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APPENDICES

Appendix 6-1

Bat Survey

6 Biodiversity

6.1 Introduction

This chapter assesses the biodiversity value of the proposed development area and the potential impacts of the development on the ecology of the surrounding area and within the potential zone of influence (ZOI). Standard construction and operational phase mitigation measures, in addition to monitoring measures are proposed, to minimise potential impacts of the proposed works and to improve the biodiversity potential of the proposed development site post construction.

This chapter of the EIAR has been prepared by Bryan Deegan of Altermar Limited. Altermar Ltd. is an established environmental consultancy that is based in Greystones, Co. Wicklow that has been in operating in Ireland since 2001.

Bryan Deegan MCIEEM is the Managing Director of Altermar Ltd. and holds a M.Sc. Environmental Science, BSc (Hons.) in Applied Marine Biology and a National Diploma in Applied Aquatic Science. He has over 26 years' experience as an environmental consultant in Ireland and was the ecologist for all aspects of this project.

Previous projects where Altermar were the lead project ecologists include the Lidl Ireland GmbH regional distribution centres in Newbridge and Mullingar, 18 airside projects for daa at Dublin Airport and 7 fibre optic cable landfalls in Ireland including the New York to Killala cable project in 2015. He is a competent expert in accordance with the EIA Directive 2014/52/EU.

The programme of work in relation to biodiversity assessment was designed to identify and describe the existing ecology of the area and detail designated sites, habitats or species of conservation interest that could potentially be impacted by the proposed development. It also assesses the significance of the likely impacts of the scheme on the biodiversity elements, and designs mitigation measures to alleviate identified impacts.

A separate AA Screening/Natura Impact Statement, in accordance with the requirements of Article 6(3) of the EU Habitats Directive, has been produced to identify potential impacts of the development on Natura 2000 sites, Annex species or Annex habitats. It concludes that "*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 mitigation measures, primarily as a result of direct hydrological connection to the Natura 2000 site via the proposed works and downstream impacts from the project during the enabling, in-stream, construction and drainage 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.

Following the implementation of mitigation measures in relation to preventing downstream impacts from the proposed works *“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. In combination effects have been excluded.”*

6.2 Assessment Methodology

This assessment was carried out in accordance with best practice methodology as noted below.

- EPA 2022 Guidelines and EC Guidance on EIAR
- The European Commission’s “Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment” (2013)
- The Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report, European Commission, 2017
- CIEEM (Chartered Institute of Ecology and Environmental Management) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine, CIEEM 2018

A pre-survey biodiversity data search was carried out. This included examining records and data from the National Parks and Wildlife Service (NPWS), National Biological Data Centre (NBDC) and the Environmental Protection Agency (EPA), in addition to aerial, 6 inch maps and satellite imagery. A habitat survey of the site was undertaken within the appropriate seasonal timeframe for terrestrial fieldwork. Field surveys were carried out as outlined in Table 6.2. All surveys were carried out in the appropriate seasons.

Table 6-1:Field Surveys

Area	Surveyors	Survey Dates
Terrestrial Ecology	Bryan Deegan (MCIEEM) of Altemar	19 th September 2020, 3 rd April 2022
Bat Fauna	Dr Tina Aughney of Bat Eco Services	<i>Static Surveillance – 4 units, 3 nights Dusk Surveys – 13/9/2020 (2 surveyors), 14/9/2020 (2 surveyors) – included walking transects on both nights. Dawn</i>

Area	Surveyors	Survey Dates
		<i>Survey – 14/9/2020 (2 surveyors) Daytime Surveys – Bridge inspections, Tree inspections</i>
Aquatic Ecology	Bryan Deegan (MCIEEM) of Altemar	19 th September 2020, 3 rd April 2022
Mammal Survey	Bryan Deegan (MCIEEM) of Altemar	March 26 th 2020, 3 rd April 2022

Desk studies were carried out to obtain relevant existing biodiversity information within the ZOI. As outlined in CIEEM (2018) The ‘zone of influence’ for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries.’ In line with best practice guidance an initial zone of influence should be set at a radius of 2km for non-linear projects (IEA, 1995). However, there is a watercourse within the proposed development site that involves instream works. As a result, the potential ZOI extends beyond the site, with the potential for hydrological impacts to extend the ZOI beyond the site outline via the watercourse. In relation to the ZOI as a result of the watercourse works this was extended to 10km. Details of the proposed development are seen in Chapter 5 of the report. The proposed works and landscape design were reviewed to inform this assessment.

6.2.1 Proximity to designated conservation sites and habitats or species of conservation interest

The designated conservation sites within 15km of the site were examined for potential impact (Table 6-2a and 6-2b). No additional designated Natura 2000 sites are located downstream from the proposed works. This assessment included sites of international importance; Natura 2000 sites (Special Areas of Conservation (SAC), Special Protection Areas (SPA)) and Ramsar sites and sites of National importance ((Natural Heritage Areas (NHA), proposed Natural Heritage Areas (pNHA)). Up to date GIS data (2022 NPWS data shapefiles) were acquired and plotted against 1, 5, 10 and 15km buffers from the proposed development site. Available datasets of rare and threatened species within 10km of the proposed site (GIS shapefile) was provided by NPWS. Additional information on rare and threatened species was researched through the National Biodiversity Data Centre maps. Works are proposed to the watercourse on site and there is a direct hydrological pathway to Natura 2000 sites (River Barrow and River Nore SAC and River Nore SPA) via the Ballyhale River. This watercourse outfalls to the Little Arrigle River, which in turn outfalls to the River Nore, then the River Barrow, and ultimately outfalls to the marine environment at Waterford Harbour. Therefore, an AA

Screening/Natura Impact statement was carried out for the project and is included with the supporting documentation for this application.

6.2.2 *Terrestrial and Avian Ecology*

A pre-survey data search was carried out. This included a literature review to identify and collate relevant published information and ecological studies previously conducted and comprised of information from the following sources; the National Parks and Wildlife Service, NPWS Rare and Protected Species Database, National Biodiversity Data Centre, EPA WMS watercourses data, in addition to aerial, 6 inch, satellite imagery. Following the desktop study, walk-over assessments of the site were carried out on the 19th September 2020, March 26th 2020 and 3rd April 2022. Surveys were carried out by means of a thorough search within the potential ZOI. The presence of mammals is indicated principally by their signs, such as resting areas, feeding signs or droppings - though direct observations are also occasionally made. Habitat mapping was carried out according to Fossitt (2000) based on Smith (2011) Best Practice and Guidance for Habitat Surveying and Mapping using ArcGIS 10.5 and displayed on Bing satellite imagery or street mapping. Any rare or protected species or habitats were noted.

6.2.3 *Bat Fauna*

The bat fauna survey is detailed in Appendix 6.1. The bat survey involved a combination of passive static bat detector survey (4 static detector units, 3 nights), dusk and night time detector and walking transect surveys (13/9/2020 (2 surveyors), 14/9/2020 (2 surveyors), dawn surveys (14/9/2020 (2 surveyors)) and daytime Surveys which included bridge inspections and tree inspections.

6.2.4 *Difficulties Encountered*

No difficulties were encountered in relation to the preparation of the Biodiversity report. The surveys were undertaken within the optimal survey season. No difficulties were encountered during the preparation of the EIAR.

6.3 Consultation

Consultation was carried out with the project team and Inland Fisheries Ireland (IFI) in addition to the National Parks and Wildlife Service (NPWS) in relation to the options and proposed design.

The stream running to the south and through Ballyhale site is the Ballyhale (or Knockwilliam) Stream, a tributary of the River Little Arrigle. Consultation was carried out with Inland Fisheries

Ireland in October and November 2020, specifically in relation to the conservation value of the stream and the proposed works. Initial consultation with Inland Fisheries Ireland indicated that despite the stream being relatively small it is a salmonid catchment, and this section of stream is likely to have a stock of salmonids. Inland Fisheries Ireland stated that it would be their preference to divert the watercourse in one single large channel with no overflows during floods. However, they were cognisant of the fact that there may be existing discharges to the stream within the village and some flows in these routes would also need to be maintained. In the event of overflow channels being used in flood situations the potential impacts on the overflow mechanism e.g. weir and channel, full assessment on the potential impact on biodiversity including migratory fish species during flood situation and normal stream operation would need to be assessed. Migration of fish including salmonids must not be impacted negatively by the works. Donnachadh Byrne, Senior Fisheries Environmental Officer undertook a site visit in November 2020. Additional meetings took place with Inland Fisheries Ireland in mid 2022 in relation to the design of the enhancement measures and rock ramp.

NPWS were consulted in relation to the proposed options assessment. On the 23rd October 2020 they stated the following in relation to ecology assessments:

“Design of the flood bypass channel must ensure that the overflow channel does not form a trap for migrating fish species, does not lead to reduced flow in the Ballyhale stream causing an access barrier for fish and other aquatic species and does not lead to the spread of invasive species.”

“The hydrological impacts of the project, including impacts of flow diversion, directly and indirectly, on the River Barrow and River Nore SAC (Site Code 2162) and its qualifying interests must be assessed. The potential for medium to long term impacts on water quality from flow diversion must also be assessed.”

“It is advised that the Appropriate Assessment may not have lacunae and must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the hydrological effects of the proposed project would adversely affect the integrity of the River Barrow and River Nore SAC.”

“Qualifying interest species of the River Barrow and River Nore SAC include the following aquatic species: Atlantic salmon, brook lamprey, sea lamprey, river lamprey, twaite shad and white-clawed crayfish. As outlined in the Natura Impact Statement For River Basin (15) Nore Flood Risk Management Plan (2018), the impacts to these species must be assessed and surveys should be undertaken by appropriately qualified ecologists to identify any important habitat in the vicinity of FRM works or directly downstream of the AFA, and any potentially significant impacts on these areas.”

“The impacts to the Annex 1 habitats ‘Water courses of plain to montane levels with the Ranunculus fluitantis and Callitriche-Batrachion vegetation’ and ‘Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)’ must also be assessed. Surveys should inform option design and design-specific mitigation.”

“Otter is a qualifying interest species of the River Barrow and River Nore SAC. Otter territories can be over 13km in length along watercourses and therefore otter will be found both within and outside this SAC. Appropriate Assessment must examine implications of the project for species such as otter, outside a site, provided that those implications are liable to affect the conservation objectives of the site. Effects of the project on otters, including ongoing drainage maintenance, must be assessed in the AA.”

“The proposed project lies upstream of the River Nore SPA for Kingfisher. The Ecological Survey carried out as part of the Ballyhale Local Area Plan notes the presence of Kingfisher on the Ballyhale Stream. It is recommended that AA identifies potential impacts on to the conservation objectives for this species and provides appropriate mitigation, if required.”

“The Natura Impact Statement for the Nore 2018¹ states ‘Works should only be carried out after a method statement, detailed plans and timing of works have been agreed with the National Parks & Wildlife Service and Inland Fisheries Ireland.’

