a brief summary of geological and hydrological data is provided below in order to put the SWMP into perspective.

2.1.1 Existing Geological Regime

The superficial geology (*i.e.* overburden) at the UWF Grid Connection locations comprises poorly draining mineral or peaty topsoil over glacial tills. Alluvium and fluvio-glacial sand and gravels are present along the larger watercourses such as the Newport River, Bilboa River and Clare River.

The underlying bedrock in the study area comprises a mixture of sandstone, limestone and volcanic meta-sediments, with the latter being most predominant.

2.2 Existing Hydrogeological Regime

The proposed development is located within 2 no. local groundwater bodies (GWBs) - the Slieve Phelim GWB and the Templemore A GWB. Both these GWBs have been classified as "Good Status" by the Water Framework Directive (WFD) characterisation process.

Within the Slieve Phelim GWB, the construction works areas are underlain by both Poor Bedrock Aquifers and Locally Important Aquifers with the former being more dominant. Within the Templemore A GWB, the construction works areas are completely underlain by Poor Bedrock Aquifers.

In general, the groundwater flow regime of both bedrock types is typically poorly productive. These bedrock aquifers generally have no inter-granular permeability. Groundwater flows within fractures and faults are more likely to occur within the Locally Important Aquifers rather than within the Poor Aquifers.

Local groundwater flow directions will mimic topography whereby flow paths will be from topographic high points to lower elevated discharge areas at local streams and rivers.

2.2.1 Existing Hydrological Regime

On a regional scale the UWF Grid Connection is located within the River Shannon and the River Suir surface water catchments. Approximately 29km of the 30.5km 110kV UGC route (including the Mountphilips Substation) is located in the River Shannon catchment while the remainder (1.5km) is located within the River Suir catchment.

Within the River Shannon catchment, the 110kV UGC route and the Mountphilips Substation site exist within the Lower Shannon & Mulkear hydrometric area. The sub-catchments within the Lower Shannon & Mulkear hydrometric area that the UWF Grid Connection passes through (list from west to east) include the Killeengarriff_SC_010, Newport (Tipperary)_SC_010, and Bilboa_SC_010. Within the River Suir catchment the route of the 110kV UGC (1.5km of the total 30.5km), exists within the Suir_SC_030 sub-catchment.

A Local hydrology map is attached in Section 5 of this SWMP as **Figure SWMP 1:** Local Hydrology Map.

The UWF Grid Connection crosses 68 no. watercourses, 3 no. of which are at the Mountphilips Substation site in the Ballyard_010 local surface water body of the Killeengarriff_SC_010 subcatchment. The remaining 65 no. watercourses are located along the route of the 110kV UGC on the road network outside the Mountphilips

Substation site. The spread of the 65 no. watercourse crossings within each sub-catchment, along with the extent of 110kV UGC works in each catchment is shown in Error! Reference source not found. below.

Table 2: Summary of Regional Hydrology, Local Hydrology and Proposed 110kV UGC Infrastructure

Regional Catchment	EPA Sub-Catchments[1]	EPA - Local Surface Water Bodies[2]	Length of 110kV UGC (km)	No. Water-course Crossings (all exist)	Potential Culvert Replace-ment Works	Works to road level/ parapet walls at bridges	No. Joint Bays
Shannon	Killeengarriff_SC_010	Ballyard_010	1.3	1	0	0	1
	Newport (Tipperary)_SC_010	Newport_040	3.5	5	0	1	6
	Killeengarriff_SC_010	Annagh(Tipperary)_030	4	7	0	0	5
		Annagh(Tipperary)_020	8.4	23	8	1	11
	Bilboa_SC_010	Bilboa_010	6.4	18	2	1	10
		Inch (Bilboa)_010	5.4	6	2	0	7
Suir	Suir_SC_030	Clodiagh (Tipperary)_010	1.5	5	1	0	2

1 Catchments are listed west to east along the 110kV route from the Mountphilips Substation site entrance to the Consented UWF Substation
2 Catchment areas as now defined in https://gis.epa.ie/EPAMaps/

2.2.2 Local Drainage Features

A detailed survey of all watercourse crossings along the UWF Grid Connection was completed as part of the EIAR assessment. The walkover surveys were completed in the winter and spring months of 2019 and therefore streams and rivers were seen in medium to high flow conditions.

Due to the upland nature of the majority of the UWF Grid Connection, many of the watercourses intercepted by the works area are small headwater streams or drains. A summary of the watercourse types intercepted by the UWF Grid Connection are shown in **Table 3** below. The locations of the Local Surface Water crossings are shown on **Figure SWMP 2:** Local Surface Water Crossing Locations, see section 5.

The main watercourse crossings along the UWF Grid Connection include the Newport River, Clare River and the Bilboa River. These 110kV UGC works across these watercourse crossings are located along the public road within the bridge structures. Works to the road level and parapet wall heights will be required at all three bridges. The Newport River will be crossed by installing cable in the Rockvale Bridge north of Newport town The Clare River will be crossed by installing cable in the Tooreenbrien Bridge on the R503. And the Bilboa River will be crossed by installing cable in the Anglesey Bridge on the R503.

While the Mountphilips Substation is located in a low lying location, most of the 110kV UGC is located across the lower slopes of an upland area, and consequently the watercourse crossings comprise mainly drains along with several headwater streams (1st – 2nd order).

Table 3: Watercourse Crossing Types along the 110kv UGC

Type	Watercourse Description	Total No.
1	EPA mapped blue line, major river or stream	13
2	Headwater Stream, equivalent to EPA blue line but not mapped	3
3	Ephemeral watercourse, heavily vegetated with low or no flow during dry periods	27
4	Manmade Drain	25
	Total	**68**

2.3 Flood Risk Assessment

The OPW Indicative Flood Maps have no records of recurring flood incidences along the UWF Grid Connection areas or immediately downstream of them (**Figure B** over, refers). The closest mapped recurring flooding event is mapped at Derryleigh, 350m south of the UWF Grid Connection route.

There are further afield recurring flood incidences mapped to the west of the Mountphilips Substation and west of the 110kV UGC in the town of Newport.

Where complete the Catchment Flood Risk Assessment and Management (CFRAM)[1] OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the Preliminary Flood Risk Assessment Maps (PFRA) maps. CFRAM mapping is largely only available for watercourses downstream of the 110kV UGC route at Newport and therefore the PFRA mapping was consulted.

The PFRA mapping indicates that fluvial flooding along the 110kV UGC route is relatively localised to the larger stream and river crossing locations, namely; crossing locations W5, W7 (Newport River), W8, W9, W33, W36 (Clare River), W49 and W53 (Bilboa River) which are all mapped to be within the 100-year flood zone (Flood Zone A). All the above watercourse crossing within mapped 100-year flood zones are along the public road at existing bridges. These bridges will be crossed by installing a cable within the existing bridge structure, with the exception of W8 and W9, which will be directional drilled.

There are 42 no. joint bays (and their communication and link box chambers) located along the 110kV UGC and only 1 no. of the joint bay locations (J6) is located within a mapped fluvial flood zone. The Mountphilips Substation site and it's access roads are not located within a mapped fluvial flood zone.

There are no significant mapped pluvial flood zones along the UWF Grid Connection route. Due to the elevated and hilly nature of the topography in the area of the UWF Grid Connection development and the fact that the route is along public roads with drainage, no significant pluvial flooding is anticipated. None of the proposed joint bays are located within a mapped pluvial flood zone.

The proposed development largely involves the construction of the substation compound and the installation of underground cables and joint bays for the 110kV UGC. The 110kV UGC has no potential to increase flood risk due to its subsurface nature. The public road and agricultural land surrounding the permanent footprint of the Mountphilips Substation will be reinstated back to its original condition after the works are completed.

There are certain elements of the permanent infrastructure at the Mountphilips Substation site, such as new permanent watercourse crossing structures at watercourse crossings W2 and W3, and the new permanent access road which have *potential* to increase flood risk. Project design measure and best practice measures will be implemented during the construction of the UWF Grid connection to reduce flood risk – see Section 3.

[1] *CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011, and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.*

Figure B: OPW Flood Hazard Mapping (**www.floods.ie**)

2.4 Designated Sites

The UWF Grid Connection overlaps the boundary of the Lower River Shannon SAC and is located upstream of the Lower River Suir SAC and the Clare Glens SAC.

The Lower River Shannon SAC encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments, and the marine area between Loop Head and Kerry Head.

