Kilkee Flood Relief Scheme

Final Report

AA Screening

July 2024

COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

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Contract

This report relates to the Kilkee Flood Relief Scheme commissioned by Clare County Council, on behalf of the Office of Public Works. Johanna Healy and Anne Mullen of JBA Consulting carried out this work.

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Purpose

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Abbreviations

AA	Appropriate Assessment
CO	Conservation Objectives
CIEEM	Chartered Institute of Ecology and Environmental Management
DEHLG	Department of the Environment, Heritage and Local Government
DHLGH	Department for Housing, Local Government and Heritage
EC	European Community
EPA	Environmental Protection Agency
EU	European Union
FRS	Flood Relief Scheme
GIS	Geographical Information System
GSI	Geological Survey Ireland
GWB	Ground Water Body
IROPI	Imperative Reasons of Overriding Public Interest
NIS	Natura Impact Statement
NBDC	National Biodiversity Data Centre
NNIS	Non-Native Invasive Species
NPWS	National Parks and Wildlife Services
NRA	National Roads Authority
OPR	Office of the Planning Regulator
OPW	Office of Public Works
QI	Qualifying Interests
SAC	Special Area of Conservation
SPA	Special Protection Area
WFD	Water Framework Directive
ZOI	Zone of Influence

1 Introduction

1.1 Background

JBA Consulting Engineers and Scientists Ltd (hereafter JBA has been appointed by Clare County Council, to undertake Environmental Consultancy services in relation to the Kilkee Flood Relief Scheme (FRS) in Kilkee, Co. Clare.

The proposed development consists of development of a flood relief scheme to minimise the risks currently posed to people, the community, social amenity, environment and landscape.

Screening for Appropriate Assessment is intended to be an initial examination which must be carried out by the Planning Authority or An Bord Pleanála as the competent authority. However, this screening is completed on behalf of the project proposer to show that likely significant effects have been considered in the project development and design, and where necessary progress with further assessment to a Stage 2 Appropriate Assessment.

1.2 Legislative Context

The Habitats Directive (Directive 92/43/EEC) aims to maintain or restore the favourable conservation status of habitats and species of community interest across Europe. The requirements of Articles 6(3) and 6(4) of the Habitats Directive have been transposed into Irish legislation by means of the European Communities (Birds and Natural Habitats) Regulations 2011 as amended.

Under the Directive a network of sites of nature conservation importance have been identified by each Member State as containing specified habitats or species requiring to be maintained or returned to favourable conservation status. In Ireland the network consists of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), and candidate sites, which together form the *Natura 2000* network.

Article 6(3) of the Habitats Directive requires that, in relation to European designated sites (i.e. SACs and SPAs that form the *Natura 2000* network), "*any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to* ***appropriate assessment*** *of its implications for the site in view of the site's conservation objectives*".

A competent authority, in this case Clare County Council as a public body, can only agree to a plan or project after having determined that it will not adversely affect the integrity of the site(s) concerned.

1.3 Appropriate Assessment Process

Guidance on the Appropriate Assessment (AA) process was produced by the European Commission, which was subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DEHLG) (DEHLG 2010; OPR 2021a). These guidance documents identify a staged approach to conducting an AA, as shown in Figure 1-1.

Figure 1-1: The Appropriate Assessment Process (from: Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities, DHLGH, 2009).

1.3.1 Stage 1 - Screening for AA

The initial, screening stage of the Appropriate Assessment is to determine:

- whether the proposed plan or project is directly connected with or necessary for the management of the European designated site for nature conservation
- if it is likely to have a significant effect on the European designated site, either individually or in combination with other plans or projects.

For those sites where, potential adverse impacts are identified, either alone or in combination with other plans or projects, further assessment is necessary to determine if the proposals will have an adverse impact on the integrity of a European designated site, in view of the site's conservation objectives (i.e., the process proceeds to Stage 2).

1.3.2 Stage 2 - AA

This stage requires a more in-depth evaluation of the plan or project, and the potential direct and indirect impacts of them on the integrity and interest features of the European designated site(s), alone and in-combination with other plans and projects, taking into account the site's structure, function, and conservation objectives. Where required, mitigation or avoidance measures will be suggested.

The competent authority can only agree to the plan or project after having ascertained that it will not adversely affect the integrity of the site(s) concerned. If this cannot be determined, and where mitigation cannot be achieved, then alternative solutions will need to be considered (i.e., the process proceeds to Stage 3).

1.3.3 Stage 3 - Alternative Solutions

Where adverse impacts on the integrity of Natura 2000 sites are identified, and mitigation cannot be satisfactorily implemented, alternative ways of achieving the objectives of the plan or project that avoid adverse impacts need to be considered. If none can be found, the process proceeds to Stage 4.

1.3.4 Stage 4 - IROPI

Where adverse impacts of a plan or project on the integrity of Natura 2000 sites are identified and no alternative solutions exist, the plan will only be allowed to progress if imperative reasons of overriding public interest can be demonstrated. In this case compensatory measures will be required.

The process only proceeds through each of the four stages for certain plans or projects. For example, for a plan or project, not connected with management of a site, but where no likely significant impacts are identified, the process stops at stage 1. Throughout the process, the precautionary principle must be applied, so that any uncertainties do not result in adverse impacts on a site.

This report is in support of a Stage 1 Screening for Appropriate Assessment.

1.3.5 Rulings of the Court of Justice of the European Union (CJEU)

The CJEU issued a ruling on the consideration of avoidance and reduction measures as a result of the case known as People over Wind, Peter Sweetman v Coillte Teoranta (Case C-323/17). This judgement stated that measures intended to reduce or avoid effects on a Natura 2000 site should only be considered within the framework of an Appropriate Assessment, and it is not permissible to take into account such measures at the screening stage. In practice, this means that any activities that are not integral to the project (i.e., the project could conceivably take place without them) and have the effect of avoiding or reducing an impact on a Natura 2000 site, cannot be considered at the screening stage.

The CJEU ruling in the case of Grace & Sweetman [2018] (C-164/17) clarified the difference between avoidance and reduction (mitigation) measures and compensation. Measures intended to compensate for the negative effects of a project cannot be taken into account in the assessment of the implications of a project, and instead are considered under Article 6(4). This means that any project where an effect on the integrity of a Natura 2000 site remains and can only be offset by compensation, would need to proceed under Article 6(4), demonstrating "imperative reasons of overriding public interest".

The judgements referred to as the Dutch Nitrogen cases [2018] (C-293/17 and C-294/17) have important implications for projects that could potentially impact on sites that are exceeding critical thresholds for input of damaging ammonia (but could also reasonably apply where other nutrients are impacting Natura 2000 sites). The judgements state that the use of thresholds to exclude project impacts is acceptable in principle, and that strategic plans can be used as mitigation but only with consideration of the certainty (or otherwise) of the outcomes of those strategic plans. It clarifies that where the status of a habitat type is already unfavourable the possibility of authorising activities which increase the problem is necessarily limited.

The CJEU ruling in the case of Holohan v An Bord Pleanála (C-461/17) also clarified the importance in Appropriate Assessment of taking into account habitat types and species outside the boundary of the Natura 2000 site where implications of the impacts on those habitat and species may impact the conservation objectives of the Natura 2000 site. In this assessment, functionally linked and supporting habitat for species outside of Natura 2000 sites are assessed where they could potentially impact the conservation objectives of any screened in Natura 2000 sites.

The CJEU ruling in response to questions referred by the Irish High Court in the Eco Advocacy case (C-721/21) indicated that an applicant for permission in its AA screening report/and a decision maker in undertaking its AA screening can take into account "standard features", i.e. all the constituent elements of that project inherent in it/elements that are incorporated into a projects design not with the aim of reducing its negative effects (even where these have the effect of reducing harmful effects on a European site).

2 Methodology

The Screening for Appropriate Assessment has been prepared having regard to the Birds and Habitats Directives, the European Communities (Birds and Natural Habitats) Regulations 2011-15 as amended and relevant jurisprudence of the EU and Irish courts. The following documents have also been used to provide guidance for the assessment:

- DEHLG (2009 rev 2010) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government(DEHLG 2010).
- Office of the Planning Regulator (2021) OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management (OPR 2021b).
- European Communities (EC) (2019) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission (European Commission 2019).
- EC (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC. (European Commission 2021)
- EC (2002) 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, Office for Official Publications of the European Communities, Luxembourg. European Commission (European Commission et al. 2002).
- EC (2013) Interpretation manual of European Union habitats. Version EUR 28. (EC 2013).
- EC (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. European Commission Management (European Commission, 2007).
- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater and Coastal, Second Ed. (Chartered Institute of Ecology and Environmental), updated 2022.

2.1.1 Desktop Study

A desktop study was conducted of available published and unpublished information, along with a review of data available on the National Parks and Wildlife Service (NPWS) and National Biodiversity Data Centre (NBDC) web-based databases, in order to identify key habitats and species (including legally protected and species of conservation concern) that may be present within ecologically relevant distances from the project as explained below. A baseline habitat assessment was performed using satellite imagery of the site. The data sources below (accessed June 2023) were consulted for the desktop study:

- Aerial photography available from Google Satellite imagery and Esri World Imagery.
- NPWS website (www.npws.ie) where Natura 2000 site synopses, data forms and conservation objectives were obtained along with Annex I habitat distribution data and status reports.
- River Basin Management Plans (www.wfdireland.ie)
- NBDC species data within a custom polygon covering the study area with an additional 5km buffer

- NBDC Biodiversity Maps (maps.biodiversityireland.ie)
- Catchments (www.catchments.ie)
- Environmental Protection Agency Maps (https://gis.epa.ie/EPAMaps)
- Geological Survey Ireland (GSI) website (www.gsi.ie)
- GSI - Groundwater data viewer (https://dcenr.maps.arcgis.com)
- Planning Applications (myplan.ie)

2.1.2 Ecological Site Surveys

Various ecological site surveys were performed by JBA Ecologists Anne Mullen, Damien McAndrew, Johanna Healy, Hannah Mulcahy, Dominic Tilley, Joe Freijser, Eilis Hogan, Colm O'Leary and Karen Van Dorp. Table 2-1 contains further details on survey dates and type of survey undertaken.

The ecological walkover survey recorded habitats and protected species, following the methods outlined in the documents below:

- Heritage Council (2011). Best Practice Guidance for Habitat Survey and Mapping (Smith et al. 2011).
- Fossitt, J. (2000). A Guide to Habitats in Ireland. The Heritage Council, Kilkenny (Fossitt 2000).
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009b).

Aerial photographs and site maps assisted the survey. Habitats have been named and described following Fossitt (2000). Nomenclature for higher plants principally follows that given in The New Flora of the British Isles 4th Edition (Clive Stace 2019). Identification of Irish plants generally follows that given in Webb's An Irish Flora (Parnell and Curtis, 2012).

Table 2-1: Ecological surveys undertaken in the study area.

Survey	Date	Surveyor(s)
Multi-disciplinary walkover survey (habitat mapping, protected and invasive species)	29/05/2020	KvD, JF
Wintering bird habitat suitability scoping surveys	24/02/2021	AM, EH
Wintering bird surveys	20/01/2022 22/02/2022 30/03/2022 22/11/2022 12/01/2023 02/03/2023	AM, JF, DM, JH
Dusk bird survey	20/01/2022	AM, JF
Country nesting bird surveys	13/05/2022	HM, DM
Additional habitat surveys	01/07/2022	AM
Fisheries and in-stream electrofishing surveys	15/09/2022	Ross Macklin, Fisheries expert, *Triturus Environmental Ltd.*
Breeding bird surveys	04/05/2023 05/05/2023 26/06/2023 27/06/2023	DT

Survey	Date	Surveyor(s)
Additional habitat surveys	04/08/2023	JH, MH
JBA Ecologists: AM = Anne Mullen, JF = Joe Freijser, COL = Colm O'Leary, DM = Damien McAndrew, HM = Hannah Mulcahy, JH = Johanna Healy, DT = Dominic Tilley, EH = Eilis Hogan, MH = Mia Heigh		

2.2 Screening Method

This screening assessment uses the source-pathway-receptor model as outlined in guidance (OPR 2021). Using the source-pathway-receptor model allows for the potential significant effects to be eliminated if no viable source, pathway or receptor is present.

An examination of the construction methods or project description allows sources of impact to be determined. This also allows a to be zone of influence for the project to be generated based on the size, scale and nature of the works involved. The pathways for impact are also analysed to see if a functional pathway for impact is present. This report analyses three pathways: surface water, groundwater and land. Using information gathered from desk sources (e.g. mapped qualifying interests from the Conservation Objectives for the site) and from field surveys, receptors within the zone of influence are identified. In some cases, sensitive receptors may also play a role in determining the zone of influence. If any of the three parts to the model are not present (source-pathway-receptor) the potential for a likely significant effect from the project on the Natura 2000 network can be discounted.

As the works are confined to Kilkee and will largely use existing infrastructure the project will primarily affect the site only. Given the size scale and nature of the project the following zones of influence are used this project.

- noise and vibration disturbance (500m),
- air pollution (500m as per the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction 2024).
- groundwater - within the same groundwater body, where groundwater dependent habitats are present.
- surface water (all Natura 2000 sites downstream of the site, and upstream where migratory species are QI's, if relevant).
- and any supporting habitat for Qualifying Interest (QI) species within 15km.

This means the final 'Zone of Influence' can be a complex shape not easily defined by a simple distance figure, but in this way the assessment includes all relevant sites whilst avoiding unnecessary inclusion of other sites.

2.2.1 Likely Significant Effect Test

The test for AA screening is whether the project could have a 'Likely Significant Effect' (LSE) on any Natura 2000 site. A likely significant effect is defined as any effect that could undermine the conservation objectives of a Natura 2000 site, either alone or in combination with other plans or projects. There must be a causal connection between the project and the qualifying interest of the site which could result in possible significant effects on the site. The LSE test is a lower threshold for the screening assessment than 'adverse effect on site integrity' considered at Appropriate Assessment stage (Stage 2) as screening is intended to be a preliminary examination for potential effects.

The Zone of Influence was used to identify Natura 2000 sites that could be impacted by the project. For each of these sites, the Qualifying Interest features and their associated conservation objectives were identified, and the possibility of LSE was

determined by a combination of location, ecological and hydrological connectivity, sensitivity of receptor and magnitude of the source of impact.

2.2.2 In-combination Screening

The possibility of in-combination effects are considered only at a high level. Where there is no effect at all via a pathway, there is no possibility of in-combination effects. Where an LSE is identified, the in-combination assessment is carried forwards to a Stage 2 Appropriate Assessment.