6.4 Baseline Environment

6.4.1 Zone of Influence

The potential ZOI of the project was deemed to be the area within the site outline (including works areas and compounds), within 150m from the outline for mammals and terrestrial species with potential for downstream impacts on the Ballyhale River, Little Arrigle River, River Nore, River Barrow, and the Natura 2000 sites (River Barrow and River Nore SAC and River Nore SPA) in the absence of standard construction phase controls or, mitigation measures. This site outline is shown in figure 6-1.

6.4.2 Designated Sites

As can be seen from Figures 6-2 (SAC's within 15km), 6-3 (SPA's within 15km), 6-4 (NHA (none) and pNHA within 15km), 6.5 (Watercourses proximate to the site.) in addition to Tables 6-2a and

¹ https://s3-eu-west-1.amazonaws.com/docs.floodinfo.opw/floodinfo_docs/SouthEastern_CFRAM/UOM15/09_NaturalImpactStatement/NIS_Final2018_RiverBasin_15.pdf

Table 6-2b there is a direct pathway to designated sites (Natura 2000 sites and pNHA's) from the proposed works.

Table 6-2a: Natura 2000 sites within 15km of the proposed development

Natura 2000 Site	Distance	Direct Hydrological / Biodiversity Corridor
Special Areas of Conservation (SAC)		
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 Areas (SPA)		
River Nore SPA	5.3 km	Yes

Table 6-2b: National designated sites within 15km of the proposed development

Designated Site	Distance	Direct Hydrological / Biodiversity Corridor
Proposed Natural Heritage Area		
Kilkeasy Bog	3.2 km	No
Hugginstown Fen	4.1 km	No
Thomastown	5.9 km	Yes
Mount Juliet	7.5 km	No
Inistioge	9.2 km	Yes
Ice House, Near Inistioge, Co. Kilkenny	10.1 km	Yes
Murphy's Of The River	10.7 km	Yes
Brownstown Wood	12 km	No
Rathsnagadan Wood	12.3 km	Yes
Garryrickin Nature Reserve	13.4 km	No
Kylecorragh Wood	13.8 km	Yes



Figure 6.1 – Proposed Development Site

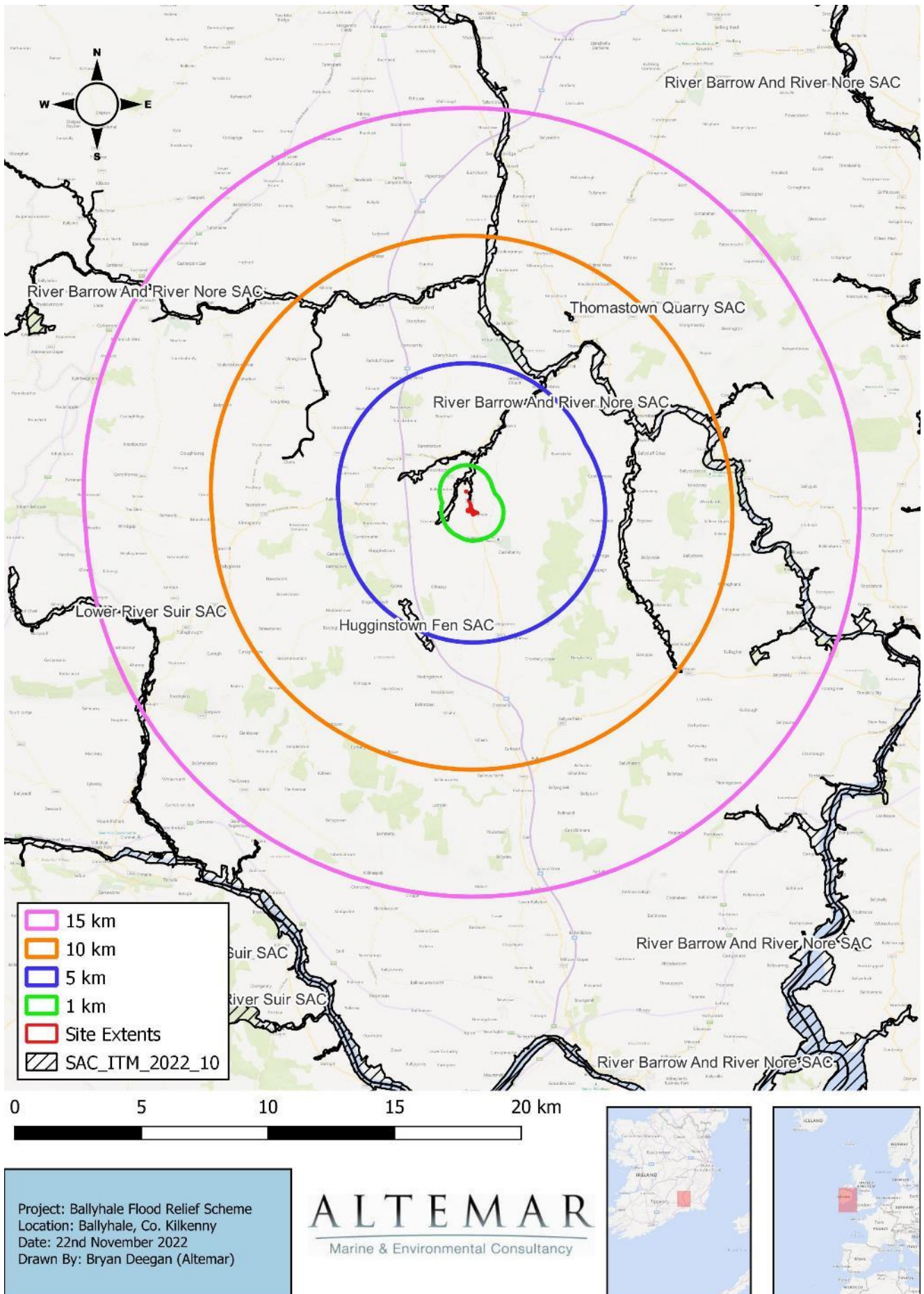
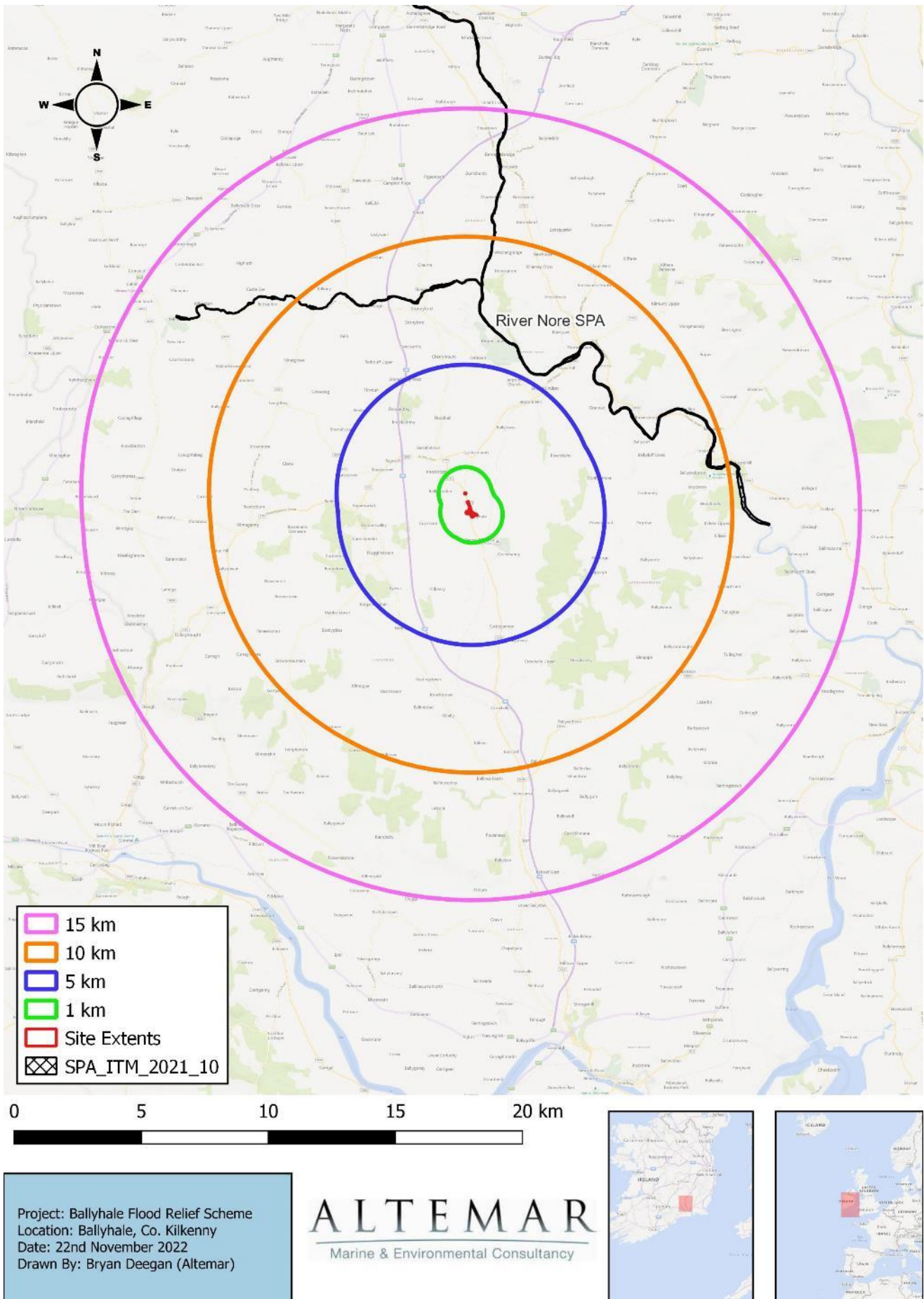


Figure 6.2 – Special Areas of Conservation within 15km.