The Mountphilips Substation site and the majority of the 110kV UGC (29km of the total 30.5km) are located within the Mulkear River catchment of the Lower River Shannon SAC catchment area. The UWF Grid Connection (110kV UGC) is located within the boundary of the Lower River Shannon SAC at six locations, over a total distance of 1025m, as follows;

- 190m along a section of the local public road L6013-0 to the north of Newport;
- 230m along a section of local public roads L2156-0 and L2157-0 on either side of, and over Rockvale Bridge. Rockvale Bridge crosses the Newport River, to the north of Newport town, at Watercourse Crossing W6;
- 100m, 80m and 390m sections along the Regional Limerick to Thurles Road R503 to the east of Rear Cross; and
- 35m along a section of the Regional Road R503 at Anglesey Bridge, near Kilcommon. Anglesey Bridge crosses over the Bilboa River, to the south of Kilcommon village, at Watercourse Crossing W52.

All trenching works at the Rockvale Bridge and Anglesey Bridge will be carried out in the bridge structure. No instream works and no works on the lands below the bridges will be required. All works will be carried out from the bridge structures.

All construction works on the public road, including where works overlap the SAC boundary, will be carried out in the public road pavement and no instream works, and no works in the verges or adjacent lands will occur.

The Lower River Suir SAC consists of all of the freshwater stretches of the Suir immediately south of Thurles, and the tidal stretches as far as the confluence with the Barrow/Nore immediately east of Cheekpoint in Co. Waterford. Within the River Suir catchment, the last c.1.5km of the UWF Grid Connection 110kV UGC route is located in the Clodiagh River catchment. The UWF Grid Connection construction works are located c.12km upstream of the River Suir SAC.

Within the Suir_SC_030 sub-catchment of the River Suir, there are a total of 5 no. watercourses within the construction works area boundary associated with the UWF Grid Connection (W64 – W68). The 110kV UGC will cross all 5 watercourses at existing crossing points (culverts) along the public road network – 3 no. (W64, W65, W66) are located L2264-50 and L6188-0 public roads, while the remaining 2 no. (W67 and W68) are located along the private paved road to the Consented UWF Substation. Due to the primarily upland nature of the study area, all of the watercourses intercepted by the UWF Grid Connection within the River Suir catchment are either drains or minor headwater (1st - 2nd order) streams.

Clare Glen SAC is located in a wooded area on both banks of the Clare River approximately c.2.2km downstream of the UWF Grid Connection (110kV UGC) within the Clare River catchment. The qualifying interests, which includes Old Oak Woodlands and Killarney Fern, are terrestrial habitats, rather than water or watercourse based habitats. Regardless, with the implementation of the project design measures, any effects to water quality within the downstream SAC will be imperceptible of less.

Best practice surface water management mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses as described in Section 3 below.

3. SURFACE WATER MANAGEMENT & POLLUTION PREVENTION

3.1 Project Design Measures

3.1.1 Introduction

At the conception of the Project, the design team evaluated the potential or likely significant effects of the development, on the receiving environment. Any potential or likely significant effects were avoided, in most cases, by integrating mitigation measures into the fundamental design of the development. Various measures, particularly options for mitigation by avoidance and mitigation by prevention are proposed.

3.1.2 Project Design Measures

The project design measures relating to the water environment are shown in Table 4 below.

Table 3: Water Related Environmental Protection Project Design Measures

Impact Source: Sediment / Suspended Solids	
PD No.	**Project Design Measure**
PD19	At Mountphilips Substation location, where dewatering of trenches or excavations is required, there will be no direct discharge of untreated water into any watercourse or drain. Rather all pumped water will be treated prior to discharge using an infiltration trench or settlement pond or suitable water treatment train such as a Siltbuster, as appropriate to the volume of water requiring treatment (if any) to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD20	At Mountphilips Substation site, all excavated material will be removed for temporary or permanent storage at designated berms, which will be located more than 25m away from the watercourses on Mountphilips Substation site. All storage berms will be graded and sealed following emplacement. The berms will be covered if there is a risk of erosion. Temporary silt control methods such as silt fencing will be placed around all overburden storage areas. The existing vegetative buffer between the berms and the nearest watercourses will be maintained and no works will occur in the buffer zone.
PD21	At Mountphilips Substation site, the permanent storage berms will be along the new access road and around the substation compound will be planted with local provenance native fruiting hedge species, with grasses and native flower species common to the surrounding vegetation sown along the sides of the berms. Local provenance native wildflower seed of flowering plants like clovers, vetches and knapweed will be included. Revegetation works will take place at the soonest practicable opportunity after emplacement.
PD22	Outside of the Mountphilips Substation site, there will be no storage of overburden and all excavations from road trenches will be removed to licensed waste facilities in accordance with the UWF Grid Connection Waste Management Plan. Loads of excavated material will be covered during transportation to prevent spillages of excavated material.
PD23	All Joint Bays for the 110kV UGC will be located at least 50m from a Class 1 or Class 2 watercourse and at least 25m from Class 3 or Class 4 watercourses.
PD24	Outside of the Mountphilips Substation site, where dewatering of trenches or excavations is required for the 110kV UGC, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated using a mobile water treatment train and then discharged via a silt bag to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.

PD26	A phased approach will be undertaken in relation to excavations, excavation dewatering and any culvert replacement works, where these works occur within 50m of a watercourse. The phased approach will only permit one of main potential sediment producing activities (i.e. excavations, excavation dewatering or culvert replacement works), to be carried out within 50m of a watercourse, at any one time.
PD27	At Mountphilips Substation site, works within 50m of watercourses, additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
PD28	Along the 110kV UGC on the public road, where works will take place within 50m of a watercourse, additional mitigation measures will be implemented which include silt fencing and placement of sandbag arrangements along preferential surface water flowpaths on the road pavement. Following works on any particular section, any works debris will be removed from the road before the sandbags and silt fences are removed.
PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD30	Lines of silt fencing and sandbags will be erected along the edge of the road so that surface water runoff from adjacent construction works areas is captured and directed to the excavated trench, where it can be pumped and treated before being released, as per PD24.
PD31	Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below.
PD32	At Mountphilips Substation site, instream construction works at the watercourse crossings W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2 and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed.Although intended for the purpose of the WFD, this measure will also indirectly contribute to downstream water quality protection in the SAC.
PD37	In addition to PD22, there will be no storage of overburden within the Lower River Shannon SAC.
PD38	110kV UGC works outside of Mountphilips Substation site will be carried out entirely on paved roads and where the 110kV UGC crosses watercourses, the works will be carried out over the existing bridges and over/under existing culverts. No in-streams works are proposed at any watercourse crossing points (including the Newport River and Bilboa River crossings) within the boundary of the Lower River Shannon SAC and therefore there will be no placement of cement or other materials within the river channels or on the river banks within the SAC.
PD40	In addition to PD29, all 110kV UGC works within the boundary of the Lower River Shannon SAC will only be completed during dry weather in the dryer months of the year – i.e. February to September included.

PD45	The horizontal directional drilling works at W8 and W9 will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works, and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized water tight skip before being taken off-site to a suitably licensed waste facility. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the following contingency measures; In the event of break-out occurring in the river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures; In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point; and in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency Response Procedures are included in the UWF Grid Connection Environmental Management Plan (see Volume D).
PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD50	Culvert replacement works along the 110kV UGC will not be undertaken without isolation of flow within the watercourse. Isolation of flow will be achieved through the use of sandbags filled with clean, washed sand. Any fish within the isolated section will be removed prior to works commencing. This will require the engagement of licensed fisheries personnel to deplete the works area using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping using a flume (pipe), with deflector plates used on the downstream side of the flume to reduce the hydraulic power of the water. Construction works at the crossing will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilization measures, reinstatement of bank slope and character; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and the use of deflector plates during the restoration of flow. As per PD41, culvert replacement works will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. These measures will ensure that the baseline character is maintained and will ensure that a deterioration in morphology is avoided, as required under the Water Framework Directive. This in turn will protect Aquatic Ecology.
PD51	The sections of the 110kV UGC trench within the R503, in the central part of the 110kV UGC where the adjacent lands comprise predominantly peaty soils, will be lined with a geotextile membrane which will provide support to the cables trench and the road structure.
Oils and Fuels	
PD16	No refuelling of plant or equipment will be permitted within 100m of identified water supply wells
PD39	In addition to PD42, there will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within 100m of the boundary of the Lower River Shannon SAC.
PD42	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment. The

	Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
PD43	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound at the Mountphilips Substation site. All fuel will be stored in bunded, locked storage containers. The designated storage location will be greater than 100m from a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored at the designated location in the temporary compound and all operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
PD44	Overnight parking of plant and machinery will only be permitted at the temporary compound at the Mountphilips Substation site and at a distance greater than 50m from watercourses.
PD45	The horizontal directional drilling works at W8 and W9 will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works, and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized water tight skip before being taken off-site to a suitably licensed waste facility. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the following contingency measures; In the event of break-out occurring in the river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures; In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point; and in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency Response Procedures are included in the UWF Grid Connection Environmental Management Plan (see Volume D).
Cement Based Compounds	
PD34	Only precast concrete culverts or structures will be used at the watercourse crossing locations at Mountphilips Substation site and for any culvert replacements along the 110kV UGC. Only precast concrete chambers will be used at Joint Bay locations. No batching of wet cement will take place on-site.
PD35	Concrete pours will be required for the 110kV UGC cables trench. Only chutes will be washed out at the works locations into the cable trench, with the washout of the tank taking place at the concrete supplier depot. Concrete chute washouts within the SAC boundary will take place into designated bins for removal to the designated concrete wash settlement pond at the Mountphilips Substation site.
PD36	The sections of 110kV UGC trenches that overlap the Lower River Shannon SAC will be lined with an impermeable geotextile material to prevent potential migration of cement from the trench base or sides into the SAC.
PD38	110kV UGC works outside of Mountphilips Substation site will be carried out entirely on paved roads and where the 110kV UGC crosses watercourses, the works will be carried out over the existing bridges and over/under existing culverts. No in-streams works are proposed at any watercourse crossing points (including the Newport River and Bilboa River crossings) within the boundary of the Lower River Shannon SAC and therefore there will be no placement of cement or other materials within the river channels or on the river banks within the SAC.

Flood Risk	
PD18	The new substation compound and the new permanent access road at the Mountphilips Substation site will have a permanent surface water drainage network in place which will include check dams. These check dams will allow the settlement of suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.
PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD33	All new permanent watercourse culverts at the Mountphilips Substation site and any replacement culverts along the public road for the 110kV UGC will be sized to cope with a minimum 100-year flood event.
PD40	In addition to PD29, all 110kV UGC works within the boundary of the Lower River Shannon SAC will only be completed during dry weather in the dryer months of the year – i.e. February to September included.
PD48	The new permanent cross structures at the Mountphilips Substation site and the replacement culvert at W14 along the R503 will be bottomless or clear spanning.
PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
Scheduling and Phasing of Works	
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.
PD26	A phased approach will be undertaken in relation to excavations, excavation dewatering and any culvert replacement works, where these works occur within 50m of a watercourse. The phased approach will only permit one of main potential sediment producing activities (i.e. excavations, excavation dewatering or culvert replacement works), to be carried out within 50m of a watercourse, at any one time.
PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD31	Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below.
PD32	At Mountphilips Substation site, instream construction works at the watercourse crossings W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2

	and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. Although intended for the purpose of the WFD, this measure will also indirectly contribute to downstream water quality protection in the SAC.
PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).

3.1.3 Phasing of Works within 50m of a watercourse

In an effort to reduce the potential for localised in-combination effects on surface water quality from the main sediment sources during construction works (i.e. watercourse crossing Works, earthworks and excavation dewatering), it is built into the proposed works as a Project Design Measure (PD26) that a phased approach will be undertaken during the construction works, particularly where works within 50m of a watercourse are required.

It is proposed that within any local surface water catchment, the following works will be completed separately:

- Earthworks (trench and joint bay excavations along the 110kV UGC; excavations, access road construction and overburden storage at Mountphilips Substation site);
- Excavation dewatering (i.e. cable trench/joint bay/foundation dewatering where required); and,
- Watercourse crossing works (particularly at W1, W2 and W3 instream works at Mountphilips Substation, and where culvert replacement is required at up to 13 no. locations along the 110kV UGC route, and also to the 2 no. directional drilling locations at W8 and W9.

Not all the activities listed above will be required at all locations (e.g. excavation dewatering are likely to be required at a number of locations only). Earthworks and watercourse crossings will be the main activities required throughout the works area and importantly these activities will be completed at separate times. For example, after the completion of the earthworks (i.e. access road construction / trench excavation) up to a point where watercourse crossing works are required (e.g. new/replaced culvert), the permanent drainage and/or runoff control measures will have been put in place prior to the commencement of the watercourse crossing works. This will reduce the potential for localised in-combination effects on surface water quality. In other words, the watercourse crossing works such as open trenching / excavation pumping / installation or replacement of structures will not commence until the earthworks within 50m of the watercourse have been completed and the relevant surface water control measures have been put in place.

3.1.4 Protection measures to be implemented within 50m of a Watercourse

In addition to the Phasing of Works within 50m, the following Project Design Measures will also be implemented within 50m of watercourse:

- At the Mountphilips Substation site, where works within 50m of watercourses are taking place, the following additional mitigation measures will be put in place: double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
- Along the 110kV UGC on the public road, where works will take place within 50m of a watercourse, the following additional mitigation measures will be put in place: placement of sandbag arrangements along preferential surface water flowpaths on the road pavement, regular road sweeping to remove debris from works areas on the road, and sweeping road before the sandbags are removed.
- Excavation work will not be undertaken during periods of high rainfall. This will minimise the risk of entrainment of suspended sediment in surface water runoff and transport via this pathway to surface watercourses;
- If high levels of silt or other contaminants are noted in any local watercourse, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;
- At the Mountphilips Substation site, all disturbed ground will be re-seeded at the soonest, practicable opportunity to prevent erosion; all temporary surface water control / protection measures such as silt fencing and check dams will be kept in place until disturbed ground has vegetated and stabilized;
- There will be no refuelling of vehicles or plant permitted within 100m of a watercourse. All plant will be checked for purpose of use prior to mobilisation. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be trained in the use of this equipment

3.2 Best Practice Measures

Best Practice Measures (BPMs) have been prepared for each of the main construction activities that have the potential to impact on the surface water environment. The BPMs are listed in **Table 5** below, and included in full in Tab 7 of the UWF Grid Connection Environmental Management Plan.

Table 4: Water Related Environmental Protection Best Practice Measures

BPM No.	Best Practice Measure Title
GC-BPM-01	Measures for Protection of Surface Water Quality and Watercourse Morphology during instream works at Mountphilips Substation site
GC-BPM-02	Measures for Protection of Surface Water Quality and Watercourse Morphology during replacement of existing culverts along the 110kV UGC outside Mountphilips Substation site
GC-BPM-03	Design of New Permanent Watercourse Crossing Structures and Existing Culvert Replacements to Prevent Flood Risk
GC-BPM-04	Surface Water Quality Protection Measures for Site Runoff during the Mountphilips Substation Site Construction Works
GC-BPM-05	Protection of Surface Water and Groundwater Quality during use of Cement Based Compounds
GC-BPM-06	Protection of Surface Water and Groundwater Quality During Storage and Handling of Fuels, Oils and Chemicals
GC-BPM-07	Surface Water Quality Protection Measures During Storage of Overburden at the Mountphilips Substation Site

3.3 Emergency Response Measures

Three Emergency Response Procedures have been developed, and will be implemented immediately in the unlikely event of a significant pollution occurrence in local surface waters relating to the works. These Emergency Response Procedures are listed in Table 6 below, and included in full in Tab 6 of the UWF Grid Connection Environmental Management plan.

Table 5: List of Emergency Response Procedures

ERP No.	Environmental Emergency Response Procedures
GC-ERP-01	Oil/Fuel Spillage
GC-ERP-02	Significant Pollution Occurrence in Local Surface Waters
GC-ERP-03	Frac-Out during Drilling Works at W8 or W9

4. WATER QUALITY MONITORING PLAN

4.1 Drainage Inspection & Maintenance at Mountphilips Substation site

Drainage control and maintenance will form part of the civil works contract requirements. During the construction phase the effectiveness of drainage measures designed to minimise runoff entering works areas and the capture and treatment of potentially silt-laden water from the works areas will be monitored periodically (daily, weekly, and event based monitoring, *i.e.* after heavy rainfall events) by the Environmental Clerk of Works and their team of environmental specialists, which will include a Project Hydrologist and a Project Aquatic Ecologist.

