

Appropriate Assessment Screening & Natura Impact Statement - Information for a Stage 1 (AA Screening) and Stage 2 (Natura Impact Statement) AA for a proposed Flood Relief Scheme at Ballyhale, Co. Kilkenny.



20th January 2022

Prepared by: Bryan Deegan (MCIEEM) of Altemar Ltd.

On behalf of: Kilkenny County Council.

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Document Control Sheet			
Project	Proposed Flood Relief Scheme at Ballyhale, Co. Kilkenny.		
Report	Appropriate Assessment Screening and Natura Impact Statement.		
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Introduction

The following Appropriate Assessment (AA) (Screening Stage) has been prepared by **Altamar Ltd.** at the request of Kilkenny County Council in relation to a proposed Flood Relief Scheme at Ballyhale, Co. Kilkenny.

An Appropriate Assessment is an assessment of the potential effects of a proposed project or plan, on its own, or in combination with other plans or projects, on one or more European sites. European sites are those sites designated as Special Areas of Conservation (SAC) or Special Protection Areas (SPA).

The AA Screening stage examines the likely significant effects of a plan or project, either on its own, or in combination with other plans and projects, upon a European site and considers whether, on the basis of objective scientific evidence, it can be concluded that there are no likely significant effects on any European site, in view of best scientific knowledge and the conservation objectives of the relevant European sites.

The Natura Impact Statement examines whether the plan or project, either alone, or in combination with other plans and projects, in the view of best scientific knowledge and in view of the sites' conservation objectives, will adversely affect the integrity of the European sites.

Altamar Ltd.

Since its inception in 2001, Altamar has been delivering ecological and environmental services to a broad range of clients. Operational areas include residential, infrastructural, renewable, oil & gas, private industry, local authorities, EC projects and State/semi-State Departments. Bryan Deegan is the managing director of Altamar. Bryan is an environmental scientist and marine biologist with 27 years' experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. Bryan Deegan (MCIEEM) holds a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic Science and a NCEA National Certificate in Science (Aquaculture). Bryan Deegan carried out all elements of this Appropriate Assessment Screening.

Background to the Appropriate Assessment

The Habitats Directive 92/43/EEC (together with the Birds Directive (2009/1477/EC)) forms the cornerstone of Europe's nature conservation policy. The Directive protects over 1000 animals and plant species and over 200 "habitat types" which are of European importance. In the Habitats Directive, Articles 3 to 9 provide the legislative means to protect habitats and species of European Community interest through the establishment and conservation of an EU-wide network of conservation sites (NATURA, 2000). These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Birds Directive), Article 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect European sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment:

"Any plan or project not directly connected with or necessary to the management of the [NATURA 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implication for the site and subject to the provisions of paragraph 4, the component national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."

As outlined in "Managing European sites, The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC" (European Commission, 21 November 2018) *"The purpose of the appropriate assessment is to assess the implications of the plan or project in respect of the site's conservation objectives, either individually or in combination with other plans or projects. The conclusions should enable the competent authorities to ascertain whether the plan or project will adversely affect the integrity of the site concerned. The focus of the appropriate assessment is therefore specifically on the species and/or the habitats for which the European site is designated."*

As outlined in the EC guidance document on Article 6(4) (January 2007)¹:

“Appropriate assessments of the implications of the plan or project for the site concerned must precede its approval and take into account the cumulative effects which result from the combination of that plan or project with other plans or projects in view of the site's conservation objectives. This implies that all aspects of the plan or project which can, either individually or in combination with other plans or projects, affect those objectives must be identified in the light of the best scientific knowledge in the field.

Assessment procedures of plans or projects likely to affect European sites should guarantee full consideration of all elements contributing to the site integrity and to the overall coherence of the network, both in the definition of the baseline conditions and in the stages leading to identification of potential impacts, mitigation measures and residual impacts. These determine what has to be compensated, both in quality and quantity. Regardless of whether the provisions of Article 6(3) are delivered following existing environmental impact assessment procedures or other specific methods, it must be ensured that:

- *Article 6(3) assessment results allow full traceability of the decisions eventually made, including the selection of alternatives and any imperative reasons of overriding public interest.*
- *The assessment should include all elements contributing to the site's integrity and to the overall coherence of the network as defined in the site's conservation objectives and Standard Data Form, and be based on best available scientific knowledge in the field. The information required should be updated and could include the following issues:*
 - *Structure and function, and the respective role of the site's ecological assets;*
 - *Area, representativity and conservation status of the priority and nonpriority habitats in the site;*
 - *Population size, degree of isolation, ecotype, genetic pool, age class structure, and conservation status of species under Annex II of the Habitats Directive or Annex I of the Birds Directive present in the site;*
 - *Role of the site within the biographical region and in the coherence of the European network; and,*
 - *Any other ecological assets and functions identified in the site.*
- *It should include a comprehensive identification of all the potential impacts of the plan or project likely to be significant on the site, taking into account cumulative impacts and other impacts likely to arise as a result of the combined action of the plan or project under assessment and other plans or projects.*
- *The assessment under Article 6(3) applies the best available techniques and methods, to estimate the extent of the effects of the plan or project on the biological integrity of the site(s) likely to be damaged.*
- *The assessment provides for the incorporation of the most effective mitigation measures into the plan or project concerned, in order to avoid, reduce or even cancel the negative impacts on the site.*
- *The characterisation of the biological integrity and the impact assessment should be based on the best possible indicators specific to the European assets which must also be useful to monitor the plan or project implementation.”*

¹ European Commission. (2007). Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission;

Stages of the Appropriate Assessment

This Appropriate Assessment screening was undertaken in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (EC, 2001), Part XAB of the Planning and Development Act 2000, as amended, in addition to the December 2009 publication from the Department of Environment, Heritage and Local Government; 'Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities' and the European Communities (Birds and Natural Habitats) Regulations 2011. In order to comply with the above Guidelines and legislation, the Appropriate Assessment process must be structured as follows:

1) Screening stage:

- Description of plan or project, and local site or plan area characteristics;
- Identification of relevant European sites, and compilation of information on their qualifying interests and conservation objectives
- Identification and description of individual in combination effects likely to result from the proposed project;
- Assessment of the likely significance of the effects identified above. Exclusion of sites where it can be objectively concluded that there will be no likely significant effects; and,
Conclusions

2) Appropriate Assessment (Natura Impact Statement):

- Description of the European sites that will be considered further;
- Identification and description of potential adverse impacts on the conservation objectives of these sites likely to occur from the project or plan; and,
- Mitigation Measures that will be implemented to avoid, reduce or remedy any such potential adverse impacts
- Assessment as to whether, following the implementation of the proposed mitigation measures, it can be concluded, beyond all reasonable scientific doubt, that there will be no adverse impact on the integrity of the relevant European Site in light of its conservation objectives"
- Conclusions.

If it can be demonstrated during the AA screening phase (Stage 1), that the proposed project will not have a significant effect, whether alone or in combination with other plans or projects, on the conservation objectives of a Natura 2000 site, then no further AA (Stage 2) will be required. It is important to note that there is a requirement to apply a precautionary approach to AA screening. Therefore, where effects are possible, certain or unknown at the screening stage, AA will be required.

In addition, it should be noted that Article 6(3) of the Habitats Directive must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an AA of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site.

Stage 1: Screening Assessment

Management of the Site

The project is not directly connected with, or necessary to, the management of a European site. However, it would be expected that following completion of the works downstream Natura 2000 sites would benefit as the project will relieve flooding and potential associated pollution events. In addition, following completion of the project an improvement in the biodiversity value of the watercourse would be foreseen, which will benefit features of interest of European Sites proximate to the works.

Description of the Proposed Project

Kilkenny County Council intend to apply for planning permission for a proposed Flood Relief Scheme at Ballyhale, Co. Kilkenny (Figures 1 and 2). Kilkenny County Council intends to seek approval of An Bord Pleanála under Section 177AE and Section 175 of the Planning and Development Act, 2000 (as amended) to carry out proposed works in the townlands of Ballyhale and Kiltorcan in County Kilkenny.

The proposed scheme involves:

- Embankments located upstream of the village to prevent overland flooding
- Flood wall to western perimeter of “Arrigle View”
- A section of new river channel re-connecting all outlets from the Chapel Lane bridge into the western river channel and removing the flow split. This will require excavation of the existing church pedestrian access and replacement via a new pedestrian connection which also serves to form a new bank to the redirected stream.
- Landscaping of eastern river channel to allow for a low flow channel to reflect reduced flow conditions
- Flood Defences (wall and embankments) between the western channel and the properties at risk on Main St. Lands acquired for these flood defences will be landscaped to provide a riverside walkway/park
- Removal of one of two existing minor private bridges providing access across the river to a private land parcel. Access to the parcel will be maintained by retrofitting the second bridge to flood defence level
- Removal of a boundary wall spanning the watercourse
- The existing weir at the Ballyhale Business Park will be removed (X-003) allowing the channel gradient to be increased along this section which increases capacity (D-002). The existing bridge will be removed and replaced with a 6m wide by 1.2m high precast portal culvert. Low flood wall alongside the road opposite Brookfield to prevent out of bank flows emerging onto the road surface.
- Provision of rock ramp to existing weir at Ballyhale Shamrocks access to improve fish passage conditions.
- Channel reprofiling at the existing Main St bridge to improve bridge inlet conditions.
- Provision of additional conveyance capacity to the Main Street Bridge. The additional conveyance will be provided by an additional bridge opening (box culvert) set at high level to provide capacity for extreme flood events.
- Provision of rock ramp to downstream face of the Main Street Bridge to improve fish pass conditions
- Provision of a temporary construction compound.
- Fencing, accommodation works and all site development and landscaping works.

The proposed site outline and location are demonstrated in Figures 1 & 2. The proposed layout, works, embankment detail, flood walls details and landscape details are seen in Figures 3-11.



0 0.5 1 1.5 2 km

Project: Ballyhale Flood Relief Scheme
 Location: Ballyhale, Co. Kilkenny
 Date: 22nd November 2022
 Drawn By: Bryan Deegan (Altamar)



Figure 1. Proposed site outline and location



Project: Ballyhale Flood Relief Scheme
 Location: Ballyhale, Co. Kilkenny
 Date: 22nd November 2022
 Drawn By: Bryan Deegan (Altamar)

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 Marine & Environmental Consultancy



Figure 2. Proposed site outline

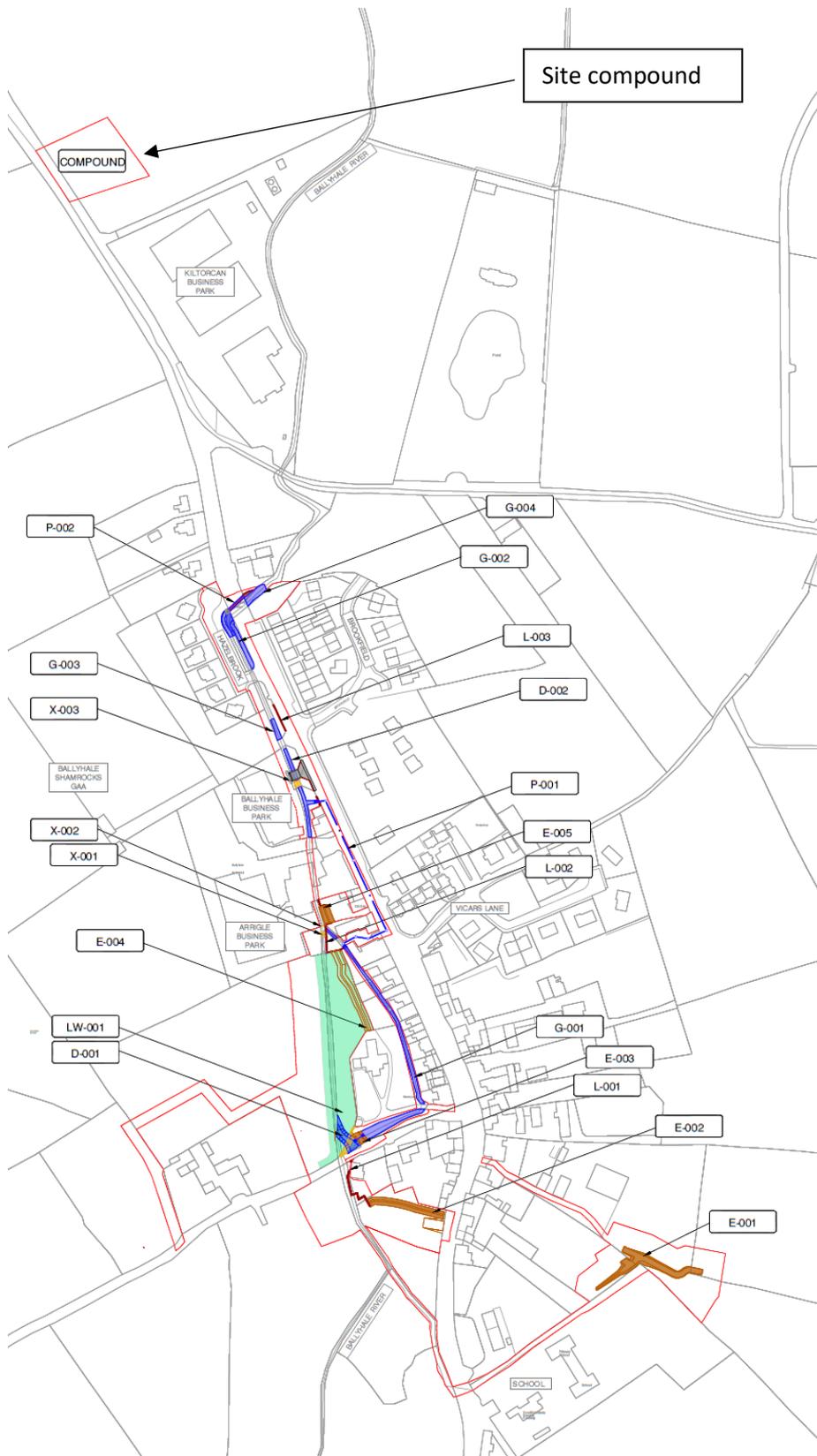
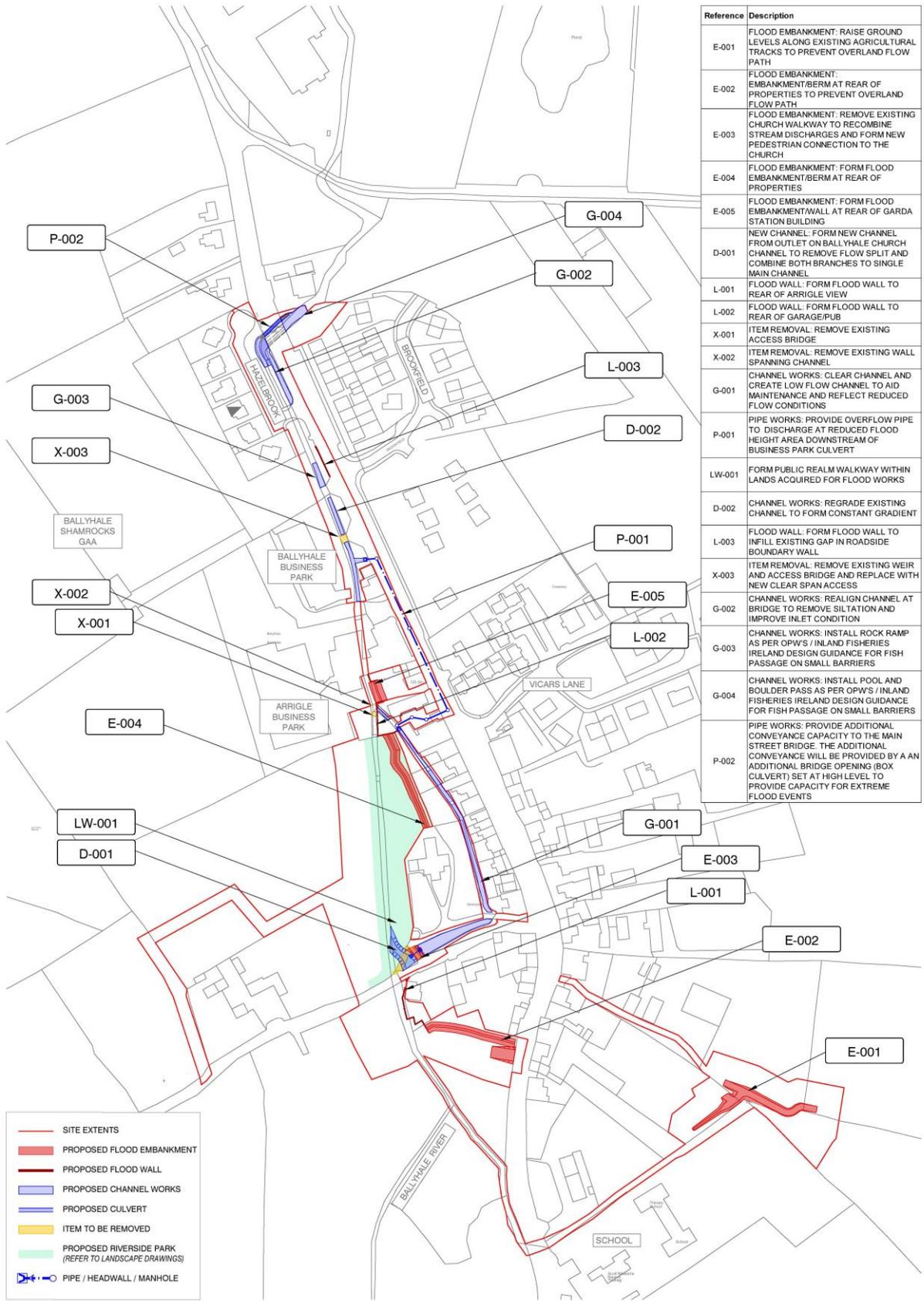


Figure 3. Proposed site layout



Reference	Description
E-001	FLOOD EMBANKMENT: RAISE GROUND LEVELS ALONG EXISTING AGRICULTURAL TRACKS TO PREVENT OVERLAND FLOW PATH
E-002	FLOOD EMBANKMENT: EMBANKMENT/BERM AT REAR OF PROPERTIES TO PREVENT OVERLAND FLOW PATH
E-003	FLOOD EMBANKMENT: REMOVE EXISTING CHURCH WALKWAY TO RECOMBINE STREAM DISCHARGES AND FORM NEW PEDESTRIAN CONNECTION TO THE CHURCH
E-004	FLOOD EMBANKMENT: FORM FLOOD EMBANKMENT/BERM AT REAR OF PROPERTIES
E-005	FLOOD EMBANKMENT: FORM FLOOD EMBANKMENT/WALL AT REAR OF GARDA STATION BUILDING
D-001	NEW CHANNEL: FORM NEW CHANNEL FROM OUTLET ON BALLYHALE CHURCH CHANNEL TO REMOVE FLOW SPLIT AND COMBINE BOTH BRANCHES TO SINGLE MAIN CHANNEL
L-001	FLOOD WALL: FORM FLOOD WALL TO REAR OF ARRIGLE VIEW
L-002	FLOOD WALL: FORM FLOOD WALL TO REAR OF GARAGE/PUB
X-001	ITEM REMOVAL: REMOVE EXISTING ACCESS BRIDGE
X-002	ITEM REMOVAL: REMOVE EXISTING WALL SPANNING CHANNEL
G-001	CHANNEL WORKS: CLEAR CHANNEL AND CREATE LOW FLOW CHANNEL TO AID MAINTENANCE AND REFLECT REDUCED FLOW CONDITIONS
P-001	PIPE WORKS: PROVIDE OVERFLOW PIPE TO DISCHARGE AT REDUCED FLOOD HEIGHT AREA DOWNSTREAM OF BUSINESS PARK CULVERT
LW-001	FORM PUBLIC REALM WALKWAY WITHIN LANDS ACQUIRED FOR FLOOD WORKS
D-002	CHANNEL WORKS: REGRADE EXISTING CHANNEL TO FORM CONSTANT GRADIENT
P-001	FLOOD WALL: FORM FLOOD WALL TO INFILL EXISTING GAP IN ROADSIDE BOUNDARY WALL
L-003	ITEM REMOVAL: REMOVE EXISTING WEIR AND ACCESS BRIDGE AND REPLACE WITH NEW CLEAR SPAN ACCESS
X-003	CHANNEL WORKS: REALIGN CHANNEL AT BRIDGE TO REMOVE SILTATION AND IMPROVE INLET CONDITION
G-002	CHANNEL WORKS: INSTALL ROCK RAMP AS PER OPW'S / INLAND FISHERIES IRELAND DESIGN GUIDANCE FOR FISH PASSAGE ON SMALL BARRIERS
G-003	CHANNEL WORKS: INSTALL POOL AND BOULDER PASS AS PER OPW'S / INLAND FISHERIES IRELAND DESIGN GUIDANCE FOR FISH PASSAGE ON SMALL BARRIERS
G-004	CHANNEL WORKS: INSTALL POOL AND BOULDER PASS AS PER OPW'S / INLAND FISHERIES IRELAND DESIGN GUIDANCE FOR FISH PASSAGE ON SMALL BARRIERS
P-002	PIPE WORKS: PROVIDE ADDITIONAL CONVEYANCE CAPACITY TO THE MAIN STREET BRIDGE. THE ADDITIONAL CONVEYANCE WILL BE PROVIDED BY A AN ADDITIONAL BRIDGE OPENING (BOX CULVERT) SET AT HIGH LEVEL TO PROVIDE CAPACITY FOR EXTREME FLOOD EVENTS

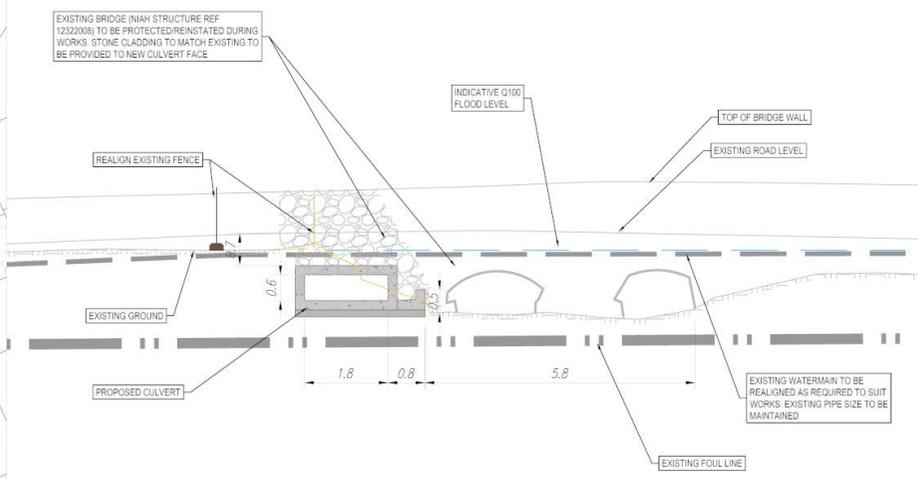
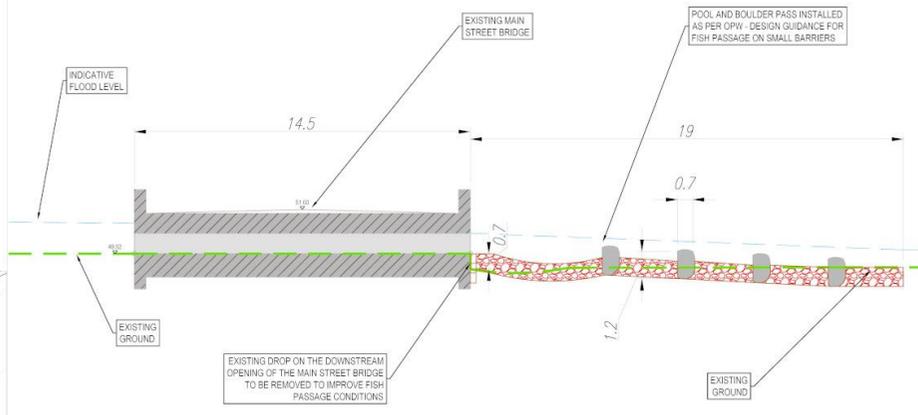
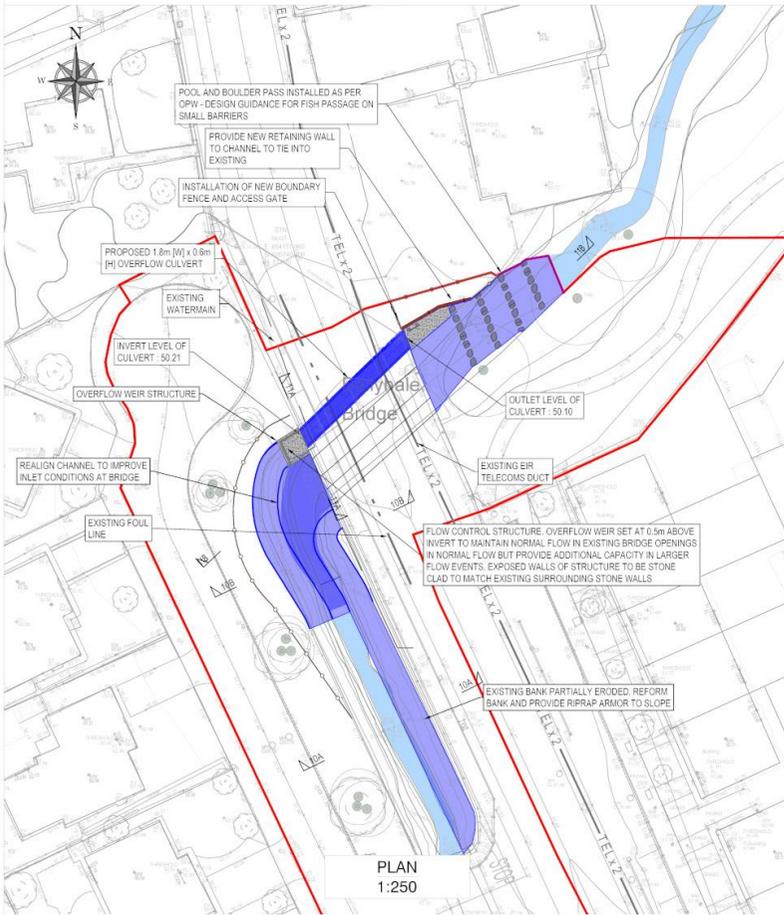
Figure 3. Proposed site layout and works (excluding site compound which is located to the north)



EXISTING OUTLET DROP TO BE REMOVED



EXISTING UPSTREAM BRIDGE FACE



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NOTES

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- ALL LEVELS ARE TO BE ABOVE (SLASH) BELOW (WALL HEAD).