2.3 Competent Persons

The assessment has been carried out by JBA ecologist Johanna Healy BSc (Hons). Johanna has undertaken numerous Appropriate Assessment Screening and NIS assessments for a variety of projects. Freshwater fisheries ecology, and catchment & river restoration specialist Jonathan Whitmore provided input on fish and stream ecology.

The assessment has been reviewed by Anne Mullen BSc Env., MSc Eco., MCIEEM and This report has been reviewed by JBA Principal Ecologist Patricia Byrne BA (Hons), PhD, MCIEEM.

2.4 Limitations and Constraints

The screening assessment necessarily relies on some assumptions, and it was inevitably subject to some limitations. These would not affect the conclusion, but the following points are recorded in order to ensure the basis of the assessment is clear:

- Information on the works and conditions on site are based on current knowledge at the time of writing. Changes to the site since this report was drafted cannot be accounted for. However, significant changes to the site are unlikely in the time between the submission of the report and likely determination date (2023).
- This assessment is based on the methodology for proposed works as described in this report. Where changes to methodology occur, an ecologist will need to be consulted to determine if the changes are likely to alter the ecological impacts and would therefore need reassessment.

The AA Screening addresses issue around designated sites and does not exempt works from responsibilities related to habitats and species covered under separate national legislation.

3 Project Description

3.1 The 'Project'

The proposed flood relief scheme (FRS) in Kilkee, hereafter referred to as 'Kilkee FRS' meets the criteria of a 'Project' as defined in the Habitats Directive and is not directly connected with or necessary to the management of any Natura 2000 site. Therefore, the project is subject to the requirements of the Appropriate Assessment process.

3.2 Project location

The proposed FRS is located within Kilkee town. Proposed works are to take place in two main sites for fluvial options: the Victoria stream and adjoining lands to the west of the study area and the Atlantic stream and adjoining lands to the east. The footprint of the proposed FRS works is outlined in Figure 3-1.

3.3 Description of Proposed Development

A Draft Buildability Report has been prepared for the proposed FRS which outlines the construction methodology and phasing. This report will remain a live document until after the planning application stage, when the finalised detailed design of the scheme is complete.

An overview of the proposed fluvial options for the Victoria and Well stream is given in Figure 3-2 and Atlantic stream sites in Figure 3-3. A summary of the main works also presented, but the Buildability Report should be read in conjunction with this AA for full details on the works to be carried out at each site.

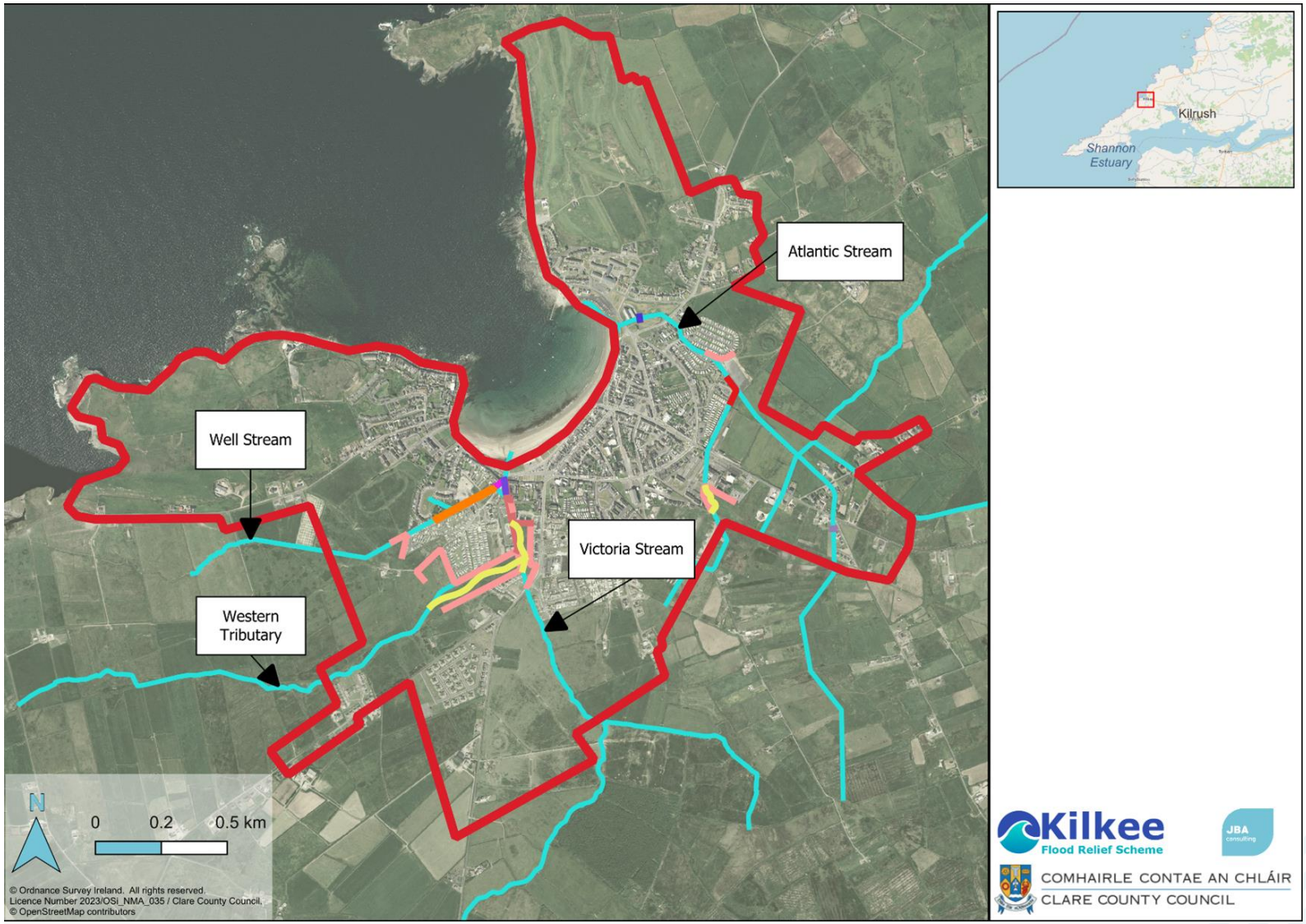

Figure 3-1: Site location and boundary of works.

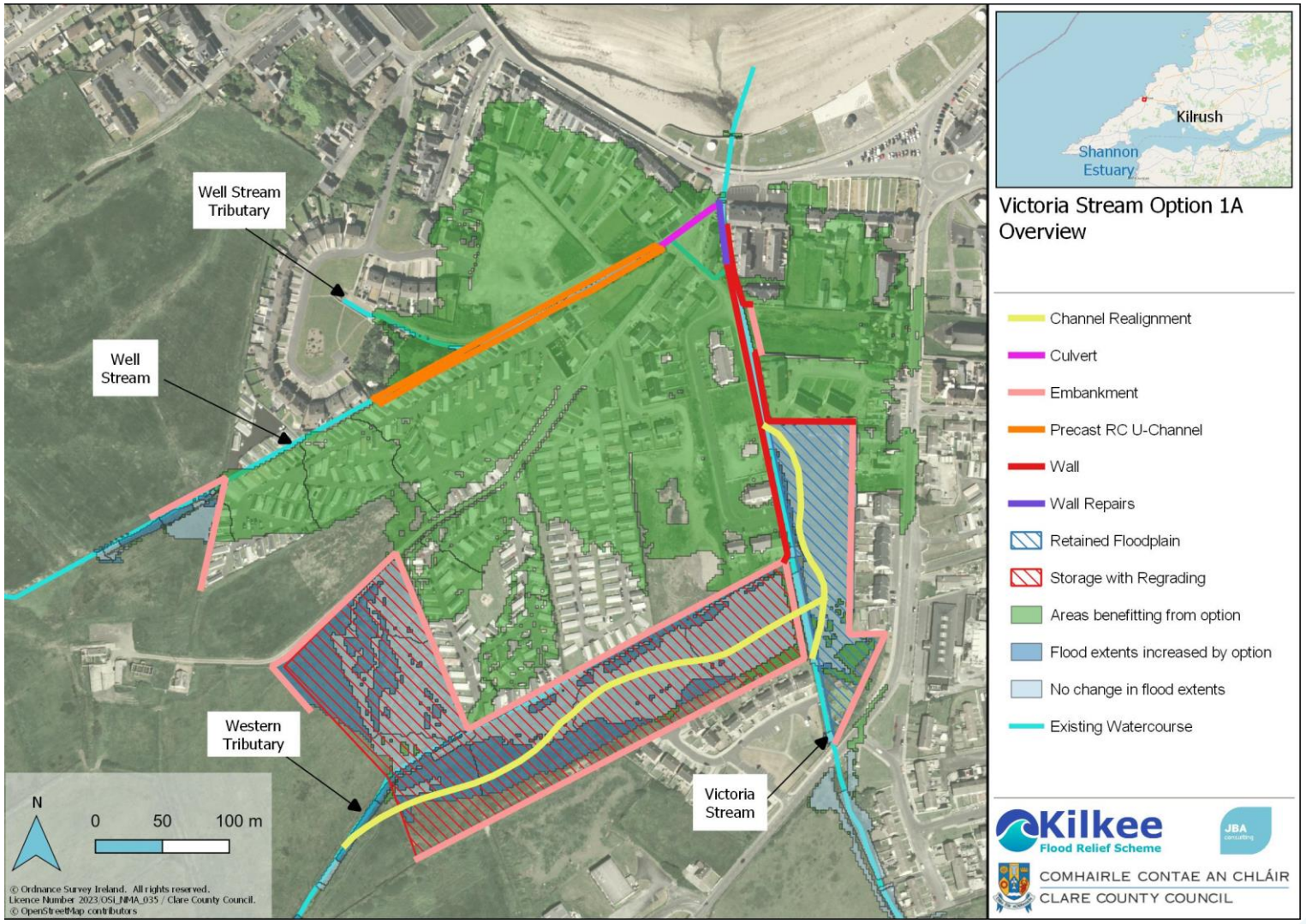

Figure 3-2: Preferred option for Victoria Stream.

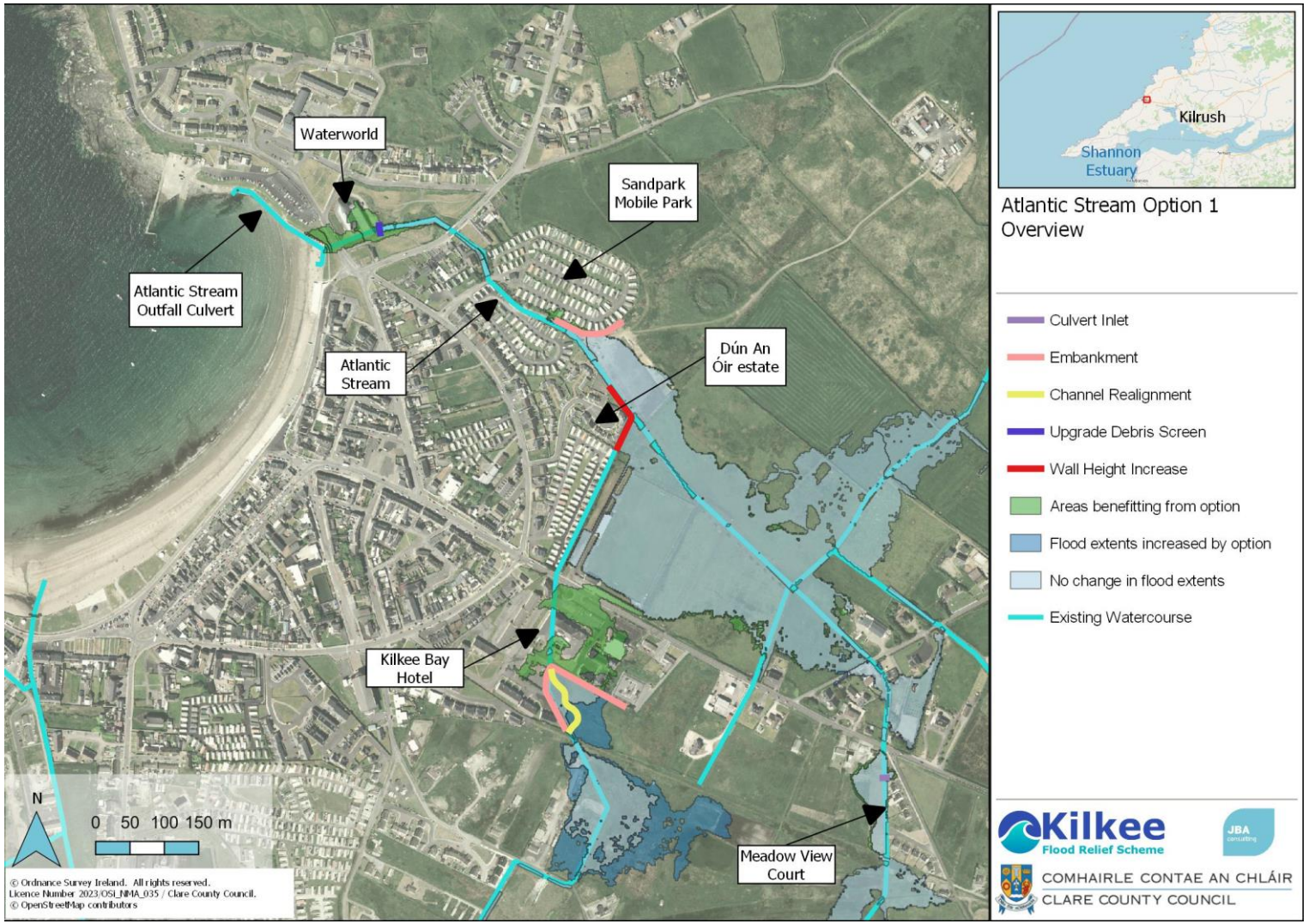

Figure 3-3: Preferred option for Atlantic Stream.

3.3.1 Potential Measures

The proposed flood relief works will include the following measures. Full details are provided in the Buildability Report, which is a live document and should be used for the latest updates on work details.

Atlantic Stream

- The Atlantic Stream proposals include the following measures in key locations.

Kilkee Bay Hotel

- Construction of c. 200m long embankment c. 1.3-1.6m high.
- Diversion of c. 110m of open channel into centre of floodplain.
- Installation of new headwall and 600mmØ inlet culvert under embankment to link with existing culvert.

Dún an Óir estate

- Increase the height of the existing boundary wall by c. 300mm over c. 103m length.

Sandpark mobile park

- Construction of c. 110m long embankment c. 700mm high.