The Construction Manager will respond to changing weather and drainage conditions on the ground as the project proceeds, to ensure the effectiveness of the drainage design is maintained. Regular inspections of all existing and installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water along the works area. Any excess build-up of silt levels at check dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed.

The following periodic inspection regime at Mountphilips Substation site will be implemented, and inspections recorded:

- Daily general visual inspections by Environmental Clerk of Works;
- Weekly (existing & new drains) inspections by site Construction Manager;
- All inspection to include all elements of drainage systems;
- Inspections required to ensure that drainage systems are operating correctly and to identify any maintenance that is required;
- Any changes, such as discolouration, odour, oily sheen or litter should be noted and corrective action should be implemented immediately.
- High risk locations such as settlement ponds will be inspected on a daily basis by the Construction Manager;
- Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement;
- Event based inspections by the Environmental Clerk of Works as follows:
    - >10 mm/hr (*i.e.* high intensity localised rainfall event);
    - >25 mm in a 24 hour period (heavy frontal rainfall lasting most of the day); or,
    - Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week).
- Weekly, Fortnightly and Monthly (depending on weather conditions and the nature of on-going construction works) site inspections by the Project Hydrologist during construction phase.

4.2 Water Quality Monitoring at Mountphilips Substation site and along the 110kV UGC

4.2.1 Field Monitoring

Daily field monitoring of water quality parameters and collection of samples will be undertaken by the Environmental Clerk of Works. He/she will be appropriately trained on the required monitoring methods and the use, calibration and maintenance of all monitoring equipment used.

Regular (i.e. weekly or fortnightly depending on weather conditions) field monitoring will be carried out by the Project Hydrologist.

4.2.2 Sampling Locations

Surface water quality will be monitored during the construction phase and this monitoring will also extend into the post construction phase. Proposed monitoring locations downstream of the works areas (9 no. in total, DSW01 – DSW09) and upstream of the works area (4 no.in total, DSW10 – DSW13) within the EPA sub-catchments are shown on **Figure SWMP 3:** Surface Water Quality Monitoring Locations, see section 5**.**

The locations of the surface water monitoring points will be agreed with Inland Fisheries Ireland and Tipperary County Council in advance of the construction phase.

Coordination of the flow monitoring and continuous monitoring (maintenance and downloading and data management) will be undertaken by the Environmental Clerk of Works, Project Hydrologist and Project Aquatic Ecologist.

4.2.3 Laboratory Analysis

Laboratory analysis of water samples will also be undertaken as part of the monitoring programme by an independent and appropriately certified laboratory.

Coordination of the laboratory sampling and analytical programme will be undertaken by the Environmental Clerk of Works. Samples will be dispatched for analysis under chain of custody procedures.

Laboratory analytical results will be sent to the Environmental Clerk of Works who will relay the data onto the Project Hydrologist and Project Aquatic Ecologist for their independent review.

Proposed parameter suite for hydrochemistry analysis at the monitoring locations is shown in **Table 7** below.

Table 6: Parameter Suite for Surface Water Monitoring

pH (field measured)	Soluble Iron
Electrical Conductivity (field measured)	Ammonia N
Nitrate	Total Petroleum Hydrocarbons
Ortho-Phosphate	Total Suspended Solids
Phosphorus	Turbidity
Biological Oxygen Demand	Total Dissolved Solids
Temperature (field measured)	
Chloride	

4.2.4 Frequency of Water Quality Monitoring

Monitoring frequency will be specified and finalised following consultation with Inland Fisheries Ireland and Tipperary County Council prior to commencement of construction.

As a minimum, the monitoring programme will include:

- Daily visual checks at watercourse crossing locations where works are taking place;
- Weekly sampling for suspended solids and turbidity in catchments where earthworks or watercourse crossing work is on-going;
- Fortnightly sampling for the full suite of parameters (Table 7) in catchments where works are on-going;
- Event based sampling, e.g. after heavy rainfall;
- Additional sampling in the event of trigger level exceedance, after heavy rainfall, etc; and,
- Post construction sampling programme (monthly sampling) for a period of six months.

4.2.5 Surface Water Monitoring Reporting

Results of surface water quality monitoring shall assist in determining requirements for improvements in drainage and pollution prevention measures implemented on site. All results will need to comply with the criteria included in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) to ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.

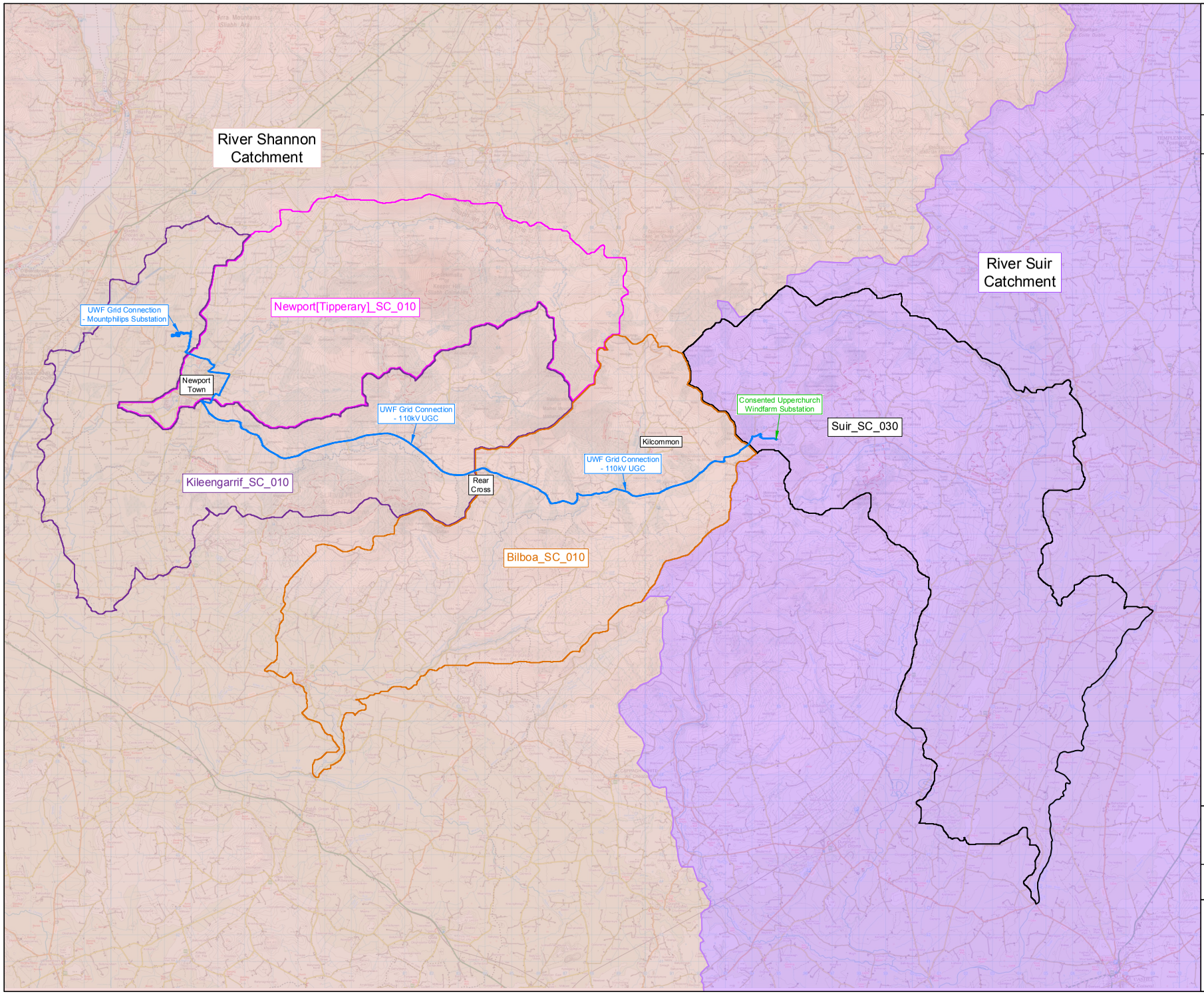
Interpretation and reporting of both the field and laboratory data will be the responsibility of the Project Hydrologist and Project Aquatic Ecologist, who will report the results including any recommendations to the Environmental Clerk of Works.

It will be the responsibility of the Environmental Clerk of Works to present the ongoing results of water quality and weather monitoring to the Project Team at regular site meetings. There will also be regular meetings between the Environmental Clerk of Works and the Construction Manager which will include a look ahead for upcoming works and any environmental management required to facilitate ongoing construction works.