LEGEND

- SITE EXTENTS
- PROPOSED FLOOD EMBANKMENT
- PROPOSED FLOOD WALL
- PROPOSED CHANNEL WORKS
- PROPOSED CULVERT
- ITEM TO BE REMOVED
- PIPE / HEADWALL / MAN-HOLE
- PROPOSED GRASS FLOOD WALL
- INDICATIVE FLOOD LEVEL (SECTIONS)
- INDICATIVE EXISTING RIVER CHANNEL (PLAN)
- EXISTING TREE
- EXISTING TREE TO BE REMOVED
- PROPOSED FENCE

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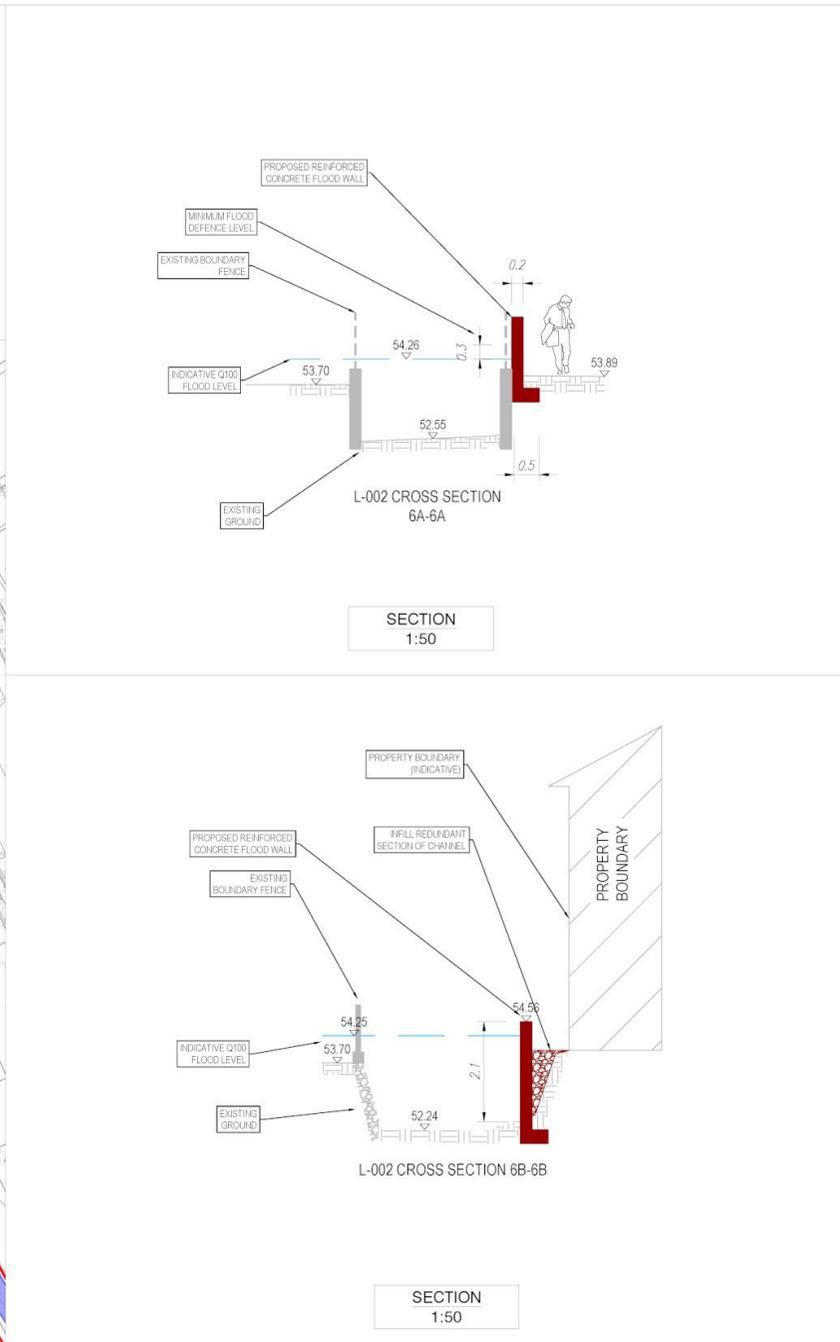
Figure 4. Proposed bridge works (and rock ramp)



Figure 5. Proposed watercourse sections



Figure 6. Proposed embankment details



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LEGEND

- SITE EXTENTS
- PROPOSED FLOOD EMBANKMENT
- PROPOSED FLOOD WALL
- PROPOSED CHANNEL WORKS
- PROPOSED CULVERT
- ITEM TO BE REMOVED
- PIPE / HEADWALL / MAN-HOLE
- PROPOSED GLASS FLOOD WALL
- INDICATIVE FLOOD LEVEL (SECTIONS)
- INDICATIVE EXISTING RIVER CHANNEL (PLAN)
- EXISTING TREE
- EXISTING TREE TO BE REMOVED
- PROPOSED FENCE

client approval

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project ref:

BALLYHALE FLOOD RELIEF SCHEME

drawing title:

FLOOD WALL L-002 GENERAL ARRANGEMENT

client:

KILKENNY COUNTY COUNCIL

designed by:

JPC

checked by:

AMP

scale:

AS NOTED

sheet no.:

A1

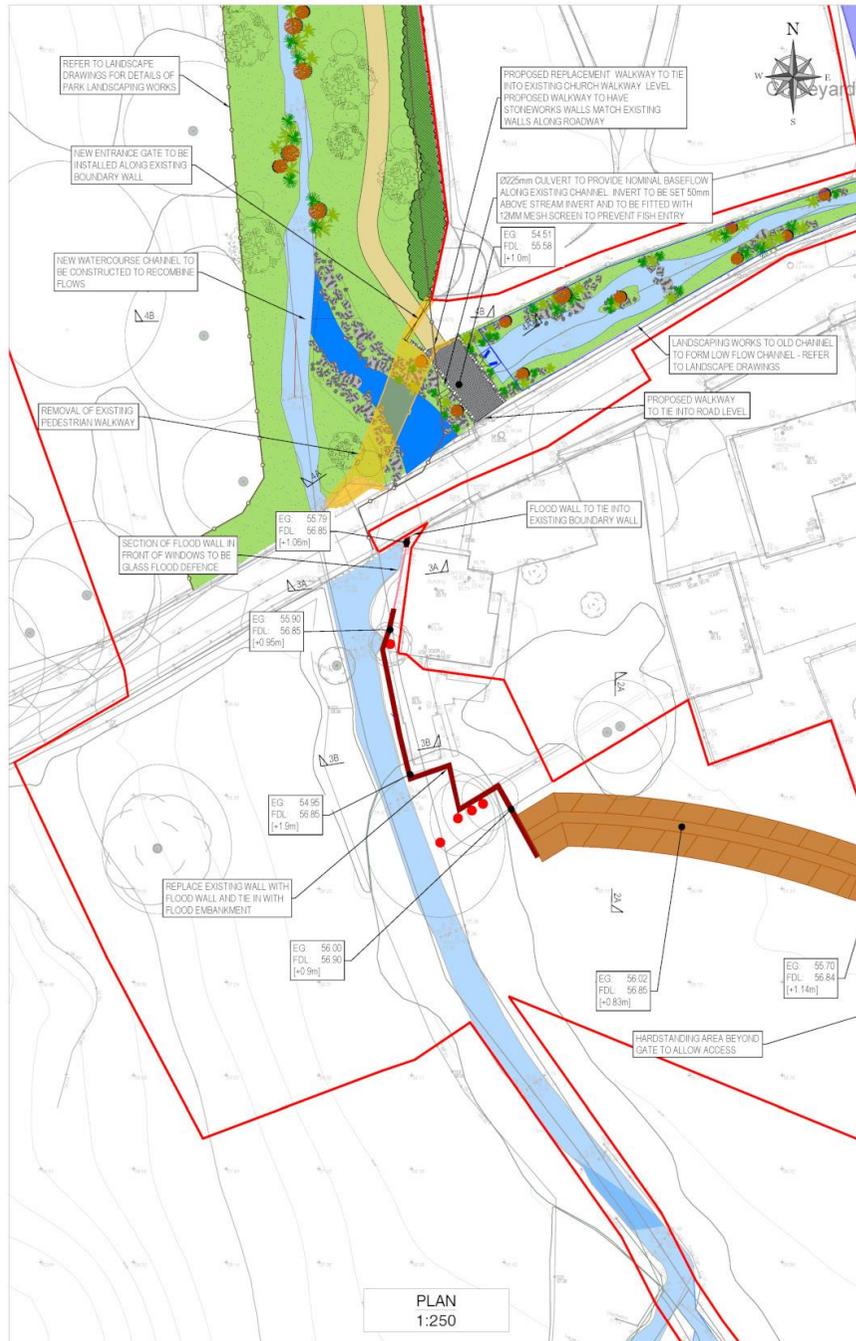
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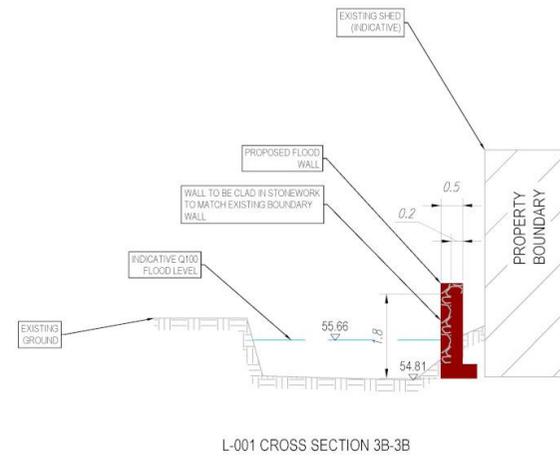
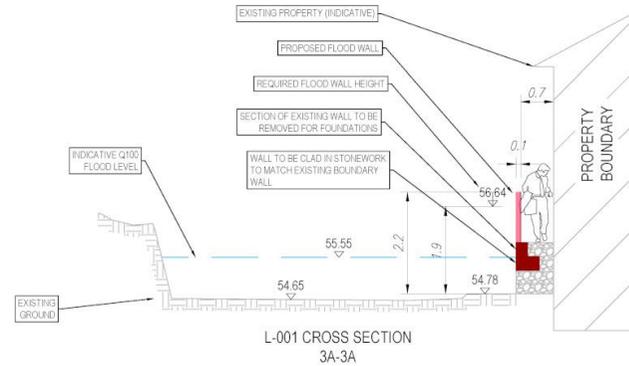
Figure 7. Proposed floodwall detail



EXISTING PROPERTY BOUNDARY WITH WATERCOURSE



EXAMPLE OF GLASS FLOOD WALL IN WATERFORD CITY



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LEGEND

- SITE EXTENTS
- PROPOSED FLOOD EMBANKMENT
- PROPOSED FLOOD WALL
- PROPOSED CHANNEL WORKS
- PROPOSED CULVERT
- ITEM TO BE REMOVED
- PIPE / HEADWALL / MAN-HOLE
- PROPOSED GLASS FLOOD WALL
- INDICATIVE FLOOD LEVEL (SECTIONS)
- INDICATIVE EXISTING RIVER CHANNEL (PLAN)
- EXISTING TREE
- EXISTING TREE TO BE REMOVED
- PROPOSED FENCE

REV	DATE	DESCRIPTION	BY	CHKD
A		Approved		
B		Approved with comments		
C		Do not use		

STATUS: WORK IN PROGRESS / PRELIMINARY DESIGN

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DBPL is a member of the Group Practice, Waterford Road, Gal. T12 X1V
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project ref: BALLYHALE FLOOD RELIEF SCHEME

drawing title: FLOOD WALL L-001 GENERAL ARRANGEMENT

client: KILKENNY COUNTY COUNCIL

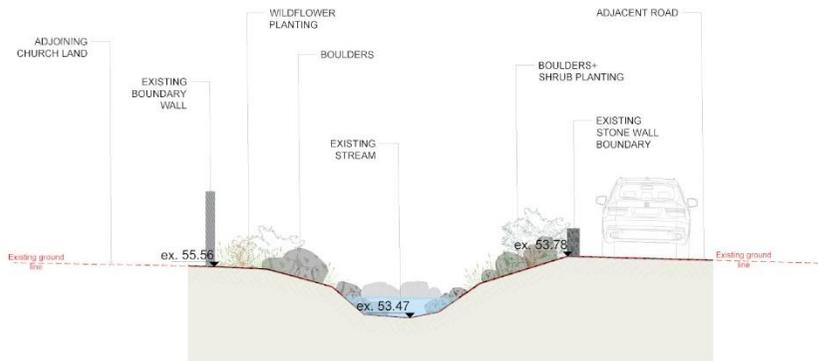
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Figure 8. Proposed floodwall detail



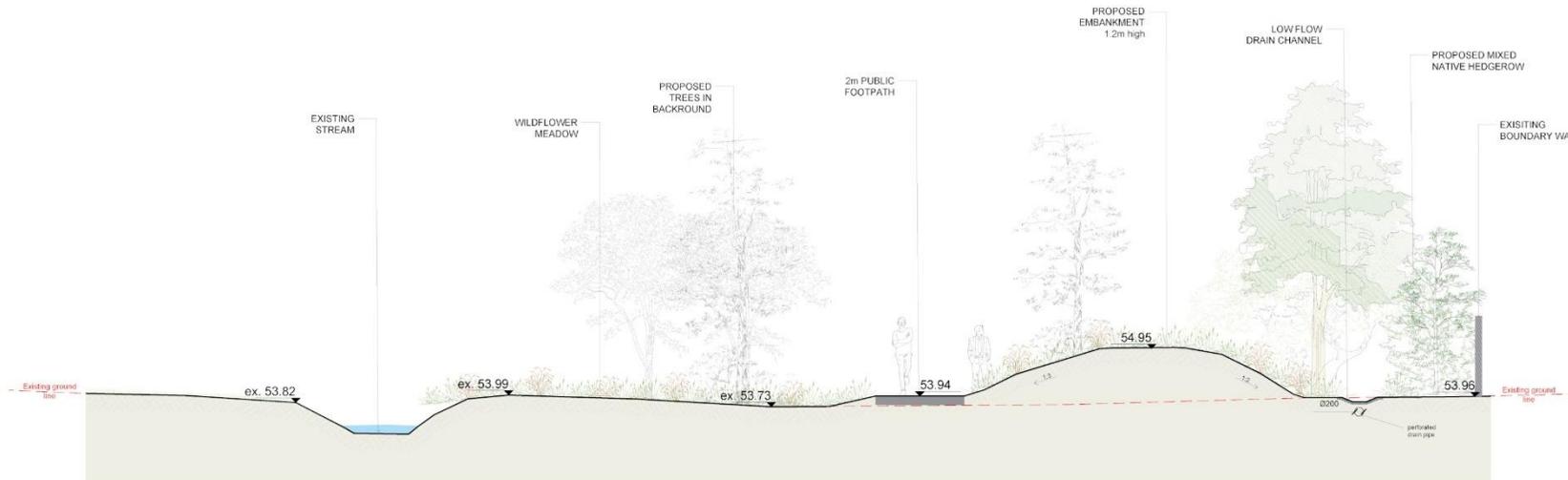
Figure 9. Proposed walkway detail



Section A
STREAM CROSS SECTION
Scale 1:50



KEY PLAN - NTS



Section B
EMBANKMENT CROSS SECTION
Scale 1:50

REV	DATE	AMENDMENT
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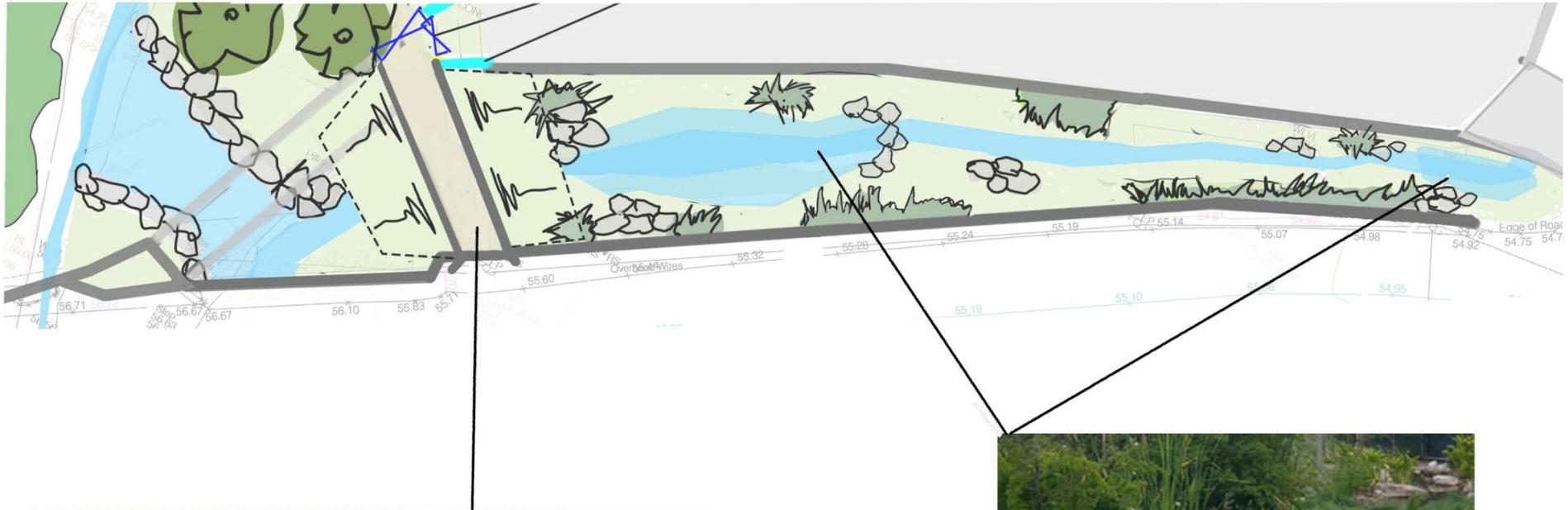
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EMAIL info@csrdp.com



PROJECT: BALLYHALE FLOOD RELIEF SCHEME, CO. KILKENNY	DATE: 04-10-2021
DRAWING: PROPOSED LANDSCAPE - CROSS SECTIONS	SCALE: 1:50
	DRAWN: CHECKED: ACM AF
	DRAWING NO: 20392-1-201

Figure 11. Proposed landscape sections



STONE WALKAWAY



WETLAND TYPE PLANTING AND ROCKS

Black cohos, Cowslip, Ragged robin, Yellow iris, Siberian iris, Bugle weed, Tufted hair grass, Meadowsweet,

Figure 11. Proposed pool detail

Preliminary Construction Management Plan

A Preliminary Construction Management Plan (CMP) was prepared by DBFL. The CMP states that *'The project is currently at planning stage and as such input from the contractor has not been incorporated into the plan. On appointment of a contractor this preliminary document will be issued to them to be further developed into their final construction management plan for the project. The final construction management plan would be submitted by the contractor to be approved by the planning authority prior to commencement of development.'*

The outline plan seeks to demonstrate how works can be delivered in a logical sensible and safe sequence with the incorporation of specific measures to mitigate the potential impact on people and the surrounding environment, particularly the residential areas adjacent the site.'

'Ballyhale is within the catchment of the Little Arrigle River which is a tributary of the River Nore. The main channel of the Little Arrigle runs to the west of the village and a tributary of the Little Arrigle runs through the village. This tributary is also known locally as the Little Arrigle however will be termed the Ballyhale River for the purposes of this assessment (this is also referred to in EPA mapping as Knockwilliam Stream).'

The Ballyhale River rises approximately 2.9km south of the town of Ballyhale. It begins in a forested region and flows north through largely agricultural land. The Ballyhale River enters the village near the church and splits into two channels either side of the church. The western branch flows in a generally open channel through agricultural land. The eastern channel flows through the rear of a number of domestic properties through a heavily modified channel with frequent structures of varying construction type. The branches merge upstream of Arrigle Business Park and flow through a long (circa 50m) culvert under buildings in the business park. Several additional culverts/bridges are present on the watercourse along its remaining route through the village.

A number of weirs are also present on the channel within the village. The Ballyhale River leaves Ballyhale and merges with the Little Arrigle approximately 850 m north of Ballyhale.'

'Construction Programme and Staging

The project is currently at planning stage and subject to approval and detailed design. It is estimated that the works would be tendered in 2023 with commencement in 2024 and an estimated site programme of approximately 18 months depending on construction phasing.

- *The primary works elements are anticipated to include*
- *Site Setup*
- *Site Clearance and Demolition*
- *Earthworks*
- *Channel Works*
- *New Structures*
- *Installation of Drainage*
- *Landscaping & Demobilisation*

Programme Constraints

'The proposed in stream works will be constructed during the instream open season (between June – September only). Weather conditions will be monitored throughout the construction period by the contractor and works will not be carried out during extreme rainfall or high flow events and shall take notice of other statutory and best practice working period restrictions imposed.

Tree and shrub removal will be ideally carried out between September and February (inclusive). If this is not possible, an ecologist will survey relevant vegetation in advance in order to determine whether any protected fauna are present. If any are encountered, the vegetation clearance will be delayed until the protected fauna have moved away from the area, a derogation licence will be sought only where no alternatives exist.

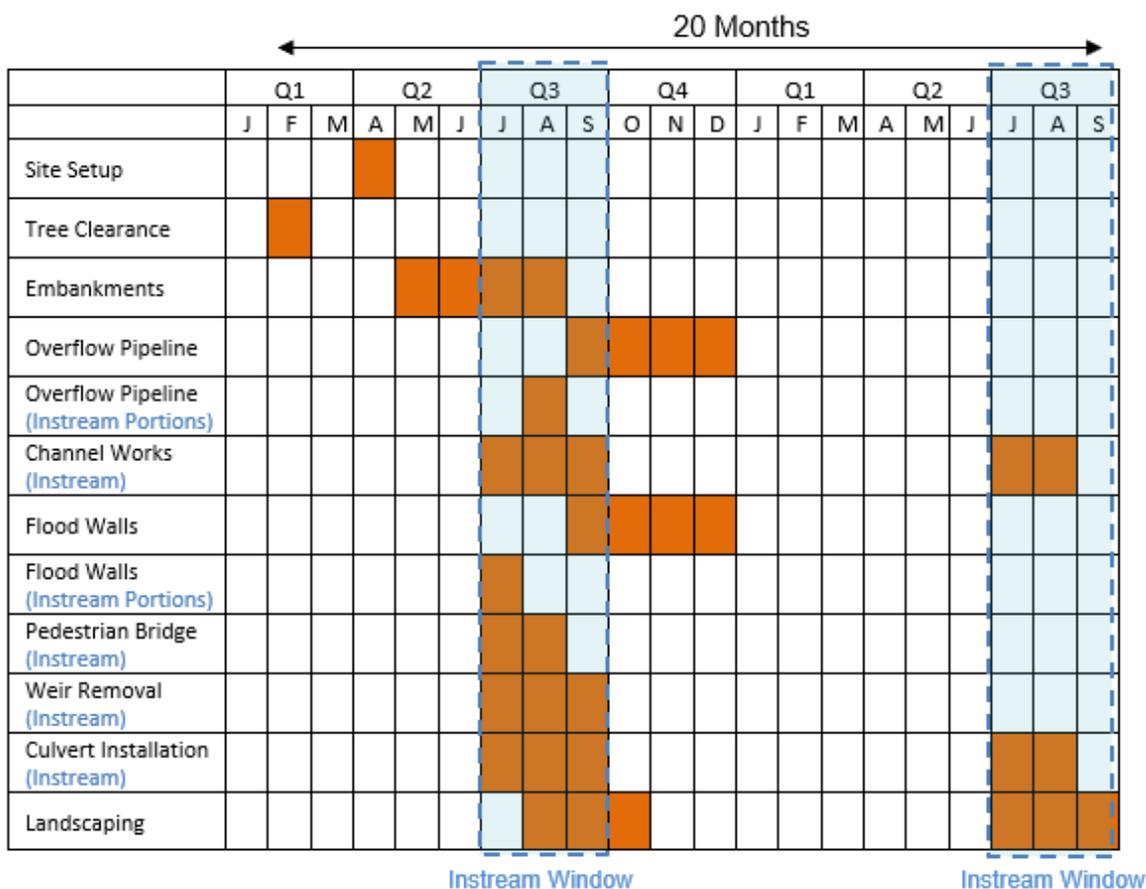
The works include a number of elements which will affect access or operations within residential and commercial properties. The contractor shall liaise with all property owners to ensure the works schedule is co-ordinated with landowner requirements to minimise disturbance and provide temporary access measures as appropriate. Particular landowner requirements or restrictions shall be included within tender documents for the project.

A preliminary construction programme has been prepared by DBFL but when a contractor is appointed, they will produce a Programme for construction which will be submitted to the Local Authority for approval before any works commence.'

Preliminary Construction Programme

A preliminary construction programme has been prepared by DBFL but when a contractor is appointed post planning permission, they will produce a Programme for construction which will be submitted to the Local Authority for approval before any works commence. The contractors programme shall comply with works restrictions set out in the EIAR and this CEMP

The indicative programme chart below shows an 20-month construction period and assumes a start date in Q2 2024. This allows for works to span across two instream windows however if all instream works can be completed in a single window the construction period could be reduced.



Site Setup

'The contractor shall establish a site compound and additional temporary compounds as necessary. The exact location of the construction compound will be detailed in the Contractors Construction Management Plan which will be submitted to the local authority for approval, but it should be within an area proximate to the works from which safe access to the surrounding road network can be provided and be located outside environmental restriction zones set out in the EIAR/CEMP.'

'Much of the site is adjacent or within the Ballyhale River which is a sensitive receptor draining to an SAC as outlined in the project EIAR. The contractor shall put in place measures to ensure that the river bed and banks are not damaged, pollution is avoided and that the flow is correctly managed throughout the construction period. All mitigation measures outlined in the EIAR and within this PCMP shall be included in the contractors Construction Management Plan. In general, all works in the vicinity of the channel will be subject to a specific method statement agreed in advance with the statutory authorities.'

Given the nature of the proposed works at Ballyhale there are a number of discrete works areas and it is likely that individual access will be required to each area, complete with temporary fencing around these works areas as required.

The contractor shall establish and maintain suitable temporary fencing around their works areas. Where semi-permanent hoarding is required, hoardings will be painted timber hoarding circa 2.4m including supports and appropriate anchoring (Designed by Temporary Works Engineer), with external lighting and Safety signage as appropriate. Site hoarding will include Health and Safety warnings at appropriate intervals.

Site security will be provided by way of a monitored infrastructure systems such as site lighting and CCTV cameras, when deemed necessary.

The construction compound will not be located within 50m of the Ballyhale River.'

Access Routes

'The proposed contract works will use existing access routes where possible and were selected to minimise impact and potential disturbance. The access routes will be clearly demarcated across the site prior to any construction activities.

The public road network will be used to access the general areas of the proposed works where practical. Existing farm access routes will be used to gain access to other areas which are not directly accessible from the public road.'

Site Clearance and Demolition

'The works area will be required to be cleared of vegetation in a phased approach to avoid leaving exposed ground for long periods of time. The contractor shall minimise the vegetation clearance carried out and only clear what is strictly necessary to facilitate the works. Tree and shrub removal will be carried out between September and February (inclusive). If this is not possible, an ecologist will survey relevant vegetation in advance in order to determine whether any nesting birds are present. If any are encountered, the vegetation clearance will be delayed until the protected fauna have moved away from the area, a derogation licence will be sought only where no alternatives exist.

Minor demolition is proposed including replacement of existing walls and existing channel structures. It is anticipated that most of the waste generated from demolitions will be segregated wherever possible for reuse or recycling in accordance with the relevant legislation and guidelines and the project's Construction Waste Management Plan. All unused demolition waste will be removed off-site to a licensed facility.'

Earthworks

'Excavated material will be generated from the stripping of surface and excavation of subsoil layers for the construction of the proposed foundations and channel works. Earthworks material will also be placed to form embankments. All imported material shall be sourced from a licensed supplier and be tested to ensure it is free from contamination

Bunds will be placed around areas of exposed soils such as excavations / material stockpiles. This will prevent clean water entering the area and dirty water from leaving the area. The bunds will be made of a non-erodible material such as strawbales / geotextiles.