Waterworld

- Installation of new debris screen at upstream culvert headwall.

Meadow View Court

- Construction of 2no. 2100mm dia. inlet manholes with grated covers on existing 1200mm dia. culvert.

Atlantic Stream Outfall

The Atlantic Stream outfall proposals include:

- Upgrade existing overflow chamber with raised cover (c. 2.7m long x 2m wide x 400mm high) with flap valves.
- Reconstruction of outfall manhole and installation of non-return valve on upstream 750mmØ culvert.
- Install non-return valve to existing 750mmØ overflow outfall culvert and seal existing cover of manhole downstream of overflow chamber on main outfall culvert at existing ground level.

Option 2 consists of a reconstruction of the overflow manhole with a new pressure-releasing chamber cover to allow surcharged flows to be dissipated in a controlled fashion and allow flood waters to run down the promenade terracing and onto the beach. Non-return valves are proposed to the existing main outfall and overflow outfall culverts. The manhole on the main outfall culvert alignment downstream of the upgraded overflow manhole is to be sealed at its existing ground level.

Meadow View Court proposals include:

- Construction of 2 no. 2100mm dia. inlet manholes with grated covers on existing 1200mm dia. culvert.

Victoria Stream

- The Victoria Stream proposals are shown in Figure 43 overleaf and include the following measures in key locations.

Well Stream

- Construction of c. 146m long embankment c. 1.1m high upstream of Cunningham's Holiday Park with inclusion of new headwall and 1050mmØ inlet culvert to existing culvert downstream.
- Installation of precast reinforced concrete u-channel along the existing Well Stream alignment c. 240m long and c. 1.6m above the adjacent road level.
- Installation of overflow on the Well Stream Tributary and non-return valve on the Well Stream u-channel left bank wall to maintain connectivity during normal flows and enable overflow to the carrier drain system during flood events.
- Decommissioning of existing Well Stream box culvert and circular overflow culverts at Crescent Place. Installation of new RC box culvert (c. 1.6m wide x 900mm high) c. 55m long under Crescent Place.
- Resurfacing and regrading of Well Road (c. 300m long x 5.5m wide x 300mm high).

Victoria Court

- Reconstruction of Victoria Court boundary wall.

Victoria Stream

- Local repointing and thickening of existing left bank wall behind Crescent Place properties. Replacement of c. 3m section of wall to facilitate Well Stream RC box culvert installation at Crescent Place.
- Construction of c. 280m long embankment behind Carrigaholt Road c. 1.2-1.4m high above ground level.
- Construction of new flood defence wall c. 230m long along filled-in left hand bank from Victoria Park to Crescent Place c. 1.2-1.8m high above ground level.
- Diversion of c. 170m of open channel to centre of floodplain. Existing open channel to be filled in.
- Reconstruction of Victoria Crescent boundary wall c. 130m long.
- Construction of c. 37m long embankment c. 800mm high north of Victoria Crescent.

Western Tributary

- Construction of embankment c. 980m long and c. 1.3-1.8m high around Western Tributary floodplain.
- Diversion of c.400m of open channel to centre of floodplain and filling in of existing channel.
- Regrading of floodplain in field north of Cluain na Mara estate by c. 700mm max.
- Regrading of floodplain in field west of Cunningham’s Holiday Park (north of existing alignment of filled-in Western Tributary) by raising to 6.70mOD for the northern two-thirds section and lowering to 6.40mOD for the southern third section.
- Installation of 900mmØ culvert under Western Tributary embankment to link to diverted Victoria Stream alignment. Inclusion of headwalls on inlet and outlet of culvert.

4 Existing Environment

4.1 Overview

This section summarises the baseline information about the environment within the project footprint. This is based on a review of the information listed in Section 2.1.1 and data collected during ecological surveys of the study area.

Details of timings and type of ecological surveys undertaken within the study area are available in Section 2.1.2.

4.2 Habitats

Habitat types recorded within the study area are listed in Table 4-1. Habitats recorded in proximity to the proposed FRS works are demonstrated in Figure 4-1.

Table 4-1: Habitat types recorded in the study area.

Habitat Type	Fossitt Code	Potential for Link with Annex I Habitat (correspondence to Fossitt is not always 1:1)	Presence of QI habitat within FRS area?
Buildings and artificial surfaces	BL3	n/a	n/a
Reed and large sedge swamps	FS1	n/a	n/a
Depositing/lowland rivers; Eroding/ upland rivers	FW2, FW1	Watercourses of plain to montane with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation [3270]	No - No correspondence for Victoria or Atlantic.
Improved agricultural grassland	GA1	n/a	n/a
Amenity grassland	GA2	n/a	n/a
Marsh	GM1	Hydrophilous tall herb fringe of plains and of the montane to alpine levels [6430]	No - No correspondence within FRS footprint. Not a QI of any nearby SAC.
Dry meadows and grassy verges, wet grassland mosaic	GS2, GS4	Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510]	Some correspondence to Annex I habitat at the site, but not a QI of any nearby SAC. See Section 4.2.6 Dry Meadows and Grassy Verges, Wet Grassland Mosaic – GS2, GS4

Habitat Type	Fossitt Code	Potential for Link with Annex I Habitat (correspondence to Fossitt is not always 1:1)	Presence of QI habitat within FRS area?
Wet grassland	GS4	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]	No correspondence at this site. Not a QI of any nearby SAC.
Exposed rocky shores	LR1	Littoral rock categories may contain examples of the annexed habitat Reefs [1170]	Yes – See Section 4.2.8 Exposed Rocky Shores (LR1) / Reefs [1170]
Sand shores	LS2	Mudflats and sandflats not covered by sea water at low tide [1140] Annual vegetation of drift lines [1210]	Not a QI of Kilkee Reefs SAC. See Section 4.2.9 Sand Shores (LS2)
Sea Inlets and Bays	MW2	Large Shallow Inlets and Bays [1160]	Yes – See Section 4.2.10 Sea Inlets and Bays (MW2) / Large Shallow Inlets and Bays [1160]
Hedgerows	WL1	n/a	n/a
Scrub	WS1	*Juniperus communis* formations on heaths or calcareous grasslands [5130]	No - No correspondence within FRS footprint.
Ornamental/non-native shrub	WS3	n/a	n/a

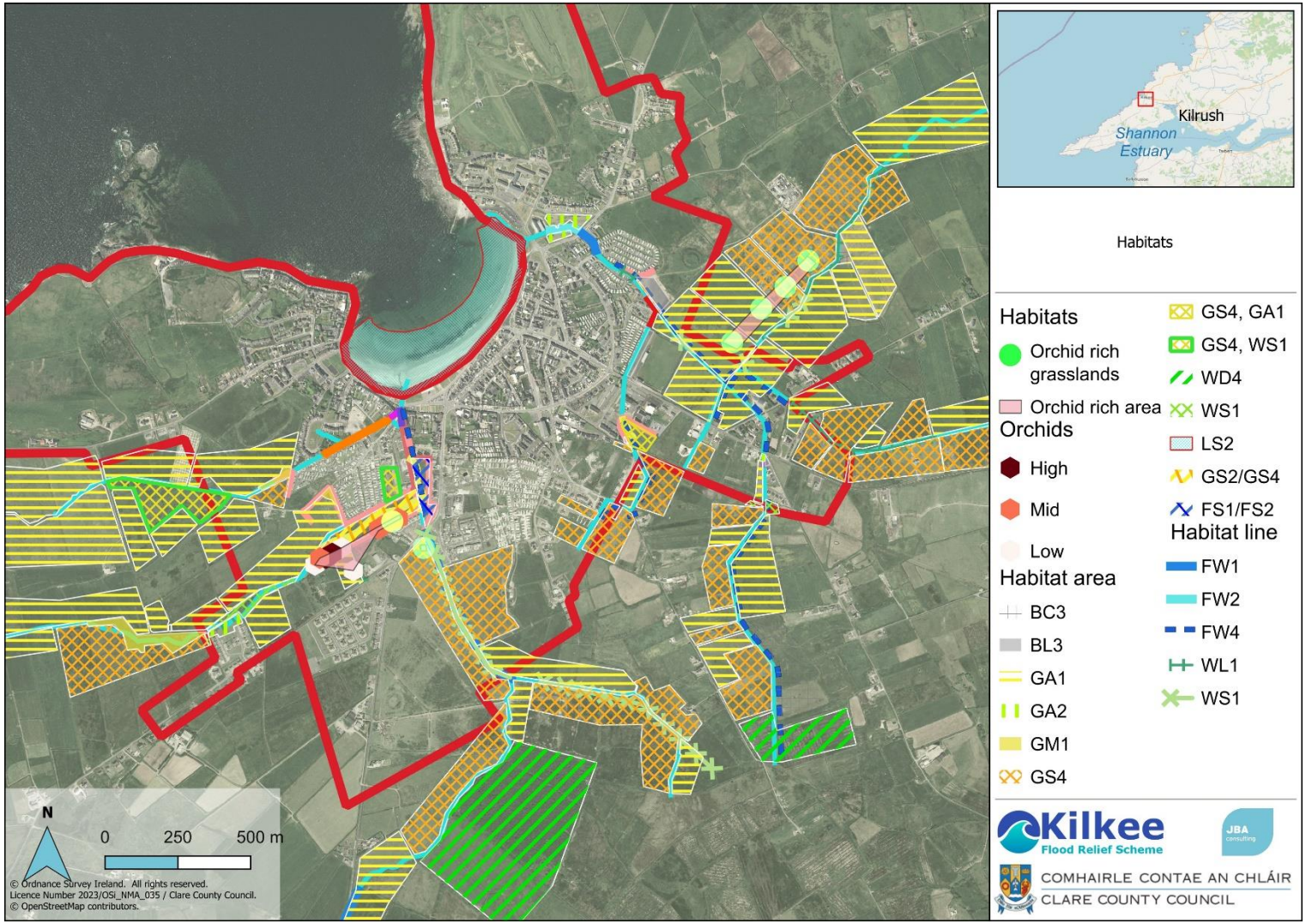

Figure 4-1: Habitats recorded in proximity of the proposed Kilkee FRS works and classified according to Fossitt.

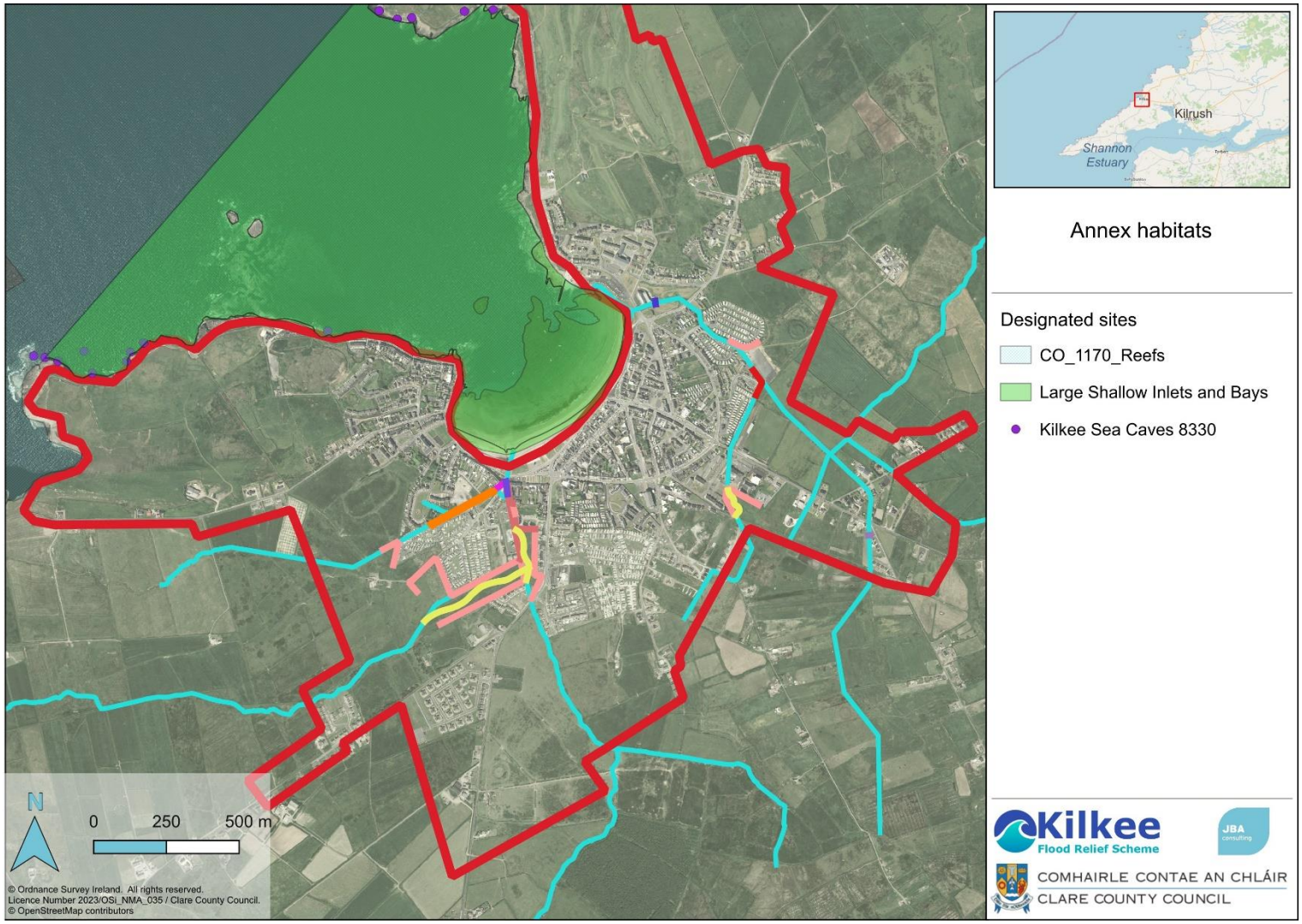

Figure 4-2: Annex I habitats recorded in proximity to the proposed FRS.

4.2.1 Buildings and Artificial Surfaces BL3

The majority of the areas surrounding the proposed FRS works consists of buildings and artificial surfaces and amenity grassland (GA2) areas, which are of low ecological value.

4.2.2 Reed and Large Sedge Swamp FS1

An area of reed and large sedge swamp c. 1ha dominated by Common Reed occurs along the east bank of the Victoria stream. Species recorded in this field include Common Knapweed *Centaurea nigra*, Meadowsweet *Filipendula ulmaria*, Bramble *Rubus fruticosus* aggregate, Cock's-foot *Dactylis glomerata*, Common Nettle *Urtica dioica*, Meadow Foxtail *Alopecurus pratensis*, *Carex* spp., Creeping Buttercup *Ranunculus repens*, Creeping Thistle *Cirsium arvense* and *Equisetum* spp. This field was notable for supporting up to 40 wintering Common Snipe *Gallinago gallinago*, a species red-listed by 'Birds of Conservation Concern in Ireland' (Gilbert et al. 2021).