Reports on water quality will consider all field monitoring and results of laboratory analysis completed that period. Reports will describe how the results compare with baseline data as well as previous reports on water quality. The reports will also describe whether any deterioration or improvement in water quality has been observed, whether any effects are attributable to construction activities and what remedial measures or corrective actions have been implemented or are required going forward. The reports will be made available to Tipperary County Council and Inland Fisheries Ireland on request.

* *

5. FIGURES



EMP: Surface Water Management Plan

Figure GC SWMP 1

Local Hydrology Map

Map Number:
Map 1 of 1

Legend:

Subject Development:

- UWF Grid Connection Construction Works Area

Survey Results:

- River Shannon Catchment
- River Suir Catchment
- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010
- Bilboa_SC_010
- Suir_SC_030

N

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UWF Grid Connection (2019)

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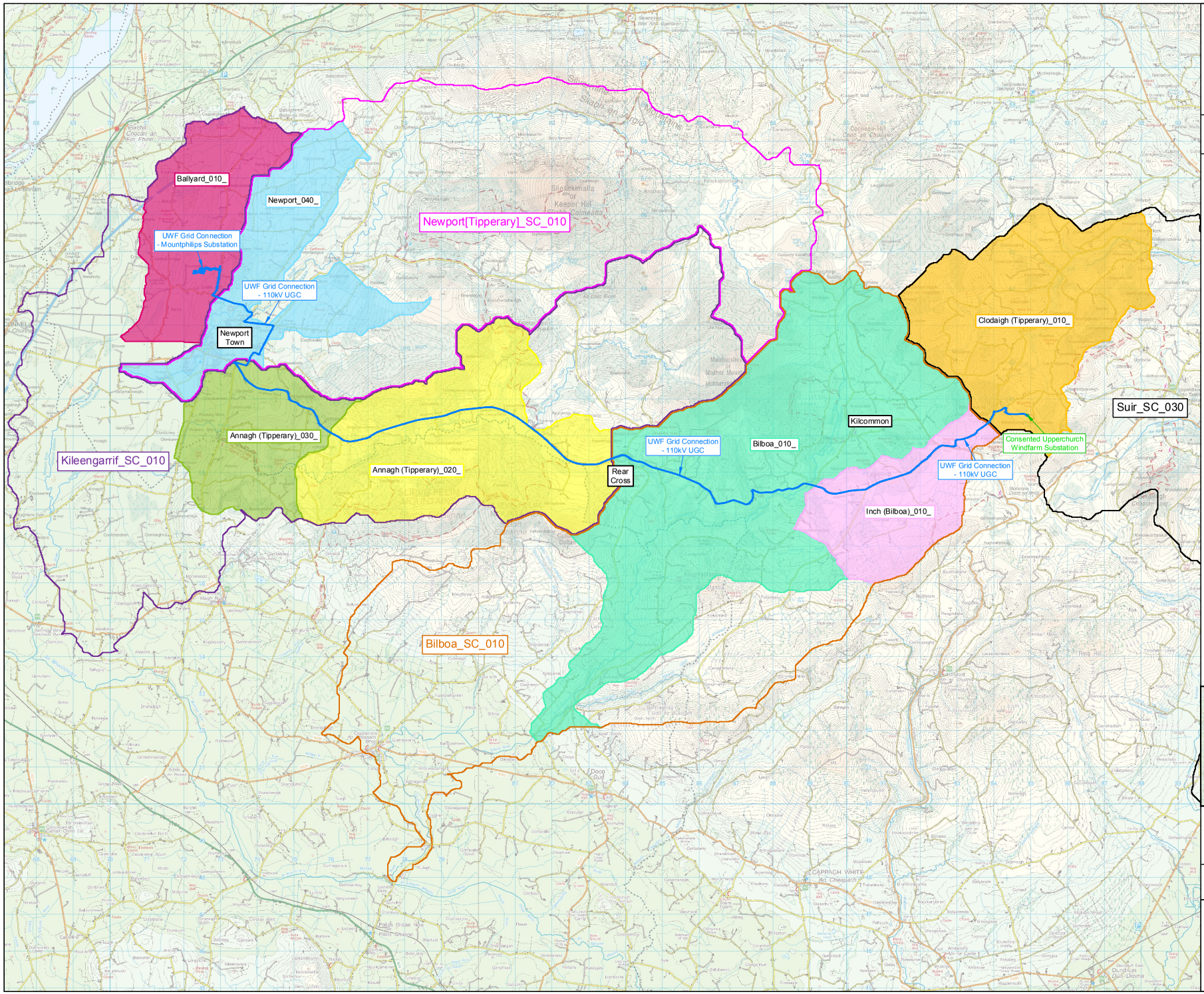


EMP: Surface Water Management Plan

Figure GC SWMP 2

Local Surface Water Crossing Locations

Map Number:

Overview Map

Legend:

Subject Development:

- UWF Grid Connection Construction Works Area

Survey Results:

EPA Sub-Catchment:

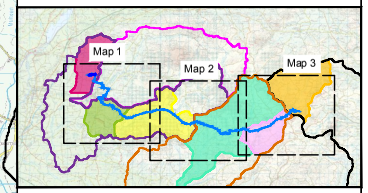
- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010
- Bilboa_SC_010
- Suir_SC_030

EPA Local Surface Water Bodies:

- Ballyard_010
- Newport_040
- Annagh (Tipperary)_030
- Annagh (Tipperary)_020
- Bilboa_010
- Inch (Bilboa)_010
- Clodaigh (Tipperary)_010

N

Keyplan:



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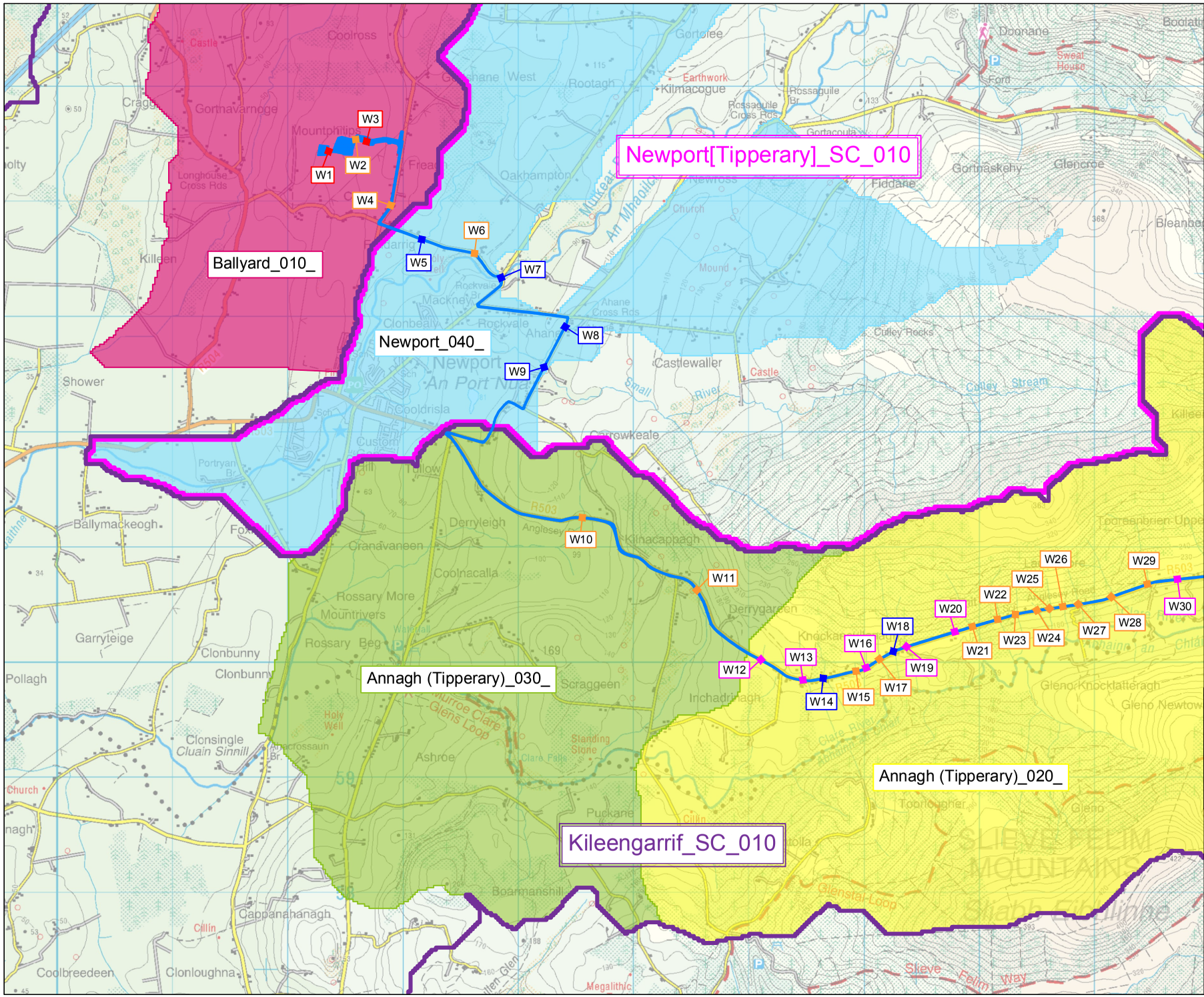