Excess material will be disposed offsite to a suitably licensed facility in accordance with current waste management legislation & the project's Construction Waste Management Plan.'

In Channel Works

'The proposed in stream works will be constructed during the instream open season (between June – September only). Weather conditions will be monitored throughout the construction period by the contractor and works will not be carried out during extreme rainfall or high flow events.

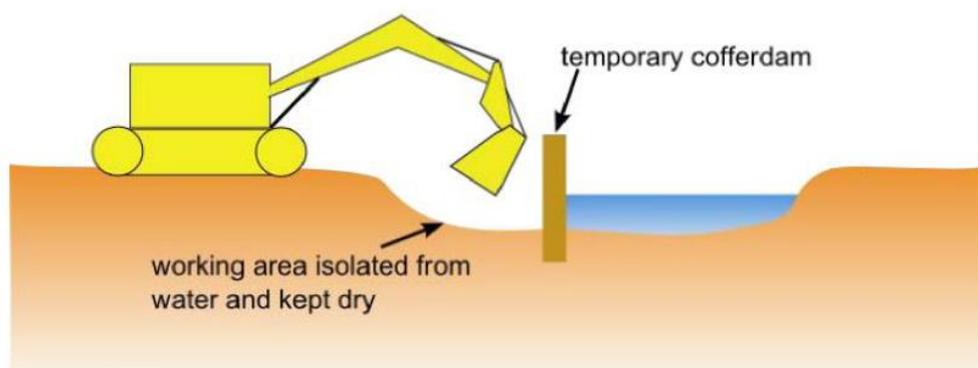
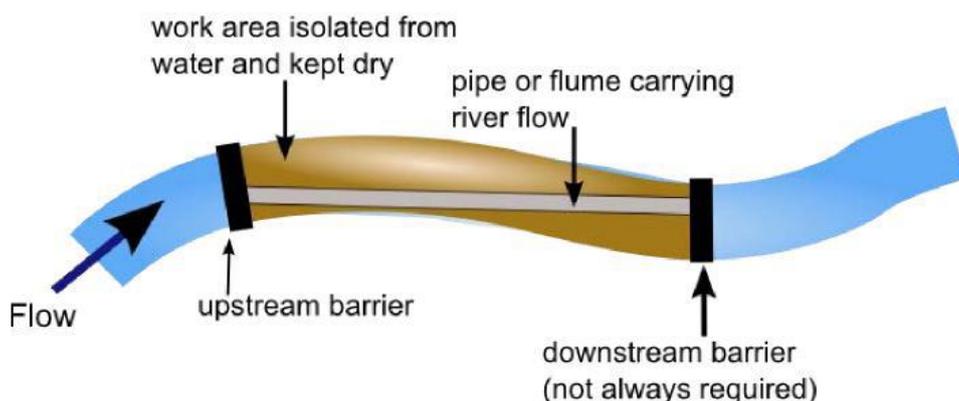
Construction and operational controls will be incorporated into the proposed development project to minimise the potential negative impacts on the ecology within the Zone of Influence (Zoi) including the Knockwilliam Stream, Little Arrigle Stream, River Nore, and River Barrow.

The contractor shall prepare a detailed method statements for all elements of instream works and all in-stream works will comply with current best practice, notably the Inland Fisheries Ireland Guidelines on protection of fisheries during construction works in and adjacent to waters (IFI, 2016) and Transport Infrastructure Ireland's Guidelines for the crossing of watercourses during the construction of national road schemes (TII 2008).

Where specified in Chapter 6 Biodiversity, Electro fishing will be carried out subject to licence.

For any construction work within or directly adjacent to the water the following mitigation measures will apply

- Works to be carried out in the dry (offline or outside the water flow) in all cases.
- "Dry" works areas will be achieved either via full isolation of the channel section via Gravity Pipe/Flume or via partial isolation using cofferdams. See schematic diagrams below



To minimise trash and sediment accumulation at the upstream end, flume pipes will be inspected (including the inlet and outlet) regularly for damage or blockage. The contractor will clear blockages and repair any damage immediately.

When removing flume pipes at the end of the works, the contractor will remove any accumulation of silt or trash against the barrier and dispose of it appropriately. The contractor will remove the downstream barrier before removing the upstream barrier.

Identification of Relevant Natura 2000 Sites

The proposed development site is not located within a European site. As outlined in Office of the Planning Regulator (2021) *“The zone of influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source- Pathway-Receptor framework and not by arbitrary distances (such as 15 km).”*

A key factor in the consideration as to whether or not a particular European site is likely to be affected by the proposed works is its distance from the location of the works. It is generally, but not necessarily, the case that the greater the distance from the plan or project the smaller the likelihood of impacts. In this case, the nearest European site to the proposed development is within a portion of the subject site outline (River Barrow and River Nore SAC).

The ZoI of the proposed project is deemed to be the watercourse on site, within the site outline, there is potential for downstream impacts on the Knockwilliam Stream, Little Arrigle River, River Nore, River Barrow, and the European Sites (River Barrow and River Nore SAC and River Nore SPA) in the absence of standard construction phase controls or mitigation measures. As can be seen in Figures 12-20, there is a direct hydrological pathway to the River Barrow and River Nore SAC and River Nore SPA from the proposed works.

In the interest of carrying out a thorough assessment in line with both the Habitats Directive, and the precautionary principle, the ZoI was expanded for this assessment to include designated sites within 15km of the proposed development site, and sites beyond 15km with the potential for a hydrological connection. This was done in the interest of ensuring that any pathways, however indirect or remote, were taken into account. The European sites within 15km are seen in Figures 3 & 4. Watercourses, SACs and SPAs proximate to the proposed development are demonstrated in Figures 14-20. All Natura 2000 sites within 15km are listed in Table 1. The conservation objectives, qualifying interests, and the potential impact of the development on each European site and qualifying interest, are outlined in Table 2. There is no direct or indirect pathway to Natura 2000 sites beyond 15km. No European Sites outside of the zone of influence could be impacted by the proposed development

Table 1. Proximity to designated sites of conservation importance

NATURA 2000 Site	Distance	Direct Hydrological / Biodiversity Connection
Special Areas of Conservation		
River Barrow and River Nore SAC	Within a portion of the subject site	Yes
Hugginstown Fen SAC	4.1 km	No
Thomastown Quarry SAC	7.8 km	No
Lower River Suir SAC	13.1 km	No
Special Protection Area		
River Nore SPA	5.3 km	Yes

Table 2. Initial screening of NATURA 2000 sites within 15km and NATURA 2000 sites with potential of hydrological connection to the proposed development – Screened IN (NIS Required)

NATURA Code	Name	Screened IN/OUT	Details/Reason
Special Areas of Conservation			
IE002162	River Barrow and River Nore SAC	In	<p>Conservation Objectives The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.</p> <p>Qualifying Interests Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) [1029] White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092] Sea Lamprey (<i>Petromyzon marinus</i>) [1095] Brook Lamprey (<i>Lampetra planeri</i>) [1096] River Lamprey (<i>Lampetra fluviatilis</i>) [1099] Twaite Shad (<i>Alosa fallax fallax</i>) [1103] Salmon (<i>Salmo salar</i>) [1106] Otter (<i>Lutra lutra</i>) [1355] Killarney Fern (<i>Trichomanes speciosum</i>) [1421] Nore Pearl Mussel (<i>Margaritifera durrovensis</i>) [1990]</p> <p>Potential Impact The proposed works site is located within a portion of this SAC (Figure 12). A significant portion of the Features of Interest of this site are aquatic species, or could potentially be impacted directly or indirectly by aquatic pollution or by a deterioration in water quality or a reduction in aquatic biodiversity. As a result of the lengthy design process, which included consultation with Inland Fisheries Ireland, NPWS, and the project ecologist, the sensitivities of this SAC have been taken into account and a design that would limit potential impacts on the SAC during construction and operation has been chosen. However, given that extensive in-stream works are proposed and there is a direct hydrological pathway to this SAC, extensive mitigation measures are required. These are required to ensure that dust, silt, and petrochemicals do not enter the Little Arrigle Stream or the Knockwilliam Stream and that works do not result in the potential for downstream impacts on this SAC, either by silt or petrochemicals. During operation and during flood events it is expected that similar quantities and velocities of water will be seen as in the Do Nothing Scenario.</p>

			<p>However, improvements in water quality are expected during flood events as flooding of vehicles and houses will be reduced. During standard operation of the project, a reduction in flows will be seen in the watercourse within the village. It is expected that this will highlight outstanding pollution inputs e.g. misconnections. It is expected that in the medium to long term that point source pollution will be addressed. However, as part of the mitigation measures monitoring and the identification of residual point source pollution entering the watercourse (both immediately upstream and within the works area) should be addressed, as the reduction in water volumes within the village will reduce the dilution effect and could potentially impact on features of interest downstream, although the watercourses do merge prior to entering the SAC.</p> <p>The increase in water volumes in the watercourse to the west of the village could result in the altering of river bed with a reduction in silt in the area as a result of higher velocities. The existing silt within this area could be expected to mobilise in high velocity events and would transfer downstream.</p> <p>Significant effects are likely in the absence of mitigation measures.</p> <p>A NIS is Required.</p>
Special Protection Areas			
IE004233	River Nore SPA	In	<p>Conservation Objectives To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.</p> <p>Qualifying Interests Kingfisher (<i>Alcedo atthis</i>) [A229]</p> <p>Potential Impact The proposed works site is located 5.3 km from this SPA (Figure 13).</p> <p>Given that in-stream works are proposed and there is a direct hydrological pathway to this SPA, mitigation measures are required to ensure that dust, silt, and petrochemicals do not enter the Little Arrigle Stream or the Knockwilliam Stream, with the potential for downstream impacts on this SPA.</p> <p>It is worth noting that, in the absence of mitigation, given the minimum distance (5.3 km) to this SPA, it is considered that much of the silt that could potentially be resuspended would settle by the time it reaches the SPA. However, significant effects on the qualifying interests of this SPA cannot be ruled out, primarily as a result of the potential for additional pollution and indirect effects through the loss of prey items as a result of instream pollution in the absence of mitigation measures. It is important to note that mitigation measures will be required for the River Barrow and River Nore SAC and that these mitigation measures will also reduce the potential impact on the River Nore SPA.</p> <p>Significant effects are likely in the absence of mitigation measures.</p> <p>A NIS is Required</p>

Table 3. Initial screening of NATURA 2000 sites within 15km and NATURA 2000 sites beyond 15km with potential of hydrological connection to the proposed development – Screened OUT

NATURA Code	Name	Screened IN/OUT	Details/Reason
Special Areas of Conservation			
IE000404	Hugginstown Fen SAC	OUT	<p>Conservation Objectives The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.</p> <p>Qualifying Interests Alkaline fens [7230]</p> <p>Potential Impact The proposed works site is a minimum of 4.1 km from this SAC (Figure 12). There is no direct or indirect hydrological pathway from the proposed development site to this SAC. The qualifying interests will not be impacted by the proposed development.</p> <p>No significant effects are likely</p>
IE002252	Thomastown Quarry SAC	OUT	<p>Conservation Objectives The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.</p> <p>Qualifying Interests Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]</p> <p>Potential Impact The proposed works site is a minimum of 7.8 km from this SAC (Figure 12). There is no direct or indirect hydrological pathway from the proposed development site to this SAC. The qualifying interests will not be impacted by the proposed development.</p> <p>No significant effects are likely</p>
IE002137	Lower River Suir SAC	OUT	<p>Conservation Objectives The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.</p> <p>Qualifying Interests Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] Taxus baccata woods of the British Isles [91J0] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) [1029] White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092]</p>

NATURA Code	Name	Screened IN/OUT	Details/Reason
			<p>Sea Lamprey (<i>Petromyzon marinus</i>) [1095] Brook Lamprey (<i>Lampetra planeri</i>) [1096] River Lamprey (<i>Lampetra fluviatilis</i>) [1099] Twaité Shad (<i>Alosa fallax fallax</i>) [1103] Salmon (<i>Salmo salar</i>) [1106] Otter (<i>Lutra lutra</i>) [1355]</p> <p>Potential Impact The proposed works site is a minimum of 13.1 km from this SAC (Figure 12). There is no direct or indirect hydrological pathway from the proposed development site to this SAC. The qualifying interests will not be impacted by the proposed development.</p> <p>No significant effects are likely</p>

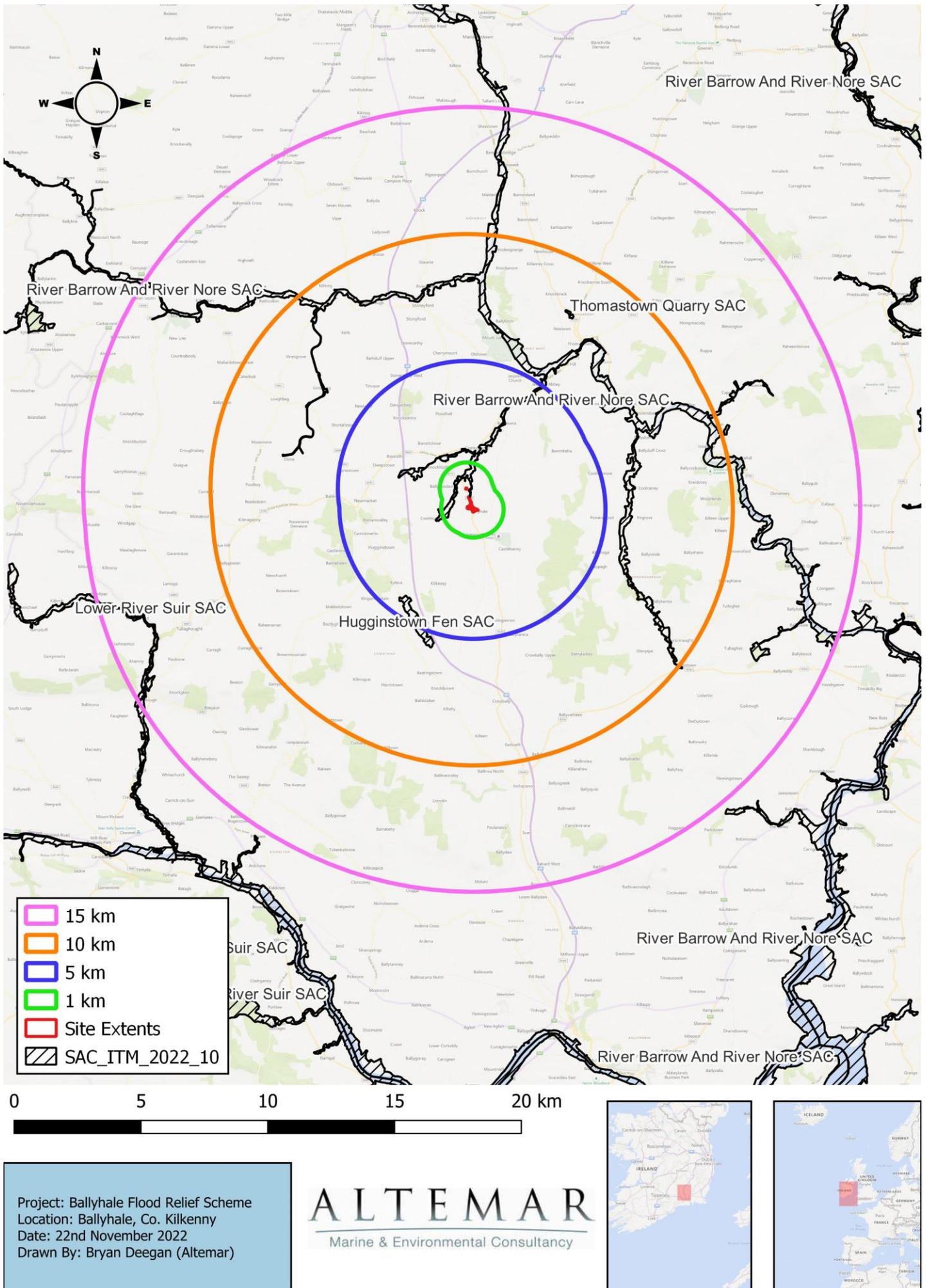
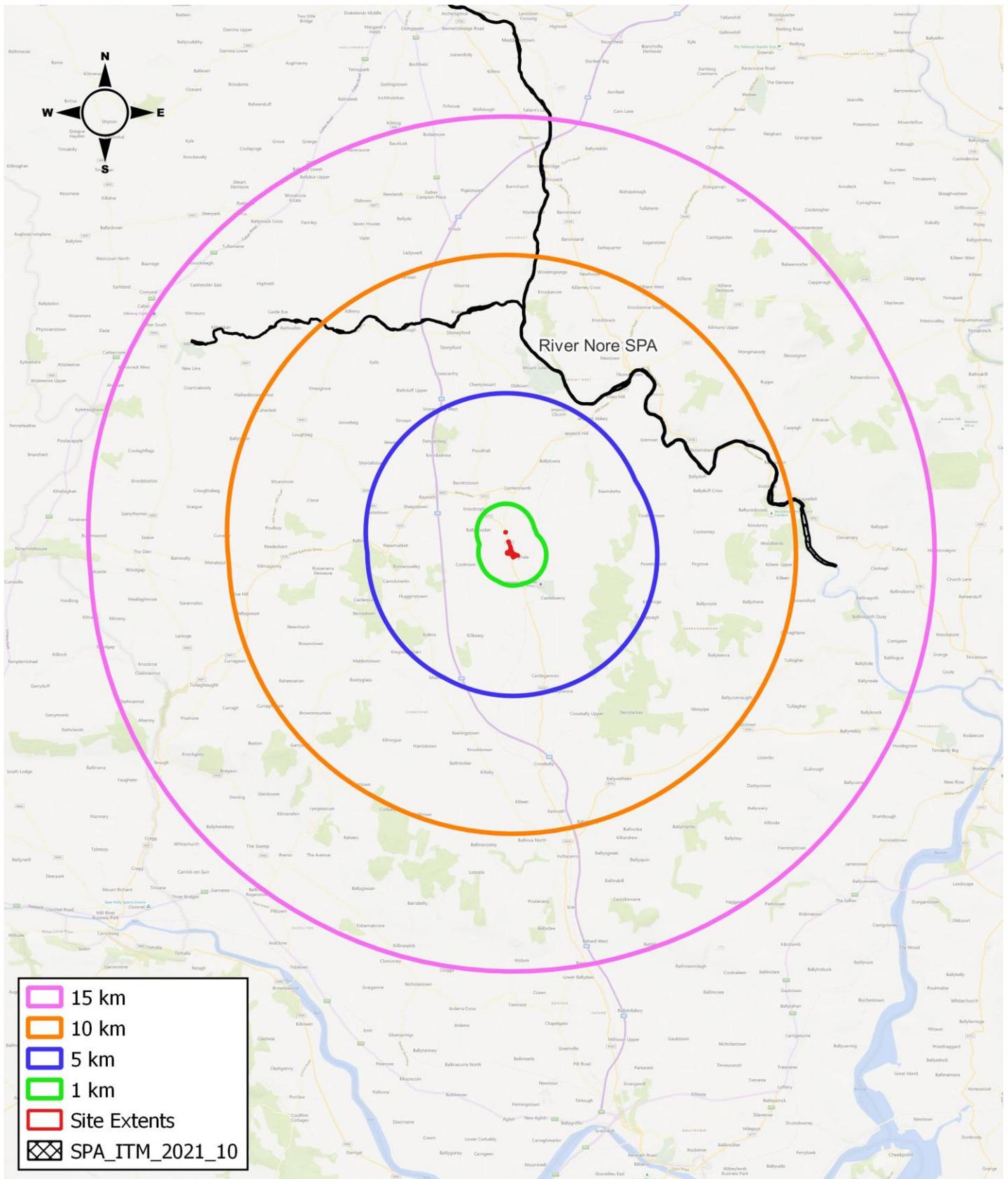


Figure 12. Special Areas of Conservation (SAC) within 15km of proposed development

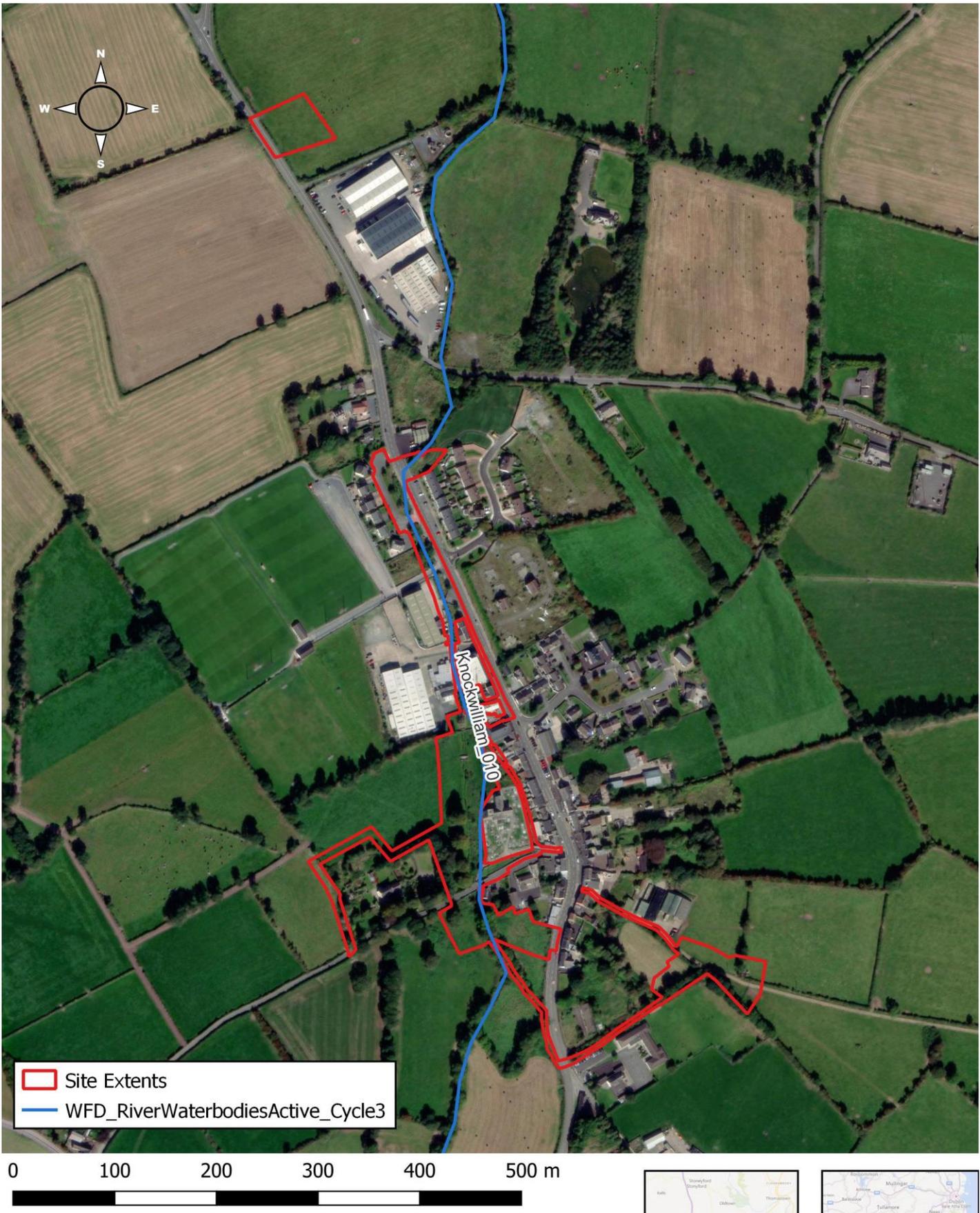


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 Location: Ballyhale, Co. Kilkenny
 Date: 22nd November 2022
 Drawn By: Bryan Deegan (Altamar)

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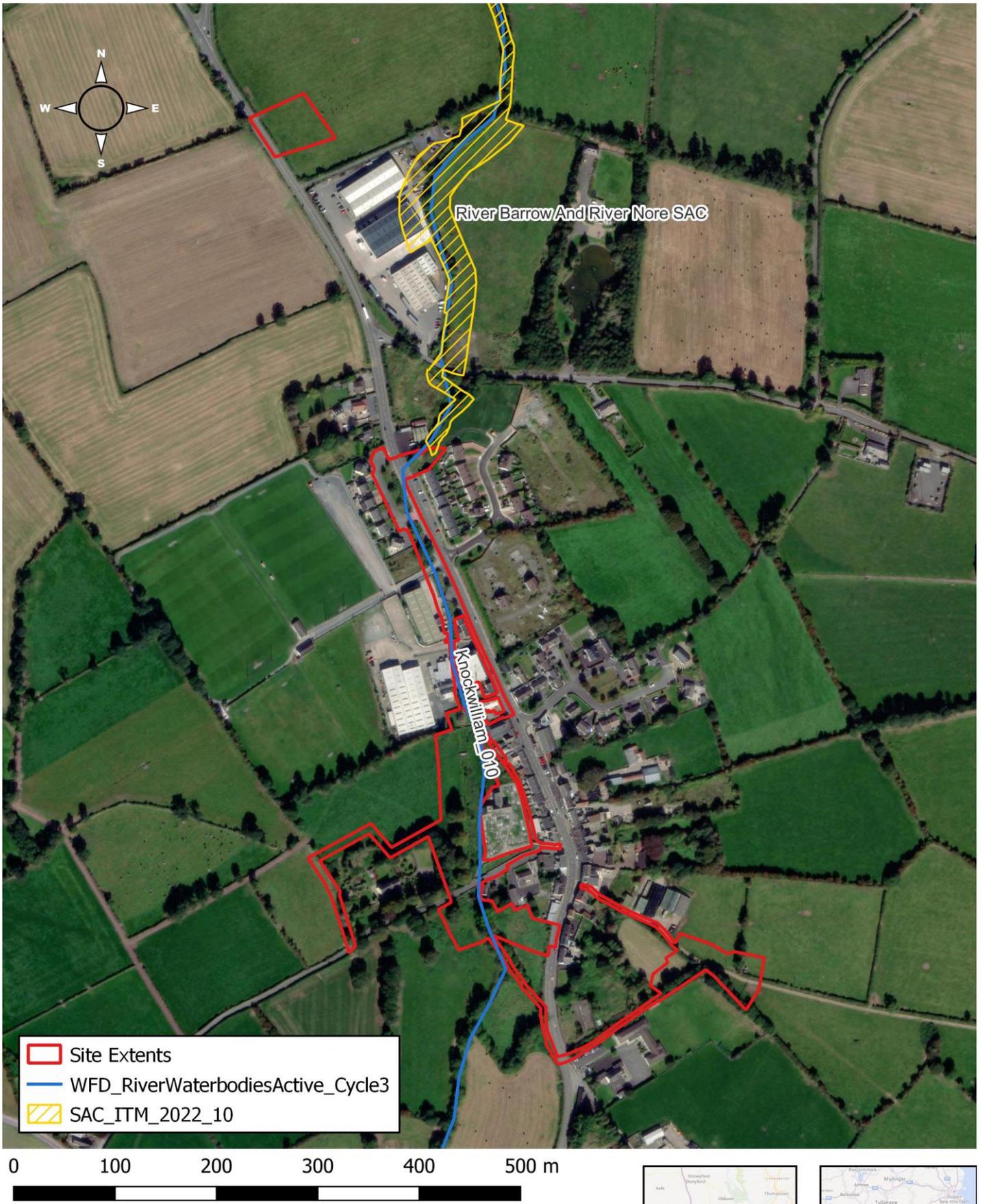
Figure 13. Special Protection Areas (SPA) within 15km of proposed development