Figure 4-3: Reed and large sedge swamp - Church Road (Snipe Field)

4.2.3 Depositing/Lowland Rivers FW2; Eroding/Upland Rivers FW1

Several watercourses that were not previously mapped were recorded during site surveys, including the Well Stream and parts of the Atlantic Stream. The Victoria Stream and Western Tributary also occur within the study area. All watercourses within the study area correspond to the same EPA waterbody – Kilkee Lower_010 (Waterbody code IE_SH_27K650930). The catchment in the area is mainly agricultural, however the natural conditions of the watercourses were maintained upstream of Kilkee town and the proposed FRS, before becoming highly channelised within Kilkee town.

There are numerous surface water inputs from housing estates, particularly along the Well and Victoria Streams.

Atlantic Stream

The Atlantic Stream is highly channelised throughout the study area. Levels of in-stream vegetation are high directly upstream of the Atlantic Stream culvert (Figure 4-4, Figure 4-5), where an updated trash screen is to be installed (Figure 4-6). The Atlantic stream drains behind Kilkee Bay hotel (Figure 4-7), Sandpark (Figure 4-8) and Dún an Óir. Species include Lesser Water-parsnip *Berula erecta* and Duckweed *Lemna* spp. Bankside vegetation is beginning to encroach on the culvert where the previous debris screen has been removed, mainly Common Nettle. The main outfall of the Atlantic Stream culvert flows out near Kilkee Pier (Figure 4-9), with overflows draining onto the beach upstream (Figure 4-10).

Detailed notes on the river conditions upstream of this location (behind Sandpark) were taken during the fisheries assessment undertaken by Ross Macklin (Triturus 2022): The watercourse had been extensively straightened and deepened historically, resulting in a steep trapezoidal channel with poor hydromorphology and drainage channel-like characteristics. Bank full heights were 2-4m. The site had also been excavated in the recent past with spoil evident on the banks. The stream was a homogenous 2.5m wide and 0.2-0.3m deep, comprising slow-flowing glide and occasional pool with no riffle areas. Whilst some exposed mixed gravels and cobbles were present locally, the substrata were dominated by soft silt with a high-clay fraction (further indication of recent excavation). Macrophyte coverage was very high (>75%) with abundant Fool's-watercress *Helosciadium nodiflorum*, Branched Bur-reed *Sparganium erectum* and Common Duckweed *Lemna minor* with frequent Lesser Water-parsnip. Water Starwort *Callitriche* sp., Watercress *Nasturtium officinale* and Stonewort *Chara* sp. were occasional. Filamentous algae cover was also very high (>50%), indicating significant enrichment. The steep sloping banks supported abundant Reed Canary-grass *Phalaris arundinacea*, Water Horsetail *Equisetum fluviatile*, Meadowsweet and rank grasses with scattered Alder *Alnus glutinosa*, Sycamore *Acer pseudoplatanus* and dense Bramble *Rubus fruticosus* aggregate scrub. The site was bordered by Sandpark Kilkee holiday homes (BL3) and recolonising bare ground (ED3).

Figure 4-4: Atlantic Stream.

Figure 4-5: Atlantic Stream - upstream of location of new trash screen.

Figure 4-6: Atlantic Stream – location of new trash screen.

Figure 4-7: Atlantic drain along field behind Kilkee bay hotel.

Figure 4-8: Atlantic drain behind Sandpark Kilkee.

Figure 4-9: Atlantic Stream culvert main outfall.

Figure 4-10: Atlantic Stream culvert overflow.

Victoria Stream

The Victoria Stream is highly channelised throughout the study area (Figure 4-11, Figure 4-12). The riverbanks are steep with high cover of Willow *Salix* sp. and Bramble *Rubus fruticosus* scrub.

Detailed notes on the river conditions near the Victoria Stream culvert and a location upstream of the proposed FRS were taken during the fisheries assessment undertaken by Ross Macklin (Triturus 2022):

The lower reaches of the stream had been historically modified with high retaining walls along both banks. Upstream, along Victoria Park, the river had been extensively straightened and deepened, with a near vertical trapezoidal channel and bank full heights of up to 2m. The lower reaches comprised tidal glide habitat that was stagnant at the time of survey given the closure of tidal gates on the beach side of the box culvert under Marine Parade Road. The tidal gate was installed to protect the blue flag status of the beach due to poor water quality (i.e., faecal coliforms). The substrata comprised heavily compacted and silted cobble and boulder along Victoria Park, with cobble and boulder bedded in extensive sand beds predominating further downstream. Siltation was naturally high given the tidal and depositional nature of the channel. Common reed was abundant along the steep banks, with occasional Fool's Watercress and Water Starwort *Callitriche* sp. along channel margins. Filamentous algae were frequent on instream structures. Extensive bacterial films were present on silt at the tidal gates, indicating a level of organic pollution. Numerous point sources and culverts adjoined the channel near the survey site and were evidently contributing to water quality declines.

The Victoria Stream upstream of the proposed FRS has been recorded as an eroding/upland river (FW1). The watercourse had been extensively straightened and deepened historically, with a steep (near vertical) trapezoidal channel and bank full heights of up to 1.8m. The river suffered from low

seasonal water levels at the time of survey, with only slight flows present. The channel averaged 1.5m wide and 0.1-0.2m deep with a profile comprising very slow-flowing glide and pool. The substrata were dominated by heavily compacted cobble and boulder with only localised interstitial gravels. These were heavily silted (exacerbated by low seasonal flows). Soft sediment accumulations were flocculent, where present. The site was heavily shaded and vegetated with abundant Fool's-watercress (>75% cover) and occasional Brooklime *Veronica beccabunga*. Common Reed was also abundant along the channel margins and banksides. Aquatic bryophytes were limited to very occasional *Leptodictyum riparium* (an enrichment indicator) and *Pellia* sp. liverwort on larger substrata. Filamentous algae *Cladophora* sp. were also present (<1% cover), further indicating enrichment. The river at this location was heavily shaded (often tunnelled) with abundant Common Reed and Bramble, herbaceous vegetation and scattered Hawthorn *Crataegus monogyna*. The site was bordered by a residential area (Marion Estate; BL3) and low-intensity pasture (GA1).

The tidal gates of the Victoria Stream are closed during the bathing season, and close from approximately the last week in May to the start of September. The water is kept from overflowing the tidal gates through pumping out to Intrinsic Bay, along with the wastewater from the Kilkee area. Flow is very slow at this time and water is pooling. When the gates are open the stream passes into Kilkee Bay, see Figure 4-13.

Figure 4-11: Victoria Stream.

Figure 4-12: Victoria Stream culvert.

Figure 4-13: Dry bed of Victoria Stream, leading out to Kilkee Bay, when gates are closed.

Western Tributary

A tributary of the Victoria Stream, referred to as the Western Tributary, is also highly channelised (Figure 4-14). Low light levels are present along the stream,

where it flows between Cunninghams Holiday Park and the existing embankment south.

Notes on the river conditions were also taken during the fisheries assessment undertaken by Ross Macklin (Triturus 2022): The watercourse had been extensively straightened and deepened historically, with a steep (near vertical) trapezoidal channel and bank full heights of 1.5-2m. The stream suffered from low seasonal water levels at the time of survey, with only slight flows present. Frequent bank slumping and infilling caused instream flow blockages.

Upstream of the field proposed for storage, the stream averaged <1m wide and 0.1-0.2m deep with a profile comprising very slow-flowing glide and pool with highly localised riffle. The substrata were dominated by heavily compacted cobble with very localised mixed gravels and small boulder. These were heavily silted (exacerbated by low seasonal flows). Soft sediment accumulations were present locally. The site was heavily shaded (near 100% tunnelling) with Common Reed *Phragmites australis* the only macrophyte present (growing along margins and on the steep banks). Aquatic bryophytes recorded included the liverwort species *Conocephalum conicum* and *Pellia* sp. on muddy areas of the bank. The stream at this location was heavily tunnelled with abundant Common Reed and bramble with Meadowsweet *Filipendula ulmaria*, Horsetail *Equisetum* sp., Field Bindweed *Convolvulus arvensis*, Nettle *Urtica dioica* and rank grasses with scattered Gorse *Ulex europaeus*. The site was bordered by scrub and wet, low-intensity pasture (GA1).

Near the confluence of the Western Tributary and the Victoria Stream (Figure 4-14), the stream averaged <0.5m wide (1.5m channel) and <0.1m deep with a profile comprising slow-flowing glide and riffle over instream vegetation and debris. The substrata were dominated by heavily compacted cobble with occasional fine gravels and sands. However, these were heavily silted (exacerbated by low seasonal flows). Soft sediment accumulations were frequent. The site was heavily tunnelled with abundant Common Reed, Water Starwort (Callitriche sp.) and rare Fool's-watercress *Helosciadium nodiflorum*. Aquatic bryophytes were not recorded. The stream at this location was heavily tunnelled with abundant Common Reed and Bramble *Rubus fruticosus* aggregate with Meadowsweet, Field Horsetail *Equisetum arvense*, Field Bindweed, Nettle and rank grasses with scattered willow *Salix* sp. and Hawthorn *Crataegus monogyna*. The site is bordered by low-intensity, often wet, improved grassland (GA1) and residential areas (Victoria Park, BL3).

Figure 4-14: Confluence of Western Tributary and Victoria Stream.

Well Stream

The Well Stream is highly channelised for the majority of its extent and becomes culverted along Crescent Place before it joins the Victoria Stream. There are high levels of vegetation in-stream, mainly Fool's-watercress and *Lemna* spp. Riparian vegetation includes grasses such as Cocksfoot *Dactylus glomeratum*; Nettle, Briars, Creeping buttercup *Ranunculus repens*, and ornamental species (Figure 4-15).

Figure 4-15: Well Stream.

4.2.4 Improved Agricultural Grassland GA1

The majority of fields surveyed within the study area in Kilkee were improved agricultural grasslands with low plant diversity and low usage by bird species associated with the SPAs within the project ZoI or those using Kilkee Bay (see Section 4.3.2 Birds). The majority of these are not connected to the proposed FRS and will not be significantly affected.

4.2.5 Amenity Grassland GA2

Numerous areas of amenity grassland occur within the study area in Kilkee town. The majority of these are not connected to the proposed FRS and will not be adversely affected. An area of amenity grassland occurs in a small park behind Kilkee Waterworld. This habitat is not of value for bird species associated with the SPAs within the project ZoI or those using Kilkee Bay. The grassland has low plant diversity and a mix of native shrub and non-native/ornamental planting of shrubs throughout, used only by common garden bird species (see Section 4.3.2 Birds).

4.2.6 Dry Meadows and Grassy Verges, Wet Grassland Mosaic – GS2, GS4

Several areas of wet grassland occur within the study area (Figure 4-16, Figure 4-17), with poor to moderate drainage and are generally improved. Abundant Rushes *Juncus* spp., Yellow Iris *Iris pseudacorus*, Creeping Buttercup and White Clover *Trifolium repens* occur in these grasslands.

The wet grassland along Atlantic drain 2, behind the Kilkee Bay hotel contained similar species indicative of wet habitat conditions, including Yellow Iris, Creeping Buttercup, Rushes including Soft-rush *Juncus effusus* and Compact Rush *Juncus conglomeratus*, Marsh Woundwort *Stachys palustris*, *Persicaria* spp., Meadowsweet, Creeping Thistle *Cirsium arvense*, Yorkshire-fog *Holcus lanatus*, Common Fleabane *Pulicaria dysenterica* and Nettle.

Some of these wet grasslands were also recorded as orchid-rich grasslands due to relatively high numbers of orchid species including Common Spotted-orchid *Dactylorhiza fuchsii*, Marsh-orchid *Dactylorhiza* spp. and Irish Marsh-orchid *Dactylorhiza kerryensis* observed during field surveys (see locations in Figure 4-1).

Figure 4-16: Wet grassland south of Cunningham's Holiday Park.

Figure 4-17: Wet grassland along Atlantic Stream - south of Kilkee Bay Hotel.

Wet grassland, dry meadows GS2 mosaic

A species list was taken for the orchid-rich dry meadow, wet grassland mosaic in an agricultural field south of Cunningham's holiday park in Kilkee (Figure 4-18). This grassland has been provisionally classified as the Irish Vegetation Classification (IVC) community type Festuca rubra - Rhinanthus minor grassland (GL3E).

It is not likely that this habitat corresponds to the Annex I habitat Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) [6510], due to the high cover of grass and litter observed during surveys in August 2023. The grass layer was thick with a build-up of leaf litter beneath. Localised patches of forbs were recorded throughout the field, mainly Meadowsweet and rushes.

Species recorded in 2021 include Marsh Horsetail, Yellow-rattle *Rhinanthus minor*, Meadowsweet, Ribwort Plantain *Plantago lanceolata*, Yorkshire-fog *Holcus lanatus*, Cat's-ear *Hypochaeris radicata*, Meadow Buttercup *Ranunculus acris*, Creeping Buttercup, Jointed Rush *Juncus articulatus*, Bent-grass *Agrostis* spp., Crested Dog's-tail *Cynosurus cristatus*, Common Sorrel *Rumex acetosa*, Greater Bird's-foot-trefoil *Lotus pedunculatus*, Red Clover *Trifolium pratense*, Silverweed *Potentilla anserina*, Lesser Stitchwort *Stellaria graminea*, Common Mouse-ear *Cerastium fontanum*, Common Knapweed, Sweet Vernal-grass *Anthoxanthum odoratum*, Compact Rush *Juncus conglomeratus*, Sheep's Sorrel *Rumex acetosella*, Selfheal *Prunella vulgaris*, Creeping Thistle, Bindweed *Calystegia* spp., Red Fescue *Festuca rubra*, Common Bird's-foot-trefoil *Lotus corniculatus*, Meadow Vetchling *Lathyrus pratensis* and Marsh Woundwort *Stachys palustris*.

Tufted Vetch *Vicia cracca*, Marsh Woundwort, Common Valerian *Valeriana officinalis*, False Oat-grass *Arrhenatherum elatius*, Common Reed *Phragmites australis*, Bramble *Rubus fruticosus* aggregate, Yellow Iris and Wild Angelica *Angelica sylvestris* were also recorded along the field margins.