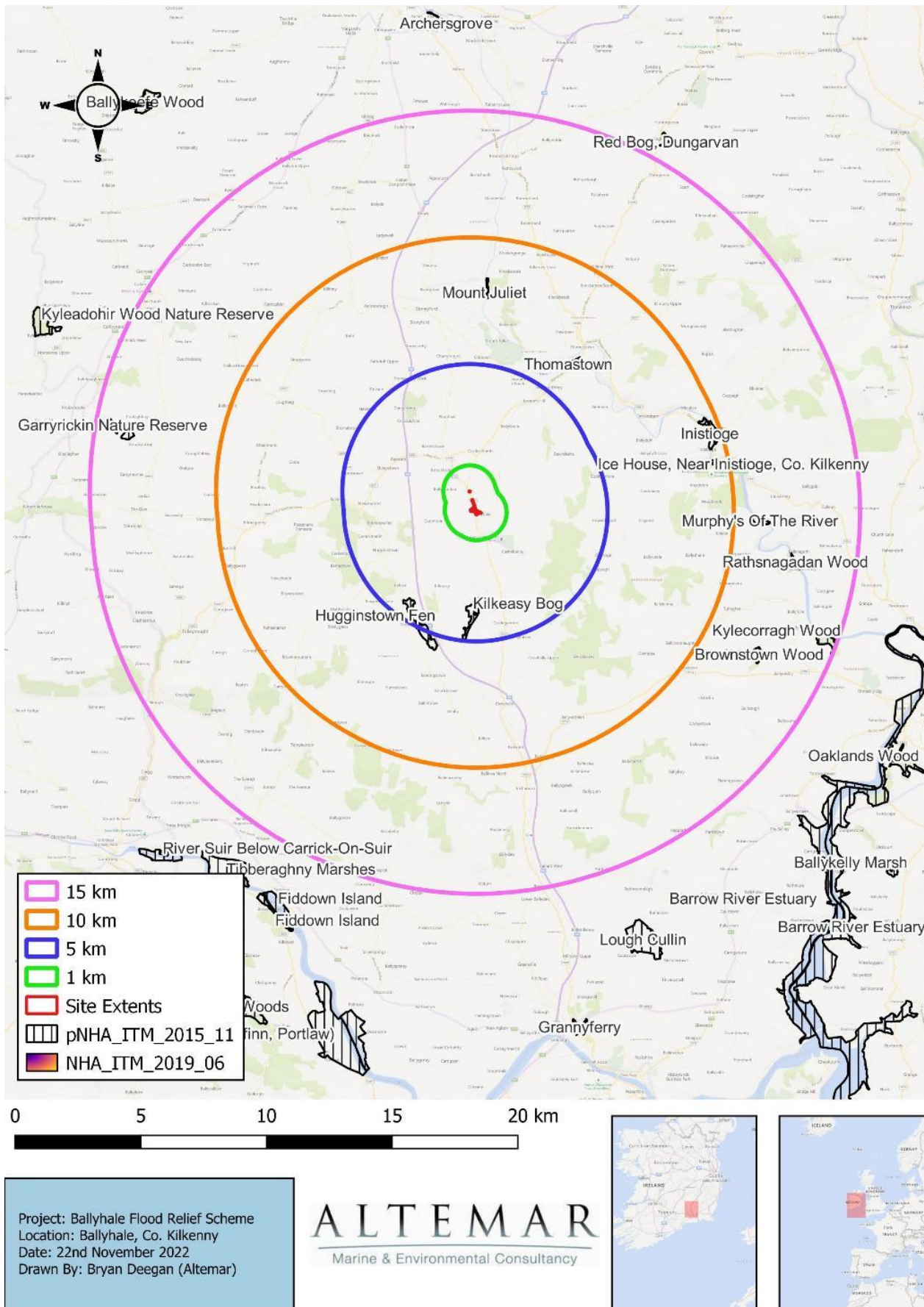


Figure 6.4 – Natural Heritage Areas (None) and proposed Natural Heritage Areas within 15km.