Project: Ballyhale Flood Relief Scheme
 Location: Ballyhale, Co. Kilkenny
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 Drawn By: Bryan Deegan (Altamar)



Figure 14. Waterbodies proximate to the proposed development site



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 Drawn By: Bryan Deegan (Altamar)



Figure 15. Waterbodies and SACs proximate to the proposed development site

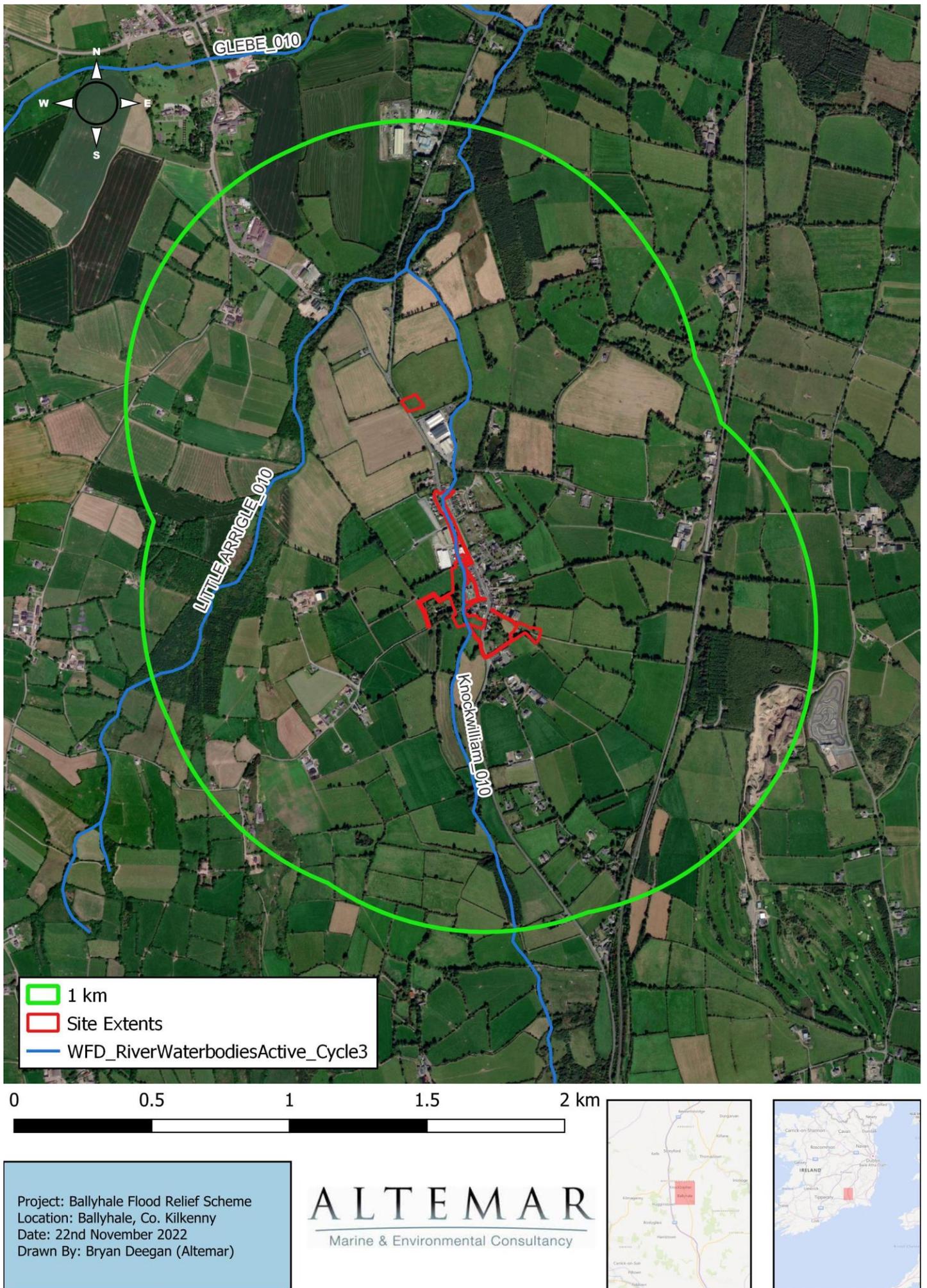


Figure 16. Waterbodies within 1km of the proposed development site

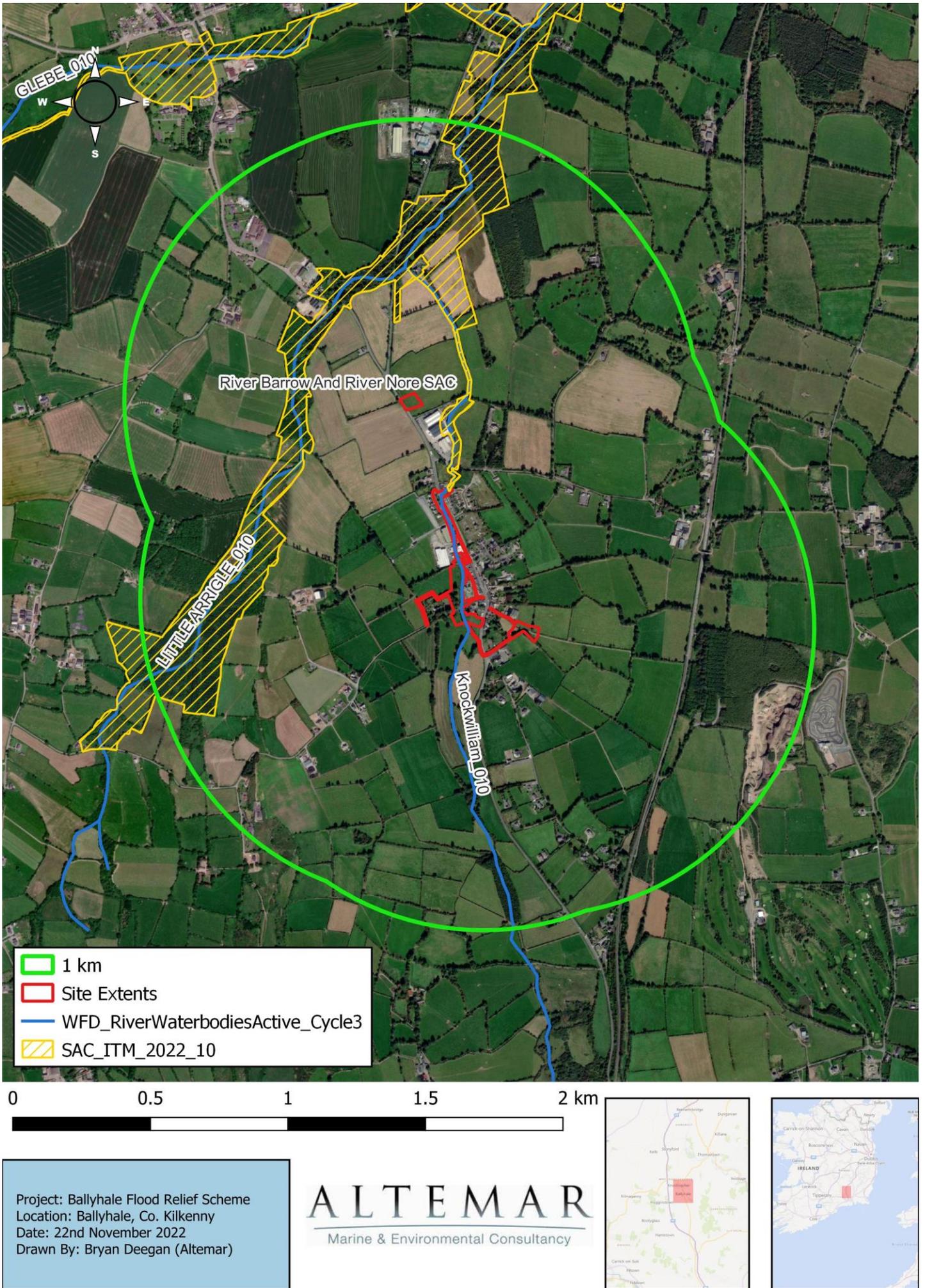
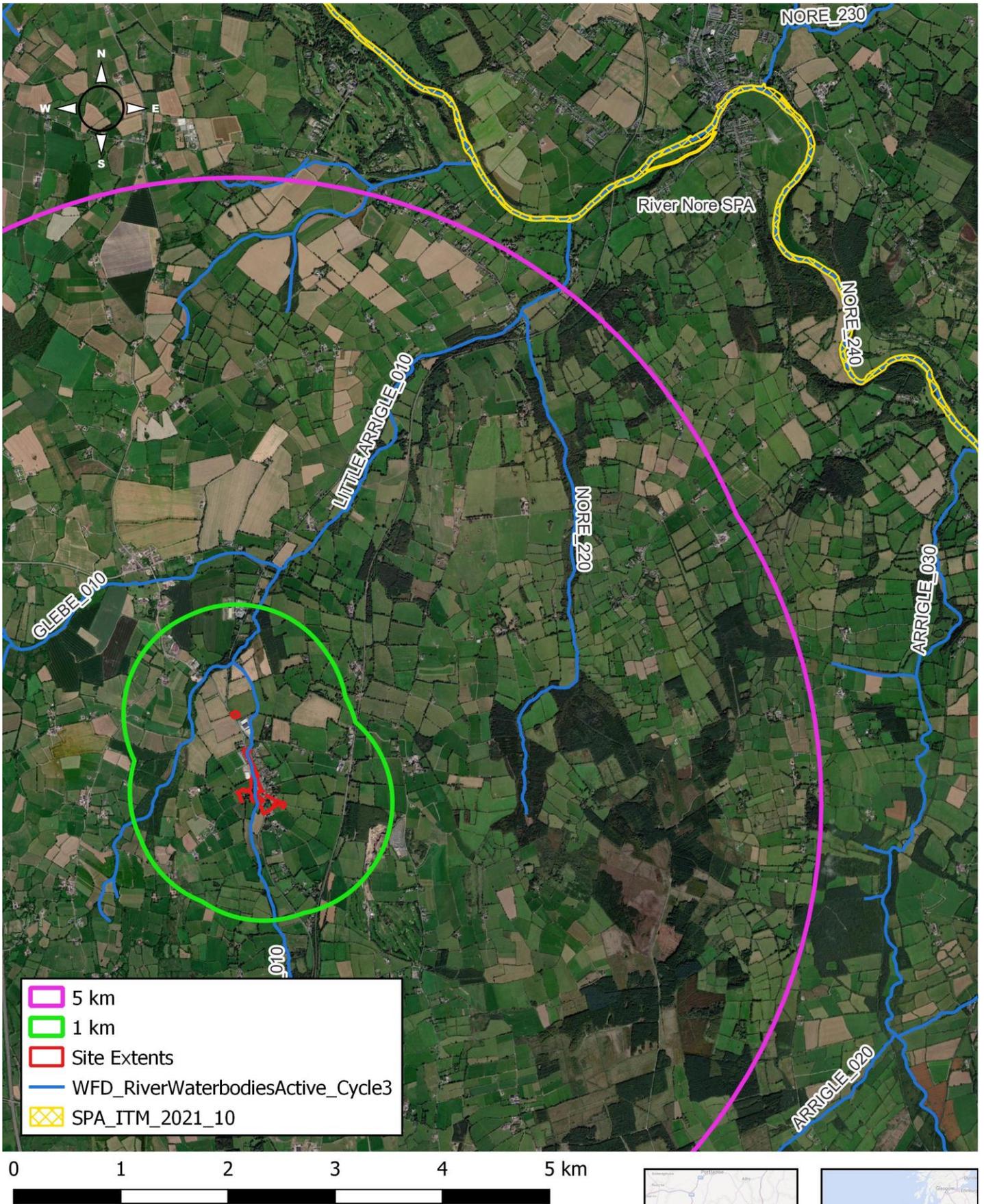


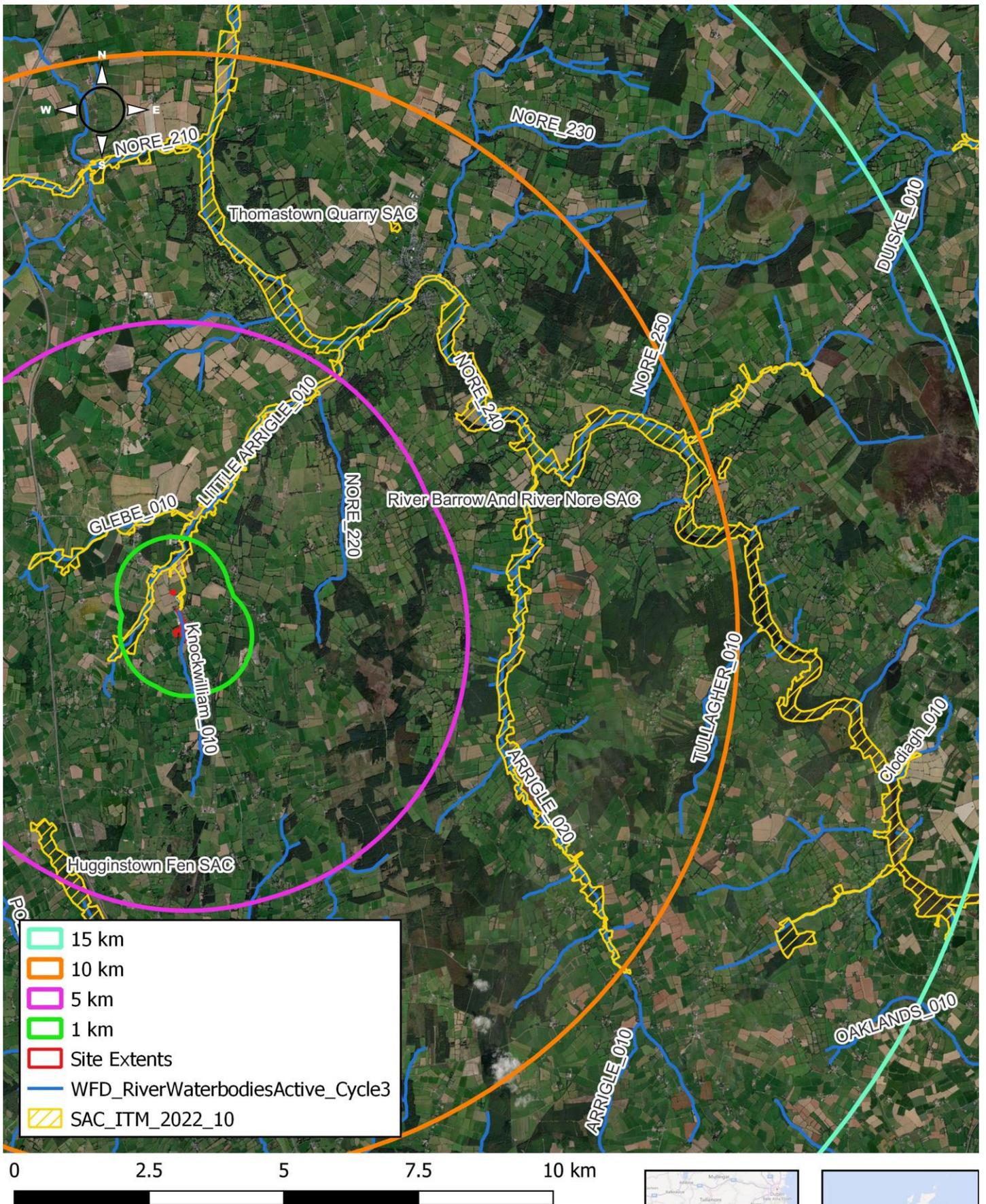
Figure 17. Waterbodies and SACs within 1km of the proposed development site



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 Location: Ballyhale, Co. Kilkenny
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 Drawn By: Bryan Deegan (Altamar)



Figure 19. Waterbodies and SPAs within 5km of the proposed development site

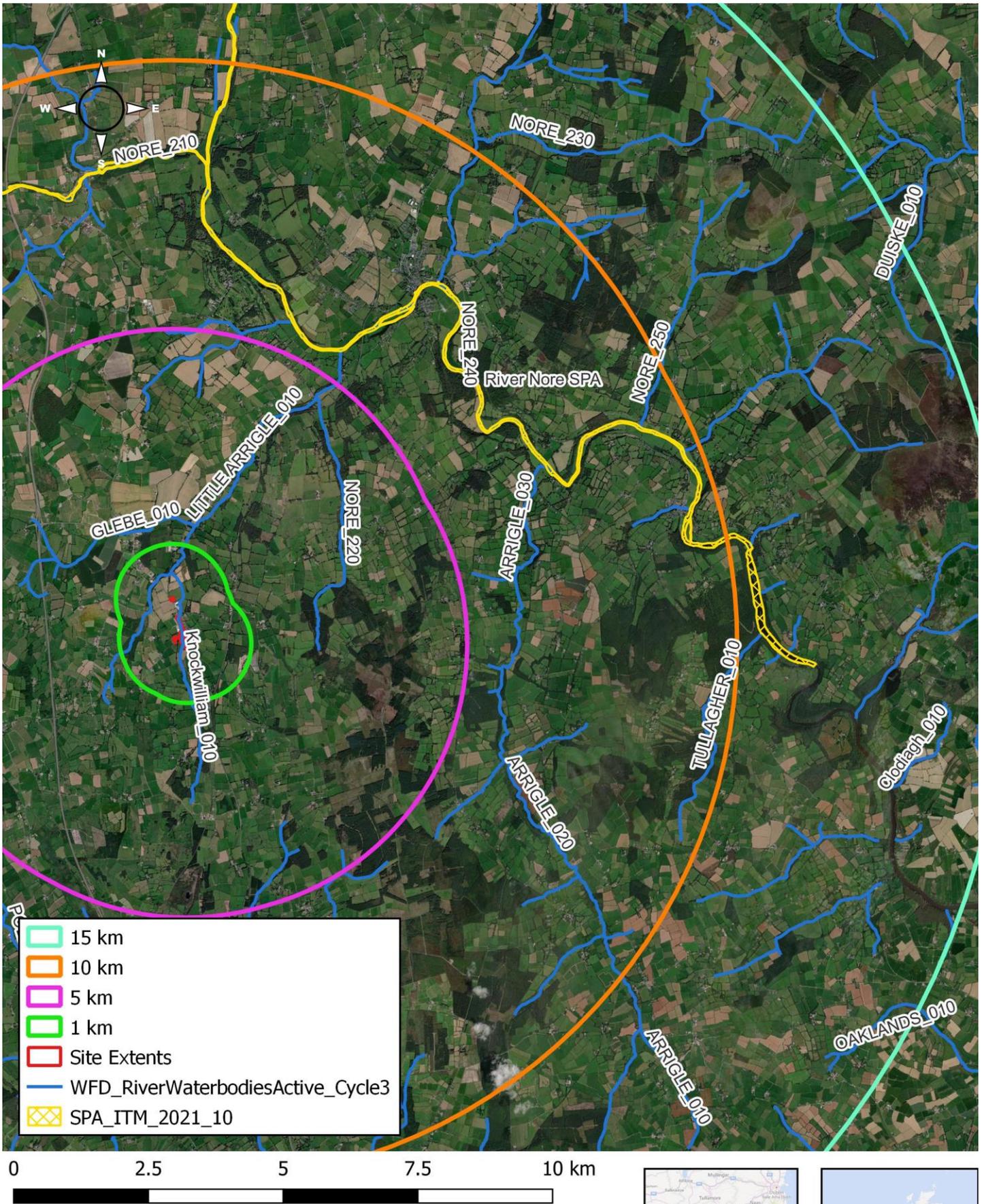


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 Location: Ballyhale, Co. Kilkenny
 Date: 22nd November 2022
 Drawn By: Bryan Deegan (Altemar)

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Figure 19. Waterbodies and SACs within 15km of the proposed development site



Project: Ballyhale Flood Relief Scheme
 Location: Ballyhale, Co. Kilkenny
 Date: 22nd November 2022
 Drawn By: Bryan Deegan (Altamar)



Figure 20. Waterbodies and SPAs within 15km of the proposed development site

Species Data

It should be noted that no species of conservation importance were noted on site, based on NPWS and NBDC records at fine resolution. Species recorded within the 2km² grid include are seen in Table 4

Table 4: National Biodiversity Data Centre Records within the 2km² (S53M) grid

Barn Swallow (Hirundo rustica); Common Kestrel (Falco tinnunculus); Common Starling (Sturnus vulgaris); House Sparrow (Passer domesticus); Spotted Flycatcher (Muscicapa striata); Yellowhammer (Emberiza citrinella); Butterfly-bush (Buddleja davidii); Japanese Knotweed (Fallopia japonica); Sycamore (Acer pseudoplatanus); Brown Rat (Rattus norvegicus); Eurasian Badger (Meles meles); Lesser Noctule (Nyctalus leisleri); Pipistrelle (Pipistrellus pipistrellus sensu lato); Soprano Pipistrelle (Pipistrellus pygmaeus); West European Hedgehog (Erinaceus europaeus)



Figure 21 – Otter (*Lutra lutra*) (purple) (Source NBDC) (Site – red circle)

Specifically, NBDC records show sightings of the following species in locations that are in close proximity to the subject site:

1. Otter (*Lutra lutra*) in grid reference S532354. Recorded on 15/11/2017 and approximately 0.8 km West of the subject site.
2. Freshwater Crayfish (*Austropotamobius pallipes*) in grid reference S544373. Recorded on 31/12/1991 and approximately 1.3km North of the subject site. A dead freshwater crayfish was noted during the bat assessment for the proposed works, in the vicinity of the Bridge / Culvert running under the Main Street between Hazel Brook and Tyre Centre.

As can be observed in Figure 23, there have been no recordings of Freshwater Pearl Mussel (*Margaritifera (Margaritifera) Margaritifera*) in close proximity of the propose development site. It should be noted that no species of conservation importance have been noted within the site outline.



Figure 22 – Freshwater Crayfish (*Austroptamobius pallipes*) (yellow) (Source NBDC) (Site – red circle)



Figure 23 – Freshwater Pearl Mussel (*Margaritifera (Margaritifera) Margaritifera*) (purple) (none)(Source NBDC) (Site – red circle)

Table 5: Species found by NPWS within 10km

Irish Hare (Lepus timidus subsq. hibernicus); Bog Orchid (Hammarbya paludosa); Common Frog (Rana temporaria); Otter (Lutra lutra); Red Deer (Cervus elaphus); Badger (Meles meles); Small Cudweed (Filago minima); Mute Swan (Cygnus olor); Sea Lamprey (Petromyzon marinus); Meadow Saffron (Colchicum autumnale); West European Hedgehog (Erinaceus europaeus); Brook Lamprey (Lampetra planeri); Green-flowered Helleborine (Epipactis phyllanthes); Grey Heron (Ardea cinerea); Sand Martin (Riparia riparia); Kingfisher (Alcedo atthis); Mallard (Anas platyrhynchos); Nettle-leaved Bellflower (Campanula trachelium); Freshwater Crayfish (Austropotamobius pallipes); Opposite-leaved Pondweed (Groenlandia densa); House Martin (Delichon urbica); Swallow (Hirundo rustica); Moorhen (Gallinula chloropus); Irish Stoat (Mustela erminea subsq. hibernica):

The closest species recorded by NPWS to the site was Bog Orchid (*Hammarbya paludosa*) at 440m south-east of the site and Freshwater Crayfish (*Austropotamobius pallipes*) at 720m north of the site. No species of conservation importance have been noted on site by NPWS.

It should be noted that the subject site is located within a designated Freshwater Pearl Mussel (*Margaritifera (Margaritifera) Margaritifera*) sensitive area, as demonstrated in Figure 24. However, as demonstrated in Figure 23 and within both NBDC and NPWS data, there are no specific recordings of Freshwater Pearl Mussel (*Margaritifera (Margaritifera) Margaritifera*) located proximate to the subject site.

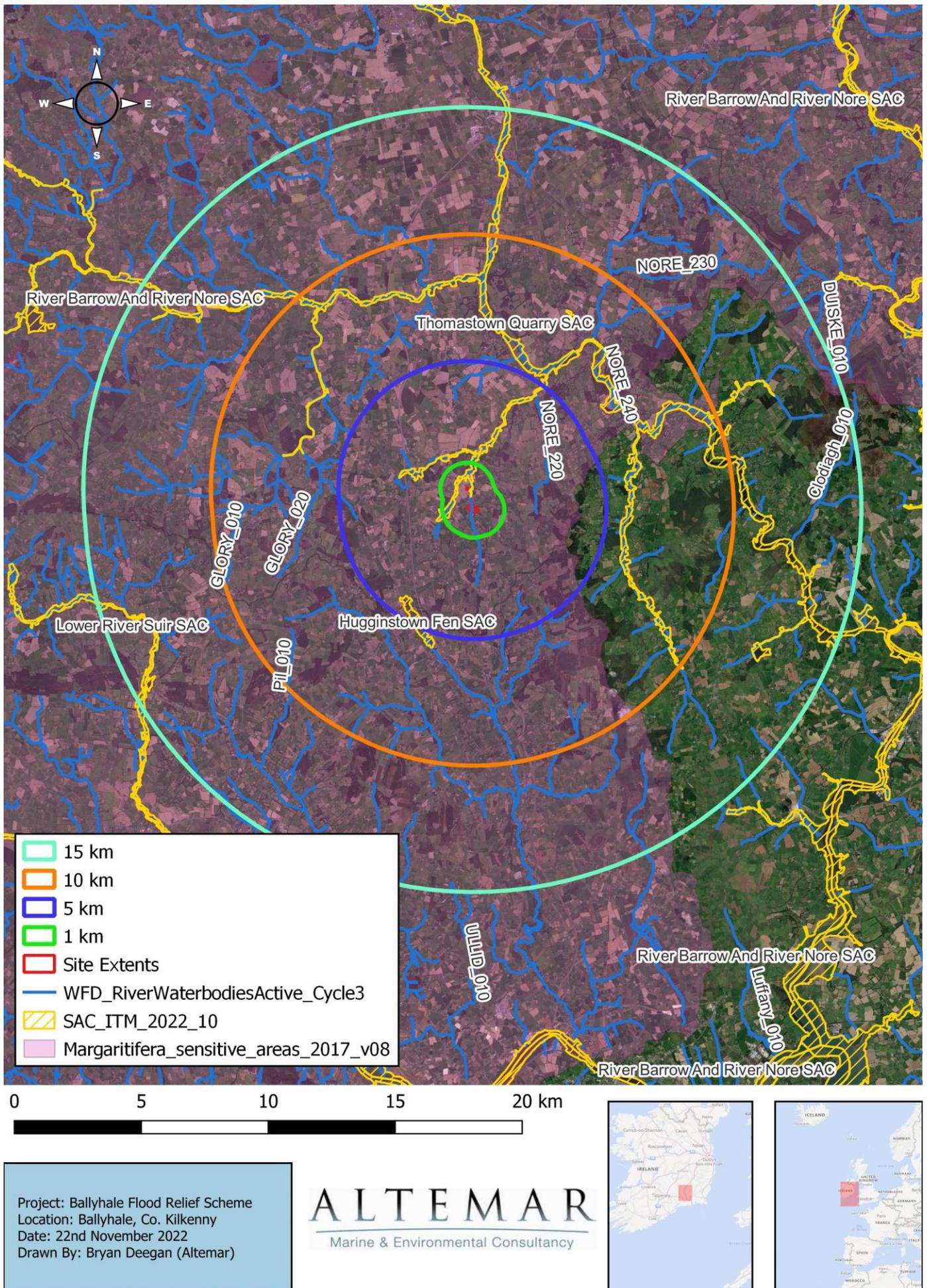


Figure 24 – Watercourses, SACs, and the subject site within designated Freshwater Pearl Mussel (*Margaritifera Margaritifera*) sensitive areas

In-Combination Effects

There are several development proposals located in the area immediately surrounding the subject site that have been granted permission. The following is a list of planning application(s) as identified on the Department of Housing, Local Government and Heritage's 'National Planning Application Database' portal:

Table 6. In combination effects evaluated.