This habitat is not a QI for any Natura 2000 sites within the project ZoI and is therefore not considered for impacts in the screening assessment in Section 7.

Follow up surveys of this habitat were conducted on 4 August 2023, to determine the potential correspondence of this grassland to Annex I Lowland hay meadows. Similar species were again recorded, with Curled Dock *Rumex crispus*, Spear Thistle *Cirsium vulgare*, Common Chickweed *Stellaria media*, Rough Hawkbit *Leontodon hispidus*, Devil's-bit *Scabious* Succisa pratensis, White Clover *Trifolium repens*, Rosebay Willowherb *Chamaenerion angustifolium*, Field Bindweed *Convolvulus arvensis*, Sneezewort *Achillea ptarmica*, Purple-loosestrife *Lythrum salicaria* and horsetails *Equisetum* spp. were additionally recorded. Note that no orchids were observed during this survey.

Figure 4-18: Wet grassland/meadows mosaic south of Cunninghams holiday park.

4.2.7 Marsh GM1

Several small areas of marsh were recorded within wet grasslands within the study area. These were mapped as a different habitat type to increased wetness in the area, dominated by growth of sedges *Carex* spp. and Yellow Iris *Iris pseudacorus* as well as Creeping Buttercup *Ranunculus repens* and Water-cress *Nasturtium officinale. Trees included Salix spp.*

Figure 4-19: Marsh in corner of wet grassland field by Cunninghams holiday park

4.2.8 Exposed Rocky Shores (LR1) / Reefs [1170]

The main outfall for the Atlantic stream culvert flows over the easternmost portion of the exposed rocky shores in Kilkee bay. A strong flow from the outfall was observed during field surveys, and it was also noted that the only growth was of green algae *Cladophora rupestris* on top of rocks over which the outfall flows. All other seaweed species recorded were deposited, not growing in this area; species deposited in the drift line south of the pier include Oar Weed *Laminaria digitata*, Furbelows *Saccorhiza polyschides*, Sugar Kelp *Laminaria saccharina*, Serrated Wrack *Fucus serratus*, Horned Wrack *Fucus ceranoides*, Bladder Wrack *Fucus vesiculosus*, Wrack Siphon Weed *Vertebrata lanosa*, Thong Weed *Himanthalia elongata*, Guiry's Bladder Wrack *Fucus guiryi*, *Ulva* spp. and Brown Tuning Fork Weed *Bifurcaria bifurcata*. More loose rock was observed in this area (Figure 4-20).

North of the pier and behind the sea wall, there was some seaweed growth noted (Figure 4-21), mainly of Bladder Wrack, Serrated Wrack and green algae, with some *Ulva* spp. and Sand Binder *Rhodothamniella floridula* also growing. Deposited seaweeds include Sugar Kelp, Landlady's Wig *Desmarestia aculeata*, Guiry's Bladder Wrack, Thongweed and Irish Moss *Chondrus crispus*. Bedrock was intact in this area, with numerous small rock pools. *Limpets* Patella spp., Barnacles and Common Periwinkle *Littorina littorea* were recorded on the rocks, with Sandalled Anemone *Actinothoe sphyrodeta*, sea squirts and Common Mussel *Mytilus edulis* were recorded in the rock pools.

The exposed rocky shores recorded in Kilkee Bay correspond to the Annex I habitat 'Reefs' [1170], a QI of the Kilkee Reefs SAC. The reefs and rocky shores in the SAC are described in the site synopsis and conservation objectives supporting documents for the SAC (see Section 5.2.1 Kilkee Reefs SAC (002264)).

Figure 4-20: Rocky shore south of pier with eroded bedrock and deposited seaweed, with green algae growth from Atlantic stream outfall.

Figure 4-21: Rocky shore behind sea wall with seaweed growth on rocks, intact bedrock with rock pools.

Figure 4-22: Rocky shore north of the sea wall – no deposited or growing seaweed noted.

4.2.9 Sand Shores (LS2)

No terrestrial vegetation was recorded in the sand shores at Kilkee beach. Species recorded in the drift line included Oar Weed *Laminaria digitata*, Furbelows *Saccorhiza polyschides*, Sugar Kelp *Laminaria saccharina*, Serrated Wrack *Fucus serratus*, Horned Wrack *Fucus ceranoides*, Bladder Wrack *Fucus vesiculosus*, Wrack Siphon Weed *Vertebrata lanosa*, Thong Weed *Himanthalia elongata*, Guiry's Bladder Wrack *Fucus guiryi, Ulva* spp. and Brown Tuning Fork Weed *Bifurcaria bifurcata*.

The beach at Kilkee is described in the site synopsis and conservation objectives supporting documents for Kilkee Reefs SAC, and site surveys had similar findings and species communities (see Section 5.2.1 Kilkee Reefs SAC (002264)).

4.2.10 Sea Inlets and Bays (MW2) / Large Shallow Inlets and Bays [1160]

The bay in Kilkee corresponds to the Annex I habitat 'Large shallow inlets and bays' [1160], a QI of the Kilkee Reefs SAC.

This habitat is present where the influence of freshwater is generally limited in semi-enclosed coastal waters or indentations of the coast. Large shallow inlets and bays are generally sheltered from wave action and contain a great diversity of sediments and substrates with a well-developed zonation of benthic communities. These communities generally have high biodiversity. (European Commission 2013)

A dedicated survey of this habitat has not been conducted.

4.2.11 Hedgerows WL1

Hedgerows occur throughout the study area, along field boundaries, watercourses and embankments, but tend to be low and wind cropped, and lack tall mature trees. Common species in these habitats include Bramble and Hawthorn *Crataegus monogyna* or are Gorse *Ulex europaeus* dominated.

4.2.12 Scrub WS1

A small area of scrub was recorded along the Western Tributary, upstream of the Tributary Field. Species recorded include Bramble, Gorse *Ulex europaeus*, Willow *Salix* spp., Common Nettle *Urtica dioica* and conifers.

4.2.13 Ornamental/Non-Native Shrub WS3

A small area of ornamental/non-native shrub was recorded within amenity grassland behind Kilkee Waterworld in mosaic with native shrub species. Species include Hawthorn, Bramble, Creeping Thistle, Bush Vetch *Vicia sepium*, Japanese Rose *Rosa rugosa* and Cherry Laurel *Prunus laurocerasus*.

4.3 Protected Flora and Fauna

4.3.1 Desktop Survey Data

Records of protected flora and fauna including amphibians, birds, fish and mammals collated from the National Biodiversity Data Centre's biodiversity maps and databases (NBDC 2023), present within a 5km radius of the proposed site and within the past 10 years are listed in Appendix A. This table includes the date of the last record of these species.

The following species of Qualifying Interest for Natura 2000 sites within the ZoI of the proposed works have been recorded in the NBDC database within 5km of the study area:

- Cormorant *Phalacrocorax carbo*
- Curlew *Numenius arquata*
- Redshank *Tringa totanus*

Hen Harrier *Circus cyaneus*, Peregrine Falcon *Falco peregrinus* and Red-billed Chough *Pyrrhocorax pyrrhocorax*, species listed under Annex I of the E.U. Birds Directive, have also been recorded within 5km of the proposed FRS. These species were not recorded during wintering or breeding bird surveys of the site, and suitable nesting habitats were not recorded within the study area.

Several non-QI E.U. Habitats Directive Annex II and IV species have been recently recorded within 5km of the proposed FRS:

- Marsh Fritillary *Euphydryas aurinia*
- Bottle-nosed Dolphin *Tursiops truncatus*
- Common Dolphin *Delphinus delphinus*
- Common Porpoise *Phocoena phocoena*
- Grey Seal *Halichoerus grypus*
- Humpback Whale *Megaptera novaeangliae*
- Killer Whale *Orcinus orca*
- Long-finned Pilot Whale *Globicephala melas*
- Minke Whale *Balaenoptera acutorostrata*
- Risso's Dolphin *Grampus griseus*
- Striped Dolphin *Stenella coeruleoalba*
- Leathery Turtle *Dermochelys coriacea*

Numerous protected marine species have been recorded within a 5km buffer. The majority of these have only been recorded through stranding records or at significant distance from Kilkee Bay. Species likely to be using Kilkee Bay and thus within the project ZoI include Bottle-nosed Dolphin, Common Dolphin, Common Porpoise and Minke Whale.

Several features of interest for protected flora and fauna were recorded within the study area during the initial ecological site surveys, including an area of reed and large sedge swamp noted to support numbers of up to 40 wintering Common Snipe, an area of potential Annex I Lowland hay meadows, and intertidal areas of Kilkee Bay.

No habitat suitable for supporting Marsh Fritillary was recorded in the areas in proximity to the works areas. Marsh Fritillary require high density of Devil's-bit Scabious *Succisa pratensis.*

4.3.2 Birds

The site was visited by JBA Ecologists Anne Mullen and Eilis Hogan on 24 February 2021. A brief examination of 5 sites was undertaken. These sites were chosen as areas of interest to be examined as part of Kilkee FRS to examine wintering bird usage of the sites. Weather was cloudy (90%), but dry and clear with low winds. Birds were counted using a pair of Nikon 8 x 42 binoculars.

Notes were made on habitat type, dominant vegetation, habitat condition and on discharge outlets to the watercourses where encountered at the sites. Photos of sites, and numbers of birds recorded are outlined further in the original note to file (JBA Consulting 2021). The location of the sites are outlined in Figure 4-23.

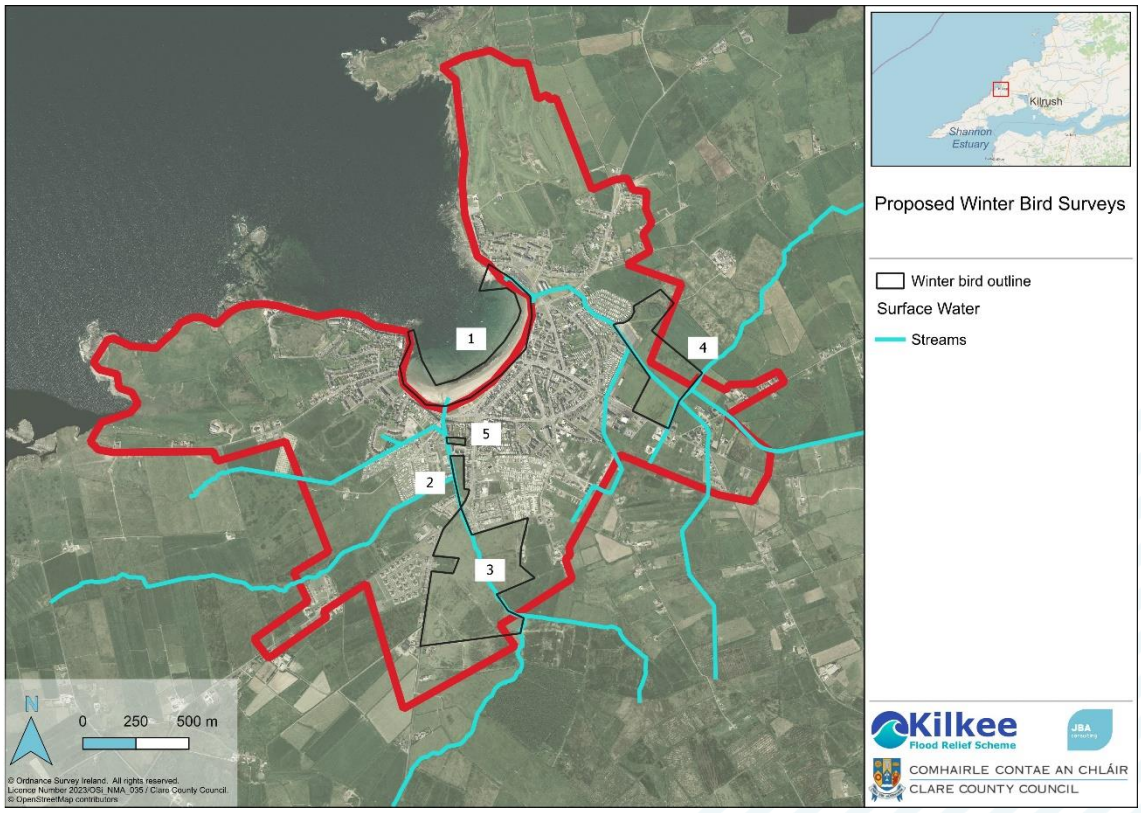

Figure 4-23: Locations of sites surveyed for suitability for wintering birds.

The conclusions of the initial surveys are as follows:

- All 5 sites have various degrees of wintering bird potential - Sites 2 and 5 hosted good habitats for feeding and roosting Common Snipe, although they may be becoming too overgrown to be optimal. It is likely that breeding Common Snipe utilise these two sites as well.
- Sites 3 and 4 held good feeding grounds and shelter areas during storms for gulls, and both had some potential to host wintering wader birds too (e.g., Lapwing and Curlew). Site 4 had good structural vegetation to support wintering waders in particular, while site 3 hosts good feeding grounds for gulls.
- The streams themselves are unlikely to host riverine birds such as Dipper or Kingfisher, given the patchy nature of the riparian vegetation, as well as the channelisation leading to sub-optimal feeding grounds.

Following on from the identification of sites and covering a number of option areas wintering bird surveys were undertaken in 2022 to gain an understanding of the sites and any potential link between the inland terrestrial sites and the reefs, beach and Poulnasharry Bay (part of the River Shannon and River Fergus Estuaries SPA).

Wintering bird surveys

Wintering bird surveys were carried out over winter in 2022 and 2023 to establish the use of migratory wetland and waterbirds of sites of interest throughout Kilkee. Wintering bird survey methods used included the 'look – see' method as used in the I-Webs Irish Wetland Bird Survey (Crowe & Holt 2013), during the period of September to March. Birds sighted during the survey were recorded in an international, national and local context to identify species of conservation importance.

Wintering bird surveys were carried out for 3 months in winter 2022 and winter 2023 by JBA Ecologists Anne Mullen, Damien McAndrew, Johanna Healy and Joe Freijser. Counts were undertaken for 15 minutes at each vantage point as shown in Figure 4-24, except for site 8, where rank reed growth required a full walkover of the site to record any emerging birds. Sites 1-6 (Figure 4-24) located within Kilkee Reefs SAC were surveyed during both low tide and high tide. Surveys were carried out on the following dates:

- Winter 2022
  - 20th January 2022
  - 22nd February 2022
  - 30th March 2022

These surveys were conducted in order to provide scope on the value of the site for wintering birds. Results are available in Appendix C.