Figure 6.5 – Waterbodies proximate to the proposed development site

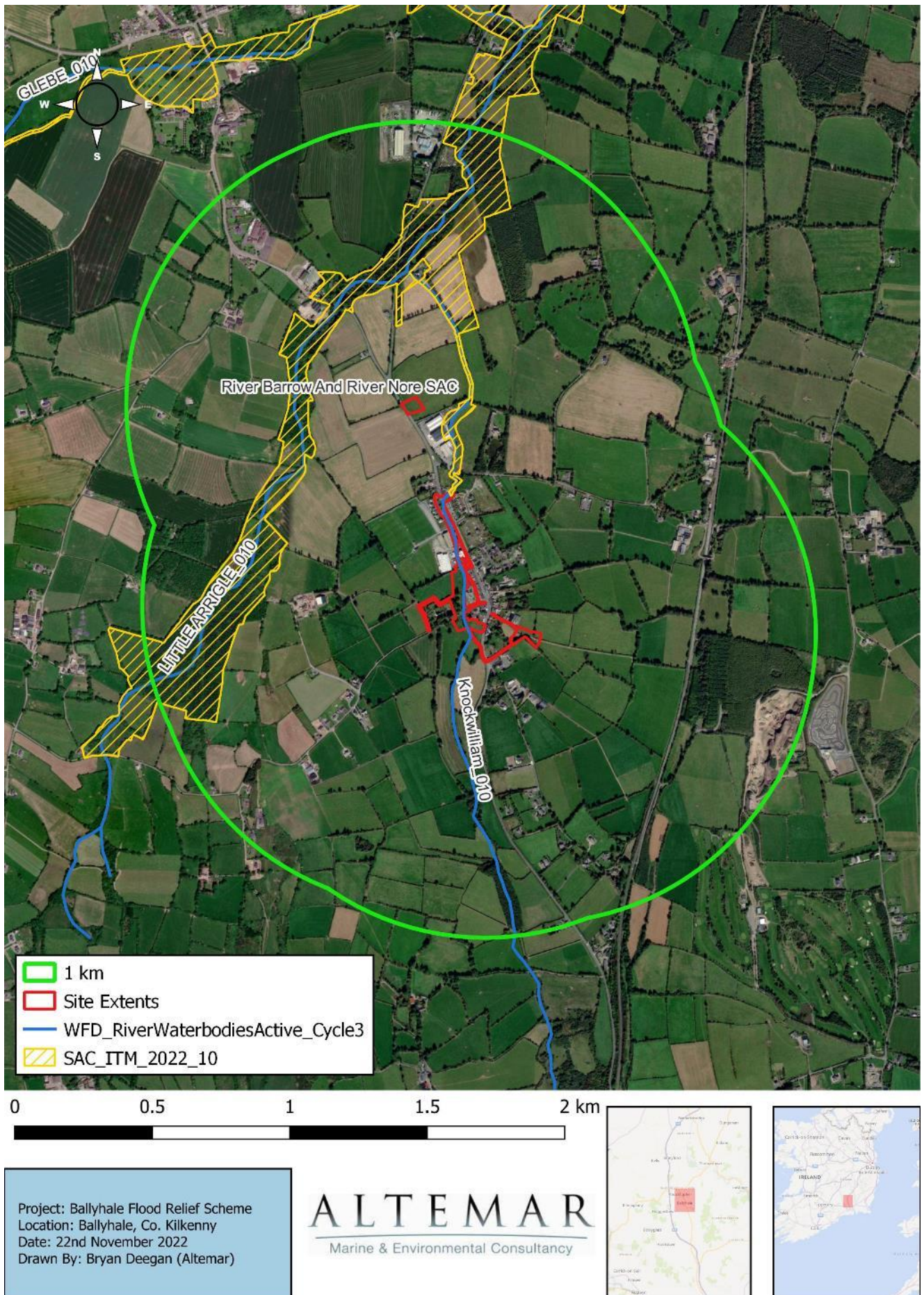


Figure 6.6 – Waterbodies and SACs proximate to the proposed development site



Figure 6.7 – Waterbodies within 1km of the proposed development site

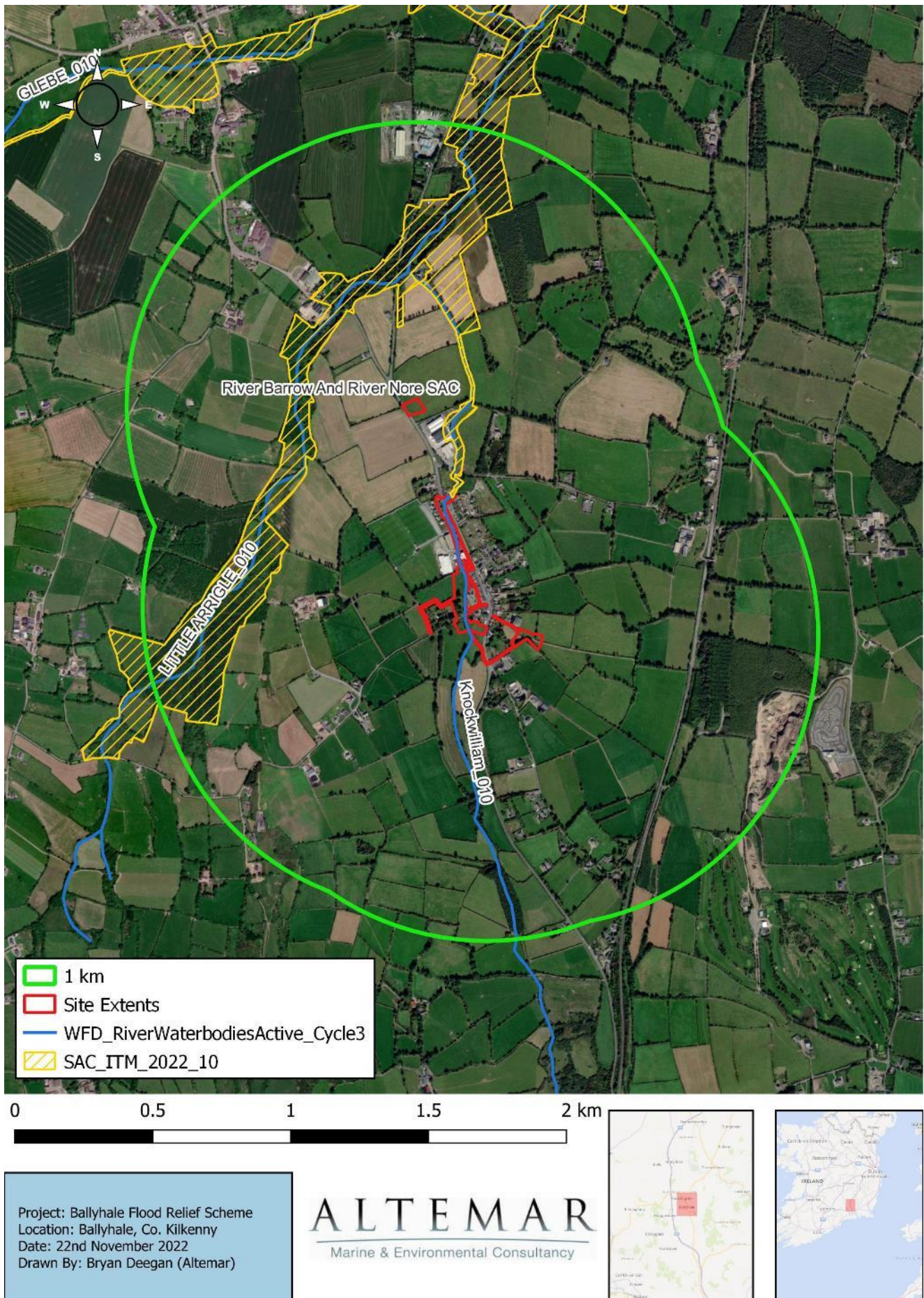


Figure 6.8 – Waterbodies and SACs within 1km of the proposed development site

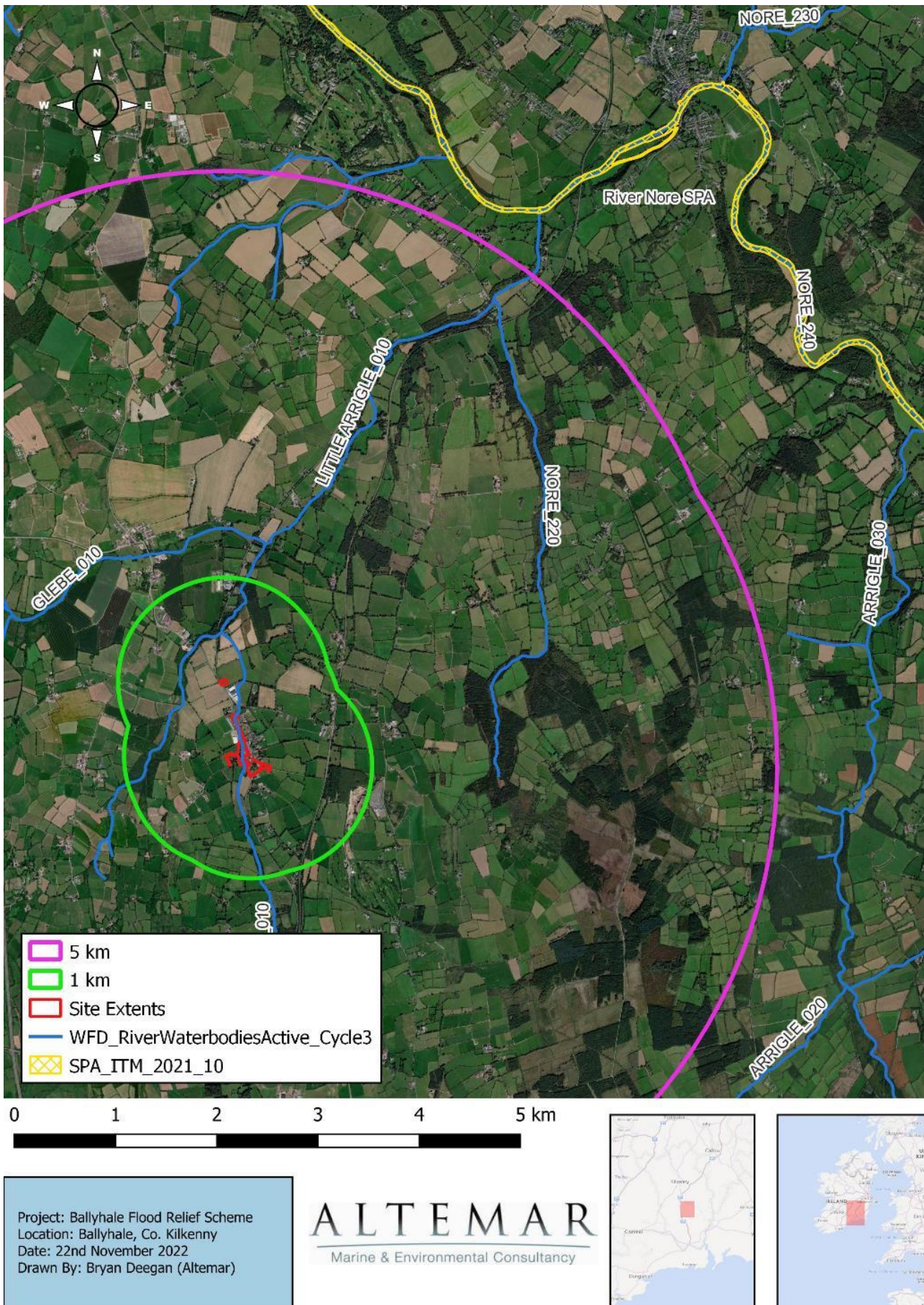


Figure 6.9 – Waterbodies and SPAs within 5km of the proposed development site

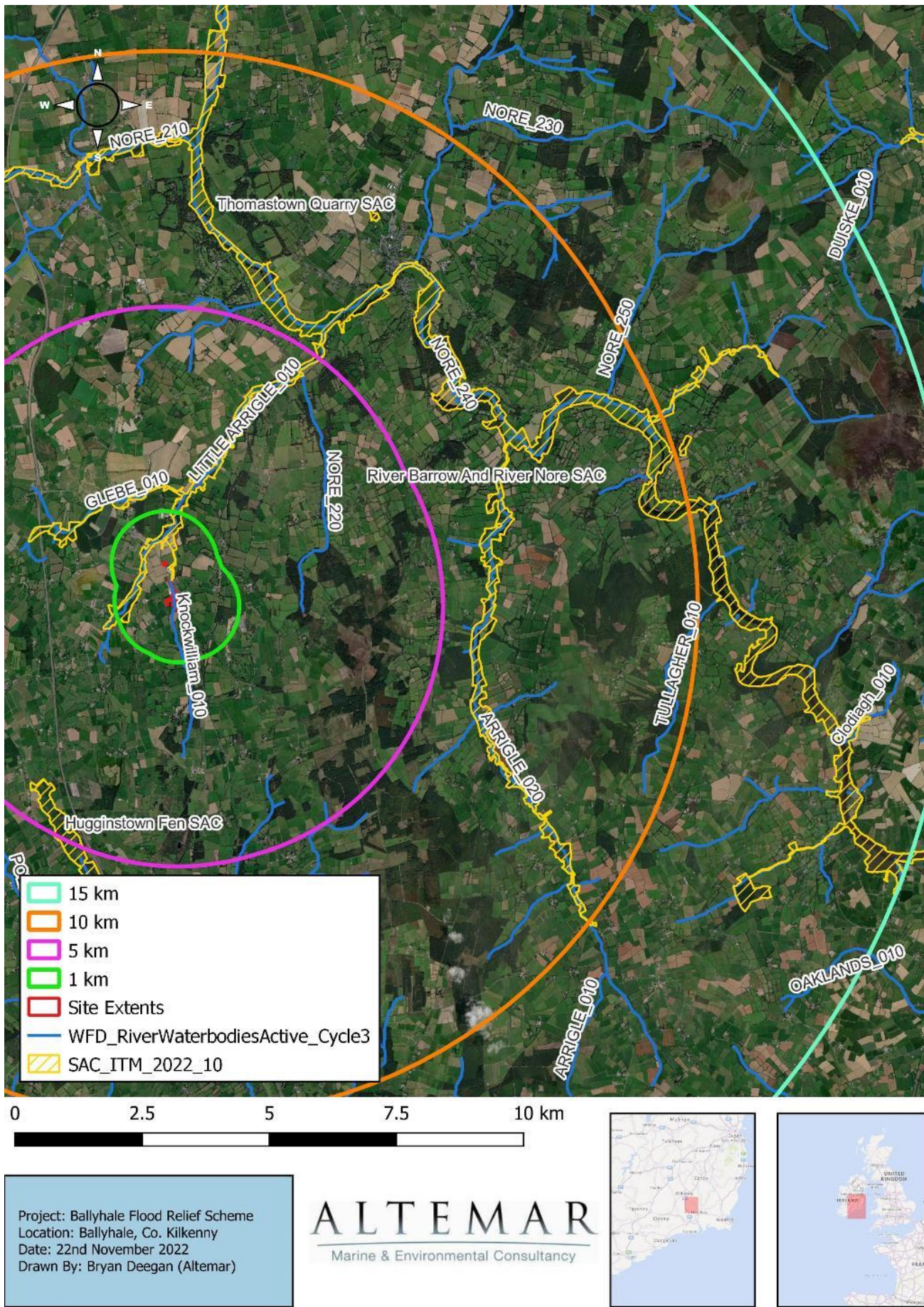


Figure 6.10 – Waterbodies and SACs within 15km of the proposed development site

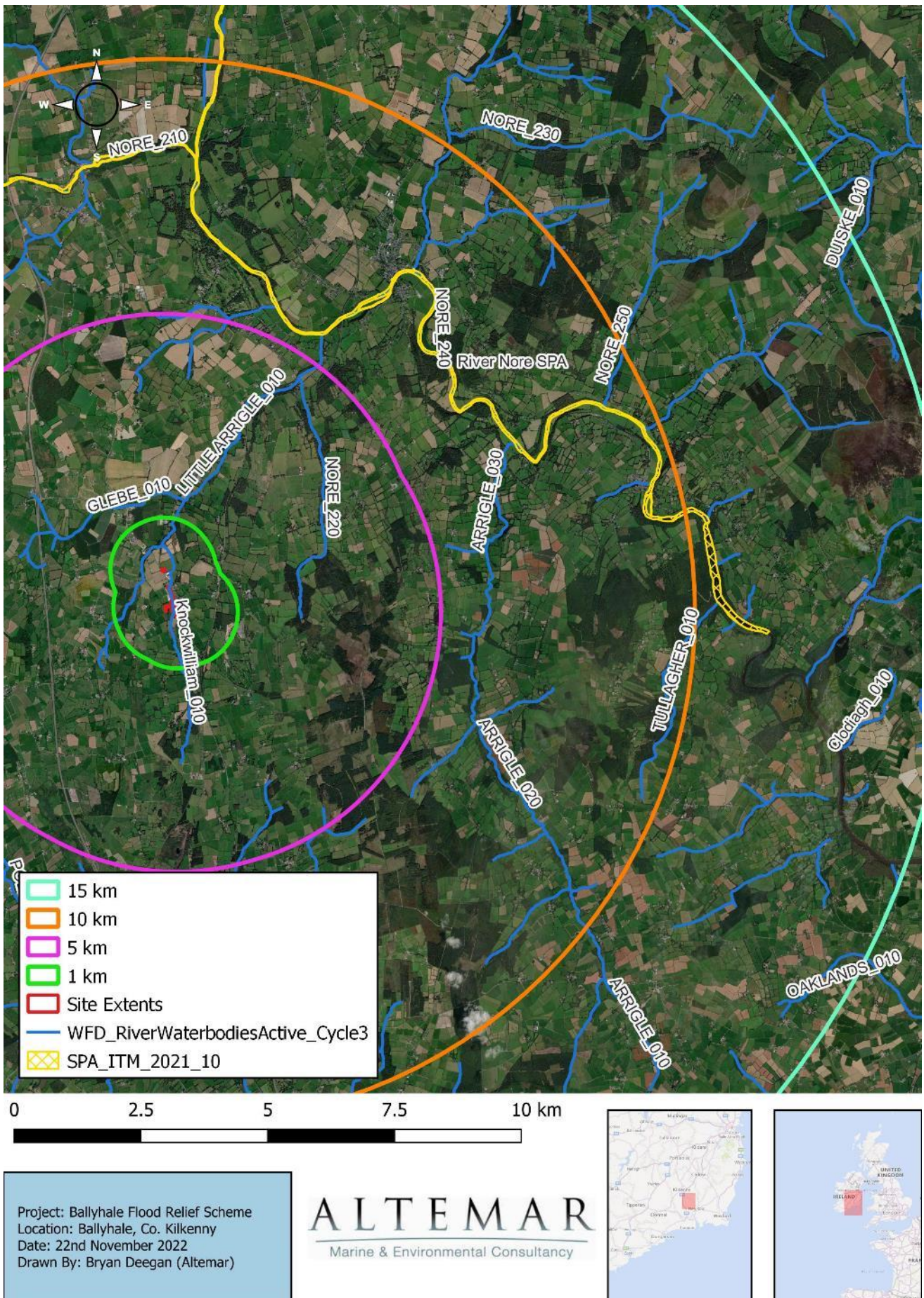


Figure 6.11 – Waterbodies and SPAs within 15km of the proposed development site

6.4.3 Species Data

It should be noted that no species of conservation importance were recorded on site, based on NPWS and NBDC records as fine resolution. Species recorded within the 2km² grid are included in Table 6.3