Planning Ref.	Address	Proposal
21595	Kiltorcan and Ballyhale, Co. Kilkenny	for alterations to the previously granted solar farm in the townlands of Ballyhale and Kiltorcan (Kilkenny County Council Reg Ref. 16592, and An Bord Pleanala Reg Ref. PL10.247616) as amended by Kilkenny County Council Reg Ref. 19538. Permission was originally granted for a Solar photovoltaic installation comprising up to 26,100m ² of solar panels on ground mounted frames, 4 no. inverters housed in 2 units, 1 no. 20kV substation, security fencing, new entrance onto public road, access tracks, CCTV; underground cable and ducts including underground cable and ducts along the public road to the entrance of the existing Ballyhale substation within the townland of Kiltorcan, Co. Kilkenny and all associated ancillary development works and services. Permission was sought for a period of 10 years. Permission was subsequently granted for the addition of 4 no. battery storage containers and extension to the operational period of the solar farm from 25 years to 30 years. Permission is now sought for the following: increase the area of solar panels from up to 26,100 m ² to up to 30,500 m ² ; increase in height to the permitted solar panels from 2.72m to 2.82m and; permission to increase the operational period of the solar farm from 30 years to 35 years. A Natura Impact Statement (NIS) accompanies this application. Planning permission is sought for a period of 10 years.
19897	Ballyhale, Co Kilkenny, R95 W3C5	to demolish existing single and two storey structures to the side and rear for the existing dwelling, to construct a part two / single storey extension to the side and rear of the existing dwelling, to construct a two storey extension to the front and side of the existing dwelling, elevational modifications to include raising of the ridge and eaves height of the existing dwelling, all internal modifications and all associated site developments works
19605	Derrynahinch, Kiltorcan, Co. Kilkenny	for development consisting of a 10 year permission for the construction of a Solar PV Energy development within a total site area of up to 9hA, to include electrical transformer/ inverter station modules, battery storage modules, solar PV panels ground mounted on steel support structures, access roads, fencing and associated electrical cabling, ducting and ancillary infrastructure
19538	Ballyhale and Kitorcan, Co. Kilkenny	for development comprising the provision of four battery storage containers which are required for the operation of the previously granted solar farm in the townlands of Ballyhale and Kitorcan, Co. Kilkenny (Reg. Ref. 16592 and PL10.247616). This planning application also includes an extension to the operational permission of the solar farm to be increased from 25 to 30 years and a reduction in the validity period of planning approval from 10 to 4 years,
16445	Derrynahinch, Knocktopher, Co. Kilkenny	for development. The development will consist of a 10 year permission for the construction of a Solar PV Energy development within a total site area of up to 10.6hA, to include one single storey electrical substation building, electrical transformer/inverter station modules, solar PV panels ground mounted on steel support structures, access roads, fencing and associated electrical cabling, ducting and ancillary infrastructure

In relation to Planning Ref. **19605**, an Appropriate Assessment Screening Report was prepared by Wetland Surveys Ireland Ltd to accompany this planning application. This report concludes with the following:

'In conclusion, it has been determined that the development is not directly connected with or necessary to the management of European sites. Secondly, this report concludes on the basis of objective scientific information, that there is no potential for any likely significant effects on the Natura 2000 network of sites resulting from the proposed extension to the consented Derrynahinch Solar Farm, and accordingly it is considered that there is no need to prepare a Natura Impact Statement / Appropriate Assessment, in this instance.

This Report concludes the Appropriate Assessment process. A Finding of No Significant Effects Report has been completed and is presented in Appendix II of this report.'

In relation to Planning Ref. **21595**, an Appropriate Assessment Screening Report and Natura Impact Statement was prepared by Fehily Timoney & Company to accompany this planning application. This report concludes with the following:

'In summary, whilst it has been acknowledged that there is the potential for the project to have significant indirect impacts on River Barrow and River Nore SAC and the Nore River SPA, with the implementation of the detailed mitigation measures identified in this NIS, the integrity of this European site as natural habitats will not be adversely affected. In particular, with the implementation of the detailed mitigation measures identified in this NIS, there is no scientific doubt remaining as to the absence of potential adverse effects.'

The above planning applications are the developments which are being considered in an in combination basis and there are no significant projects proposed or currently under construction that could potentially cause in combination effects on Natura 2000 sites.

Given this, it is considered that in combination effects with other existing and proposed developments in proximity to the application area would be unlikely, neutral, not significant and localised. It is concluded that no significant effects on Natura 2000 sites will be seen as a result of the proposed development alone or combination with other projects.

No significant effects are likely on Natura 2000 sites from in combination effects

Conclusions

An initial screening of the proposed works, using the precautionary principle (without the use of any standard construction phase controls or mitigation measures) and the Source/Pathway/Receptor links between the proposed works and Natura 2000 sites with the potential to result in significant effects on the conservation objectives and qualifying interests of the Natura 2000 sites was carried out in Tables 2 & 3. Based on best scientific knowledge and objective information and assessment, the possibility of significant effects caused by the proposed project was excluded for the following Natura 2000 sites:

Special Areas of Conservation

- Hugginstown Fen SAC [IE000404]
- Thomastown Quarry SAC [IE002252]
- Lower River Suir SAC [IE002137]

The project is limited in scale and extent and the potential zone of influence has the potential to extend downstream from the immediate site to impact on European Sites i.e. River Barrow and River Nore SAC in addition to the River Nore SPA. As a result, potential impacts in the absence of standard construction phase or mitigation measures may result in impacts on the River Barrow and River Nore SAC [IE002162] and River Nore SPA [IE004233].

NIS is required in respect of the effects of the project on the River Barrow and River Nore SAC and River Nore SPA (downstream impacts during construction) because it cannot be excluded on the basis of best objective scientific information following screening, in the absence of control or mitigation measures that the plan or project, individually and/or in combination with other plans or projects, will have a significant effect on the named European Site/s.

An NIS or Stage 2 Appropriate Assessment is not required for the effects of the project on all other listed Natura 2000 sites above because it can be excluded on the basis of the best objective scientific information following screening that the plan or project, individually and/or in combination with other plans or projects, will have a significant effect on the Natura 2000 Sites.

A Natura Impact Statement is required for the proposed works.

Stage 2: Natura Impact Statement

A Natura Impact Statement (NIS) is prepared at Stage 2 of the Appropriate Assessment process. A NIS is statement for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own or in combination with other plans or projects, for one or more than one European site, in view of the conservation objectives of the site or sites. In the case of the proposed Flood Relief Scheme at Ballyhale, a NIS is required in respect of the effects of the project on the River Barrow and River Nore SAC [IE002162] and River Nore SPA [IE004233] (downstream impacts during construction in the absence of mitigation) because it cannot be excluded on the basis of best objective scientific information, in the absence of controls or mitigation measures, following screening that the project, individually and/or in combination with other plans or projects, will have a significant effect on the named European Site/s.

A Stage 2 Appropriate Assessment or NIS is not required for the effects of the project on all other European sites because it can be excluded on the basis of the best objective scientific information following screening that the plan or project, individually and/or in combination with other plans or projects, will have a significant effect on the European Site/s.

The NIS evaluates the potential for direct, indirect effects, alone or in combination with other plans and projects having taken into account the use of mitigation measures. The NIS is required under Section 177T of the 2000 Act to include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for one or more than one European site in view of the conservation objectives of the site or sites.

A further review of the Conservation Objectives and features of interest is necessary to determine if significant effects are likely to impact the SAC and/or SPA.

River Barrow and River Nore SAC (Site Code: 002162)

As outlined in the River Barrow and River Nore SAC Site Synopsis (NPWS, Version date 09.02.2016)²:

'This site consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains, and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. The site passes through eight counties – Offaly, Kildare, Laois, Carlow, Kilkenny, Tipperary, Wexford and Waterford. Major towns along the edge of the site include Mountmellick, Portarlinton, Monasterevin, Stradbally, Athy, Carlow, Leighlinbridge, Graiguenamanagh, New Ross, Inistioge, Thomastown, Callan, Bennettsbridge, Kilkenny and Durrow. The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow, and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and King's Rivers on the Nore.

Both rivers rise in the Old Red Sandstone of the Slieve Bloom Mountains before passing through a band of Carboniferous shales and sandstones. The Nore, for a large part of its course, traverses limestone plains and then Old Red Sandstone for a short stretch below Thomastown. Before joining the Barrow it runs over intrusive rocks poor in silica. The upper reaches of the Barrow also run through limestone. The middle reaches and many of the eastern tributaries, sourced in the Blackstairs Mountains, run through Leinster Granite. The southern end, like the Nore runs over intrusive rocks poor in silica. Waterford Harbour is a deep valley excavated by glacial floodwaters when the sea level was lower than today. The coast shelves quite rapidly along much of the shore.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (= priority; numbers in brackets are Natura 2000 codes):*

[1130] Estuaries [1140] Tidal Mudflats and Sandflats [1170] Reefs [1310] Salicornia Mud [1330] Atlantic Salt Meadows [1410] Mediterranean Salt Meadows [3260] Floating River Vegetation [4030] Dry Heath [6430] Hydrophilous Tall Herb Communities [7220] Petrifying Springs [91A0] Old Oak Woodlands [91E0] Alluvial Forests* [1016] Desmoulin's Whorl Snail (Vertigo moulinsiana) [1029] Freshwater Pearl Mussel (Margaritifera margaritifera) [1092] White-clawed Crayfish (Austropotamobius pallipes) [1095] Sea Lamprey (Petromyzon marinus) [1096] Brook Lamprey (Lampetra planeri) [1099] River Lamprey (Lampetra fluviatilis) [1103] Twaite Shad (Alosa fallax) [1106] Atlantic Salmon (Salmo salar) [1355] Otter (Lutra lutra) [1421] Killarney Fern (Trichomanes speciosum) [1990] Nore Freshwater Pearl Mussel (Margaritifera durrovensis)*

²<https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002162.pdf>

Good examples of alluvial forest (a priority habitat on Annex I of the E.U. Habitats Directive) are seen at Rathsnagadan, Murphy's of the River, in Abbeyleix estate and along other shorter stretches of both the tidal and freshwater elements of the site. Typical species seen include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Rusty Willow (*S. cinerea* subsp. *oleifolia*), Crack Willow (*S. fragilis*) and Osier (*S. viminalis*), along with Iris (*Iris pseudacorus*), Hemlock Water-dropwort (*Oenanthe crocata*), Wild Angelica (*Angelica sylvestris*), Thin-spiked Wood-sedge (*Carex strigosa*), Pendulous Sedge (*C. pendula*), Meadowsweet (*Filipendula ulmaria*), Common Valerian (*Valeriana officinalis*) and the Red Data Book species Nettle-leaved Bellflower (*Campanula trachelium*).

A good example of petrifying springs with tufa formations occurs at Dysart Wood along the Nore. This is a rare habitat in Ireland and one listed with priority status on Annex I of the E.U. Habitats Directive. These hard water springs are characterised by lime encrustations, often associated with small waterfalls. A rich bryophyte flora is typical of the habitat and two diagnostic species, *Palustriella commutata* and *Eucladium verticillatum*, have been recorded.

The best examples of old oak woodlands are seen in the ancient Park Hill woodland in the estate at Abbeyleix; at Kyleadahir, on the Delour, Forest Wood House, Kylecorragh and Brownstown Woods on the Nore; and at Cloghristic Wood, Drummond Wood and Borris Demesne on the Barrow, though other patches occur throughout the site. Abbeyleix Woods is a large tract of mixed deciduous woodland which is one of the only remaining true ancient woodlands in Ireland. Historical records show that Park Hill has been continuously wooded since the 16th century and has the most complete written record of any woodland in the country. It supports a variety of woodland habitats and an exceptional diversity of species including 22 native trees, 44 bryophytes and 92 lichens. It also contains eight indicator species of ancient woodlands. Park Hill is also the site of two rare plants, Nettle-leaved Bellflower and the moss *Leucodon sciuroides*. The rare Myxomycete fungus, *Licea minima* has been recorded from woodland at Abbeyleix.

Oak woodland covers parts of the valley side south of Woodstock and is well developed at Brownsford where the Nore takes several sharp bends. The steep valley side is covered by oak (*Quercus* spp.), Holly (*Ilex aquifolium*), Hazel (*Corylus avellana*) and Downy Birch (*Betula pubescens*), with some Beech (*Fagus sylvatica*) and Ash (*Fraxinus excelsior*). All the trees are regenerating through a cover of Bramble (*Rubus fruticosus* agg.), Foxglove (*Digitalis purpurea*), Great Wood-rush (*Luzula sylvatica*) and Broad Buckler-fern (*Dryopteris dilatata*).

On the steeply sloping banks of the River Nore, about 5 km west of New Ross, in Co. Kilkenny, Kylecorragh Woods form a prominent feature in the landscape. This is an excellent example of relatively undisturbed, relict oak woodland with a very good tree canopy. The wood is quite damp and there is a rich and varied ground flora. At Brownstown, a small, mature oak dominated woodland occurs on a steep slope. There is younger woodland to the north and east of it. Regeneration throughout is evident. The understorey is similar to the woods at Brownsford. The ground flora of this woodland is developed on acidic, brown earth type soil and comprises a thick carpet of Bilberry (*Vaccinium myrtillus*), Heather (*Calluna vulgaris*), Hard Fern (*Blechnum spicant*), Common Cow-wheat (*Melampyrum pratense*) and Bracken (*Pteridium aquilinum*).

Borris Demesne contains a very good example of a semi-natural broadleaved woodland in very good condition. There is quite a high degree of natural regeneration of oak and Ash through the woodland. At the northern end of the estate oak species predominate. Drummond Wood, also on the Barrow, consists of three blocks of deciduous woods situated on steep slopes above the river. The deciduous trees are mostly oak species. The woods have a well-established understorey of Holly, and the herb layer is varied, with Bramble abundant. The whitebeam *Sorbus devoniensis* has also been recorded here.

Eutrophic tall herb vegetation occurs in association with the various areas of alluvial forest and elsewhere where the floodplain of the river is intact. Characteristic species of the habitat include Meadowsweet, Purple Loosestrife (*Lythrum salicaria*), Marsh Ragwort (*Senecio aquaticus*), Ground Ivy (*Glechoma hederacea*) and Hedge Bindweed (*Calystegia sepium*). Indian Balsam (*Impatiens glandulifera*), an introduced and invasive species, is abundant in places.

Floating river vegetation is well represented in the Barrow and in the many tributaries of the site. In the Barrow the species found include water-starworts (*Callitriche* spp.), Canadian Pondweed (*Elodea canadensis*), Bulbous Rush (*Juncus bulbosus*), water-milfoils (*Myriophyllum* spp.), the pondweed *Potamogeton x nitens*, Broad-leaved Pondweed (*P. natans*), Fennel Pondweed (*P. pectinatus*), Perfoliated Pondweed (*P. perfoliatus*) and crowfoots (*Ranunculus* spp.). The water quality of the Barrow has improved since the vegetation survey was carried out (EPA, 1996).

Dry heath at the site occurs in pockets along the steep valley sides of the rivers especially in the Barrow Valley and along the Barrow tributaries where they occur in the foothills of the Blackstairs Mountains. The dry heath vegetation along the slopes of the river bank consists of Bracken and Gorse (*Ulex europaeus*) with patches of acidic grassland vegetation. Additional typical species include Heath Bedstraw (*Galium saxatile*), Foxglove, Common Sorrel (*Rumex*

acetosa) and *Creeping Bent* (*Agrostis stolonifera*). On the steep slopes above New Ross the Red Data Book species *Greater Broomrape* (*Orobanche rapum-genistae*) has been recorded. Where rocky outcrops are shown on the maps *Bilberry* and *Great Wood-rush* are present. At Ballyhack a small area of dry heath is interspersed with patches of lowland dry grassland. These support a number of clover species, including the legally protected *Clustered Clover* (*Trifolium glomeratum*) - a species known from only one other site in Ireland. This grassland community is especially well developed on the west side of the mud-capped walls by the road. On the east of the cliffs a group of rock-dwelling species occur, i.e. *English Stonecrop* (*Sedum anglicum*), *Sheep's-bit* (*Jasione montana*) and *Wild Madder* (*Rubia peregrina*). These rocks also support good lichen and moss assemblages with *Ramalina subfarinacea* and *Hedwigia ciliata*.

Dry heath at the site generally grades into wet woodland or wet swamp vegetation lower down the slopes on the river bank. Close to the Blackstairs Mountains, in the foothills associated with the Aughnabriskey, Aughavaud and Mountain Rivers there are small patches of wet heath dominated by *Purple Moor-grass* (*Molinia caerulea*) with *Heather*, *Tormentil* (*Potentilla erecta*), *Carnation Sedge* (*Carex panicea*) and *Bell Heather* (*Erica cinerea*).

Salt meadows occur at the southern section of the site in old meadows where the embankment has been breached, along the tidal stretches of in-flowing rivers below Stokestown House, in a narrow band on the channel side of *Common Reed* (*Phragmites australis*) beds and in narrow fragmented strips along the open shoreline. In the larger areas of salt meadow, notably at Carrickcloney, Ballinlaw Ferry and Rochestown on the west bank; Fisherstown, Alderton and Great Island to Dunbrody on the east bank, the Atlantic and Mediterranean sub types are generally intermixed. At the upper edge of the salt meadow in the narrow ecotonal areas bordering the grasslands where there is significant percolation of salt water, the legally protected species *Borrer's Saltmarsh-grass* (*Puccinellia fasciculata*) and *Meadow Barley* (*Hordeum secalinum*) are found. The very rare and also legally protected *Divided Sedge* (*Carex divisa*) is also found. *Sea Rush* (*Juncus maritimus*) is also present. Other plants recorded and associated with salt meadows include *Sea Aster* (*Aster tripolium*), *Thrift* (*Armeria maritima*), *Sea Couch* (*Elymus pycnanthus*), *Spear-leaved Orache* (*Atriplex prostrata*), *Lesser Sea-spurrey* (*Spergularia marina*), *Sea Arrowgrass* (*Triglochin maritima*) and *Sea Plantain* (*Plantago maritima*).

Glassworts (*Salicornia* spp.) and other annuals colonising mud and sand are found in the creeks of the saltmarshes and at the seaward edges of them. The habitat also occurs in small amounts on some stretches of the shore free of stones.

The estuary and the other E.U. Habitats Directive Annex I habitats within it form a large component of the site. Extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. Good quality intertidal sand and mudflats have developed on a linear shelf on the western side of Waterford Harbour, extending for over 6 km from north to south between Passage East and Creadaun Head, and in places are over 1 km wide. The sediments are mostly firm sands, though grade into muddy sands towards the upper shore. They have a typical macro-invertebrate fauna, characterised by polychaetes and bivalves. Common species include *Arenicola marina*, *Nephtys hombergii*, *Scoloplos armiger*, *Lanice conchilega* and *Cerastoderma edule*. An extensive area of honey-comb worm biogenic reef occurs adjacent to Duncannon, Co. Wexford on the eastern shore of the estuary. It is formed by the polychaete worm *Sabellaria alveolata*. This intertidal *Sabellaria alveolata* reef is formed as a sheet of interlocking tubes over a considerable area of exposed bedrock. This polychaete species constructs tubes, composed of aggregated sand grains, in tightly packed masses with a distinctive honeycomb-like appearance. These can be up to 25cm proud of the substrate and form hummocks, sheets or more massive formations. A range of species are reported from these reefs including: *Enteromorpha* sp.; *Ulva* sp.; *Fucus vesiculosus*; *Fucus serratus*; *Polysiphonia* sp.; *Chondrus crispus*; *Palmaria palmate*; *Coralinus officinalis*; *Nemertea* sp.; *Actinia equine*; *Patella vulgate*; *Littorina littorea*; *Littorina obtusata* and *Mytilus edulis*.

The western shore of the harbour is generally stony and backed by low cliffs of glacial drift. At Woodstown there is a sandy beach, now much influenced by recreation pressure and erosion. Behind it a lagoonal marsh has been impounded which runs westwards from Gaultiere Lodge along the course of a slow stream. An extensive reedbed occurs here. At the edges is a tall fen dominated by sedges (*Carex* spp.), *Meadowsweet*, *willowherbs* (*Epilobium* spp.) and *rushes* (*Juncus* spp.). Wet woodland also occurs.

The dunes which fringe the strand at Duncannon are dominated by *Marram* (*Ammophila arenaria*) towards the sea. Other species present include *Wild Clary/Sage* (*Salvia verbenaca*), a rare Red Data Book species. The rocks around Duncannon ford have a rich flora of seaweeds typical of a moderately exposed shore and the cliffs themselves support a number of coastal species on ledges, including *Thrift*, *Rock Samphire* (*Crithmum maritimum*) and *Buck's-horn Plantain* (*Plantago coronopus*).

Other habitats which occur throughout the site include wet grassland, marsh, reedswamp, improved grassland, arable land, quarries, coniferous plantations, deciduous woodland, scrub and ponds.

*Seventeen Red Data Book plant species have been recorded within the site, most in the recent past. These are Killarney Fern (*Trichomanes speciosum*), Divided Sedge, Clustered Clover, Basil Thyme (*Acinos arvensis*), Red Hemp-nettle (*Galeopsis angustifolia*), Borrer's Saltmarsh-grass, Meadow Barley, Opposite-leaved Pondweed (*Groenlandia densa*), Meadow Saffron/Autumn Crocus (*Colchicum autumnale*), Wild Clary/Sage, Nettle-leaved Bellflower, Saw-wort (*Serratula tinctoria*), Bird Cherry (*Prunus padus*), Blue Fleabane (*Erigeron acer*), Fly Orchid (*Ophrys insectifera*), Ivy Broomrape (*Orobanche hederarum*) and Greater Broomrape. Of these, the first nine are protected under the Flora (Protection) Order, 2015. Divided Sedge was thought to be extinct but has been found in a few locations in the site since 1990. In addition plants which do not have a very wide distribution in the country are found in the site including Thin-spiked Wood-sedge, Field Garlic (*Allium oleraceum*) and Summer Snowflake. Six rare lichens, indicators of ancient woodland, are found including *Lobaria laetevirens* and *L. pulmonaria*. The rare moss *Leucodon sciuroides* also occurs.*

*The site is very important for the presence of a number of E.U. Habitats Directive Annex II animal species including Freshwater Pearl Mussel (both *Margaritifera margaritifera* and *M. m. durrovensis*), White-clawed Crayfish, Salmon, Twaite Shad, three lamprey species – Sea Lamprey, Brook Lamprey and River Lamprey, the tiny whorl snail *Vertigo moulinsiana* and Otter. This is the only site in the world for the hard water form of the Freshwater Pearl Mussel, *M. m. durrovensis*, and one of only a handful of spawning grounds in the country for Twaite Shad. The freshwater stretches of the River Nore main channel is a designated salmonid river. The Barrow/Nore is mainly a grilse fishery though spring salmon fishing is good in the vicinity of Thomastown and Inistioge on the Nore. The upper stretches of the Barrow and Nore, particularly the Owenass River, are very important for spawning.*

*The site supports many other important animal species. Those which are listed in the Irish Red Data Book include Daubenton's Bat, Badger, Irish Hare and Common Frog. The rare Red Data Book fish species Smelt (*Osmerus eperlanus*) occurs in estuarine stretches of the site. In addition to the Freshwater Pearl Mussel, the site also supports two other freshwater mussel species, *Anodonta anatina* and *A. cygnea*.*

*Three rare invertebrates have been recorded in alluvial woodland at Murphy's of the River. These are: *Neoascia obliqua* (Order Diptera: Syrphidae), *Tetanocera freyi* (Order Diptera: Sciomyzidae) and *Dictya umbrarum* (Order Diptera: Sciomyzidae). The rare invertebrate, *Mitostoma chrysomelas* (Order Arachnida), occurs in the old oak woodland at Abbeyleix and only two other sites in the country. Two flies (Order Diptera) *Chrysogaster virescens* and *Hybomitra muhlfeldi* also occur at this woodland.*

The site is of ornithological importance for a number of E.U. Birds Directive Annex I species, including Greenland White-fronted Goose, Whooper Swan, Bewick's Swan, Bar-tailed Godwit, Peregrine and Kingfisher. Nationally important numbers of Golden Plover and Bar-tailed Godwit are found during the winter. Wintering flocks of migratory birds are seen in Shanahoe Marsh and the Curragh and Goul Marsh, both in Co. Laois, and also along the Barrow Estuary in Waterford Harbour. There is also an extensive autumnal roosting site in the reedbeds of the Barrow Estuary used by Swallows before they leave the country. The old oak woodland at Abbeyleix has a typical bird fauna including Jay, Long-eared Owl and Raven. The reedbed at Woodstown supports populations of typical waterbirds including Mallard, Snipe, Sedge Warbler and Water Rail.

Land use at the site consists mainly of agricultural activities – mostly intensive in nature and principally grazing and silage production. Slurry is spread over much of the area. Arable crops are also grown. The spreading of slurry and fertiliser poses a threat to the water quality of the salmonid river and to the populations of E.U. Habitats Directive Annex II animal species within the site. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management occurs. Fishing is a main tourist attraction along stretches of the main rivers and their tributaries and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. There is net fishing in the estuary and a mussel bed also. Other recreational activities such as boating, golfing and walking, particularly along the Barrow towpath, are also popular. There is a golf course on the banks of the Nore at Mount Juliet and GAA pitches on the banks at Inistioge and Thomastown. There are active and disused sand and gravel pits throughout the site. Several industrial developments, which discharge into the river, border the site. New Ross is an important shipping port. Shipping to and from Waterford and Belview ports also passes through the estuary.

*The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, over-grazing within the woodland areas, and invasion by non-native species, for example Cherry Laurel (*Prunus laurocerasus*) and Rhododendron (*Rhododendron ponticum*). The water*

quality of the site remains vulnerable. Good quality water is necessary to maintain the populations of the Annex II animal species listed above. Good quality is dependent on controlling fertilisation of the grasslands, particularly along the Nore. It also requires that sewage be properly treated before discharge. Drainage activities in the catchment can lead to flash floods which can damage the many Annex II species present. Capital and maintenance dredging within the lower reaches of the system pose a threat to migrating fish species such as lamprey and shad. Land reclamation also poses a threat to the salt meadows and the populations of legally protected species therein.