- Winter 2022/2023
  - 22nd November 2022
  - 12th January 2023
  - 2nd March 2023

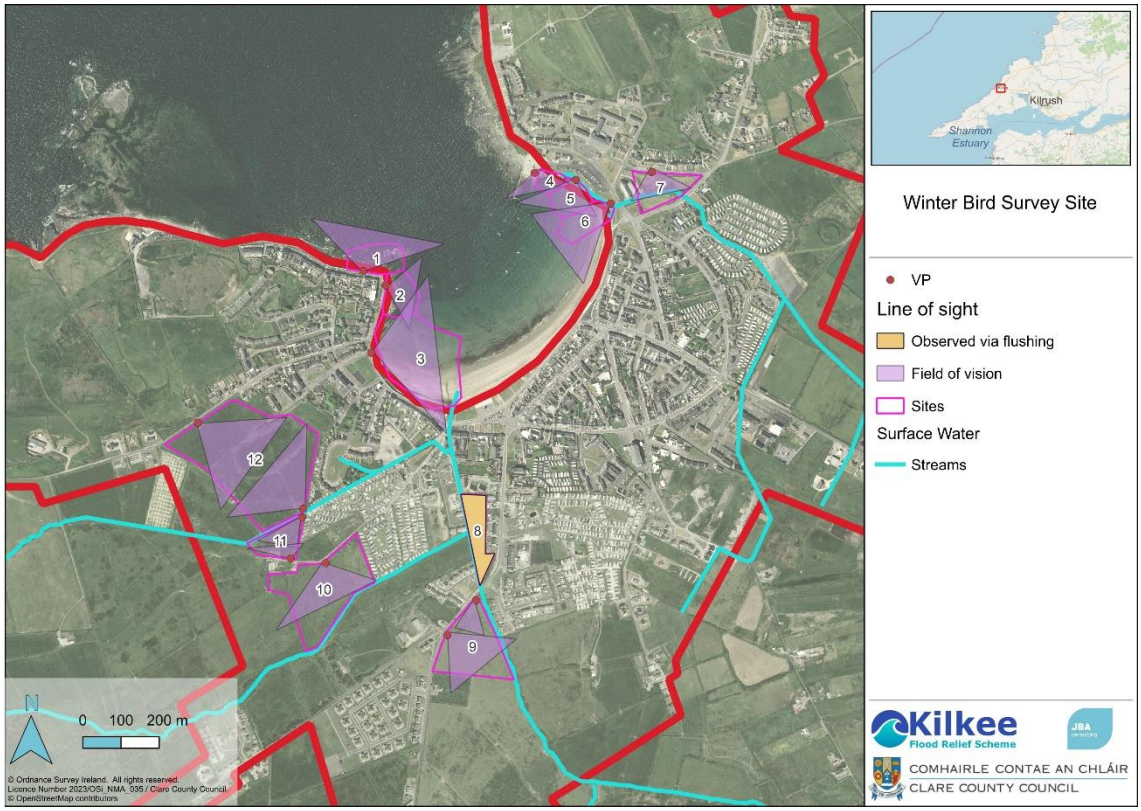

Figure 4-24: Location of 2022/2023 wintering bird survey sites and vantage points.

Table 4-2 outlines the QI species recorded for each date and their designations. The following QIs of the River Shannon and River Fergus Estuaries SPA were observed during these surveys: Cormorant *Phalacrocorax carbo,* Dunlin *Calidris alpina*, Curlew *Numenius arquata* and Redshank *Tringa tetanus*.

QIs of the Mid-Clare Coast SPA recorded during wintering bird surveys include Cormorant, Sanderling *Calidris alba*, Dunlin and Turnstone *Arenaria interpres*.

Table 4-2: QI species recorded during wintering bird surveys winter 2022/2023.

Species name	No.	Site	Tidal stage	QI species
22/11/2022				
Cormorant	1	1	Low	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Turnstone	1	1	Low	Mid-Clare Coast SPA
Dunlin *Calidris alpina*	1	1	Low	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Curlew	2	1	Low	River Shannon and River Fergus Estuaries SPA
Cormorant	1	1	High	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Cormorant	6	2	Low	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Turnstone	20	3	Low	Mid-Clare Coast SPA

Species name	No.	Site	Tidal stage	QI species
Dunlin	8	3	Low	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Dunlin	20	3	High	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Turnstone	2	3	High	Mid-Clare Coast SPA
Cormorant	13	4	Low	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Dunlin	1	4	Low	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
12/01/2023				
Dunlin	12	2	High	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Sanderling *Calidris alba*	4	3	High	Mid-Clare Coast SPA
Cormorant	1	4	High	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Black-headed Gull *Larus ridibundus*	4	6	High	River Shannon and River Fergus Estuaries SPA
02/03/2023				
Cormorant	1	1	Low	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Redshank *Tringa totanus*	3	2	Low	River Shannon and River Fergus Estuaries SPA
Dunlin	30	2	Low	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Curlew	1	2	Low	River Shannon and River Fergus Estuaries SPA
Dunlin	6	3	Low	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Dunlin	20	3	High	River Shannon and River Fergus Estuaries SPA, Mid-Clare Coast SPA
Turnstone	10	3	High	Mid-Clare Coast SPA
Redshank	1	3	High	River Shannon and River Fergus Estuaries SPA
Turnstone	1	4	Low	Mid-Clare Coast SPA

In general, the numbers of QI birds observed were low. The largest numbers were Dunlin (Max 30) Turnstone (Max 20) and Cormorant (Max 13). Low numbers of Black-headed Gull (Max 4), Sanderling (Max 4), Curlew (Max 2) and Redshank (Max 1) were observed during surveys. These populations are possibly part of wider SPA populations of the Mid Clare Coast and River Shannon and Fergus Estuaries SPA, but low/weak links are anticipated due to the distance.

The populations described in the conservation objectives for Dunlin and Turnstone are 2708 and 571 for the Mid-Clare Coast SPA respectively, and 60 breeding pairs for the Cormorant. The low numbers of the other birds (<4 birds maximum counts) indicate low importance of the sites for the overall populations. The bird populations in River Shannon and River Fergus Estuaries at Poulnasherry Bay are largely associated with the mudflats in the centre and

more towards the estuarine edge of the Poulnasherry Bay (NPWS 2012, 2014a), well away from Kilkee.

Breeding bird surveys

The breeding bird surveys did not indicate any QI species using the terrestrial sites. Results are presented within the EcIA.

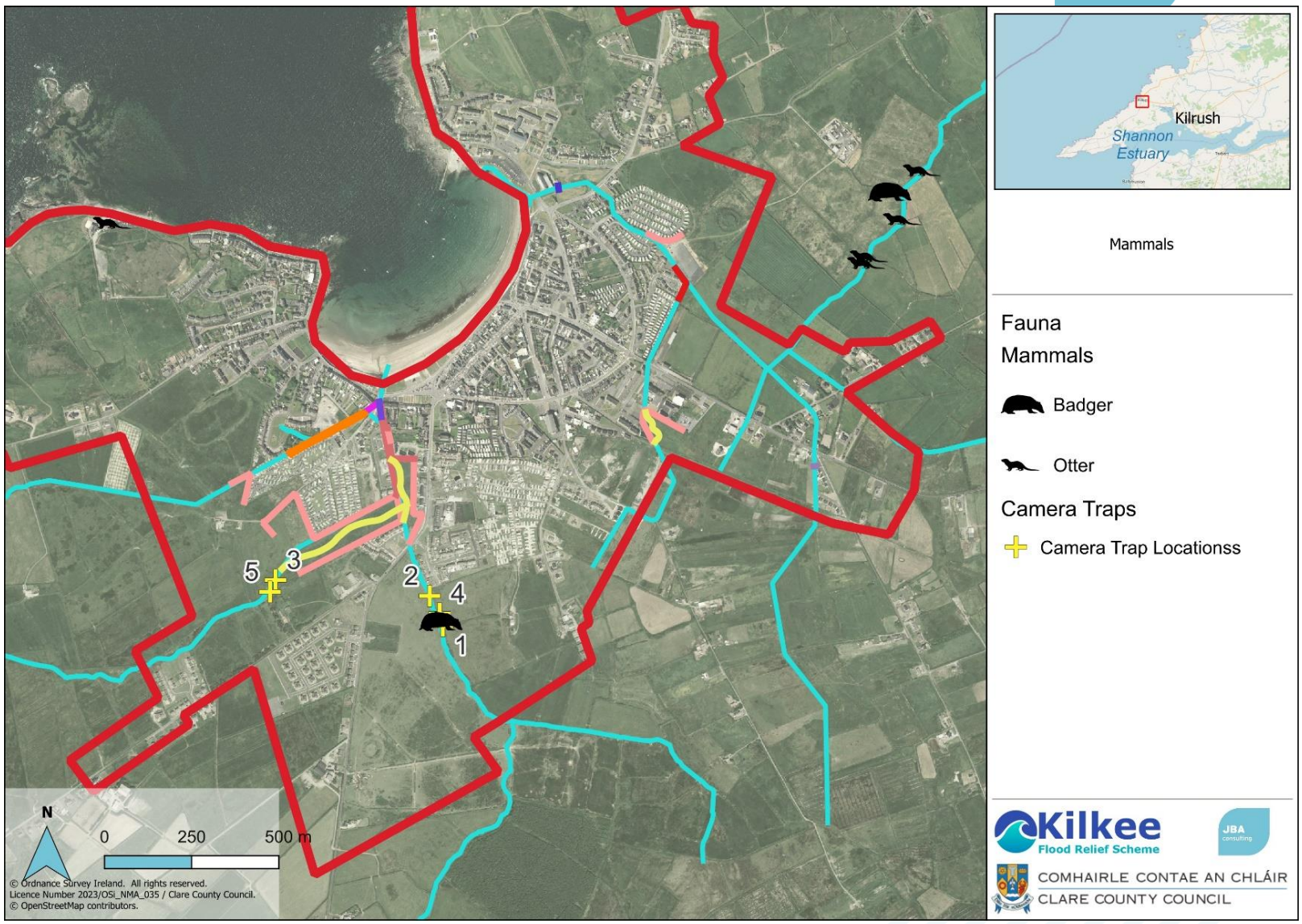

Figure 4-25: Locations of mammal signs and sightings recorded during site surveys; camera trap placement.

4.4 Invasive Non-native Species

A full list of invasive species recorded in the last ten years within the site with an additional 5km buffer is in Appendix B. These were sourced from the National Biodiversity Data Centre's biodiversity maps and databases. The following species listed under the Third Schedule of Regulation S.I. 477/2011 have been recorded within the study area in the NBDC database: Wireweed *Sargassum muticum*, Japanese Knotweed *Reynoutria japonica*, Three-cornered Garlic *Allium triquetrum* and Brown Rat *Rattus norvegicus*.

Invasive species recorded during survey

Third Schedule invasive species Japanese Knotweed was recorded during ecological site surveys (Figure 4-26). A significant stand was recorded along the east bank of the Victoria stream (Figure 4-27). This stand is currently being treated by Clare County Council. An individual record of Three-cornered Garlic, also a Third Schedule invasive species, was recorded behind the Cluain na Mara estate.

Other invasive species recorded during site surveys included Cherry Laurel *Prunus laurocerasus*, a high impact invasive species on native woodland and hedgerows.

It is highly likely that Brown Rat to be present within the study area, but no definite sightings or signs were recorded during the ecological surveys.

No non-native fish or aquatic plant species were recorded by Triturus during the fisheries assessment.

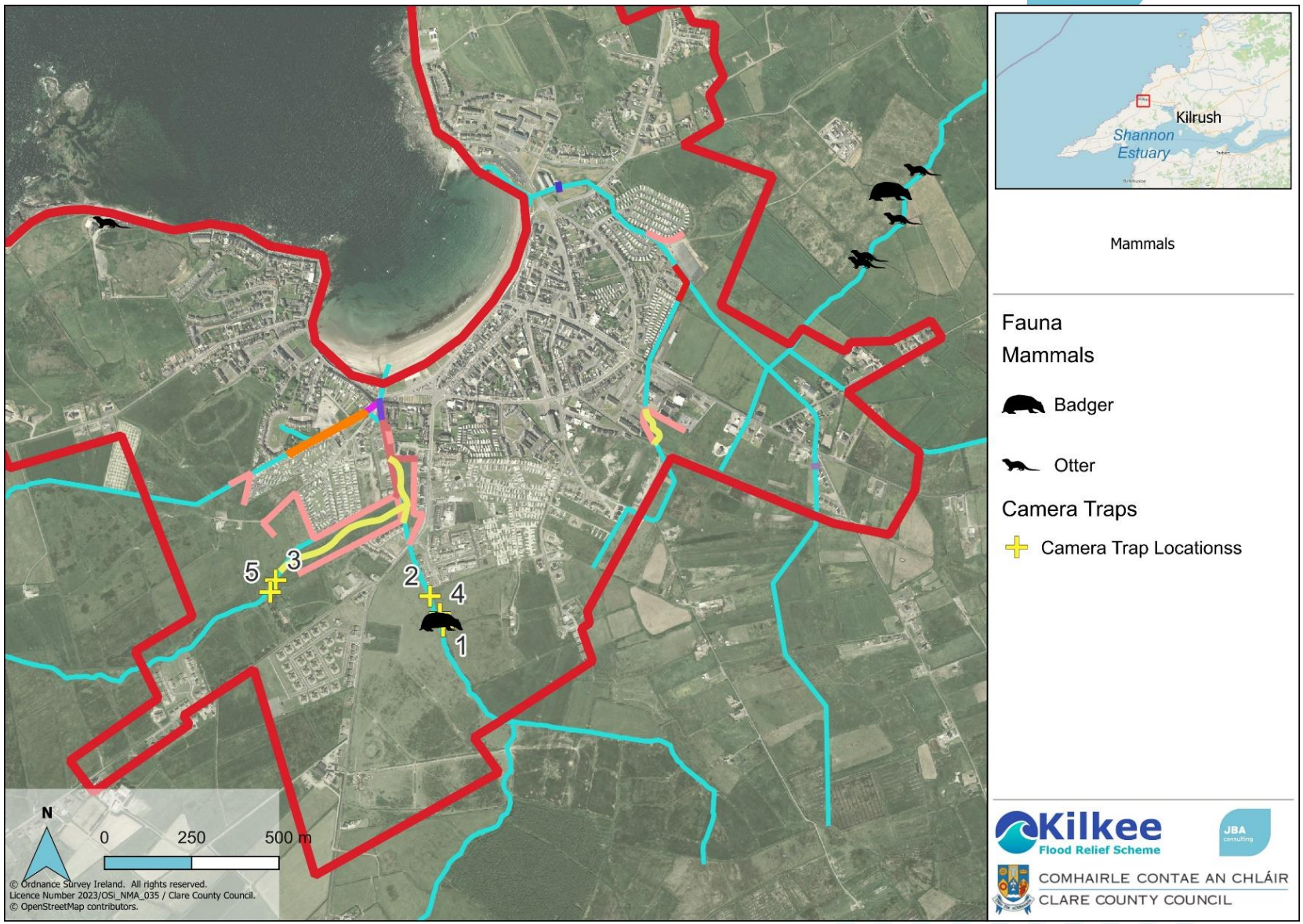

Figure 4-26: Invasive species recorded within the study area.