Table 6-3: 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)

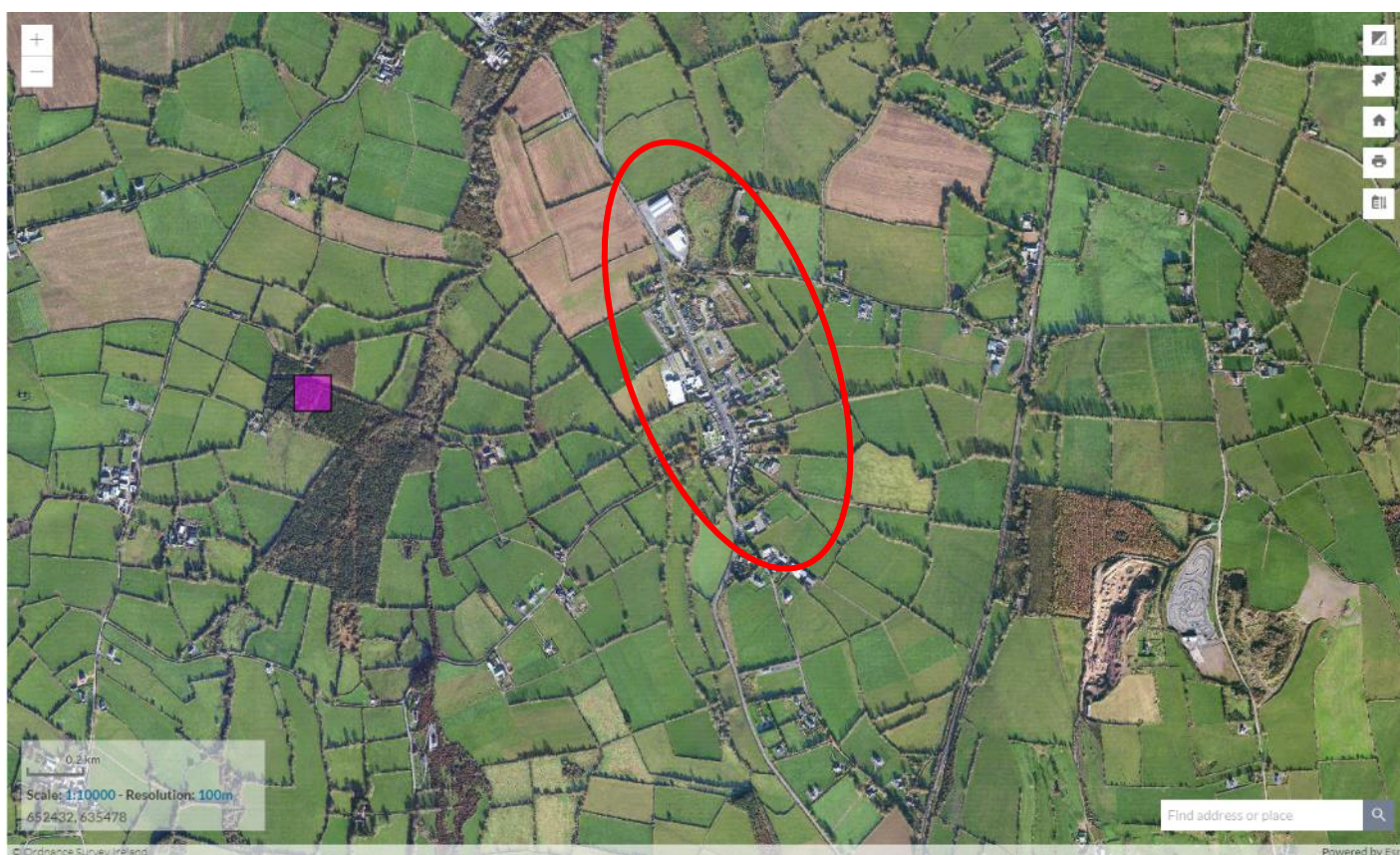


Figure 6.12 – Otter (*Lutra lutra*) (purple) (Source NBDC) (Site – red circle)



Figure 6.13 – Freshwater Crayfish (*Austropotamobius pallipes*) (yellow) (Source NBDC) (Site – red circle)



Figure 6.14 – Freshwater Pearl Mussel (*Margaritifera (Margaritifera) margaritifera*) (purple) (None) (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 0.8km 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.

As can be observed in Figure 6.14, there have been no recordings of Freshwater Pearl Mussel (*Margaritifera (Marga ritifera) Margaritifera*) in close proximity of the proposed development site. It should be noted that no species of conservation importance have been noted within the site outline.

Table 6-4: 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 subsp. 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 (Marga ritifera) Margaritifera*) sensitive area, as demonstrated in Figure 6.15. However, as demonstrated in Figure 6.14 and within both NBDC and NPWS data, there are no specific recordings of Freshwater Pearl Mussel (*Margaritifera (Marga ritifera) Margaritifera*) located proximate to the subject site.

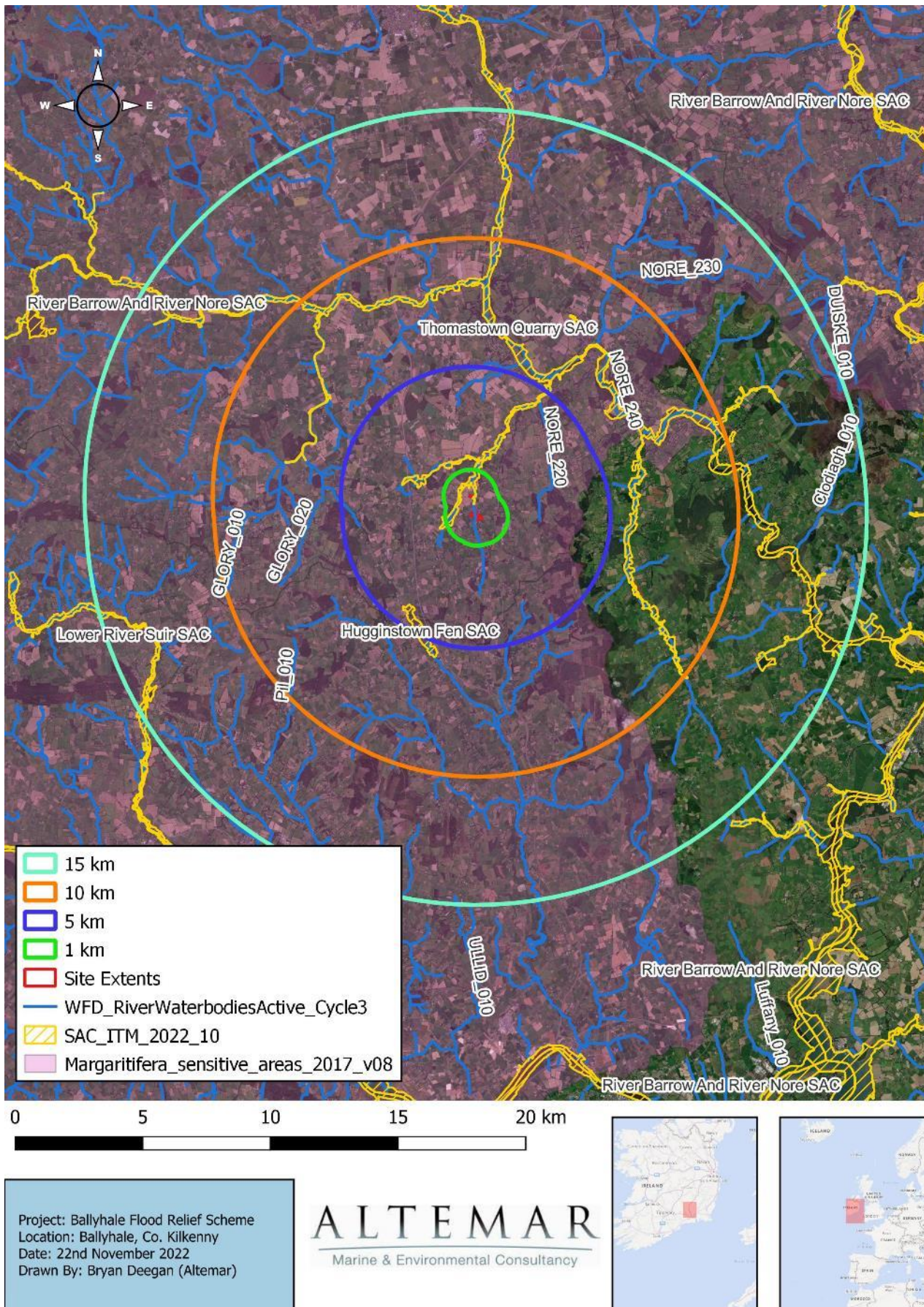


Figure 6.15 – Watercourses, SACs and the subject site within designated Freshwater Pearl Mussel (*Margaritifera Margaritifera*) sensitive areas

6.5 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 6.16) Habitats within the proposed development site were classified according to Fossitt (2000) (Figure 6.17). Results of bat surveys are seen in Appendix 6.1.

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 with strong vegetative growth at the site. 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*). 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 6.16). These were differentiated primarily by the nature of the riparian zone and stream. Overall, the instream macrophyte flora was dense in 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.