Overall, the site is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive. Furthermore it is of high conservation value for the populations of bird species that use it. The occurrence of several Red Data Book plant species including three rare plants in the salt meadows and the population of the hard water form of the Freshwater Pearl Mussel, which is limited to a 10 km stretch of the Nore, add further interest to this site.'

As outlined in the Conservation objectives supporting document:

'Dundalk Bay SAC is designated for a range of marine and coastal habitats including vegetated shingle and saltmarsh. The following four coastal habitats are included in the qualifying interests for the site:

- *Perennial vegetation of stony banks (1220)*
- *Salicornia and other annuals colonising mud and sand (1310)*
- *Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)*
- *Mediterranean salt meadows (Juncetalia maritimi) (1410)*

The first habitat is associated with shingle, while the other three are found in saltmarshes, where they occur in complex mosaics.

This backing document sets out the conservation objectives for the four coastal habitats listed above in Dundalk Bay SAC, which is defined by a list of parameters, attributes and targets. The main parameters are (a) Range (b) Area and (c) Structure and Functions, the latter of which is broken down into a number of attributes, including physical structure, vegetation structure and vegetation composition.

The targets set for the shingle is based in part on the findings of the National Shingle Beach Survey (NSBS), which was carried out in 1999 on behalf of the National Parks and Wildlife Service (NPWS) (Moore & Wilson, 1999). The targets set for the saltmarsh habitats are based primarily on the results of the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry & Ryle, 2009) and this document should be read in conjunction with those reports.'

Figures 25 & 26 demonstrate the mapping of the River Barrow and River Nore conservation objectives for Old Oak Woodlands, Alluvial Forests & Petrifying Springs (Figure 25), and Desmoulin's Whorl Snail, White Clawed Crayfish, Nore Freshwater Pearl Mussel & Killarney Fern (Figure 26). These maps have been sourced from The River Barrow And River Nore SAC – Conservation Objectives³ document.

³ https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf

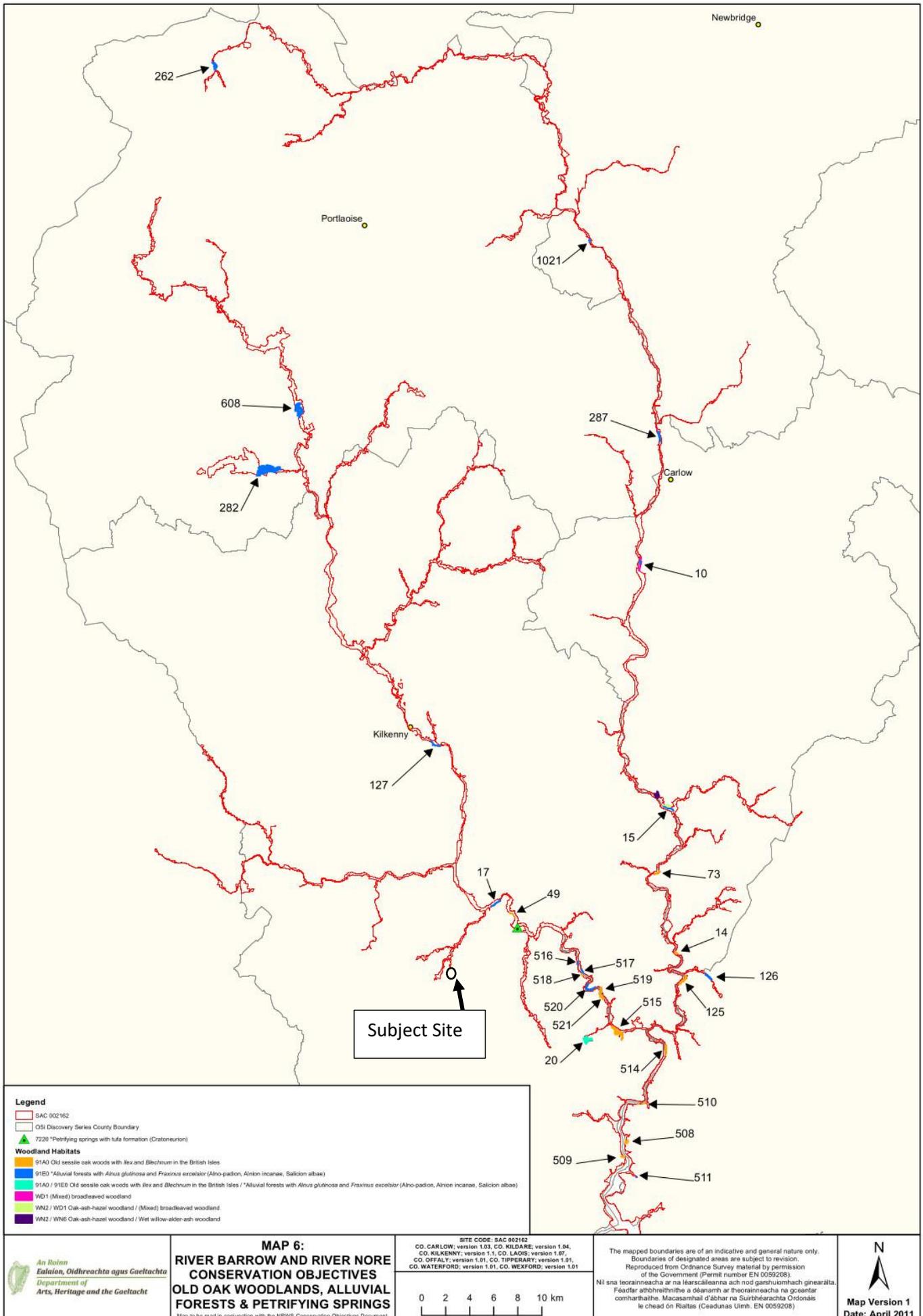


Figure 25. River Barrow and River Nore SAC – Old Oak Woodlands, Alluvial Forests & Petrifying Springs (Subject site = Black Circle)

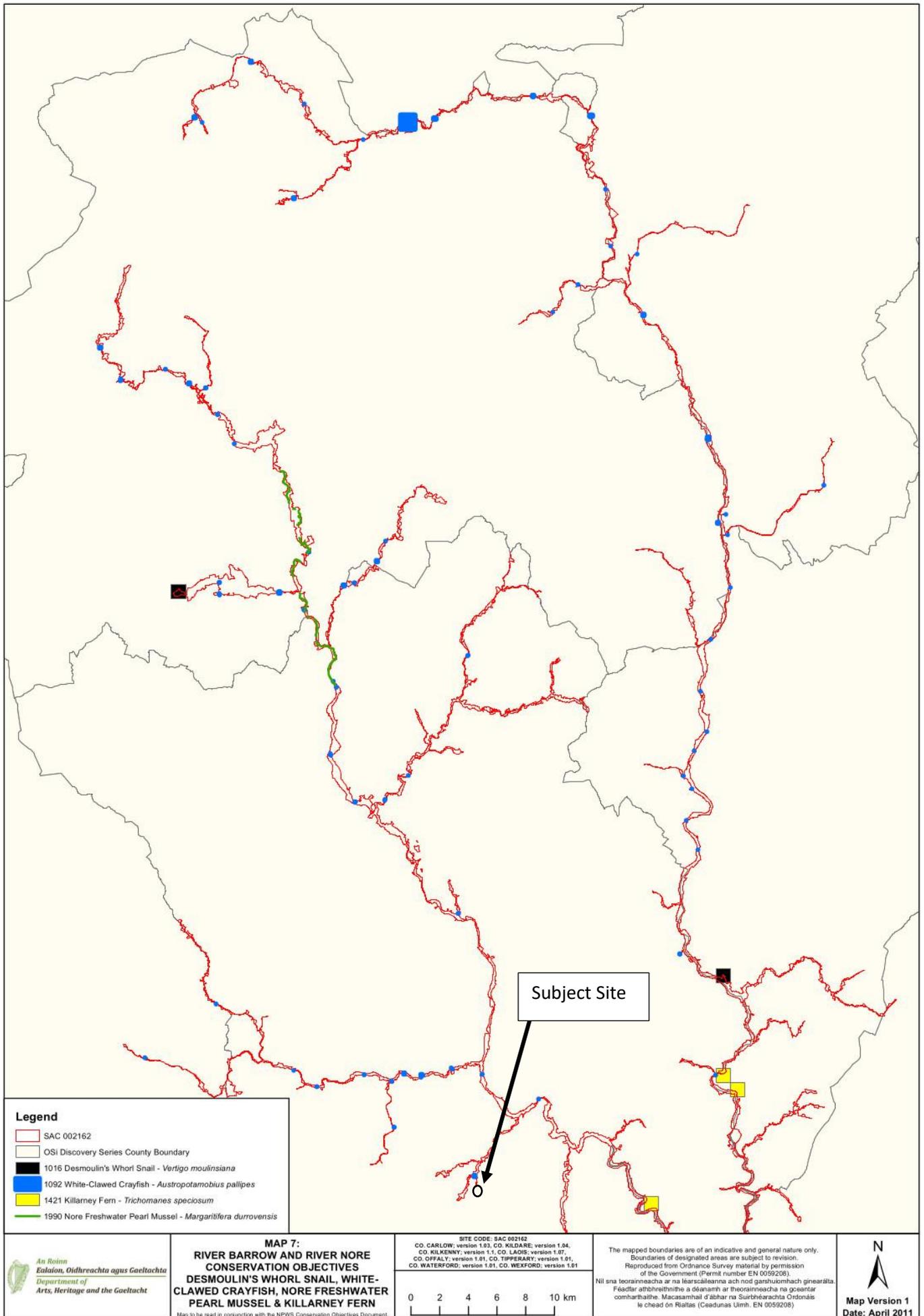


Figure 26. River Barrow and River Nore SAC – Desmoulin's Whorl Snail, White Clawed Crayfish, Nore Freshwater Pearl Mussel & Killarney Fern (Subject site = Black Circle)

River Nore SPA (Site code: 004233)

As outlined in the River Nore SPA Site Synopsis (NPWS, Version date 13.09.2011)⁴:

'The River Nore SPA is a long, linear site that includes the following river sections: the River Nore from the bridge at Townparks, (north-west of Borris in Ossory) to Coolnamuck (approximately 3 km south of Inistioge) in Co. Kilkenny; the Delour River from its junction with the River Nore to Derrynaseera bridge (west of Castletown) in Co. Laois; the Erkina River from its junction with the River Nore at Durrow Mills to Boston Bridge in Co. Laois; a 1.5 km stretch of the River Goul upstream of its junction with the Erkina River; the Kings River from its junction with the River Nore to a bridge at Mill Island, Co. Kilkenny. The site includes the river channel and marginal vegetation.

For a large part of its course the River Nore traverses Carboniferous limestone plains; it passes over a narrow band of Old Red Sandstone rocks below Thomastown.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive of special conservation interest for the following species: Kingfisher.

A survey in 2010 recorded 22 pairs of Kingfisher (based on 16 probable and 6 possible territories) within the SPA. Other species which occur within the site include Mute Swan (35), Mallard (267), Cormorant (14), Grey Heron (45), Moorhen (14), Snipe (17) and Sand Martin (1,029) – all figures are peak counts recorded during the 2010 survey.

The River Nore SPA is of high ornithological importance as it supports a nationally important population of Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive.'

The Qualifying Interests (QI) (Features of Interest), Special Conservation Interests (SCIs) for the SPA and SAC sites and the National conservation status of the QI of two Natura 2000 sites subject to the NIS are seen in Table 7. The site specific conservation Objectives for Natura 2000 sites are seen in Table 8.

⁴<https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004233.pdf>

Table 7. Qualifying Interests, Conservation Status, Management Objectives, Conditions underpinning site integrity for relevant Natura 2000 sites		
Natura 2000 Site Name & Code	Qualifying Interests	Current Conservation Status & Trend
Special Areas of Conservation (SAC)		
River Barrow and River Nore SAC (002162)	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with Alnus glutinosa and Fraxinus excelsior (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) [1029] White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092] Sea Lamprey (<i>Petromyzon marinus</i>) [1095] Brook Lamprey (<i>Lampetra planeri</i>) [1096] River Lamprey (<i>Lampetra fluviatilis</i>) [1099] Twaite Shad (<i>Alosa fallax fallax</i>) [1103] Salmon (<i>Salmo salar</i>) [1106] Otter (<i>Lutra lutra</i>) [1355] Killarney Fern (<i>Trichomanes speciosum</i>) [1421] Nore Pearl Mussel (<i>Margaritifera durrovensis</i>) [1990]	Inadequate Inadequate Inadequate Favourable Inadequate Inadequate Inadequate Bad Bad Inadequate Bad Bad Inadequate Bad Bad Bad Bad Favourable Unknown Bad Inadequate Favourable Favourable Bad
Special Protection Areas (SPA)		
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]	Amber

Table 8. Detailed Conservation Objectives for Natura 2000 sites		
Attribute	Measure	Target
River Barrow and River Nore SAC		
Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016] – To maintain the favourable conservation condition		
Distribution: occupied sites	Number	No decline. Two known sites: Borris Bridge, Co. Carlow S711503; Boston Bridge, Kilnaseer S338774, Co. Laois.
Population size: adults	Number per positive sample	At least 5 adults snails in at least 50% of samples
Population density	Percentage positive samples	Adult snails present in at least 60% of samples per site
Area of occupancy	Hectares	Minimum of 1ha of suitable habitat per site
Habitat quality: vegetation	Percentage of samples with suitable vegetation	90% of samples in habitat classes I and II as defined in Moorkens & Killeen (2011)
Habitat quality: soil moisture levels	Percentage of samples with appropriate soil moisture levels	90% of samples in moisture class 3-4 as defined in Moorkens & Killeen (2011)
Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) [1029] –		
The status of the freshwater pearl mussel (<i>Margaritifera margaritifera</i>) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. The outcome of this review will determine whether a site-specific conservation objective is set for this species. Please note that the Nore freshwater pearl mussel (<i>Margaritifera durrovensis</i>) remains a qualifying species for this SAC. This document contains a conservation objective for the latter species.		
White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092] - To maintain the favourable conservation condition		
Distribution	Occurrence	No reduction from baseline.
Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	Juveniles and/or females with eggs in at least 50% of positive samples
Negative indicator species	Occurrence	No alien crayfish species
Disease	Occurrence	No instances of disease
Water quality	EPA Q value	At least Q3-4 at all sites sampled by EPA
Habitat quality: heterogeneity	Occurrence of positive habitat features	No decline in heterogeneity or habitat quality
Sea Lamprey (<i>Petromyzon marinus</i>) [1095] - To restore the favourable conservation condition		
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers accessible from estuary.
Population structure of juveniles	Number of age/size groups	At least three age/size groups present
Juvenile density in fine sediment	Juveniles/m ²	Juvenile density at least 1/m ²
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds.

Table 8. Detailed Conservation Objectives for Natura 2000 sites		
Attribute	Measure	Target
River Barrow and River Nore SAC		
Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive.
Brook Lamprey (<i>Lampetra planeri</i>) [1096] - To restore the favourable conservation condition		
Distribution	% of river accessible	Access to all water courses down to first order streams
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present
Juvenile density in fine sediment	Juveniles/m ²	Mean catchment juvenile density of brook/river lamprey at least 2/m ²
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive.
River Lamprey (<i>Lampetra fluviatilis</i>) [1099] - To restore the favourable conservation condition		
Distribution; extent of anadromy	% of river accessible	Greater than 75% of main stem and major tributaries down to second order accessible from estuary
Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present
Juvenile density in fine sediment	Juveniles/m ²	Mean catchment juvenile density of brook/river lamprey at least 2/m ²
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive.
Twaite Shad (<i>Alosa fallax</i>) [1103] - To restore the favourable conservation condition		
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers accessible from estuary
Population structure: age classes	Number of age classes	More than one age class present
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning habitats
Water quality: oxygen levels	Milligrams per litre	No lower than 5mg/l
Spawning habitat quality: Filamentous algae; macrophytes; sediment	Occurrence	Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plant) growth
Atlantic Salmon (<i>Salmo salar</i>) [1106] - To restore the favourable conservation condition		

Table 8. Detailed Conservation Objectives for Natura 2000 sites		
Attribute	Measure	Target
River Barrow and River Nore SAC		
Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling
Out-migrating smolt abundance	Number	No significant decline
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA
Estuaries [1130] - To maintain the favourable conservation condition		
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes.
Community extent	Hectares	Maintain the natural extent of the <i>Sabellaria alveolata</i> reef, subject to natural process.
Community distribution	Hectares	The following sediment communities should be maintained in a natural condition: Muddy estuarine community complex; Sand to muddy fine sand community complex; Fine sand with <i>Fabulina fabula</i> community.
Mudflats and Sandflats not covered by seawater at low tide [1140] - To maintain the favourable conservation condition		
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes.
Community distribution	Hectares	The following sediment communities should be maintained in a natural condition: Muddy estuarine community complex; Sand to muddy fine sand community complex
<i>Salicornia</i> and other annuals colonizing mud and sand [1310] - To maintain the favourable conservation condition		
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession
Habitat distribution	Occurrence	No decline, subject to natural processes
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain or where necessary restore natural circulation of sediments and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession

Table 8. Detailed Conservation Objectives for Natura 2000 sites		
Attribute	Measure	Target
River Barrow and River Nore SAC		
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession.
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009).
Vegetation structure: negative indicator species: <i>Spartina anglica</i>	Hectares	No significant expansion of <i>Spartina</i> . No new sites for this species and an annual spread of less than 1% where it is already known to occur
Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] - To restore the favourable conservation condition		
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession
Habitat distribution	Occurrence	No decline, subject to natural processes.
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession.
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009)
Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	No significant expansion of <i>Spartina</i> . No new sites for this species and an annual spread of less than 1% where it is already known to occur

Table 8. Detailed Conservation Objectives for Natura 2000 sites		
Attribute	Measure	Target
River Barrow and River Nore SAC		
Otter (<i>Lutra lutra</i>) [1355] - To restore the favourable conservation condition		
Distribution	Percentage positive survey sites	No significant decline
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 122.8ha above high water mark (HWM); 1136.0ha along river banks / around ponds
Extent of marine habitat	Hectares	No significant decline.
Extent of freshwater (river) habitat	Kilometres	No significant decline.
Extent of freshwater (lake) habitat	Hectares	No significant decline.
Couching sites and holts	Number	No significant decline
Fish biomass available	Kilograms	No significant decline
Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] - To restore the favourable conservation condition		
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession.
Habitat distribution	Occurrence	No decline, subject to natural processes.
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain or where necessary restore natural circulation of sediments and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009)
Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	No significant expansion of <i>Spartina</i> . No new sites for this species and an annual spread of less than 1% where it is already known to occur
Killarney Fern (<i>Trichomanes speciosum</i>) [1421] - To maintain the favourable conservation condition		

Table 8. Detailed Conservation Objectives for Natura 2000 sites		
Attribute	Measure	Target
River Barrow and River Nore SAC		
Distribution	Location	No decline. Three locations known, with three colonies of gametophyte and one sporophyte colony
Population size	Number	Maintain at least three colonies of gametophyte, and at least one sporophyte colony of over 35 fronds
Population structure: juvenile fronds	Occurrence	At least one of the locations to have a population structure comprising sporophyte, unfurling fronds, 'juvenile' sporophyte and gametophyte generations
Habitat extent	m ²	No loss of suitable habitat, such as shaded rock crevices, caves or gullies in or near to, known colonies. No loss of woodland canopy at or near to known locations
Hydrological conditions: visible water	Occurrence	Maintain hydrological conditions at the locations so that all colonies are in dripping or damp seeping habitats, and water is visible at all locations
Hydrological conditions: humidity	Number of desiccated fronds	No increase. Presence of desiccated sporophyte fronds or gametophyte mats indicates conditions are unsuitable
Light levels: shading	Percentage	No changes due to anthropogenic impacts
Invasive species	Occurrence	Absent or under control
Nore freshwater pearl mussel (<i>Margaritifera durrovensis</i>) [1990] – To restore the favourable conservation condition		
Distribution	Kilometres	Maintain at 15.5km.
Population size: adult mussels	Number	Restore to 5,000 adult mussels
Population structure: recruitment	Percentage per size class	Restore to at least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length
Population structure: adult mortality	Percentage	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution
Habitat extent	Kilometres	Restore suitable habitat in length of river corresponding to distribution target (15.5km; see map 7) and any additional stretches necessary for salmonid spawning
Water quality: Macroinvertebrates and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Restore water quality- macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93

Table 8. Detailed Conservation Objectives for Natura 2000 sites		
Attribute	Measure	Target
River Barrow and River Nore SAC		
Substratum quality: Filamentous algae (macroalgae), macrophytes (rooted higher plants)	Percentage	Restore substratum quality- filamentous algae: absent or trace (<5%); macrophytes: absent or trace (<5%)
Substratum quality: sediment	Occurrence	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment
Substratum quality: oxygen availability	Redox potential	Restore to no more than 20% decline from water column to 5cm depth in substrate
Hydrological regime: flow variability	Metres per second	Restore appropriate hydrological regimes
Host fish	Number	Maintain sufficient juvenile salmonids to host glochidial larvae
Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] - To maintain the favourable conservation condition		
Habitat distribution	Occurrence	No decline, subject to natural processes
Habitat area	Kilometres	Area stable or increasing, subject to natural processes
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes
Hydrological regime: groundwater discharge	Metres per second	The groundwater flow to the habitat should be permanent and sufficient to maintain tufa formation
Substratum composition: particle size range	Millimetres	The substratum should be dominated by large particles and free from fine sediments
Water chemistry: minerals	Milligrams per litre	The groundwater and surface water should have sufficient concentrations of minerals to allow deposition and persistence of tufa deposits
Water quality: suspended sediment	Milligrams per litre	The concentration of suspended solids in the water column should be sufficiently low to prevent excessive deposition of fine sediments
Water quality: nutrients	Milligrams per litre	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition
Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition
Floodplain connectivity: area	Hectares	The area of active floodplain at and upstream of the habitat should be maintained
European dry heaths [4030] – To maintain the favourable conservation condition		
Habitat distribution	Occurrence	No decline from current habitat distribution, subject to natural processes

Table 8. Detailed Conservation Objectives for Natura 2000 sites		
Attribute	Measure	Target
River Barrow and River Nore SAC		
Habitat area	Hectares	Area stable or increasing, subject to natural processes.
Physical structure: free-draining, acid, low nutrient soil; rock outcrops	Occurrence	No significant change in soil nutrient status, subject to natural processes. No increase or decrease in area of natural rock outcrop
Vegetation structure: sub- shrub indicator species	Percentage cover	Cover of characteristic sub- shrub indicator species at least 25%: gorse (<i>Ulex europaeus</i>) and where rocky outcrops occur bilberry (<i>Vaccinium myrtillus</i>) and woodrush (<i>Luzula sylvatica</i>). Some rock outcrops support English stonecrop (<i>Sedum anglicum</i>), sheep's bit (<i>Jasione montana</i>) and wild madder (<i>Rubia peregrina</i>) as well as important moss and lichen assemblages
Vegetation structure: senescent gorse	Percentage cover	Cover of senescent gorse less than 50%
Vegetation structure: browsing	Percentage cover	Long shoots of bilberry with signs of browsing collectively less than 33%
Vegetation structure: native trees and shrubs	Percentage cover	Cover of scattered native trees and shrub less than 20%
Vegetation composition: positive indicator species	Number	Number of positive indicator species at least 2 e.g. gorse and associated dry heath/ acid grassland flora
Vegetation structure: positive indicator species	Percentage cover	Cover of positive indicator species at least 60%. This should include plant species characteristic of dry heath in this SAC including gorse, bilberry and associated acid grassland flora
Vegetation composition: bryophyte and non-crustose lichen species	Number	Number of bryophyte or non- crustose lichen species present at least 2
Vegetation composition: bracken (<i>Pteridium aquilinum</i>)	Percentage cover	Cover of bracken less than 10% - however see 'Notes'
Vegetation structure: weedy negative indicator species	Percentage cover	Cover of agricultural weed species (negative indicator species) less than 1%
Vegetation composition: non- native species	Percentage cover	Cover of non-native species less than 1%.
Vegetation composition: rare/scarce heath species	Location, area and number	No decline in distribution or population sizes of rare, threatened or scarce species, including Greater Broomrape (<i>Orobancha rapum-genistae</i>) and the legally protected clustered clover (<i>Trifolium glomeratum</i>)

Table 8. Detailed Conservation Objectives for Natura 2000 sites		
Attribute	Measure	Target
River Barrow and River Nore SAC		
Vegetation structure: disturbed bare ground	Percentage cover	Cover of disturbed bare ground less than 10% (but if peat soil less than 5%)
Vegetation structure: burning	Occurrence	No signs of burning within sensitive areas
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] – To maintain the favourable conservation condition		
Habitat distribution	Occurrence	No decline, subject to natural processes
Habitat area	Hectares	Area stable or increasing, subject to natural processes
Hydrological regime: Flooding depth/height of water table	Metres	Maintain appropriate hydrological regimes
Vegetation structure: sward height	Centimetres	30-70% of sward is between 40 and 150cm in height
Vegetation composition: broadleaf herb: grass ratio	Percentage	Broadleaf herb component of vegetation between 40 and 90%
Vegetation composition: typical species	Number	At least 5 positive indicator species present
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control- NB Indian balsam (<i>Impatiens glandulifera</i>), monkeyflower (<i>Mimulus guttatus</i>), Japanese knotweed (<i>Fallopia japonica</i>) and giant hogweed (<i>Heracleum mantegazzianum</i>)
*Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] – To maintain the favourable conservation condition		
Habitat area	Square metres	Area stable or increasing, subject to natural processes
Habitat distribution	Occurrence	No decline.
Hydrological regime: height of water table; water flow	Metres; metres per second	Maintain appropriate hydrological regimes
Water quality	Water chemistry measures	Maintain oligotrophic and calcareous conditions
Vegetation composition: typical species	Occurrence	Maintain typical species
Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] - To restore the favourable conservation condition		
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least 85.08ha for sub-sites surveyed
Habitat distribution	Occurrence	No decline

Table 8. Detailed Conservation Objectives for Natura 2000 sites		
Attribute	Measure	Target
River Barrow and River Nore SAC		
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy
Woodland structure: dead wood	m ³ per hectare; number per hectare	At least 30m ³ /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter
Woodland structure: veteran trees	Number per hectare	No decline
Woodland structure: indicators of local distinctiveness	Occurrence	No decline
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including sessile oak (<i>Quercus petraea</i>) and birch (<i>Betula pubescens</i>)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control
*Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] - To restore the favourable conservation condition		
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least 181.54ha for sites surveyed
Habitat distribution	Occurrence	No decline.
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer

Table 8. Detailed Conservation Objectives for Natura 2000 sites		
Attribute	Measure	Target
River Barrow and River Nore SAC		
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy
Hydrological regime: flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation
Woodland structure: dead wood	m ³ per hectare; number per hectare	At least 30m ³ /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)
Woodland structure: veteran trees	Number per hectare	No decline
Woodland structure: indicators of local distinctiveness	Occurrence	No decline
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including ash (<i>Fraxinus excelsior</i>) alder (<i>Alnus glutinosa</i>), willows (<i>Salix spp</i>) and locally, oak (<i>Quercus robur</i>)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control
River Nore SPA		
Kingfisher (<i>Alcedo atthis</i>) [A229] – To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA		
Population Trend	Percentage Change	Long term population trend stable or increasing
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation

Analysis of the Potential Impacts

This section has been prepared to outline the construction and operational phase measures in addition to detailing the potential impacts on sensitive receptors within the Zone of Influence (ZOI) and the Natura 2000 sites downstream of the proposed development. This section provides a description of the potential impacts that the proposed development may have on biodiversity in the absence of mitigation. The proposed development will involve extensive instream works, terrestrial works and the diversion of the existing watercourse that runs through the site which will result in increased waterflows in the section of the watercourse to the west of the village. In addition, a site compound will be located to the north of the village. Potential impacts in the absence of mitigation are seen in Table 9.