Figure 4-27: Japanese Knotweed stand recorded along the Victoria Stream banks.

4.5 Surface Waterbodies

The proposed FRS is located within the Kilkee_Lower_010 subbasin of the Doonah_SC_010 subcatchment. The proposed FRS works will take place along the Victoria (Waterbody code: IE_SH_27K650930 (Kilkee Lower), EPA code: 27K64), Well (IE_SH_27K650930, 27K65) and Atlantic (IE_SH_27K650930, no EPA code) streams, which drain directly into Kilkee Bay and therefore into the Kilkee Reefs SAC ≤100m downstream of the proposed works. The Kilkee Lower waterbody (IE_SH_27K650930) was last classed as being of 'Moderate' ecological status or potential (based on modelling, not monitoring assessment of the watercourse), and has not been reviewed for its risk of meeting its WFD 2027 targets. It is under significant pressure from agricultural and urban wastewater impacts from an agglomeration of population equivalent of 2,001 to 10,000. (EPA Catchment Science & Management Unit 2021; WFD 2022; EPA 2023a)

The surface water bodies are also described in Section 4.2.3.

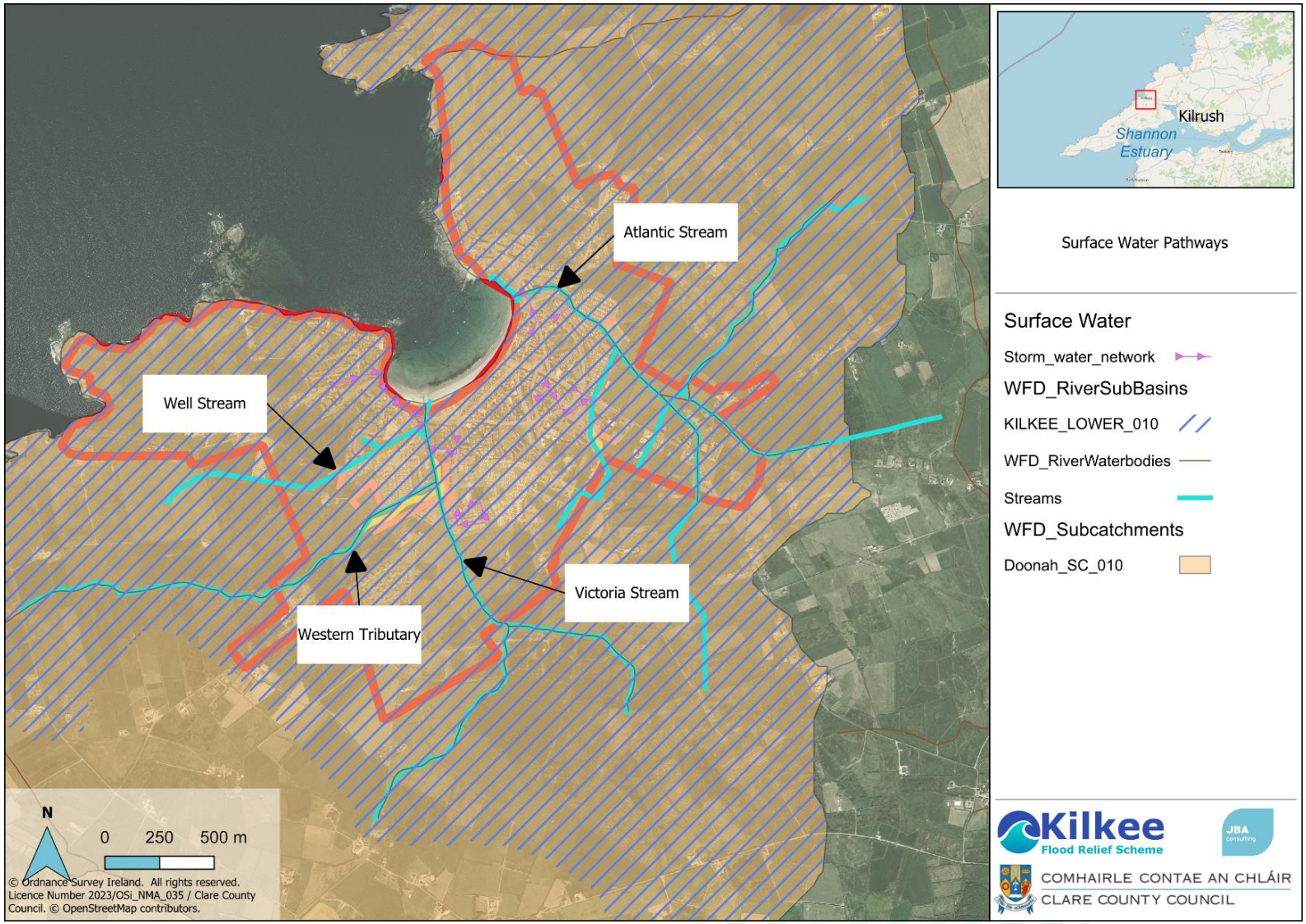

Figure 4-28: Surface waterbodies within the proposed FRS works area.

4.6 Groundwater Bodies

The proposed site is located within the Kilrush (IE_SH_G_123) groundwater body. The WFD last classified this groundwater body as being of 'Good' status and is not at risk of failing to meet its WFD 2027 targets (EPA 2023b).

Aquifer underlying the site is a locally important aquifer, which is moderately productive only in local zones. Aquifer with a limited and relatively poorly connected network of fractures, fissures and joints, giving a low fissure permeability which tends to decrease further with depth. A shallow zone of higher permeability may exist within the top few metres of more fractured/weathered rock, and higher permeability may also occur along fault zones. These zones may be able to provide larger 'locally important' supplies of water.

In general, the lack of connection between the limited fissures results in relatively poor aquifer storage and flow paths that may only extend a few hundred metres. Due to the low permeability and poor storage capacity, the aquifer has a low recharge acceptance. Some recharge in the upper, more fractured/weathered zone is likely to flow along the relatively short flow paths and rapidly discharge to streams, small springs and seeps. Groundwater discharge to streams can significantly decrease in the drier summer months. (GSI 2017, 2023)

Table 4-3: Underlying groundwater and geological conditions.

Feature	Source	Description
WFD Groundwater Body	EPA	Kilrush – IE_-SH_G_123
Teagasc Soils	GSI	Made ground, Blanket peat
Subsoils (Quaternary Segments)	GSI	Urban, Blanket peat
Subsoil Permeability	GSI	Low
Bedrock Geology	GSI	Sandstone, siltstone & mudstone
Bedrock Aquifer	GSI/EPA	Ll: Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
Groundwater Recharge	GSI	Well stream: 20% Victoria stream: 4% Atlantic stream: 4% Atlantic stream outfall: 20-85%
Groundwater Vulnerability	GSI/EPA	Well stream: Moderate Victoria stream: Low - Moderate Atlantic stream: Low – Moderate Atlantic stream outfall: High

5 Natura 2000 Sites

5.1 Determining Likely Zone of Influence (ZoI)

The DEHLG (2009) guidance identifies that Screening for Appropriate Assessment of a plan or project should consider the following Natura 2000 sites:

- Any Natura 2000 sites within or adjacent to the plan or project area.
- Any Natura 2000 sites within the likely zone of impact of the plan or project. This is dependent on the nature and scale of the plan, with 15km generally recommended for plans, but potentially much less for projects.
- Any Natura 2000 sites that are more than 15km from the plan or project area, but may potentially be impacted upon, for example, through a hydrological connection.

The project will primarily affect the site only, but a wider area of influence is used for impacts relating to

- noise and vibration disturbance (500m),
- air pollution (500m as per the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (IAQM 2024);
- groundwater - within the same groundwater body, where groundwater dependent habitats are present.
- surface water (all Natura 2000 sites downstream of the site, and upstream where migratory species are QI's, if relevant).
- and any supporting habitat for Qualifying Interest (QI) species within 15km

The final 'Zone of Influence' can be a complex shape not easily defined by a simple distance figure, but in this way the assessment includes all relevant sites whilst avoiding unnecessary inclusion of other sites. The Natura 2000 sites within the range are listed in Table 5-1 below and the locations of those within the project ZoI are shown in Figure 5-1

The ZOI also utilises the precautionary principle to identify Natura Sites present within the ZOI, and more detailed rational may be given during the screening assessment to exclude Natura Sites or individual qualifying interests.

Table 5-1: Natura 2000 sites located within the ZoI of the proposed FRS.

Natura 2000 site	Site code	Approximate direct distance from site	Approximate distance via nearest watercourse
Kilkee Reefs SAC	002264	100m	100m
Lower River Shannon SAC	002165	2km	No hydrological connection
Tullaher Lough and Bog SAC	002343	5km	No hydrological connection
Carrowmore Dunes SAC	002250	9.5km	7km via marine waterbody

Natura 2000 site	Site code	Approximate direct distance from site	Approximate distance via nearest watercourse
Carrowmore Point to Spanish Point and Islands SAC	001021	13km	14km via marine waterbody
River Shannon and River Fergus Estuaries SPA	004077	3km	No hydrological connection
Illaunonearaun SPA	004114	5km	16km via marine waterbody
Mid-Clare Coast SPA	004182	9km	13km via marine waterbody

The descriptions of the Natura 2000 sites within the ZoI are given in Sections 5.2.1 – 5.2.3.

Assessment of potential pathways to Natura 2000 sites is detailed in Table 5-2.

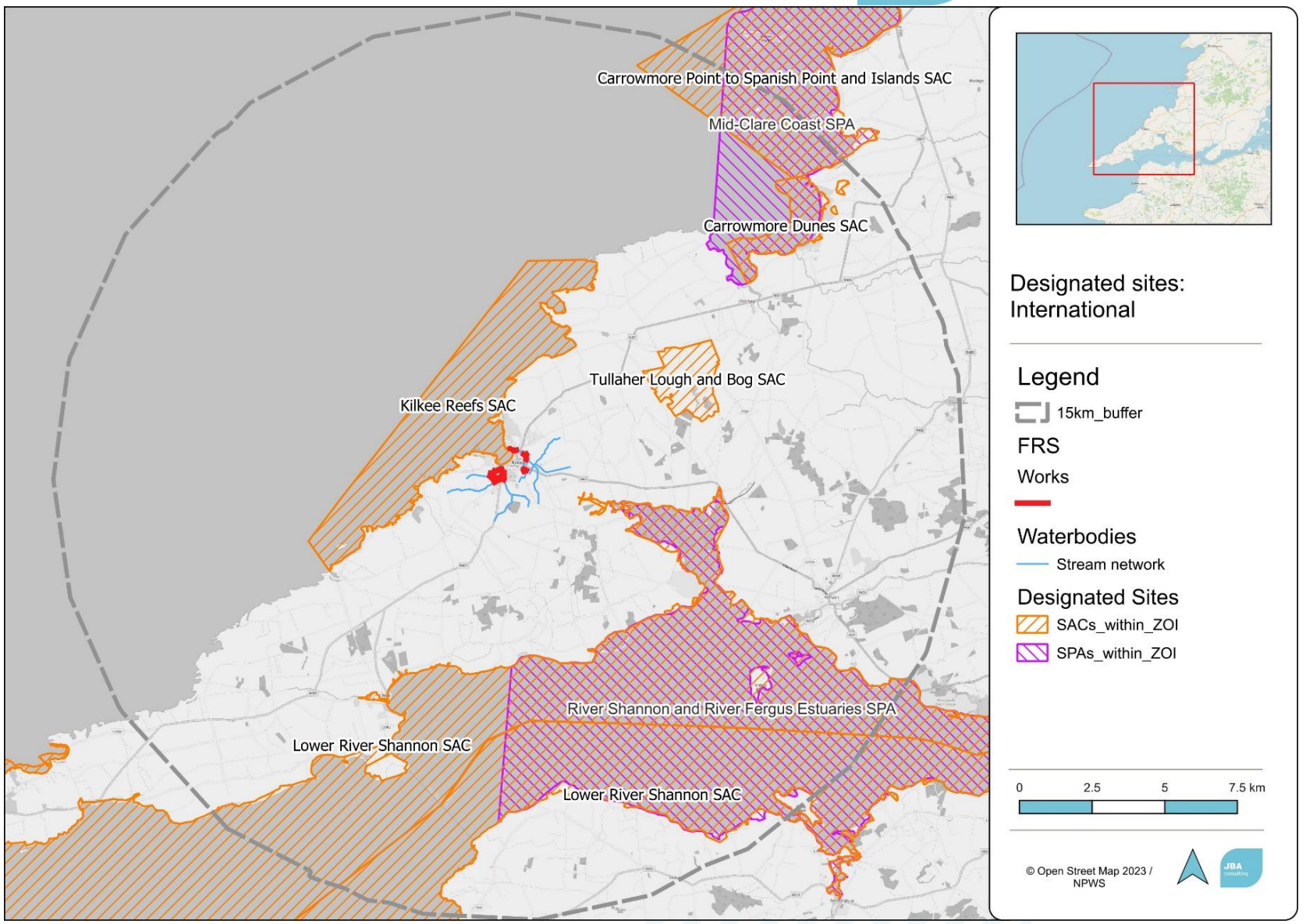

Figure 5-1: Natura 2000 sites within the project ZoI.