EMP: Surface Water Management Plan

Figure GC SWMP 2

Local Surface Water Crossing Locations

Map Number:
Map 1 of 3

Legend:

Subject Development:

- UWF Grid Connection Construction Works Area

Survey Results:

EPA Sub-Catchment:

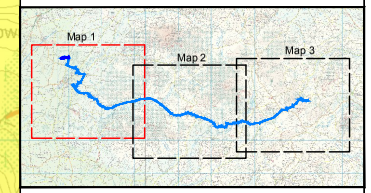
- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010

EPA Local Surface Water Bodies:

- Ballyard_010
- Newport_040
- Annagh (Tipperary)_030
- Annagh (Tipperary)_020
- W7 Class 1 Watercourse Crossing
- W1 Class 2 Watercourse Crossing
- W4 Class 3 Watercourse Crossing
- W12 Class 4 Watercourse Crossing

N

Keyplan:



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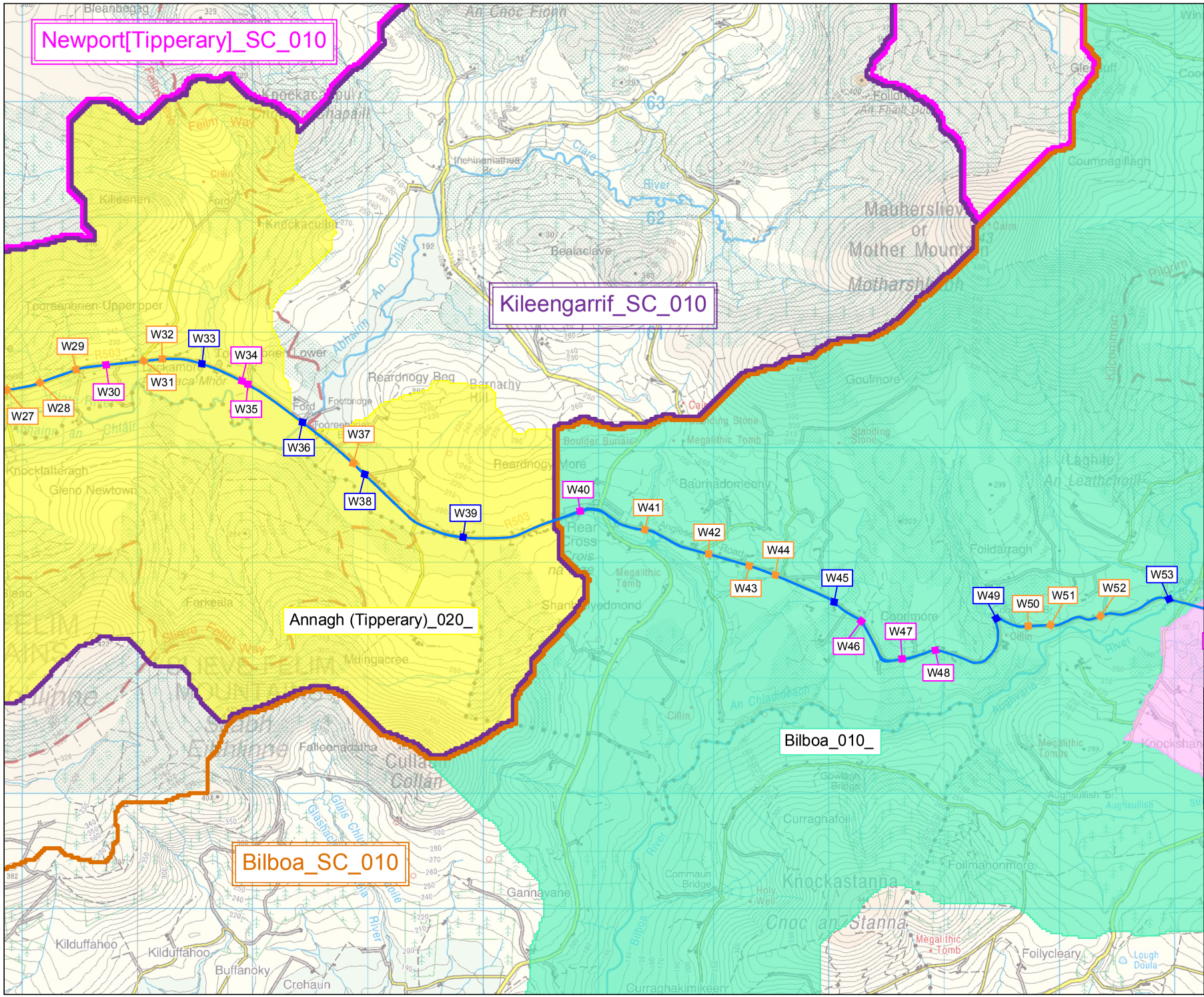

EMP: Surface Water Management Plan

Figure GC SWMP 2

Local Surface Water Crossing Locations

Map Number:
Map 2 of 3

Legend:

Subject Development:

- UWF Grid Connection Construction Works Area

Survey Results:

EPA Sub-Catchment:

- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010
- Bilboa_SC_010

EPA Local Surface Water Bodies:

- Annagh (Tipperary)_020
- Bilboa_010
- Inch (Bilboa)_010
- W7 Class 1 Watercourse Crossing
- W4 Class 3 Watercourse Crossing
- W12 Class 4 Watercourse Crossing

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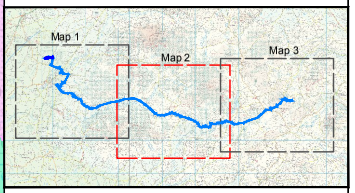
Keyplan:



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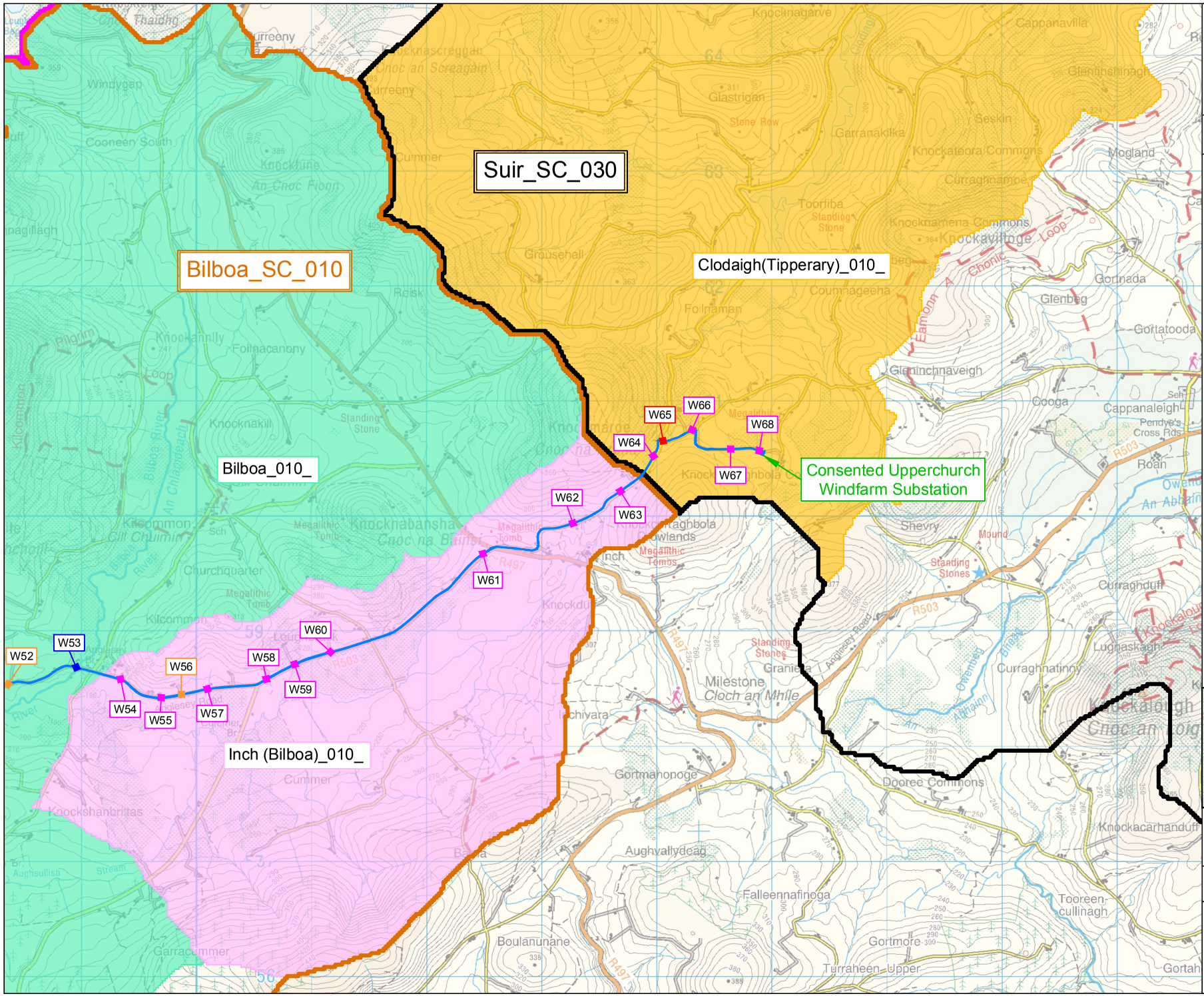


EMP: Surface Water Management Plan

Figure GC SWMP 2

Local Surface Water Crossing Locations

Map Number:
Map 3 of 3

Legend:

Subject Development:

- UWF Grid Connection Construction Works Area

Survey Results:

EPA Sub-Catchment:

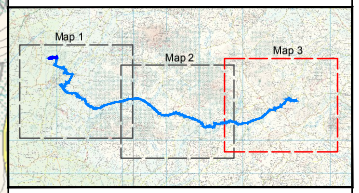
- Newport[Tipperary]_SC_010
- Bilboa_SC_010
- Suir_SC_030

EPA Local Surface Water Bodies:

- Bilboa_010
- Inch (Bilboa)_010
- Clodaigh (Tipperary)_010
- W7 Class 1 Watercourse Crossing
- W65 Class 2 Watercourse Crossing
- W4 Class 3 Watercourse Crossing
- W12 Class 4 Watercourse Crossing

N

Keyplan:



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UWF Grid Connection (2019)

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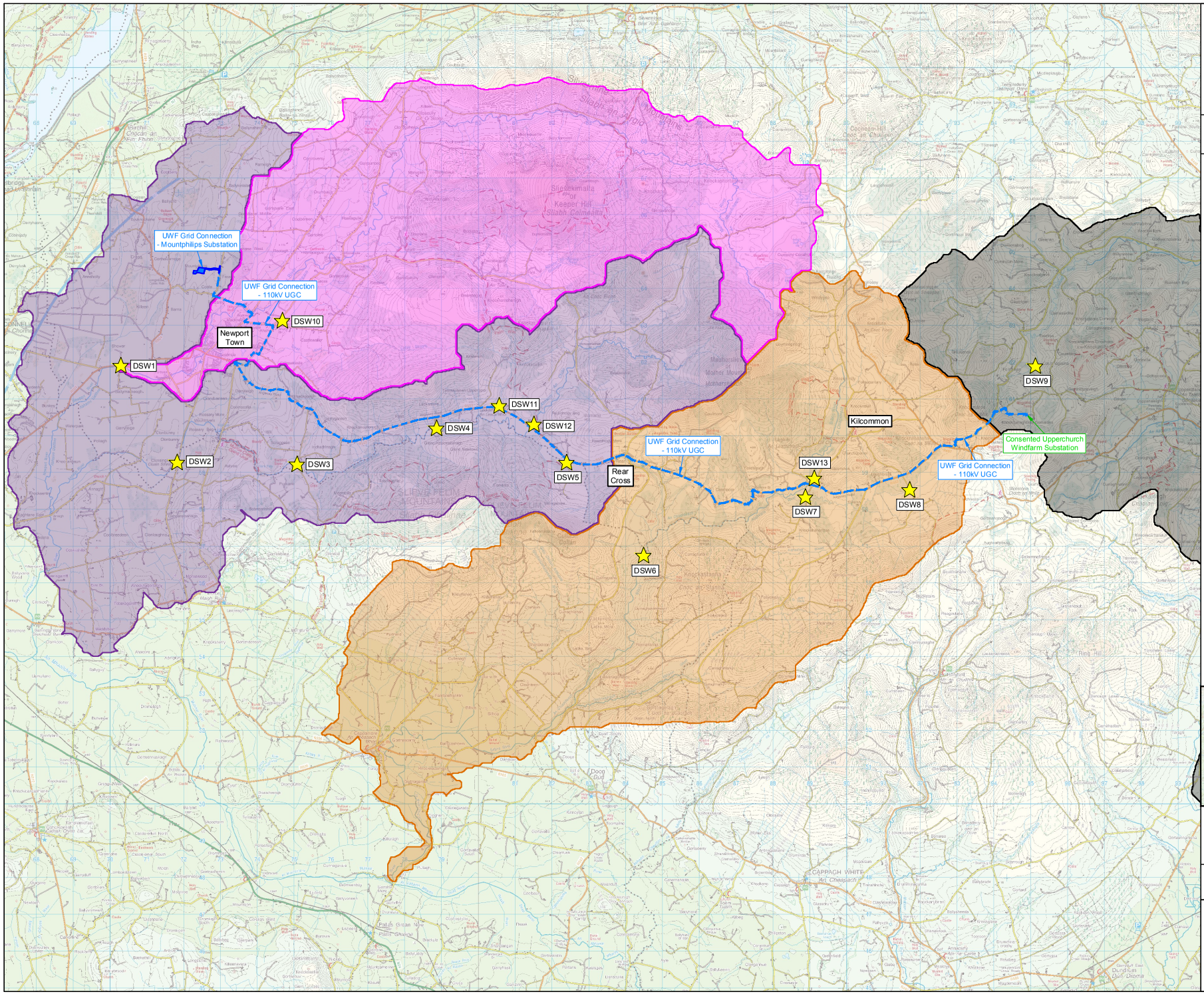


EMP: Surface Water Management Plan

Figure GC SWMP 3

Surface Water Quality Monitoring Locations

Map Number:

Overview Map

Legend:

Subject Development:

- UWF Grid Connection - 110kV UGC
- UWF Grid Connection - Mountphilips Substation

Survey Results:

EPA Sub-Catchment:

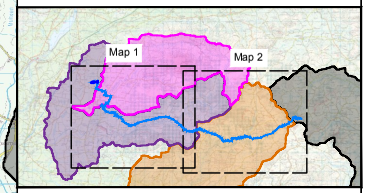
- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010
- Bilboa_SC_010
- Suir_SC_030

Map Information:

- Recommended Downstream Sampling Points
- DSW6 Recommended Downstream Sampling Points Identification Numbers

N

Keyplan:



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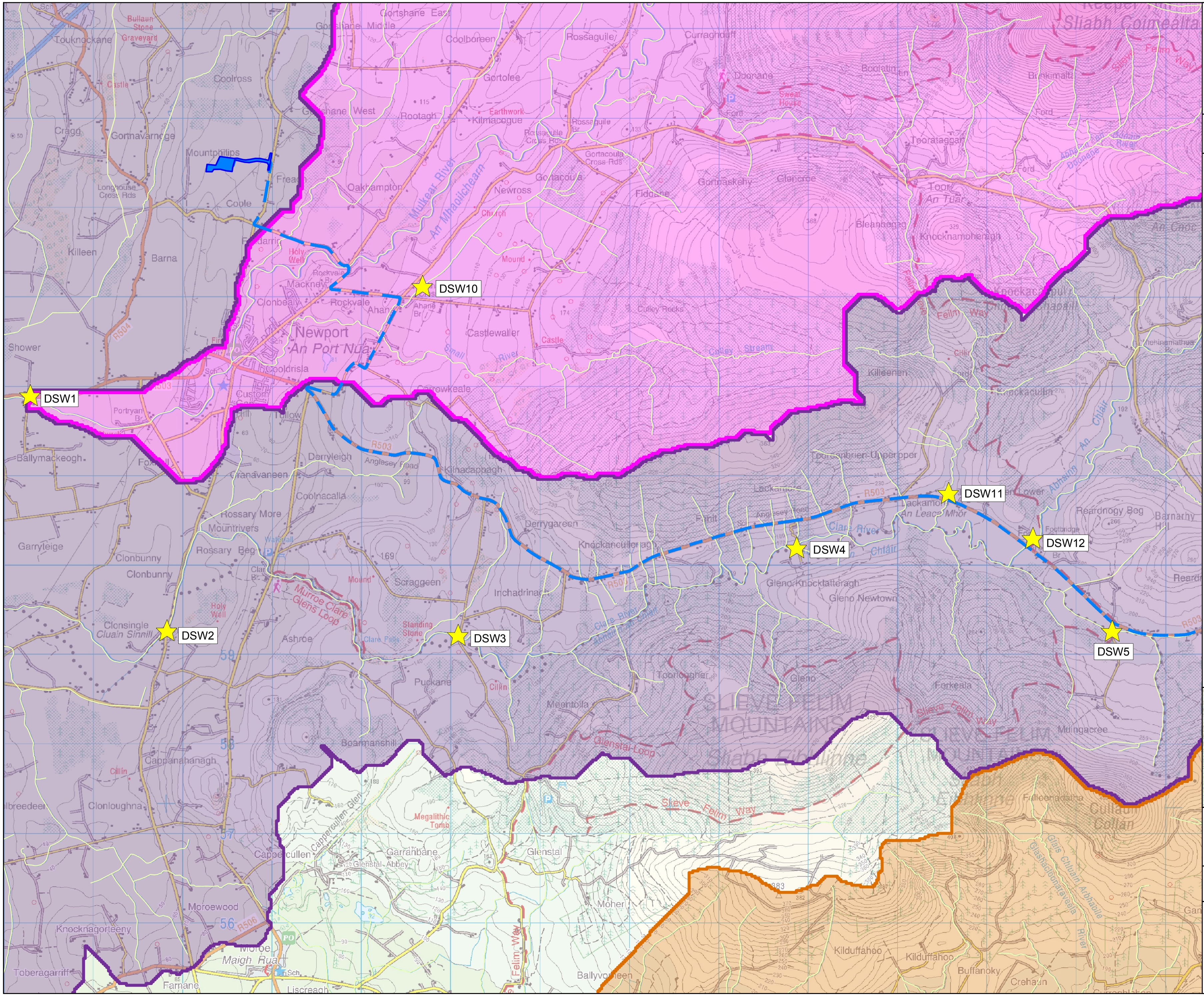


EMP: Surface Water Management Plan

Figure GC SWMP 3

Surface Water Quality Monitoring Locations

Map Number:
Map 1 of 2

Legend:

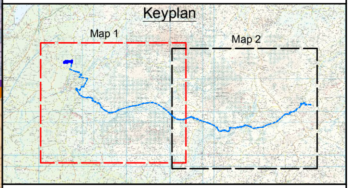
Subject Development:
- UWF Grid Connection - 110kV UGC
- UWF Grid Connection - Mountphilips Substation

Survey Results:

EPA Sub-Catchment:
- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010
- Bilboa_SC_010

Map Information:
- Recommended Downstream Sampling Points
- DSW6 Recommended Downstream Sampling Points Identification Numbers
- Watercourse

Keyplan:



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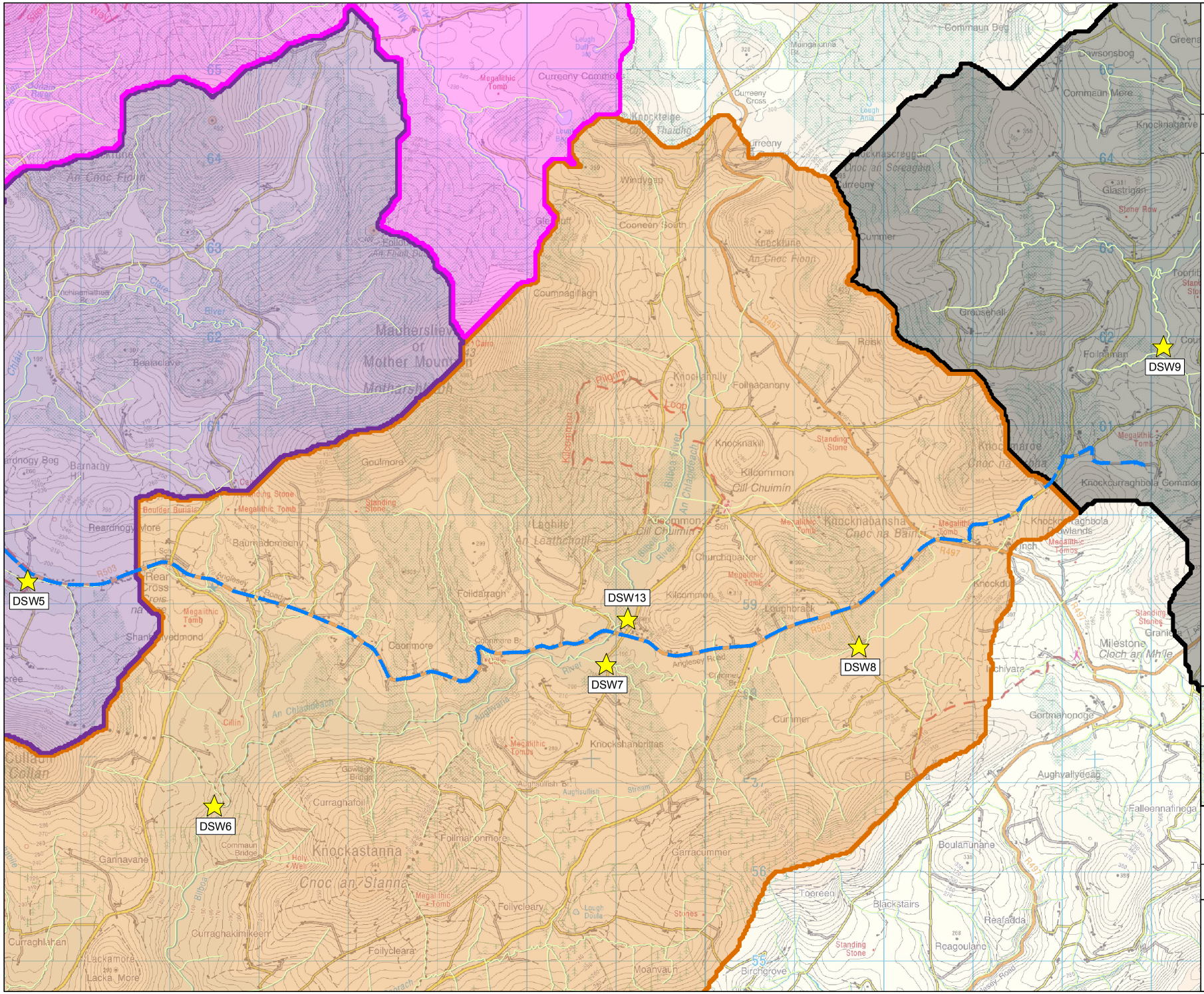


EMP: Surface Water Management Plan

Figure GC SWMP 3

Surface Water Quality Monitoring Locations

Map Number:
Map 2 of 2

Legend:

Subject Development:

- UWF Grid Connection - 110kV UGC

Survey Results:

EPA Sub-Catchment:

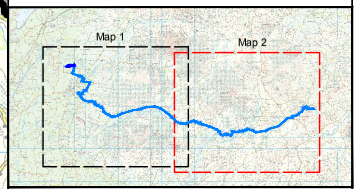
- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010
- Bilboa_SC_010
- Suir_SC_030

Map Information:

- Recommended Downstream Sampling Points
- DSW6 Recommended Downstream Sampling Points Identification Numbers
- Watercourse

N

Keyplan:



Project:

UWF Grid Connection (2019)

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