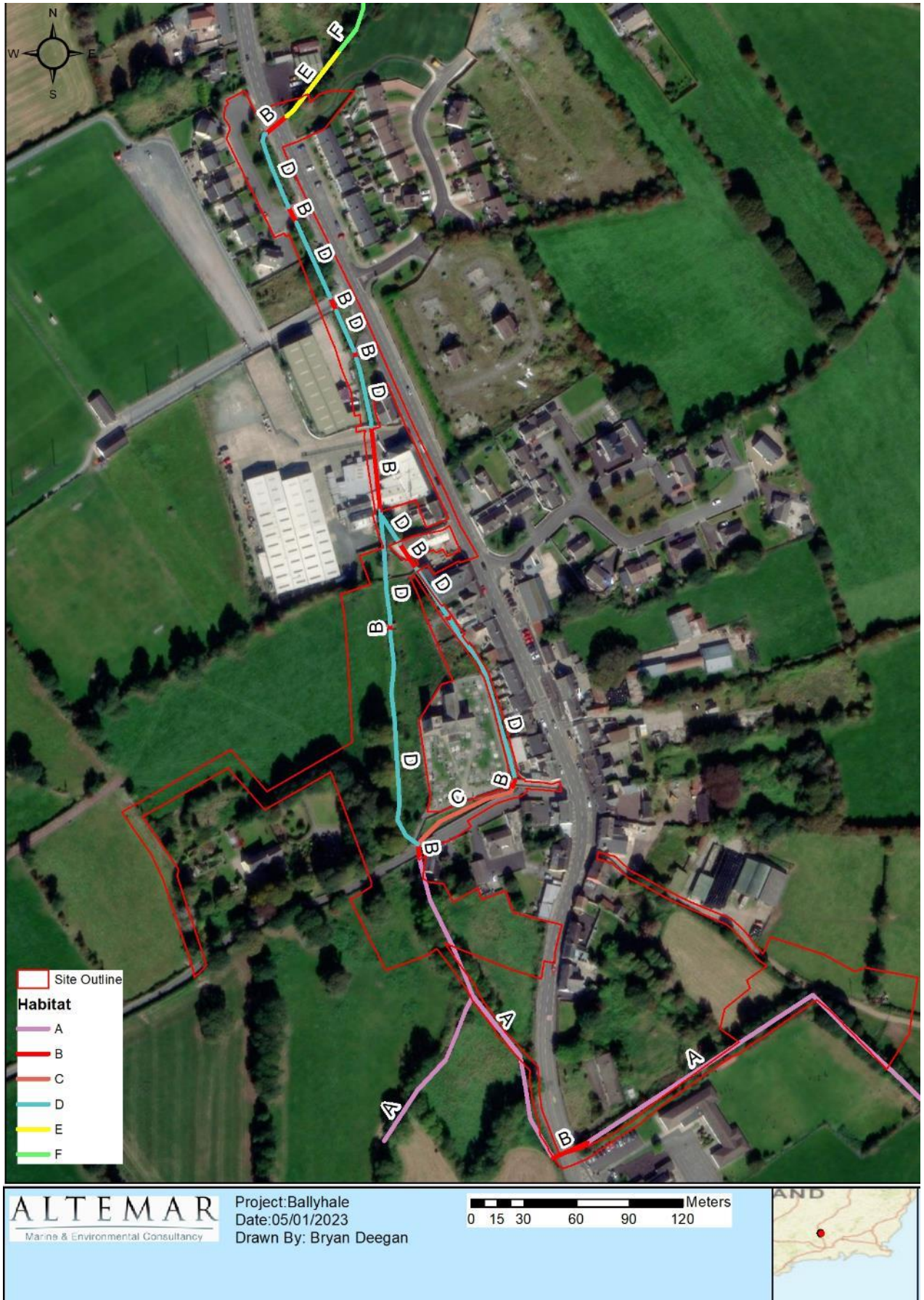


Figure 6.16. Stream Habitats in the vicinity of Ballyhale.

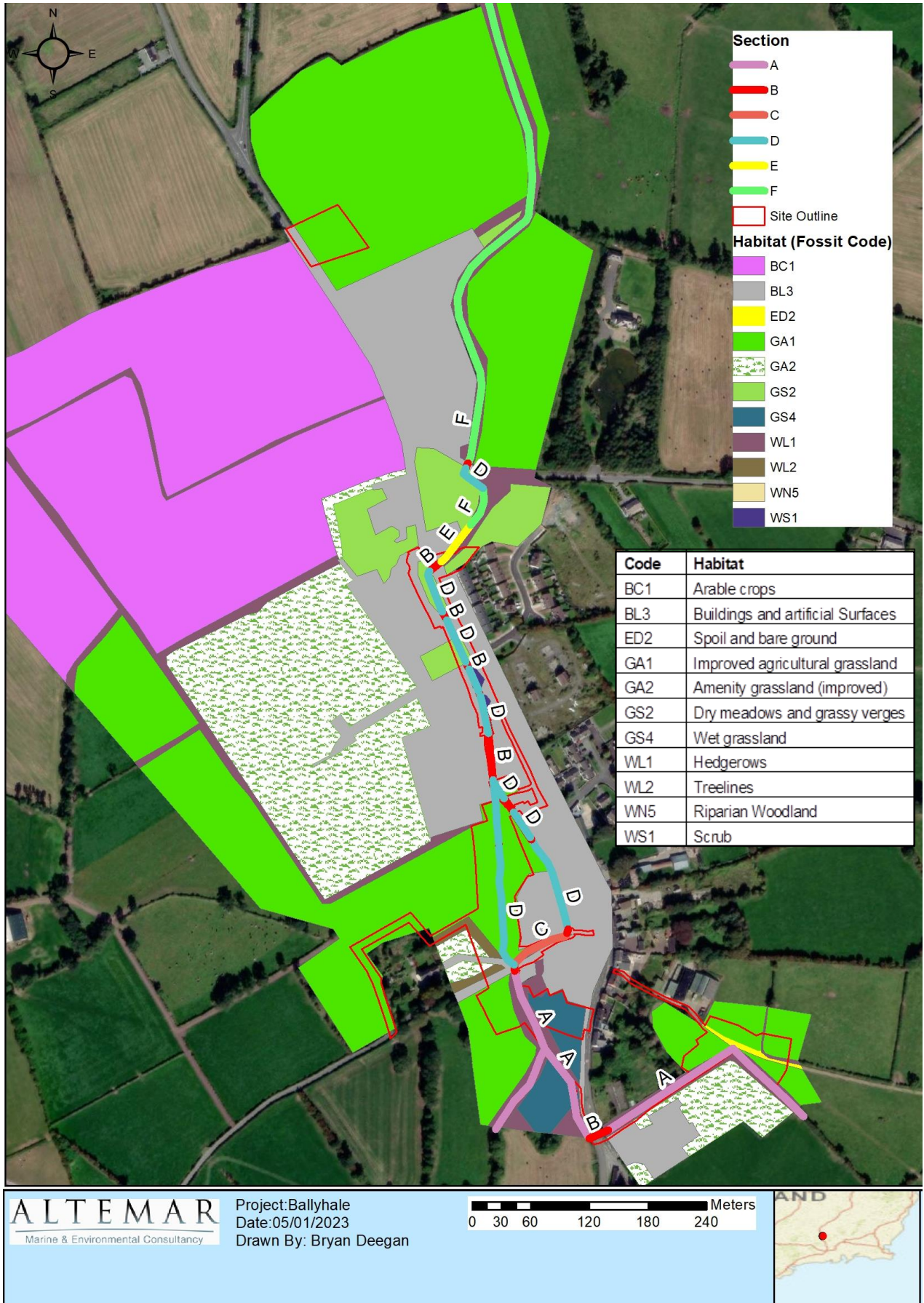


Figure 6.17 Fossitt (2000) Habitats and watercourse sections

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 which would obstruct migrating and non migrating fish within the watercourse. The bridges / culverts are particularly important refuges during spells of hot weather due to the lack of tree cover. The obstruction in Plate 3 obstructs the movement of salmonids and other migratory fish species within the watercourse.

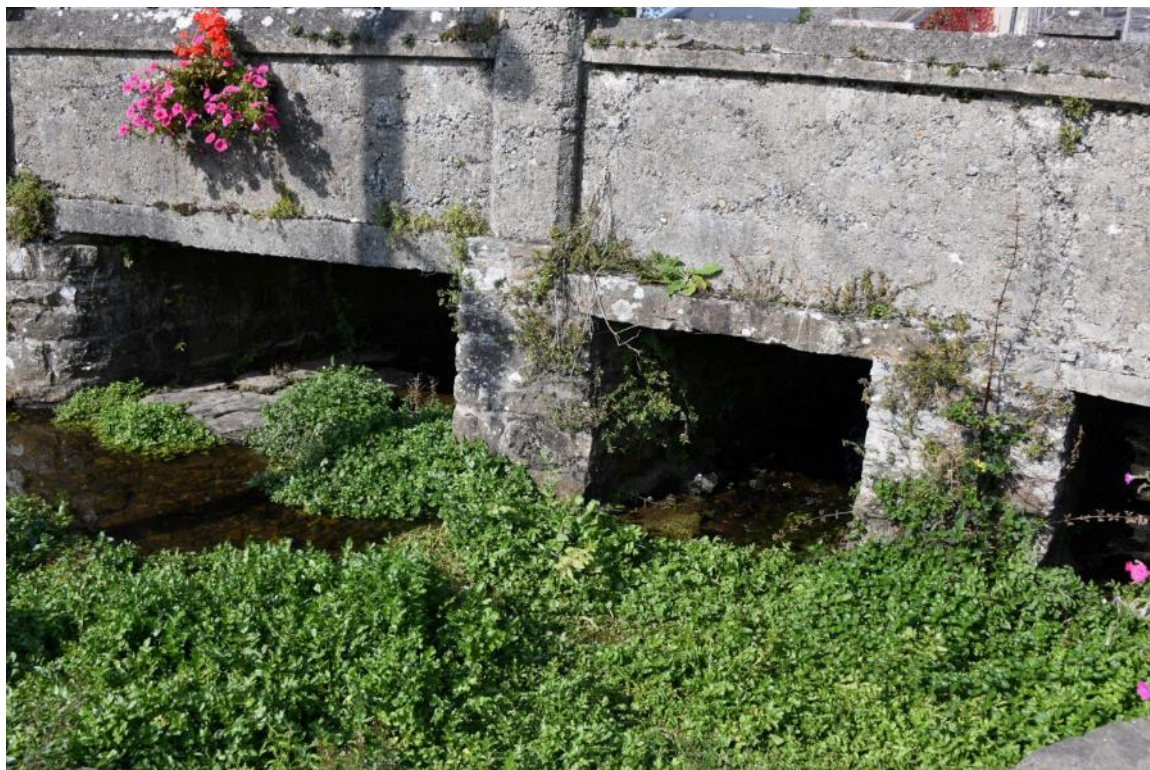


Plate 2. Bridge located at the downstream end of Section C



Plate 3. Bridge within the town with a 30cm high weir (yellow oval).

Section C



Plate 4. Section C

This section of stream is located in the southern end of Ballyhale. Just upstream of 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 town. 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 impacts 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 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 is be sensitive to impact from works. The pool located in this area appears to have been caused by scouring from 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 could be seen.

Section F



Plate 8. Section F.