Construction Impacts

The construction of the proposed development would impact on the existing ecology of the site, the surrounding area, and downstream of the proposed works. These potential construction impacts would include impacts that may arise during the terrestrial and instream works. It should be noted that the works are proposed immediately upstream of, but also within a short (3m) section of the River Barrow and River Nore SAC. There is potential for significant effects on the qualifying interests of the designated site in the absence of mitigation measures. Construction phase mitigation measures are required on site particularly as significant instream works are proposed which will remove all existing habitats within a section of the watercourse and can lead to silt laden and contaminated runoff going downstream. There is potential for silt laden runoff and contamination to enter the watercourse with potential for downstream impacts on the River Nore SPA.

It should be noted that the Knockwilliam Stream traverses through the subject site and the nearest European sites with a hydrological pathway are the River Barrow and River Nore SAC and the River Nore SPA, both located downstream of the proposed development site. Qualifying interests of the River Barrow and River Nore SAC include Otter (*Lutra lutra*), White-clawed Crayfish (*Austropotamobius pallipes*), and Freshwater Pearl Mussel (*Margaritifera margaritifera*). The Knockwilliam Stream within the works area has poor instream biodiversity and is heavily tunnelled by trees in areas (Appendix I). There were no features of interest of these conservation sites noted within the works area. However, given the proximity of habitats where these features of interest were observed it is possible that features of interest could be present and pre construction assessments must be carried out. No other European sites have a direct hydrological connection or pathway from the proposed development site. Mitigation Measures to prevent impacts on Natura 2000 sites are outlined in Table 10.

Operational Impacts

Once constructed, the waterflows to the west of the village in the section (Plate 1) will increase. The biodiversity value of the site would be expected to improve due to increased waterflows and lack of livestock access to the river. The lower waterflows that will be observed within the town could result in a local reduction in water quality due to the reduced dilution effect on point source inputs into the watercourse. However, it would result in an improved water quality to the west of the village, until the two watercourses meet at the northern end of the village where the net effect would be neutral to the current conditions due to mixing. It would be expected that the ecological impacts in the long term would be positive as there would be a reduction in pollution risk during normal flows and flooding events and the increased flows to the west of the town would be expected to improve the biodiversity value of the stream. However, it is important to note that the implementation of the rock ramp, the removal of obstacles to fish passage and the increased flows to the west of the town are seen as extremely positive for the free movement of Atlantic salmon within the watercourse. This combined with the reduced risk of pollution as a result of the reduced risk to houses and vehicles during a flood event and the reduction of livestock access to the river would be seen to have an extremely positive effect on the river and conservation interests of the SAC.

The proposed works will not result in a net increase or decrease of the volume of water that will enter the designated sites during normal or flood conditions as the two watercourses will combine before entering the designated sites. It is expected that the lower water quality that is observed within the village will result in a localised enforcement pressure on point source discharges. However, in the absence of any enforcement pressure, the net effect on water quality is expected to be neutral due to the combining of watercourses prior to entering designated sites. However, it is expected that as a result of the lower volumes and potential for point source discharges in the village increased compliance pressure will be placed on residents. Mitigation Measures to prevent impacts on Natura 2000 sites are outlined in Table 10.



Plate 1. Section D to the west of Ballyhale (area of increased waterflow as a result of the works.)

Table 9. Potential impacts on Natura 2000 sites.

Potential for adverse effects on the qualifying interests and conservation objectives of Natura 2000 sites		
European Site	Qualifying Interests	Potential for Adverse Effects
River Barrow and River Nore SAC [002162]	<p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) [1029] White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092] Sea Lamprey (<i>Petromyzon marinus</i>) [1095] Brook Lamprey (<i>Lampetra planeri</i>) [1096] River Lamprey (<i>Lampetra fluviatilis</i>) [1099] Twaite Shad (<i>Alosa fallax fallax</i>) [1103] Salmon (<i>Salmo salar</i>) [1106] Otter (<i>Lutra lutra</i>) [1355] Killarney Fern (<i>Trichomanes speciosum</i>) [1421] Nore Pearl Mussel (<i>Margaritifera durrovensis</i>) [1990]</p>	<p>In the absence of mitigation in-stream works and surface water runoff on site during construction or operation may lead to silt or contaminated materials going downstream to European sites. Concrete, silt or pollution could enter watercourses during works. Localised activity on site and noise may be generated during works. The use of plant and machinery, as well as the associated temporary storage of construction materials, oils, fuels and chemicals could lead to pollution on site or in adjacent watercourses. The storage of topsoil or works in the vicinity or the watercourse on onsite could lead to dust, soil or silt laden runoff entering adjacent watercourse.</p> <p>Given the nature of the works in all of these effects would be expected to be localised in nature restricted to the immediate vicinity of the site. However, the instream works would be seen as having the greatest potential for downstream effects on European Sites. Without the presence of mitigation measures there is a potential for downstream effects if significant quantities of pollution or silt were introduced into the watercourse or allowed to travel downstream.</p> <p>There is potential for significant effects from the works on the following qualifying Interests in the absence of mitigation measures. Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) [1029] (Precautionary approach) White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092] Sea Lamprey (<i>Petromyzon marinus</i>) [1095] Brook Lamprey (<i>Lampetra planeri</i>) [1096] River Lamprey (<i>Lampetra fluviatilis</i>) [1099] Twaite Shad (<i>Alosa fallax fallax</i>) [1103] Salmon (<i>Salmo salar</i>) [1106] Otter (<i>Lutra lutra</i>) [1355] Nore Pearl Mussel (<i>Margaritifera durrovensis</i>) [1990] (Precautionary approach)</p> <p>The mitigation measures outlined will be carried out to ensure that no significant silt or pollution enters watercourses or is allowed to travel downstream of the proposed works from the construction or operation phases of the proposed project and create localised pollution.</p>

Table 9. Potential impacts on Natura 2000 sites.

Potential for adverse effects on the qualifying interests and conservation objectives of Natura 2000 sites		
European Site	Qualifying Interests	Potential for Adverse Effects
River Nore SPA [004233]	Kingfisher (<i>Alcedo atthis</i>) [A229]	<p>In-stream works and surface water runoff on site during construction or operation may lead to silt or contaminated materials going downstream to European sites. Concrete, silt or pollution could enter watercourses during works. Localised activity on site and noise may be generated during works. The use of plant and machinery, as well as the associated temporary storage of construction materials, oils, fuels and chemicals could lead to pollution on site or in adjacent watercourses. The storage of topsoil or works in the vicinity of the watercourse on onsite could lead to dust, soil or silt laden runoff entering adjacent watercourse.</p> <p>Given the nature of the works in all of these effects would be expected to be localised in nature restricted to the immediate vicinity of the site. However, the instream works would be seen as having the greatest potential for downstream effects on European Sites. Without the presence of mitigation measures there is a potential for downstream effects if significant quantities of pollution or silt were introduced into the watercourse or allowed to travel downstream.</p> <p>There is potential for significant effects from the works on the following qualifying Interests in the absence of mitigation measures:</p> <p>Distribution, Number and Range of areas used by: Kingfisher (<i>Alcedo atthis</i>) [A229].</p>

Mitigation Measures

A strict series of mitigation measures are incorporated into the proposed project to minimise the potential negative impacts on the ecology and designated sites within the ZOI. These measures are outlined below in sequence and incorporate elements outlined elsewhere in this EIAR and in the supporting NIS.

Construction and operational controls will be incorporated into the proposed development project to minimise the potential negative impacts on the ecology within the Zone of Influence (ZOI) including the Knockwilliam Stream, Little Arrigle Stream, River Nore, and River Barrow. The proposed project design was carried out in consultation with Inland Fisheries Ireland.

Designated Conservation sites within 15km

As the main potential vector for impacts is seen to be via the Knockwilliam Stream watercourse running through the subject site, no additional controls are required besides those outlined below, during the construction and operational phases of the development, to mitigate against potential negative impacts on designated conservation sites. The mitigation has been designed to ensure that the project will comply with the Water Pollution Acts and standard IFI compliance in relation to construction and operation within and in the vicinity of watercourses.

Development Construction

Contamination of watercourses.

All works will be done in consultation with NPWS and Inland Fisheries Ireland. Consultation by the appointed project aquatic ecologist will be carried out and Method Statements will be sent to NPWS and IFI prior to the commencement of works on site.

As the Knockwilliam Stream watercourse traverses through the subject site and substantial instream works are proposed, a project aquatic ecologist will be appointed prior to works or site clearance commencing on site. All works in the riparian corridor will be carried out in consultation with IFI, NPWS and the project ecologist, following the best practice guidelines for construction in the vicinity of watercourses.

All works on site and in the riparian corridor shall have sufficient mitigation measures to prevent the movement of silt downstream during works. This will include measures outlined by the project ecologist including silt fences, phasing of the project to initially carry out localized diversion works and immediate landscaping of the riparian corridor following works.

Riparian Corridor Construction Stage

As significant site clearance is involved in the project and the site is on sloping land adjacent to a watercourse, measures need to be put in place to ensure that runoff from the site during construction is contained and that silt is intercepted. A silt interception system will be prepared in consultation with the project ecologist. The purpose of this is to ensure that silt is removed from runoff prior to entering the stream throughout the construction process. The following measures will be carried out to ensure that the site runoff is suitably contained during construction:

- a) Site works will commence with the submission of a construction methodology to IFI and NPWS. It is proposed to enhance the main watercourse through the introduction of a series of pools riffles and glides. The excavation of the riparian diversion will be carried out in the dry, isolated from the existing watercourse. Only when all dry works have been completed and inspected by the ecologist will the stream become live. Instream works will not involve over pumping and will involve a combination of diversions into existing elements of the watercourse and passive piping or the watercourse under culverts (Plate 2) etc. All instream works will be done "in the dry".



Plate 2. Passive diversion of stream through dry works area.

- b) It is important that the area proximate to the watercourse that was cleared is landscaped immediately following the works to limit any silt entering the stream during a flood.
- c) The placing of silt fences in the riparian corridor will be carried out to prevent runoff entering the newly established riparian corridor. It is important that the bases of these are buried deeply in the soil as this area has the potential to be flooded and they could cause downstream impacts if not installed correctly. There will be no machinery access into the watercourse.
- d) A project aquatic ecologist will be onsite during all instream works. The ecologist will monitor twice daily turbidity, pH and oxygen levels both upstream of the proposed works and weekly reports will be made available to the NPWS and IFI for the duration of the works.
- e) The ecologist will have the ability to cease all works immediately without delay and request additional measures to be implemented in the event of elevated siltation or reduced oxygen levels in the watercourse.
- f) Following the completion of this element of the project this area of the site will be closed off to machinery access and re-landscaped.

Works outside the riparian corridor.

- a) The project ecologist will outline a method statement to the client prior to works commencing on site. This will include the placement of silt fences will be placed along the edge of the riparian corridor (outside of future construction areas) to capture runoff from the site. These will also prevent machinery from entering the riparian corridor.
- b) Mitigation measures including silt fences will be in place (in consultation with the project ecologist and IFI) to capture silt from runoff and prevent it from entering the stream during the terrestrial works.
- c) Appropriate storage and settlement facilities will be provided on site. This could include the provision of silt and petrochemical interception for water pumped on site (if required).
- d) Fuel, oils and Chemicals will be stored on an impervious base with a bund. Under LEED there will be a strategy put in place to prevent pollution of the watercourse. In most cases this will involve collecting the run-off and routing it to treatment by filtration, settlement or specialist techniques.

Additional mitigation if required will be placed on roadworks to capture silt that may not be caught by road sweeping, before runoff enters the Knockwilliam Stream.

Permanent flow diversion Methodology

Due to the presence of sensitive species/Features of interest downstream of the works e.g. (Otter (*Lutra lutra*) and Freshwater Crayfish (*Austropotamobius pallipes*), the fact that the subject site is located within a designated Freshwater Pearl Mussel (*Margaritifera (Marga ritifera) Margaritifera*) sensitive area, in addition to having a direct hydrological pathway to two Natura 2000 sites downstream and the necessity to comply with Water Pollution Acts, it has been deemed necessary to limit the potential impact of the works and implement mitigation measures and carry out the instream works as follows:

Pre-Installation:

Prior to carrying out the works the project will:

- Submit a final methodology statement at least 1 week before the proposed in stream works.
- Notify IFI and NPWS one week in advance of works commencing.
- Carry out a pre construction ecological assessment and Electrofish the water within the full extent of the works. If required any fish caught will be transported downstream.
- All works will be done in the dry

Installation process (flow altering device):

- A temporary localized stream diversion will be prepared with sand bags to divert the water to the west of Ballyhale.
- For the duration of works a series of terram baffles will be placed downstream of the proposed works to capture silt.
- The control device will be installed in the dry while the river remains on its diverted course. The excavation will leave two areas of soil at either end of the diversion to prevent the river from entering the works area.
- Pumps will be placed within the diversion area should any seepage, rainwater or groundwater enter the works area. These are to be connected to silt busters/or to the onsite swales as directed by the project ecologist (and not directly back to the stream without filtering). Any seepage/rainwater/groundwater will be pumped onto open ground north of the river and allowed to seep naturally into the groundwater. No runoff will be allowed back into the stream.
- The excavated material will be stockpiled on site away from the watercourse (min 20m).
- Minor adjustments if required will be made to ensure the first section is correct for line and level.
- The remaining sections will be installed using the same procedure.
- Backfill material will be placed and compacted in layers.
- The ecologist will be in attendance for environmentally sensitive works.
- On completion of the backfilling the small remaining sand bags will be removed.
- Silt interception methods will be implemented downstream prior to instream works.
- Instream biodiversity elements will be placed within the watercourse as instructed by the ecologist/IFI.
- A gradual switchover will be implemented and the stream will flow through the newly installed elements under supervision of project ecologist.
- A gradual switch over to the diversion will be monitored by the project ecologist.
- Once the full flow is in the diversion and stable the Existing stream bed will then be gradually blocked off with sandbags and final elements will be carried out behind sand bags.
- When complete downstream mitigation measures will be removed.

The future localized diversion of and installation of the project elements in the Knockwilliam Stream will be carried out in the dry, in order to mitigate the silt disruption. During the works period, a project ecologist will be in attendance to monitor sensitive works (instream/connection works). The Knockwilliam Stream will be connected to its new course following the installation under the supervision of the project ecologist. IFI may require inspection of the works prior to the Knockwilliam Stream becoming live in the new diversion.

Table 10. Mitigation Measures.		
Sensitive Receptors	Potential Impacts	Designed-in Mitigation
River Barrow and River Nore SAC River Nore SPA Knockwilliam Stream Little Arrigle Stream River Nore River Barrow	<ul style="list-style-type: none"> Habitat degradation Dust deposition Pollution Silt ingress from site runoff Downstream impacts Negative impacts on aquatic and bird fauna 	<ul style="list-style-type: none"> A project ecologist will be present throughout the instream works and monitor water quality on site. All in-stream works methodologies will be submitted to Inland Fisheries Ireland. Best available technology (BAT) mitigation measures designed by project ecologist Staging of project to reduce risks to watercourses from contamination with all instream works being carried out in Phase 1 of the project, where the stream is diverted, landscaped and protected from all subsequent phases. Local watercourses (Knockwilliam Stream) will be protected from dust, silt and surface water throughout the works. Local silt traps established throughout site. Mitigation measures on site include dust control, stockpiling away from watercourse and drains Stockpiling of loose materials will be kept to a minimum of 20m from watercourses and drains. Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system and watercourses. Fuel, oil and chemical storage will be sited within a bunded area. The bund will be at least 50m away from drains, ditches or the watercourse, excavations and other locations where it may cause pollution. Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. Any water-filled excavations, that require pumping will not directly discharge to the stream. Prior to discharge of water from excavations adequate filtration will be provided to ensure no deterioration of water quality. The excavation of the diversion should be carried out in the dry with no connections to the existing watercourse, until the works are complete with the exception of the small areas where the stream is currently live. De-stocking of the stream may need to be carried out prior to the commencement of works (if required by IFI) and upstream and downstream permeable barriers to remain in place until construction is completed. In stream works to be carried out in full consultation with Inland Fisheries Ireland and the project ecologist. Staging of project to initially stabilise, isolate, fence off watercourse on site Mitigation measures on site include dust control, stockpiling away from watercourses and drains Pollution control and mitigation on site During the construction works silt traps will be put in place in the vicinity of all runoff channels the stream to prevent sediment entering the watercourse. Petrochemical interception and bunds in refuelling area On-site inspections to be carried out by project ecologist. Maintenance of any drainage structures (e.g. de-silting operations) will not result in the release of contaminated water to the surface water network.

		<ul style="list-style-type: none"> • No entry of solids to the associated stream or drainage network during the connection of pipework to the public water system • Landscaping of the Riparian corridor should be carried out to the satisfaction of IFI and the project ecologist.
Watercourses	<ul style="list-style-type: none"> • Habitat Degradation • Dust deposition • Pollution • Silt ingress • Potential downstream impacts. 	<p>Measures outlined above in addition to:</p> <ul style="list-style-type: none"> • During the works silt traps will be put in place • No discharges will be to the watercourse during and post works • Silt traps established throughout site including a double silt fence between the site and the watercourse. • Sufficient onsite cleaning of vehicles prior to leaving the site and on nearby roads, will be carried out, particularly during groundworks. • The Site Manager will be responsible for the pollution prevention programme and will ensure that at least daily checks are carried out to ensure compliance. A record of these checks will be maintained. • The site compound will include a dedicated bund for the storage of dangerous substances including fuels, oils etc. Refuelling of vehicles/machinery will only be carried out within the bunded area. • A project ecologist will be appointed and be consulted in relation to all onsite drainage during construction works. Consultation with the project ecologist will not involve the formulation of new mitigation measures for the purposes of protecting any European Site, and relate only to the implementation of those mitigation measures already stated in the submission or the formulation of mitigation for other purposes. • Dewatering of excavations may be necessary. Appropriate monitoring of groundwater levels during site works will be undertaken. Standard construction phase filtering of surface water for suspended solids will be carried out. Unfiltered surface water discharges or runoff are not permitted from the site into the watercourse during the works. • Concrete trucks, cement mixers or drums/bins are only permitted to wash out in designated wash out area greater than 50m from sensitive receptors including drains and drainage ditches. • Abstraction of water from watercourses is not to be permitted. • Spill containment equipment shall be available for use in the event of an emergency. The spill containment equipment shall be replenished if used and shall be checked on a scheduled basis. • All site personnel will be trained in the importance of good environmental practices including reporting to the site manager when pollution, or the potential for pollution, is suspected. All persons working on-site will receive work specific induction in relation to surface water management and run off controls. Daily environmental toolbox talks / briefing sessions will be conducted to outline the relevant environmental control measures and to identify any environment risk areas/works. • Environmental risks due to construction and operation of the proposed development do potentially exist, particularly in relation runoff from sloping site, drains that could lead to the watercourse . Ecological supervision will be required during diversion, excavation and enabling works stages. Silt interception measures will need to be in place to ensure that the watercourses are not impacted during works and in particular during the site clearance, in-stream works and reprofiling stages. Landscaping of the grassed areas

of the site proximate to the watercourse should take place immediately following re-profiling, to act as a buffer to protect the watercourse.

- Daily turbidity and oxygen monitoring of the watercourse (upstream, downstream of works) should take place during works by the project ecologist. This would be particularly important following high rainfall events. It is recommended that sufficient baseline readings are made prior to construction commencing to understand the existing turbidity on site particularly in the pond area as this appeared turbid during the site visit.

Storage/Use of Materials, Plant & Equipment

- Materials, plant and equipment shall be stored in the proposed site compound location;
- Plant and equipment will not be parked within 50m of the watercourse at the end of the working day;
- Hazardous liquid materials or materials with potential to generate run-off shall not be stored within 50m of the watercourse. .
- All oils, fuels and other hazardous liquid materials shall be clearly labelled and stored in an upright position in an enclosed bunded area within the proposed development site compound. The capacity of the bunded area shall conform with EPA Guidelines – hold 110% of the contents or 110% of the largest container whichever is greater;
- Fuel may be stored in the designated bunded area or in fuel bowsers located in the proposed compound location. Fuel bowsers shall be double skinned and equipped with certificates of conformity or integrity tested, in good condition and have no signs of leaks or spillages;
- Smaller quantities of fuel may be carried/stored in clearly labelled metal Jeri cans. Green for diesel and red for petrol and mixes. The Jeri cans shall be in good condition and have secure lockable lids. The Jeri cans shall be stored in a drip tray when not in use. They will not be stored within 50m of the watercourse.
- Drip trays will be turned upside down if not in use to prevent the collection of rainwater;
- Waters collected in drip trays will be assessed prior to discharge. If classified as contaminated, they shall be disposed by a permitted waste contractor in accordance with current waste management legal and regulatory requirements;
- Plant and equipment to be used during works, will be in good working order, fit for purpose, regularly serviced/maintained and have no evidence of leaks or drips;
- No plant used shall cause a public nuisance due to fumes, noise, and leakage or by causing an obstruction;
- Re-fuelling of machinery, plant or equipment will be carried out in the site compound as per the appointed Construction Contractor re-fuelling controls;
- The appointed Construction Contractor EERP will be implemented in the event of a material spillage;
- All persons working will receive work specific induction in relation to material storage arrangements and actions to be taken in the event of an accidental spillage. Daily environmental toolbox talks / briefing

		<p>sessions will be conducted for all persons working to outline the relevant environmental control measures and to identify any environment risk areas/works.</p> <ul style="list-style-type: none"> • Consultation with Inland Fisheries Ireland will be carried out pre and post works is essential and to be led by the project ecologist. •
Birds (National Protection)	<ul style="list-style-type: none"> • Removal nesting habitat. • Destruction and/or disturbance to nests (injury/death). 	<ul style="list-style-type: none"> • “Relevant guidelines and legislation (Section 40 of the Wildlife Acts, 1976 to 2012) Should this not be possible, a pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent.
Fauna	<ul style="list-style-type: none"> • Injury/death • Impacts on resting or breeding places. 	<ul style="list-style-type: none"> • Preconstruction aquatic and mammal survey.

Outline Construction Management Plan

Additional measures are outlined in the CMP. As outlined in the CMP:

'The Mitigation measures to prevent against pollution of water and soil receptors are to be incorporated into the contractors Construction Management Plan. Key Identified risks include chemical pollution & pollution by silt/suspended solids.

The contractor shall also refer to particular mitigation measures for this topic as set out in the EIAR for the development.'

Erosion and Sediment Control

'A temporary drainage system shall be installed prior to the commencement of the construction works to collect surface water runoff by the site during construction.

Measures will be implemented to capture and treat sediment laden surface water runoff (e.g. sediment retention ponds, surface water inlet protection, fencing and signage around specific exclusion zones and bunding adjacent to drainage inlets

Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of water at a controlled rate.

On-site settlement ponds are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.

Surface water discharge points during the construction phase are to be agreed with Kilkenny Council's Environment Section prior to commencing works on site.

Discharge from any vehicle wheel wash areas is to be directed to on-site settlement ponds, debris and sediment captured by vehicle wheel washes are to be disposed off-site at a licensed facility.'

Accidental Spills and Leaks

'All oils, fuels, paints and other chemicals will be stored in a secure bunded hardstand area.

Refueling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any surface water inlets (when not possible carry out such activities off site)

A response procedure will be put in place to deal with any accidental pollution events and spillage kits will be available and construction staff will be familiar with the emergency procedures and use of the equipment.

Discharge from any temporary toilet facilities should be collected by a licenced waste carrier and brought to a licenced treatment facility or connected to Irish Water Foul Drainage systems (subject to connection agreement with Irish Water).

Were the site to flood during construction this could result in pollutants being lost to the river. This should be addressed by ensuring that dangerous substances are never stored in the flood zone'.

Concrete

'Concrete batching will take place off site, wash down and wash out of concrete trucks will take place off site and any excess concrete is not to be disposed of on site

Pumped concrete will be monitored to ensure there is no accidental discharge

Mixer washings are not to be discharged into surface water drains.'

Biodiversity

'Where possible, site clearance works should proceed outside the nesting season, i.e. from September to February inclusive. If this is not possible, vegetation must first be inspected by a suitably qualified ecologist. If a nest is encountered then works must stop, until such time as nesting has ceased. Otherwise, a derogation licence must be sought from the NPWS.

A detailed Construction Management Plan (CMP) shall be prepared by the Contractor. The site manager will be responsible for ensuring that pollution prevention measures are fully implemented and monitored. A written record of at least daily checks should be maintained. Any pollution incidents should be recorded and reported to the IFI in a timely manner.

Though no invasive species have been identified on site – Contractor shall ensure that invasive species (e.g. Japanese Knotweed) are treated appropriately (consult specialist invasive species contractor for suitable methods dependent upon the species) and avoid import or spreading these species during any works/activities

The contractor shall also refer to particular mitigation measures for this topic as set out in the EIAR for the development.'

Air quality and Climate

'The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed construction phase mitigation measures are implemented, and that construction impacts and nuisance are minimised.

The following mitigation measures are to be implemented during the construction phase:

- *Procedures within the Dust Management Plan will be strictly monitored and assessed.*
- *Avoid unnecessary vehicle movements and manoeuvring, and limit speeds on site so as to minimise the generation of airborne dust.*
- *Use of rubble chutes and receptor skips during construction activities.*
- *During dry periods, dust emissions from heavily trafficked locations (on and off site) will be controlled by spraying surfaces with water and wetting agents.*
- *Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only.*
- *Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 10kmh and by use of a mechanical road sweeper.*
- *The overloading of tipper trucks exiting the site shall not be permitted.*
- *Aggregates will be transported to and from the site in covered trucks.*
- *Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser.*
- *Wetting agents shall be utilised to provide a more effective surface wetting procedure.*
- *Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant, rather than just following breakdowns; the positioning of exhausts at a height to ensure*
- *All plant not in operation shall be turned off and idling engines shall not be permitted for excessive periods.*
- *Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.*

- *Material stockpiles containing fine or dusty elements including top soils shall be covered with tarpaulins.*
- *Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment shall be fitted with a water dampening system.*
- *A programme of air quality monitoring shall be implemented at the site boundaries for the duration of construction phase activities to ensure that the air quality standards relating to dust deposition and PM10 are not exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented.*
- *A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.'*

Adverse Effects on the conservation objectives of Natura 2000 sites likely to occur from the project (post mitigation)

Standard construction and operational mitigation measures are proposed. These would ensure that water entering the watercourse, is clean and uncontaminated. However, given the proximity of numerous sensitive receptors and the watercourse leading to the Natura 2000 sites, it should be noted that the early implementation of ecological supervision on site and consultation with IFI at initial mobilisation and enabling works is seen as an important element to the project, particularly in relation to the implementation of surface water runoff mitigation.