Within Section F, the watercourse travels very tightly beside a series of industrial units, with several of 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 and discharges to the watercourse. Overall compliance in this WWTP is a “pass”. The discharge point for the WWTP is downstream of the Kiltorcan Business Park which is at the edge of Ballyhale and downstream of any proposed works.

An assessment of the potential impact of the WWTP on the River Barrow and River Nore SAC was carried out in 2010². 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.*”

² http://www.epa.ie/licences/lic_eDMS/090151b2804a831b.pdf

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.

Bats

'The following bat species were recorded during this bat survey: common pipistrelle, soprano pipistrelle, Leisler's bat, Daubenton's bat, brown long-eared bat and Natterer's bat. This represents six of the nine resident bat species known to Ireland. Three of the bat species recorded were common pipistrelle, Leisler's bat and soprano pipistrelle and these are the three most common bat species in Ireland. The remaining three bat species are less common but are associated with specific habitats'. 'The Daubenton's bat, considered to be a water specialist, was not recorded on the Ballyhale River flowing through the village of Ballyhale. This is likely due to the fact that there is little clear water free of vegetation and due to the high level of light pollution from street lights. This species was recorded along the dark areas of treelines to the west of the village. This was also the case for Natterer's bats and brown long-eared bats. All of these three bat species are light sensitive and therefore avoid the village of Ballyhale. While the three common bat species (common pipistrelle, soprano pipistrelle and Leisler's bats) are bat species that can tolerate artificial street lighting and therefore were recorded foraging and commuting in the village environs.'

6.6 Characteristics of the Proposed Development

The Flood Relief Scheme consists of a range of interventions along the watercourse reach. The general intent of the Flood Relief Scheme is to enhance the flow capacity and level of defence through the town so that the design flows can be conveyed through the town without causing property flooding.

It seeks to remove the existing flow split at the church and direct all flow to the open channel western branch. This removes flow from the heavily modified and under capacity eastern channel which is adjacent to a number of at-risk properties. It allows a continuous flood defence to be provided between all river flows and the at risk properties.

A high-level text summary of the primary measures in the Flood Relief Scheme is presented below;

- Upstream embankments (E-001 & E-002) are provided to resolve overland flood routing issues.
- A new Channel will be created (D-001) re-connecting all outlet barrels from the bridge into the western river branch and removing the flow split. This will require

excavation of the existing church pedestrian access and replacement via a new pedestrian connection (E-003) which also serves to form a new bank to the redirected stream.

- Flood Defences (E-005, L-002, E-006) will be created where required between the western channel (which now carries all flow) and the properties at risk on Main St.
- A new landscaped riverside walkway (LW-001) will be provided within the area of lands acquired for E-004
- X-001 is one of two existing minor private bridges providing access across the river to a small private land parcel. Providing the continuous defence L-002 will partially block off one side of this bridge affecting its use. Leaving a gap in the defence at the bridge will provide a potential flood route from the opposite side, over the bridge deck and through the flood defences. Therefore, it is proposed to remove this bridge. Access to the parcel will be maintained by retrofitting the second bridge with a slightly increased deck level (to flood defence level) along with steps/ramps as needed. Removal of the structure also increases channel capacity and removes a potential blockage risk. The deck level of the second bridge is above the required flood defence level so can be retained in place.
- 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 bottomless portal culvert.
- X-002 is a wall spanning the watercourse which serves no function other than boundary demarcation. It will be removed to facilitate the installation of the new flood defences. Removal of the structure also increases channel capacity and removes a potential blockage risk.
- A low wall (L-003) is proposed alongside the road to prevent out of bank flows emerging onto the road surface.
- Minor works will be carried out at the existing Main St bridge (G-002) to improve inlet conditions.
- Following reconnection of the flow split, the channel of the eastern branch will have a significantly reduced inflow and will serve a local drainage function only. The channel has a very wide cross section in front of the church (circa 8m width) which is prone to overgrowth and siltation even in the existing flow situation. This area will be landscaped to allow for a low flow channel (LW-002).
- The remainder of the channel runs alongside and through a number of properties. In light of the reduced inflow, it is proposed to line with clean stone and create a low flow channel to aid maintenance (G-001)
- A low wall (L-001) is proposed alongside the "Arrigle View" property on Church Lane.
- It is proposed at the entrance to Ballyhale Shamrocks GAA Grounds an existing weir structure will be upgraded with a 16m long Rock Ramp to reduce a 0.36m drop to improve fish pass conditions. The Rock Ramp has been designed as per the OPW's 'Design Guidance for Fish Passage on Small Barriers'.

- It is proposed to provide additional conveyance to the Main Street Bridge (P-002). The additional conveyance will be provided by a 15m long box culvert with an overflow structure designed to allow flows over the Q100 flood levels.
- At the downstream face of the Main Street Bridge, it is proposed to remove a drop of 0.66m with a Pool and Boulder Pass to improve fish pass conditions. The Pool and Boulder Pass will reduce the drop of 0.66m with a series of 4 pools proposed at 2.5m long with a 0.16m drop across each pool. The Pool and Barrier pass has been designed as per the OPW's 'Design Guidance for Fish Passage on Small Barriers'.

6.7 Potential Impacts of the Proposed Development

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 to designated conservation sites including 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 localised 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.

6.7.1 Construction Impacts

The construction of the proposed development will impact on the existing ecology of the site and the surrounding area. These potential construction impacts will include impacts that may arise during the terrestrial and instream works. It should be noted that the works are proposed immediately upstream of the River Barrow and River Nore SAC and there is potential for significant impact on the qualifying interests of the designated site in the absence of mitigation measures. Potential impacts are likely on site particularly as significant instream works are proposed which will remove all existing habitats within the watercourse and can lead to silt laden and contaminated runoff going downstream.

Designated Natura 2000 sites within 15km

The proposed development is not within a designated conservation site. It should be noted that the Ballyhale River traverses through the subject site and the nearest Natura 2000 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 Ballyhale River within the works area has poor instream biodiversity and is heavily tunnelled

by trees in areas. 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 Natura 2000 sites have a direct hydrological connection or pathway from the proposed development site.

Impacts in the absence of mitigation: negative/medium adverse / international / short term / slight effects. Mitigation is required.

Aquatic Ecology

Contaminated and silt laden runoff during terrestrial works, resuspension of material during instream works, concrete works and the resuspension of anoxic sediments, could impact on the Ballyhale River and the downstream and the qualifying interests of Natura 2000 sites. Impacts on the Ballyhale River would be seen as the primary vector for impacts on conservation sites. Silt or petrochemicals would impact on instream biodiversity by directly impacting on aquatic species or indirectly by impacting on prey items. Silt would also result in filling interstitial spaces within gravel which will impact on fish spawning areas by reducing the availability to clean oxygenated gravels. Ensuring water quality and compliance with Inland Fisheries Ireland procedures/ conditions and the Water Pollution Acts would be seen as the primary method of ensuring no significant impact on designated conservation sites.

Impacts in the absence of mitigation: negative / medium adverse / international / short term / slight effects. Mitigation is required.

Terrestrial Ecology

During the site visits no terrestrial flora or fauna of conservation importance were recorded on site adjoining hedgerows or in NPWS or NBDC records. No other terrestrial mammals of conservation importance were noted on site. No badger activity or setts were noted. No otter activity or holts were noted on site but otters are recorded downstream of the works. Impacts on water quality and noise during construction could potentially cause impact on the prey and disturbance, of otter respectively.

Common mammalian species. Loss of habitat and habitat fragmentation may affect some common mammalian species e.g house mouse, brown rat and there is expected to be mortality during construction.

Amphibians and reptiles. Frogs and reptiles were not observed on site. However, the Ballyhale River flows through the site and frogs may occur on site. The common lizard may occur on site but, was not observed. The proposed development will temporarily remove some potential foraging habitats on site.

Bat Fauna. There are no bats roosts associated with the culverts and bridges and there was little bat activity recorded associated with the river. *The flood relief scheme assessed in relation to potential impact on local bat populations. Due to the fact that the majority of bat activity was recorded west and north of the village of Ballyhale, loss of treelines and hedgerows will impact on local bat populations due to the removal of commuting routes and foraging habitat.*

However as outlined in the bat assessment the 'upgrading the existing channel and structures within the village environs will have less of an impact on local bat populations' There is potential for effects on bats during site clearance.

Impacts in the absence of mitigation: negative / low adverse / international / short term / slight effects. Mitigation is required.

Avian Ecology

No bird species of conservation importance were recorded on site or in NPWS or NBDC records. However, evidence of dipper was noted directly downstream of the proposed works. Impacts on water quality could potentially cause disturbance and impact on the prey of this species. No dipper nests were noted in the vicinity of the proposed works. The proposed works would potentially cause impacts on the prey and localised disturbance of dippers located downstream of works. Site clearance during nesting season could potentially impact on the local bird population.

Impacts in the absence of mitigation: negative / low adverse / site / short term / no significant effects. Mitigation is required.

6.7.2 Operational Impacts

Once constructed, the waterflows to the west of the village in the section (Plate 6) will increase although no works are proposed in this area. The biodiversity value of the site will be expected to improve due to increased waterflows. Currently, the watercourse is divided into two separate flows which is resulting in a suboptimal flow for biodiversity and fish passage to the west and within the village. The lower waterflows that will be observed within the centre of the town could result in a long-term local reduction in water volume and quality in the village centre due to the reduced dilution effect on point source inputs into the watercourse. This may also result in a localised reduction of water quality and invertebrate species within the village. However, as part of the project, investigations will be carried out to highlight and identify point source pollution and misconnections within the town that are resulting in a lowering of water quality within the waterbody. In addition, the project will result in an improved water quality and flows to the west of the village, until the two watercourses meet at the northern end of the

village where the net effect would be expected to be neutral to the current conditions. It will be expected that the ecological impacts in the long term will be positive due to the removal of barriers to fish movements and the increase in volume of water within the watercourse to the west of the town.

Designated Conservation sites within 15km

The proposed works will not result in a net increase or decrease to 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. The works will provide an improvement in the quality of the biodiversity corridor to the west of the town and it would be expected that it would result in a permanent increase in range for the qualifying interests of the designated sites. It would be expected that the lower water quality that could be observed within the village could result in a localised enforcement pressure on point source discharges. However, in the absence of any enforcement pressure the net effect on water quality will be neutral due to the combining of watercourses prior to entering designated sites. No significant impacts on designated sites are likely during operation.

Impacts in the absence of mitigation: positive / low beneficial / international / permanent slight effects. Mitigation is not required.

Aquatic Ecology

The aquatic ecology to the west of the village will be expected to improve while within the village itself a reduction in water quality may be seen due to lower dilution of point source pollution particularly during summer months. No species of conservation importance were noted within the village. Following the merging of the two watercourses a neutral impact on water quality will be foreseen. Increased flows during flood conditions will see increased flows through the western portion of the village. Water quality during flood conditions will be expected to improve during flood conditions due to the reduction of water flow and flooding within the village. This will essentially remove potential pollution sources such as cars, flooded houses, foul sewers etc. that would be a source of pollution during flood events. It would be expected that with improved waterflow, restrictions in livestock access, the identification of pollution sources and improved fish passage, that aquatic biodiversity, including invertebrate biodiversity would improve within the watercourse.

Impacts in the absence of mitigation: positive / low beneficial / international / permanent / moderate beneficial / not significant effects.

Mitigation is not required.

Terrestrial Ecology

Due to the increased flows to the west of the village it will be expected that the biodiversity value of the site to fauna and flora will also increase.

Impacts in the absence of mitigation: positive / low beneficial / local / permanent / not significant effects. Mitigation is not required.

6.8 Potential Cumulative Impacts

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 6-5: 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.'

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 proposed development cumulatively with other plans or projects is unlikely to have a significant effect on biodiversity.

6.9 Mitigation Measures

A strict series of mitigation measures will be incorporated into the proposed development 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 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 Ballyhale River, Little Arrigle Stream, River Nore, and River Barrow.

Designated Conservation sites within 15km

As the main potential vector for impacts would be seen to be via the Ballyhale River watercourse running through the subject site, additional controls 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 drainage within and in the vicinity of watercourses.

Development Construction

Contamination of watercourses. As the Ballyhale River watercourse traverses through the subject site, and substantial instream works are proposed, a project aquatic ecologist will be appointed by the employer representative 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 should have sufficient mitigation measures to prevent the movement of silt downstream during works. This should include measures outlined by the project ecologist including silt fences, phasing of the project to initially carry out localised diversion works and immediate landscaping of the riparian corridor following works.

6.9.1 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. 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 the employer. It should be noted that the watercourse will be fisheries compliant and will contain features for biodiversity enhancement.



Figure 6.17 Flow Piped from upstream to downstream (Source: IFI Guidelines on Protection of Fisheries during construction works in and adjacent to waters 2016)

- b) It is important that the area cleared within the potential flood zone 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, as directed by the project ecologist. 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 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 submit weekly reports to 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 relandscaped.

6.9.2 Works outside the riparian corridor.

- a) The project ecologist will outline a method statement to the employer 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 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 Ballyhale River.

6.9.3 Permanent flow diversion Methodology

Sensitive species are located downstream of the works (Otter (*Lutra lutra*) and Freshwater Crayfish (*Austropotamobius pallipes*) and the subject site is located within a designated Freshwater Pearl Mussel (*Margaritifera (Marga ritifera) Margaritifera*) sensitive area (Figure 6.15). In), in addition the works have a direct hydrological pathway to two Natura 2000 sites downstream. As a result of the species and designated 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:

- Notify IFI one week in advance of works commencing.
- Electrofish (under licence) the water within the full extent of the works location to 50m downstream (if required by IFI), at the start of the project. Remove any fish and transport downstream.
- All works will be done in the dry

Installation process (live downstream culvert):

- A temporary localised stream diversion will be prepared with sand bags to divert the water to the west of Ballyhale.

- A minimum of four independent terram baffles will be placed downstream of the proposed works.
- 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 localised 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).
- The new precast sections will be lifted with the crane and placed on to the bed of Sand/stone as required.
- 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 including terram baffles 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 diversion of and installation of the project elements in the Ballyhale River 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 Ballyhale River 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 Ballyhale River becoming live in the new diversion.

Table 6-6: Sensitive Receptors/Impacts and mitigation measures

Sensitive Receptors	Potential Impacts	Designed-in Mitigation
River Barrow and River Nore SAC River Nore SPA Ballyhale River 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 relevant in-stream works methodologies will have prior approval of Inland Fisheries Ireland. • 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 (Ballyhale River) will be protected from dust, silt and surface water throughout the works. This will include the placing of silt fences and monitoring of dust levels which will be overseen by the project ecologist. The measures will include: <ul style="list-style-type: none"> - 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, including the attenuation tank during construction, 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 localised 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 under Licence prior to the commencement of works 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. • 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. • No entry of solids to the associated stream or drainage network during the connection of pipework to the public water system

<p>Watercourses</p>	<ul style="list-style-type: none"> • Habitat Degradation • Dust deposition • Pollution • Silt ingress • Potential downstream impacts. 	<ul style="list-style-type: none"> • Landscaping of the Riparian corridor should be carried out to the satisfaction of IFI and the project ecologist. <p>Measures outlined above in addition to:</p> <ul style="list-style-type: none"> • 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 localized 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
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		<p>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.</p> <p><i>Storage/Use of Materials, Plant & Equipment</i></p> <ul style="list-style-type: none"> • 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 sessions will be conducted for all persons working to outline the relevant environmental control measures and to identify any environment risk areas/works. • Consultation with Inland Fisheries Ireland will be carried out pre and post works is essential and to be led by the project ecologist.
<p>Birds</p>	<ul style="list-style-type: none"> • Removal nesting habitat. 	<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.

(National Protection)	<ul style="list-style-type: none">• Destruction and/or disturbance to nests (injury/death).	<ul style="list-style-type: none">• 5 bird boxes (including 2 x dipper boxes) will be placed on site• Pre-inspection survey for dippers prior to construction commencing.
Fauna	<ul style="list-style-type: none">• Injury/death• Impacts on resting or breeding places.	<ul style="list-style-type: none">• Preconstruction survey for mammals and frogs.

6.9.4 Adverse Effects likely to occur from the project (post-mitigation)

Standard construction and operational mitigation measures are proposed. These will ensure that water entering the Ballyhale River, 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 Ballyhale River and biodiversity mitigation/supervision, no significant impacts are foreseen from the construction or operation of the proposed project (Table 6.7). Residual impacts of the proposed project will be localised to the immediate vicinity of the proposed works. Positive impacts will 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.

Table 6-7a: Construction Impacts on habitats and sensitive receptors post mitigation

Habitat	Habitats Directive	Site Rating ³	Construction Impact	Impact Significance
Watercourses		B	Silt or petrochemicals entering the Ballyhale River. Mitigation measures will be put in place to avoid impacting this habitat through the introduction of silt or petrochemical protection measures. Impacts within the site outline would be negative low adverse.	Negative low adverse within site. Low Beneficial, Long term. Not Significant.
Scrub		E	Construction will result in the complete removal of this habitat.	Negligible/ Not Significant.
Recolonising Bare Ground/Bare Ground		E	No impacts are foreseen on this habitat.	Negligible/ Not Significant.
Agricultural Grassland		D	No species of importance were noted on, or in, this habitat	Negligible/ Not Significant.
Hedgerows and Treelines		C	No species of importance were noted on, or in, the buildings or artificial surfaces.	Negligible/ Not Significant.
Natura 2000 and other conservation sites.	Yes	A	Silt or petrochemicals entering the Ballyhale River, River Nore, and River Barrow. Mitigation measures will be put in place to avoid impacting this habitat through the introduction of mitigation measures.	Negligible/ Not Significant.

Table 6-7b: Construction Impacts on species

Species	Site Rating	Construction Impact	Impact Significance
Mammals-Terrestrial	A-D	No other terrestrial mammals of conservation importance were noted on site.	Negligible / Not Significant.
Birds	D	Clearance of the site will result in the loss of nesting habitat.	Negligible/ Not Significant.
Amphibians-Frogs	B	Foraging habitat would be lost in the short term within the site.	Negligible/ Not Significant.
Terrestrial Flora	-	No flora of conservation significance were found on the site.	Negligible/ Not Significant.

Table 6-7c: Operation Impacts on habitats and sensitive receptors post mitigation

Habitat	Site Rating	Operational Impact	Impact Significance
Watercourses	C	Increased flows to the west of the village could have a positive impact.	Low Beneficial, Long term. Not Significant.
Recolonising Bare Ground/Bare Ground	E	No impacts are foreseen on this habitat.	Neutral
Hedgerows and Treelines	C	No impacts are foreseen on this habitat.	Neutral/ Not Significant.
Natura 2000 and other	A	No impacts are foreseen on designated sites.	Negligible/ Not Significant.

³ Site ecological evaluation rating: <https://www.tii.ie/technical-services/environment/planning/Guidelines-for-Assessment-of-Ecological-Impacts-of-National-Road-Schemes.pdf>

conservation sites.

Table 6-7d: Operational Impacts on species

Species	Site Rating	Operational Impact	Impact Significance
Mammals-Terrestrial	A-D	No other terrestrial mammals of conservation importance were noted on site.	Negligible based on mitigation/ Not Significant.
Birds	D	Improved flows could result in a positive impact.	Positive/Neutral/ Not Significant.
Amphibians-Frogs	B	Evidence of frog activity was not noted on site.	Positive/Neutral/ Not Significant.
Terrestrial Flora	-	No flora of conservation significance was found on the site.	Negligible/ Not Significant.
Aquatic Fauna		Improved flows could result in a positive impact.	Positive/ Not Significant.

Overall Construction impacts post mitigation: negative; low adverse; site, short term, not significant effects.

Overall Operational impacts post mitigation: positive; moderate beneficial; local, permanent, slight, not significant effects.

6.10 Residual Impacts

The construction and operational mitigation proposed for the development satisfactorily addresses the mitigation of potential impacts on the sensitive receptors through the application the standard construction and operational phase controls. The overall impact on the ecology of the proposed development will result in a long-term moderate positive not significant residual impact on the ecology of the area and locality overall. This is primarily as a result of the creation of an improved waterflows and limiting of livestock access to the watercourse, to the west of the village, standard construction and operational controls, improved fish passage through the site and a sensitive native landscaping strategy.

6.11 Worst Case Scenario

A project ecologist will be on site during the works and all works will be approved by IFI and NPWS. As a result, the worst case scenario would be a localised pollution event due to machinery proximate to the watercourse i.e. hydraulic hose rupture or fuel leak. Measures will be in place on site to limit the impact of such incidents.

6.12 Difficulties Encountered in Assessment

No difficulties were encountered during the preparation of the Biodiversity Chapter.

6.13 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
4. Assessment of Plans and Projects Significantly Affecting NATURA 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC; http://ec.europa.eu/environment/nature/Natura2000management/docs/art6/Natura_2000_assess_en.pdf
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. Fossitt, J.A. (2000), A Guide to Habitats in Ireland, The Heritage Council
9. Institute of Environmental Assessment, 1995. Guidelines for Baseline Ecological Assessment
10. CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland.
11. 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.
12. NPWS (2019) Conservation Objectives: Hugginstown Fen SAC 000404. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
13. NPWS (2019) Conservation Objectives: Thomastown Quarry SAC 002252. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
14. 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.
15. 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.
16. Smith, G. F., O'Donoghue, P., O'Hara, K., Delaney, E (2011) Best Practice and Guidance for Habitat Surveying and Mapping. Heritage Council

APPENDIX 6-1

Bat Assessment