With the successful implementation of standard mitigation measures to limit surface water impacts on the Knockwilliam Stream and biodiversity mitigation/supervision, no significant impacts are foreseen from the construction or operation of the proposed project (Table 10). Residual impacts of the proposed project will be localised to the immediate vicinity of the proposed works. Positive impacts would be seen through the increased instream flows to the west of Ballyhale.

The construction and operational mitigation proposed for the development satisfactorily addresses the mitigation of potential impacts on biodiversity and designated conservation sites through the application of the standard construction and operational phase controls as outlined above. In particular, mitigation measures to ensure compliance with Water Pollution Acts and prevent silt and pollution entering the stream will satisfactorily address the potential impacts on downstream biodiversity and Natura 2000 sites. No significant adverse impacts on the conservation objectives of Natura 2000 sites are likely following the implementation of the mitigation measures outlined above.

It is essential that these measures outlined are complied with, to ensure that the proposed development does not have “downstream” environmental impacts. These measures are to protect the groundwater/surface water, which are potentially the primary vectors of impacts from the site, and ensure that it is not impacted during construction and /or operational phases of the proposed development. Ongoing consultation with IFI is essential.

In-combination Effects

There are several development proposals located in the area immediately surrounding the subject site that have been granted permission. The following is a list of planning application(s) as identified on the Department of Housing, Local Government and Heritage’s ‘National Planning Application Database’ portal:

Table 11. In combination effects evaluated.

Planning Ref.	Address	Proposal
21595	Kiltorcan and Ballyhale, Co. Kilkenny	for alterations to the previously granted solar farm in the townlands of Ballyhale and Kiltorcan (Kilkenny County Council Reg Ref. 16592, and An Bord Pleanala Reg Ref. PL10.247616) as amended by Kilkenny County

Planning Ref.	Address	Proposal
		Council Reg Ref. 19538. Permission was originally granted for a Solar photovoltaic installation comprising up to 26,100m ² of solar panels on ground mounted frames, 4 no. inverters housed in 2 units, 1 no. 20kV substation, security fencing, new entrance onto public road, access tracks, CCTV; underground cable and ducts including underground cable and ducts along the public road to the entrance of the existing Ballyhale substation within the townland of Kilcorcan, Co. Kilkenny and all associated ancillary development works and services. Permission was sought for a period of 10 years. Permission was subsequently granted for the addition of 4 no. battery storage containers and extension to the operational period of the solar farm from 25 years to 30 years. Permission is now sought for the following: increase the area of solar panels from up to 26,100 m ² to up to 30,500 m ² ; increase in height to the permitted solar panels from 2.72m to 2.82m and; permission to increase the operational period of the solar farm from 30 years to 35 years. A Natura Impact Statement (NIS) accompanies this application. Planning permission is sought for a period of 10 years.
19897	Ballyhale, Co Kilkenny, R95 W3C5	to demolish existing single and two storey structures to the side and rear for the existing dwelling, to construct a part two / single storey extension to the side and rear of the existing dwelling, to construct a two storey extension to the front and side of the existing dwelling, elevational modifications to include raising of the ridge and eaves height of the existing dwelling, all internal modifications and all associated site developments works
19605	Derrynahinch, Kiltorcan, Co. Kilkenny	for development consisting of a 10 year permission for the construction of a Solar PV Energy development within a total site area of up to 9hA, to include electrical transformer/ inverter station modules, battery storage modules, solar PV panels ground mounted on steel support structures, access roads, fencing and associated electrical cabling, ducting and ancillary infrastructure
19538	Ballyhale and Kitorcan, Co. Kilkenny	for development comprising the provision of four battery storage containers which are required for the operation of the previously granted solar farm in the townlands of Ballyhale and Kitorcan, Co. Kilkenny (Reg. Ref. 16592 and PL10.247616). This planning application also includes an extension to the operational permission of the solar farm to be increased from 25 to 30 years and a reduction in the validity period of planning approval from 10 to 4 years,
16445	Derrynahinch, Knocktopher, Co. Kilkenny	for development. The development will consist of a 10 year permission for the construction of a Solar PV Energy development within a total site area of up to 10.6hA, to include one single storey electrical substation building, electrical transformer/inverter station modules, solar PV panels ground mounted on steel support structures, access roads, fencing and associated electrical cabling, ducting and ancillary infrastructure

In relation to Planning Ref. **19605**, an Appropriate Assessment Screening Report was prepared by Wetland Surveys Ireland Ltd to accompany this planning application. This report concludes with the following:

'In conclusion, it has been determined that the development is not directly connected with or necessary to the management of European sites. Secondly, this report concludes on the basis of objective scientific information, that there is no potential for any likely significant effects on the Natura 2000 network of sites resulting from the proposed extension to the consented Derrynahinch Solar Farm, and accordingly it is considered that there is no need to prepare a Natura Impact Statement / Appropriate Assessment, in this instance.

This Report concludes the Appropriate Assessment process. A Finding of No Significant Effects Report has been completed and is presented in Appendix II of this report.'

In relation to Planning Ref. **21595**, an Appropriate Assessment Screening Report and Natura Impact Statement was prepared by Fehily Timoney & Company to accompany this planning application. This report concludes with the following:

'In summary, whilst it has been acknowledged that there is the potential for the project to have significant indirect impacts on River Barrow and River Nore SAC and the Nore River SPA, with the implementation of the detailed mitigation measures identified in this NIS, the integrity of this European site as natural habitats will not be adversely affected. In particular, with the implementation of the detailed mitigation measures identified in this NIS, there is no scientific doubt remaining as to the absence of potential adverse effects.'

The above planning applications are the developments which are being considered on an in combination basis. No significant projects are proposed or currently under construction that could potentially cause in combination effects on Natura 2000 sites.

Given this, it is considered that in combination effects with other existing and proposed developments in proximity to the application area would be unlikely, neutral, not significant and localised. It is concluded that no significant effects on Natura 2000 sites will be seen as a result of the proposed development alone or combination with other projects.

Conclusion

In a strict application of the precautionary principle, it has been concluded that significant effects on the River Barrow and River Nore SAC and River Nore SPA are likely from the proposed works in the absence of standard control or mitigation measures, primarily as a result of direct hydrological connection to the site via the Knockwilliam Stream and Little Arrigle Stream and possible downstream impacts from the project during the in-stream, construction, and diversion works. For this reason, a NIS was carried out to assess whether the proposed project, either alone or in combination with other plans or projects, in view of best scientific knowledge and in view of the sites conservation objectives, will adversely affect the integrity of the European Site. All other Natura 2000 sites were screened out at initial screening.

We conclude that we have demonstrated on the basis of the best scientific information available which we consider is adequate to make this conclusion that the project alone or in combination with other plans or projects will not have an adverse effect on the integrity of the River Barrow and River Nore SAC and River Nore SPA in view of their conservation objectives. No in combination effects are foreseen on Natura 2000 sites or their conservation objectives.

Construction on this site will create localised light and noise disturbance. Mitigation measures will be in place to ensure there are no significant impacts on the surface water that leads to conservation sites. All works will be developed in accordance with the Water Pollution Acts.

The proposed in-stream works will be carried out in the dry and consultation with Inland Fisheries Ireland and a project aquatic ecologist will be appointed to oversee works in relation to the watercourses on site. The implementation of standard construction and operational phase mitigation measures including the measures outlined above and in the IFI Guidelines on protection of fisheries during construction works, which will be followed, will be sufficient to prevent adverse effects on the integrity of Natura 2000 sites. During operation positive effects would be foreseen with the increased passage of fish species through the site and the lower pollution risk due to the reduction in pollution sources e.g. misconnections and prevention of livestock access to the watercourse.

Following the implementation of the mitigation measures outlined, the proposed works would not be deemed to have a significant impact. No significant negative impacts are likely on Natura 2000 sites, alone in combination with other plans and projects based on the implementation of standard construction phase mitigation measures. Positive impacts are foreseen with the reduction in pollution risk and increased fish passage.

This report presents a Stage 1 Appropriate Assessment Screening and Stage 2 NIS for the Proposed Development, outlining the information required for the competent authority to screen for appropriate assessment and to determine whether or not the Proposed Development, either alone or in combination with other plans and projects, in view of best scientific knowledge, is likely to have a significant effect on any European or Natura 2000 site.

On the basis of the content of this report, the competent authority is enabled to conduct an assessment for Appropriate Assessment and consider whether, in view of best scientific knowledge and in view of the conservation objectives of the relevant European sites, the Proposed Development, individually or in combination with other plans or projects is likely to have a significant effect on any European site.

On the basis of the content of this report, the competent authority is enabled to conduct an Appropriate Assessment and consider whether, either alone or in combination with other plans or projects, in view of best scientific knowledge and in view of the sites conservation objectives, will adversely affect the integrity of the European site.

No significant adverse effects are likely on Natura 2000 sites, their qualifying interests or conservation objectives. The proposed project will not will adversely affect the integrity of European sites.

Data used for the AA Screening/NIS Assessment

NPWS site synopses and Conservation objectives of sites within 15km were examined. No Natura 2000 sites beyond 15km has a direct pathway to the proposed development site. The most recent SAC and SPA boundary shapefiles were downloaded and overlaid on ESRI terrain maps and satellite imagery. Site visits was carried out to determine if the site contained possible threats to a European or any species or habitats or conservation importance (Appendix I).

References

1. Department of Environment Heritage and Local Government Circular NPW 1/10 and PSSP 2/10 on Appropriate Assessment under Article 6 of the Habitats Directive – Guidance for Planning Authorities March 2010.
2. Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government 2009;
http://www.npws.ie/publications/archive/NPWS_2009_AA_Guidance.pdf
3. Managing NATURA 2000 Sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC, European Commission 2000;
http://ec.europa.eu/environment/nature/Natura2000/management/docs/art6/provision_of_art6_en.pdf
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5. Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission;
http://ec.europa.eu/environment/nature/Natura2000/management/docs/art6/guidance_art6_4_en.pdf
6. Guidance document on the implementation of the birds and habitats directive in estuaries and coastal zones with particular attention to port development and dredging;
http://ec.europa.eu/environment/nature/Natura2000/management/docs/guidance_doc.pdf
7. The Status of EU Protected Habitats and Species in Ireland.
http://www.npws.ie/publications/euconservationstatus/NPWS_2007_Conservation_Status_Report.pdf
8. NPWS (2011) Conservation Objectives: River Barrow and River Nore SAC 002162. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
9. NPWS (2019) Conservation Objectives: Hugginstown Fen SAC 000404. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
10. NPWS (2019) Conservation Objectives: Thomastown Quarry SAC 002252. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
11. NPWS (2017) Conservation Objectives: Lower River Suir SAC 002137. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
12. NPWS (2022) Conservation objectives for River Nore SPA [004233]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.

Appendix I: Baseline Environment

Site assessments were carried out on the March 26th 2020 and 19th September 2020. The watercourses in the vicinity of Ballyhale were assessed and broken into down into different in stream habitat types (Figure AI.1) Habitats within the proposed development site were classified according to Fossitt (2000) (Figure AI.2).

For much of its length through Ballyhale the stream is highly modified and channelled. Access to the stream from the banks within the village is often occluded by dense bankside growth fencing, culverts and bridges. In these areas the stream is between 1 and 2 metres below adjacent ground level. However, access was significantly better on the outside the village with the stream being adjacent to field level upstream of the village and slightly below field level after the village.

The stream varies in channel width from 1 to 2.5 and even 3m metres within this area. The flow is generally sluggish, although occasional short riffles are present. There are few pools, or areas of sanctuary for brown trout or juvenile salmon within the village or within the upstream section. In the upstream section of the stream the stream is silted with some locally impacted areas with “sewage fungus” on the instream rocks. Organic-rich sediment line the banksides in the upstream areas. Particularly where the stream widens and splits in the village, these silt deposits are densely vegetated in places and cause the stream to constrict between the vegetation, resulting in an increased flow at these localised and constricted locations. In the long sections of glide or flat water, which ranged in depth on the occasion of this survey from 0.2 to 0.4 metres, the bed of the stream is silted within the village with strong vegetative growth at the sited. Beneath the silt, which was up to 10cm deep in places, gravels are present, with bedrock in some areas.

Of particular importance is the improvement of the habitat observed just downstream of Ballyhale where water quality and habitat appeared to improve significantly. In areas where the flow velocity is increased, gravels are seen. Very occasional large stones and small boulders are present in the stream, which are used by dipper (*Cinclus cinclus*) in this area. Within and downstream of the village the water in the stream was clear and appeared to be of good quality on the occasion of the surveys. However, there appeared to be an unidentified source of organic enrichment upstream of the village which caused the water to be cloudy.

Aquatic Flora and Fauna Six ‘habitat types’ were identified in this section of stream (Figure AI.1). These were differentiated primarily areas of low tree cover and sparse in tunnelled areas, reflecting the low light conditions that operated in most of this deeply tunnelled channel downstream of the village.

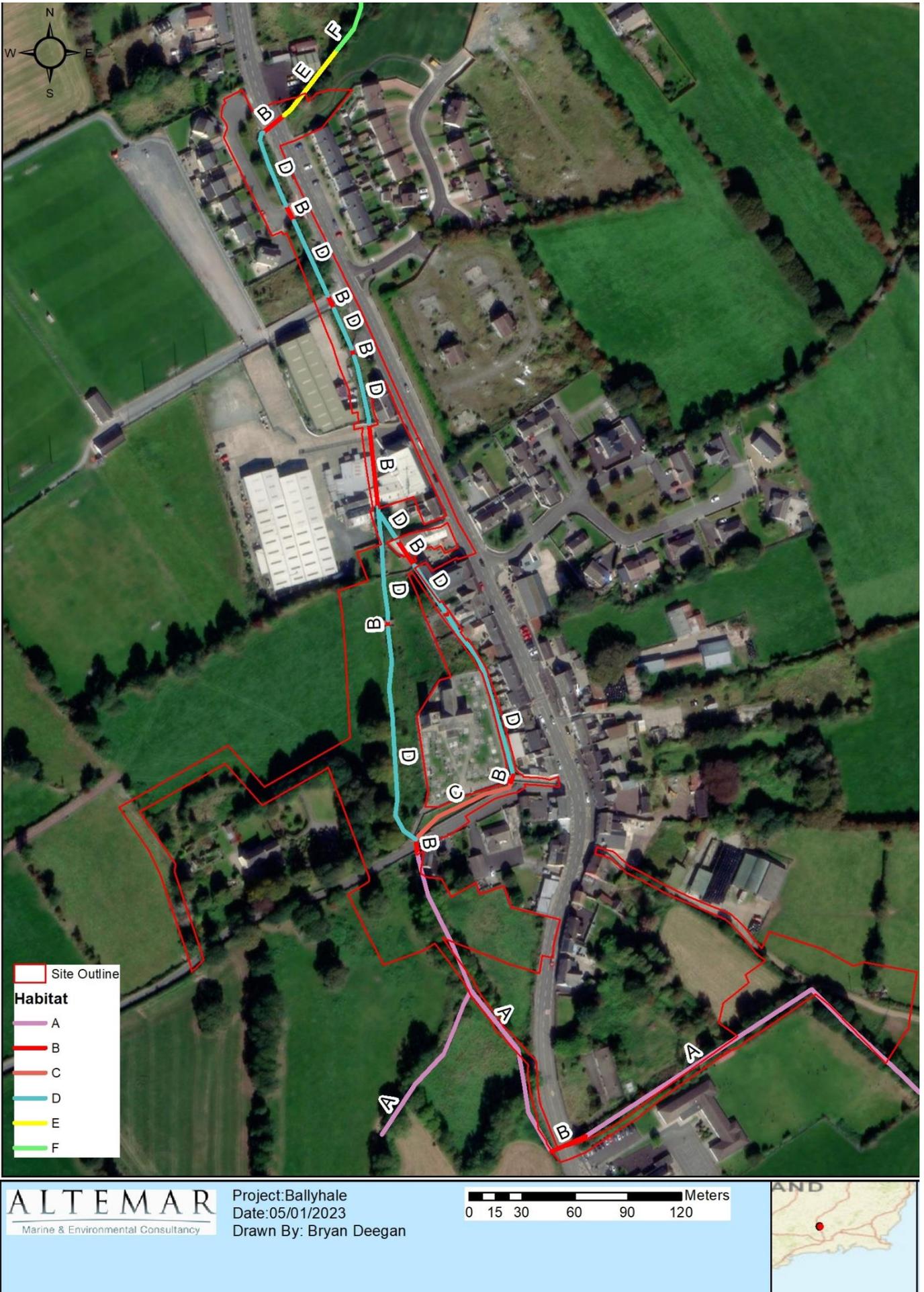
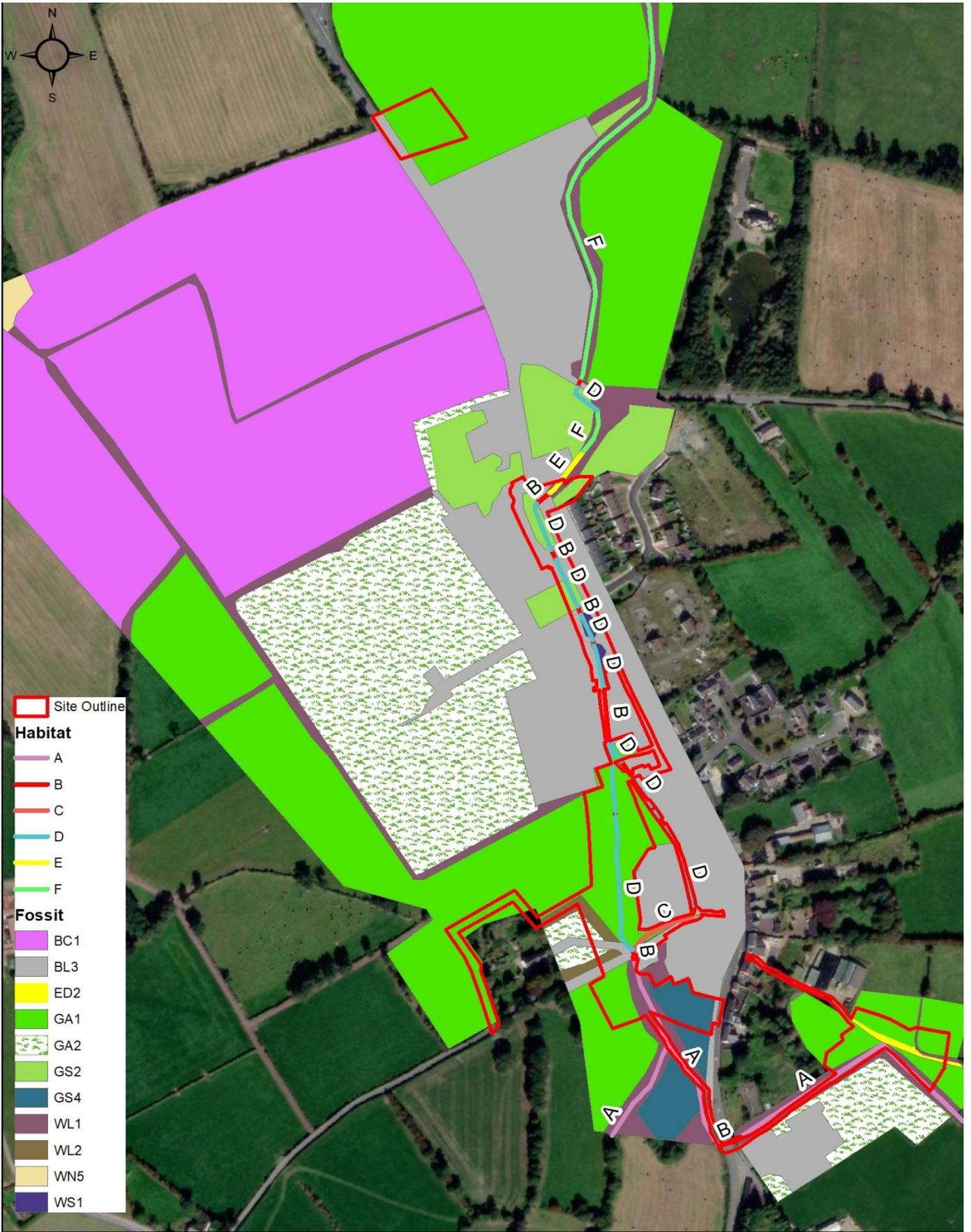


Figure AI.1. Stream Habitats in the vicinity of Ballyhale.



ALTEMAR
Marine & Environmental Consultancy

Project: Ballyhale
Date: 05/01/2023
Drawn By: Bryan Deegan

0 25 50 100 150 200 Meters



Figure AI.2 Fossitt (2000) Habitats

Section A



Plate 1. Section A

The channel of the stream at this location was relatively slow and sluggish and tunnelled beneath a mixture of hawthorn (*Crataegus monogyna*), ash (*Fraxinus excelsior*), blackthorn (*Prunus spinosa*) and gorse (*Ulex europaeus*). The frequent aquatic plants in this section were dense mats of watercress (*Nasturtium officinale*), water dropwort (*Oenanthe crocata*) and brooklime (*Veronica beccabunga*). An examination of the deep silt and mud deposits revealed no macroinvertebrate fauna. No fish were observed in this section. Sewage fungus was noted on the rocks within the stream.

Section B

Numerous sections of the stream are bridged and culverted through the town. These include several level changes within the watercourse would obstruct migrating and non migrating fish within the watercourse. These would be particularly important refuges within during spells of hot weather due to the lack of tree cover. The obstruction in in Plate 3 would obstruct the movement of salmonids and other migratory fish species within the watercourse.



Plate 2. Bridge located at the downstream end of Section C

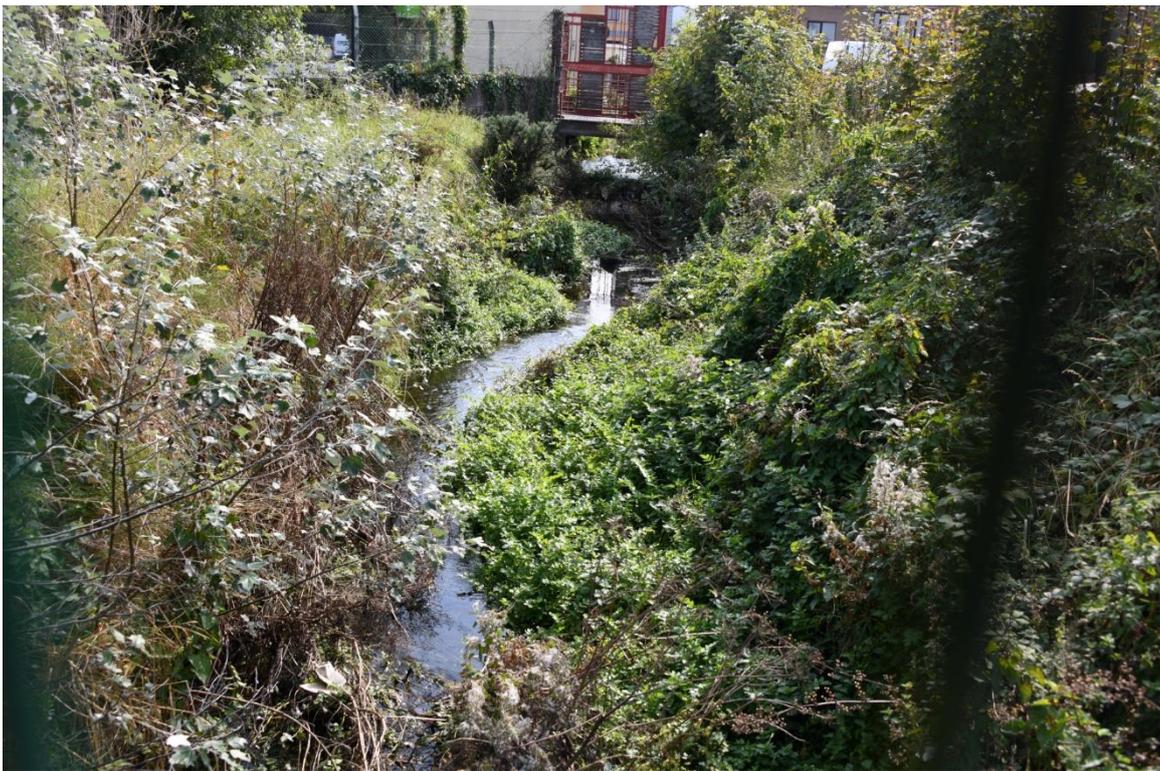


Plate 3. Bridge within the town with a 30cm high weir.

Section C



Plate 4. Section C

This section of stream is located in the southern end of Ballyhale. Just prior to this section the stream evenly splits with one section of the stream going north, to the west of the town and the other section of the stream going east and then north through the worn. It is highly likely that the widening of the stream in this area to approx. 3m, the lower flow and the organic enrichment upstream has resulted in a dense mat of watercress (*Nasturtium officinale*) which would impact on fish migration within the watercourse. No fish were observed in this section.

Section D



Plate 5. Section D showing discharge pipe from bank.

Much of the open water sections within the village were similar in nature. Throughout the village there is very little tree cover and there is dense instream vegetation to either side of the main stream channel. Very localised and small shoals of three-spined Stickleback (*Gasterosteus aculeatus*) were observed in the vicinity of the instream vegetation, but no salmonids were observed. Plant species included watercress (*Nasturtium officinale*), dropwort (*Oenanthe crocata*) and brooklime (*Veronica beccabunga*). The area to the west of the town Plate 6 is bordered by agricultural grassland.



Plate 6. Section D to the west of Ballyhale (area of increased waterflow as a result of the works.)

Section E



Plate 7. Section E.

Downstream of Ballyhale just prior to and where the watercourse enters the SAC is a very good example of salmonid habitat. Just downstream of the bridge juvenile salmonids were noted in this section and although they were not observed it, would be expected that freshwater crayfish would be present in this area, given the history of the species downstream. Otter spraints were also noted in this area. The area is slightly tunnelled but the depth of the water and gravel features would indicate that this is an important area for local biodiversity and would be sensitive to impact from works. The pool located in this area appears to have been caused by scouring following the water exiting the culvert, with increased velocities. However, it does indicate that should salmonid enhancement measures and design elements be put in place on this stream a significant improvement in instream biodiversity would be seen.

Section F



Downstream of Section E the watercourse travels very tightly beside a series of industrial units with several what appear to be surface water discharges. In this area the stream is primarily heavily tunnelled which provides a biodiversity corridor for species such as otter but also results in poor in stream vegetation and cover for biodiversity. Areas of the stream in this section are slightly silted. However, much of the bed of the stream consists of exposed gravels. No instream macrofauna was observed in this section. However, based on the previous records Freshwater crayfish and salmonids would be expected in this area. Of note within this section is the Ballyhale-Knocktopher Urban Wastewater Treatment plant which carried out secondary treatment. Overall compliance in this WWTP is a “pass”.

An assessment of the potential impact of the WWTP on the River Barrow and River Nore SAC was carried out in 2010⁵. It states that “*Of the Annex I habitats listed above, only floating river vegetation occurs within 1 km downstream of the discharge and is therefore considered to be the only Annex I habitat that could potentially be affected to any significant degree.*”

The habitat quality and records indicate that the stream would support, Atlantic salmon (*Salmo salar*), brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*) requirements for spawning, nursery and adult habitat. In addition, the watercourse supports otter (*Lutra lutra*) and crayfish (*Austropotamobius pallipes*). Signs of otter activity were noted.

⁵ http://www.epa.ie/licences/lic_eDMS/090151b2804a831b.pdf