Table 5-2 Determination of Natura sites within ZoI via source-pathway-receptor model i.e. Pre-screening of Natura Sites. (* = priority; numbers in brackets are Natura 2000 codes)

Natura 2000 Site and distance from proposed FRS works	Qualifying Interests	Likely Zone of Influence determination	Further assessment required
Kilkee Reefs SAC 70m from proposed FRS	Habitats 1160 Large shallow inlets and bays 1170 Reefs 8330 Submerged or partially submerged sea caves	The proposed FRS is adjacent to the Kilkee Reefs SAC. QI habitats 1160 and 1170 are located <100m. Sea caves have been recorded at least 1.5km from the proposed works area, and any impact would be via a marine waterbody. Therefore they are considered outside the likely zone of influence. There is potential for surface water impacts directly and indirectly affecting the marine habitats of the SAC during construction.	Yes – Further assessment required for impacts on Large shallow inlets and bays [1160] and Reefs [1170]
Lower River Shannon SAC 2km from proposed FRS	Habitats 1110 Sandbanks which are slightly covered by sea water all the time 1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1150 Coastal lagoons* 1160 Large shallow inlets and bays 1170 Reefs 1220 Perennial vegetation of stony banks 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts 1310 Salicornia and other annuals colonising mud and sand 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) 1410 Mediterranean salt meadows (*Juncetalia maritimi*) 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and	There will be no direct effects as the project footprint is located entirely outside the designated site boundary. The QI habitats are terrestrial. Aquatic are not connected to site, as they are in different sub-catchments. The outfall from the proposed FRS is >25km from Kilkee Bay to the mouth of the River Shannon within the SAC via open marine waters. Therefore, no pathway for impact exists.	No – No viable pathway for impact is present.

Natura 2000 Site and distance from proposed FRS works	Qualifying Interests	Likely Zone of Influence determination	Further assessment required
	Callitricho-Batrachion vegetation 6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)* Species 1349 Common Bottlenose Dolphin *Tursiops truncatus* 1355 Otter *Lutra lutra* 1029 Freshwater Pearl Mussel *Margaritifera margaritifera* 1106 Salmon *Salmo salar* 1095 Sea Lamprey *Petromyzon marinus* 1096 Brook Lamprey *Lampetra planeri* 1099 River Lamprey *Lampetra fluviatilis*		
Tullaher Lough and Bog SAC 5km from proposed FRS	Habitats 7110 Active raised bogs* 7120 Degraded raised bogs still capable of natural regeneration 7140 Transition mires and quaking bogs 7150 Depressions on peat substrates of the Rhynchosporion	There will be no direct effects as the project footprint is located entirely outside the designated site boundary, and the QI habitats are terrestrial. No supporting habitat has been recorded as part of the surveys. Therefore, no pathway for impact exists.	No – No viable pathway for impact is present.
Carrowmore Dunes SAC 9.5km from proposed FRS	Habitats 1170 Reefs 2110 Embryonic shifting dunes 2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes) 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)* Species 1014 Narrow-mouthed Whorl Snail *Vertigo angustior*	There will be no direct effects as the project footprint is located entirely outside the designated site boundary, and the QI habitats and species are terrestrial. Therefore, no pathway for impact exists.	No – No viable pathway for impact is present.
Carrowmore Point to Spanish Point and Islands SAC	Habitats 1150 Coastal lagoons* 1170 Reefs	There will be no direct effects as the project footprint is located entirely outside the designated site boundary, and the QI	No – No viable pathway for impact is present.

Natura 2000 Site and distance from proposed FRS works	Qualifying Interests	Likely Zone of Influence determination	Further assessment required
13km from proposed FRS	1220 Perennial vegetation of stony banks 7220 Petrifying springs with tufa formation (Cratoneurion)*	habitats are located 13km from the proposed FRS via open marine waters. Therefore, no pathway for impact exists.	
River Shannon and River Fergus Estuaries SPA 3km from proposed FRS	Birds A054 Pintail *Anas acuta* A137 Ringed Plover *Charadrius hiaticula* A143 Knot *Calidris canutus* A056 Shoveler *Anas clypeata* A062 Scaup *Aythya marila* A179 Black-headed Gull *Chroicocephalus ridibundus* A140 Golden Plover *Pluvialis apricaria* A052 Teal *Anas crecca* A050 Wigeon *Mareca penelope* A141 Grey Plover *Pluvialis squatarola* A164 Greenshank *Tringa nebularia* A162 Redshank *Tringa totanus* A048 Shelduck *Tadorna tadorna* A017 Cormorant *Phalacrocorax carbo* A046 Light-bellied Brent Goose *Branta bernicla hrota* A142 Lapwing *Vanellus vanellus* A160 Curlew *Numenius arquata* A157 Bar-tailed Godwit *Limosa lapponica* A149 Dunlin *Calidris alpina* A156 Black-tailed Godwit *Limosa limosa* A038 Whooper Swan *Cygnus cygnus* Habitats A999 Wetlands and Waterbirds	This site is located 3km southeast of the proposed FRS. QI species Redshank, Cormorant and Curlew have been recorded during wintering bird surveys using the reefs and beach in Kilkee and may be associated with the SPA. This section of the reefs/shore may be supporting habitat for these bird species. There may be potential direct and indirect impacts on QI birds during the construction phase.	Yes – Further assessment required for QI species
Illaunonearaun SPA 5km from proposed FRS	Birds A045 Barnacle Goose *Branta leucopsis*	This site is located 5km southwest of the proposed FRS. Barnacle Goose have not been recorded during wintering bird surveys undertaken in Kilkee, and therefore are not likely to be impacted by the proposed FRS.	No – No viable pathway for impact is present.
Mid-Clare Coast SPA	Birds	This site is located 9km northeast of the	Yes – Further

Natura 2000 Site and distance from proposed FRS works	Qualifying Interests	Likely Zone of Influence determination	Further assessment required
9km from proposed FRS	A017 Cormorant *Phalacrocorax carbo* A148 Purple Sandpiper *Calidris maritima* A149 Dunlin *Calidris alpina* A169 Turnstone *Arenaria interpres* A144 Sanderling *Calidris alba* A137 Ringed Plover *Charadrius hiaticula* A045 Barnacle Goose *Branta leucopsis* Habitats A999 Wetlands and Waterbirds	proposed FRS. QI species Cormorant, Dunlin, Turnstone and Sanderling have been recorded during wintering bird surveys using the reefs and beach in Kilkee, and may be associated with the SPA. This section of the reefs/shore may be supporting habitat for these bird species. There may be potential direct and indirect impacts on QI birds during the construction phase.	assessment required for QI species

5.2 Description of European sites within the potential zone of influence

This section provides baseline information on the Natura 2000 sites within the Zone of Influence (ZoI) of the Scheme, as screened-in in Section 5.1. The following list included Natura 2000 sites that occur within the ZoI;

- Kilkee Reefs SAC
- River Shannon and River Fergus Estuaries SPA
- Mid-Clare Coast SPA

5.2.1 Kilkee Reefs SAC (002264)

The Kilkee Reefs are situated north of the River Shannon Estuary on the Co. Clare coast. The site stretches for approximately 12 km from Ballard Bay to Castle Point. The reefs are exposed to the full force of Atlantic swells from the west. A small shallow bay, Moore Bay, offers some shelter from wave action and a beach is present. The bedrock is Carboniferous millstone grit and flagstone. A few small islands are included, the largest being Bishop's Island.

The reefs are very exposed to wave action and support excellent examples of communities for this habitat, including one dominated by the mussel *Mytilus edulis*. Deep rock pools have the brown alga *Bifurcaria bifurcata*, whereas the shallower pools towards the low shore have the sea urchin *Paracentrotus lividus*. The low shore has communities characterised by the brown Thongweed *Himanthalia elongata* and *Alaria esculenta*. These communities, which are typical of western Ireland, are quite distinct from communities in similar habitats elsewhere in Ireland or north-west Europe. Sub-tidally there are good examples of a variety of reef communities. In shallow water the reefs are steeply sloping with kelp forests of algal species tolerant to sand scour. Communities with less dense kelp and red foliose algae occur and may be very species rich. In deeper water the gently sloping rock is characterised by good examples of the Axinellid sponge community with the sea-fan *Eunicella veruccosa*. The sponge *Phakellia vermiculata* which is rare in shallow water is present. Vertical cliff faces are characterised by the jewel anemone *Corynactis viridis* in both shallow and deep water.

The rocky shores within the site are extensive platforms with short vertical steps and have good examples of the range of communities found on shores that are extremely exposed to wave action. There are extensive zones of lichens, Channelled Wrack *Pelvetia canaliculata* and barnacles. The upper shore has an extensive community (300 m) of barnacles and limpets on an even platform of bedrock. Cracks and crevices provide a refuge for anemones (e.g., *Actinia equina*), mussels and snails (e.g., *Littorina saxatilis* and *Nucella lapillus*). The mid shore has an extensive community of Bladder Wrack *Fucus vesiculosus*, with the barnacles *Chthamalus montagui*, *Chthamalus stellatus* and *Semibalanus balanoides*, and the limpet *Patella vulgata*. Deep rock pools are characterised by pink encrusting coralline algae and *Corallina officinalis* under a canopy of brown algae (*Laminaria saccharina, Himanthalia elongata, Bifurcaria bifurcata*, *Laminaria digitata* and *Fucus serratus*).

The lower mid shore is characterised by extensive, dense beds of mussels, mixed with barnacles on higher, less exposed rock and with *Corallina officinalis* in damp, protected areas. This zone may also be very wide (300 m). Shallow pools with pink coralline crusts and the Purple Sea Urchin *Paracentrotus lividus* living in pits, are abundant. The subtidal fringe is characterised by a narrow band of *Himanthalia elongata* and *Alaria esculenta* on exposed vertical faces and Laminaria hyperborea and *Laminaria digitata* on horizontal surfaces. The walls of a surge gully are characterised by a dense faunal turf with the hydroid *Tubularia indivisa* and the jewel anemone *Corynactis viridis* the most abundant species. The boulders at the base of the gully support a kelp community with foliose and filamentous red algae, snails and crabs. The surge gully contains a diverse biota, with 86 species recorded.

This exposed reef community [exposed intertidal reef community complex] occurs throughout the site Carricknacleara in the north to Bealanglass Bay in the south [see Figure 3 in conservation objectives supporting document for the SAC].

The substrate here is sloping bedrock in the form of extensive platforms with crevices and ledges. Vertical rock faces occur on some of the more exposed headlands within the site.

The species associated with this community are the lichens *Xanthoria parietina, Verrucaria maura* and *Tephromela atra*, the gastropod *Patella vulgata*, the brown algae *Himanthalia elongata* and *Fucus serratus*, the red algae *Osmundea pinnatifida* and *Jania rubens* and the bivalve *Mytilus edulis*.

The brown alga *Pelvetia canaliculata* and the fungus *Lichina pygmaea* are frequently recorded on the upper shore and the gastropods *Melarhaphe neritoides* and *Nucella lapillus* also occur here. The barnacles *Chthamalus montagui* and *Chthamalus stellatus*, the brown alga *Fucus vesiculosus* and the gastropod *Gibbula cineraria* are recorded from the mid shore. The barnacle *Semibalanus balanoides* occurs on the mid to low shore. The brown algae *Laminaria digitata* and *Alaria esculenta* are recorded from the sublittoral fringe while surge gullies exhibit a rich faunal turf dominated by the hydroid *Tubularia indivisa* and the anemone *Corynactis viridis*. Cracks and crevices provide shelter for the anemone *Actinia equina* and the gastropod *Littorina saxatilis*. The brown algae *Saccharina latissima* and *Bifurcaria bifurcata* with an understory of encrusting calcareous red alga and *Corallina officinalis* are recorded from rock pools.

The site contains a number of submerged marine caves which have been formed due to the erosion of the sedimentary rock. These are known to occur in areas such as Donegal Point, George's Head and Biraghty Mor. The caves give shelter to a range of fauna species, including lobsters, crayfish, spider crabs and conger eels, and in summer may be visited by sunfish and triggerfish. Where light permits, soft corals, sponges, jewel anemones and colonial sea squirts crowd the walls.

The sandy beach at Kilkee is composed of brown-coloured, poorly sorted sand and is fairly flat over most of its width. There is a small amount of drift weed on the strand line and a sandhopper community is present. In the mid shore, polychaete worms (*Scolelepis foliosa* and *Arenicola marina*) are occasional to abundant. At the low shore, polychaete worms (*Nephthys hombergii, Scolelepis foliosa* and *Arenicola marina*) are abundant and amphipod crustaceans (e.g., *Bathyporeia pelagica*) are common.

'This community complex [sediment community complex] is recorded from the intertidal and shallow subtidal (<10m) zones in Moore Bay at Kilkee and at Ballard Bay [see Figure 3 in conservation objectives supporting document for the SAC].

The sediment of this complex is that of sand to coarse sediments. In general, fine sand predominates, particularly in the intertidal zone (ranging from 2.3% to 63.6%); medium sand ranges from 4.9% to 51.2% and coarse sand from 0.5% to 43.7% while very fine sand ranges from 0.2% to 33%. Gravel is generally negligible (<0.2%), with the exception of the mid shore (5.7%) and the shallow subtidal zone (22.86%). Silt-clay is negligible (<0.3%) within this complex.

The distinguishing species of this community complex are the crustaceans *Eurydice pulchra, Bathyporeia pelagica* and *Pontocrates arenarius*. These species are not uniformly distributed throughout the complex but where they occur their abundances are low. *Eurydice pulchra* and *Bathyporeia pelagica* are recorded from the intertidal extent of the community while *Pontocrates arenarius* occurs subtidally.

Several other species occur in this complex but are limited in their distribution and where these species occur their abundances are low. On Kilkee beach, the amphipod *Gammarus* sp., the polychaetes *Arenicola marina, Nephtys hombergii, Malacoceros fuliginosus, Capitella* sp., *Scolelepis (Scolelepis) squamata* and *Scolelepis foliosa* and unidentified nemerteans are recorded. The polychaetes *Sigalion* sp., *Nephtys* sp., *Nephtys assimilis, Nephtys cirrosa, Spiophanes bombyx, Magelona filiformis* and *Owenia fusiformis*, the crustaceans *Pontocrates altamarinus, Bathyporeia* sp. and *Iphinoe trispinosa* and the bivalve

Angulus fabula occur in the shallow subtidal zone (<5m) and the gastropod *Euspira nitida* is recorded in deeper water (>5m).

The polychaete *Magelona johnstoni* occurs across the tidal interface but is more abundant subtidally.

This site is of conservation importance as it has excellent examples of reefs and includes examples of a shallow bay and marine caves, all habitats listed on Annex I of the E.U. Habitats Directive. (NPWS 2014b, 2014c)

Qualifying Interests

The site is a 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):

- Large shallow inlets and bays [1160]
- Reefs [1170]
- Submerged or partially submerged sea caves [8330]

All the QIs of the SAC occur in the Zone of Influence of the proposed works (NPWS 2014d) and hence could be potentially significantly impacted through surface water, groundwater and land and air pathways.

Site Vulnerabilities

Identified negative threats and pressures on the Kilkee Reefs SAC are listed in Table 5-3.

Table 5-3: Threats and pressures to Kilkee Reefs SAC (NPWS 2019).

Code	Threat or pressure	Ranking and Location
J02.12.01	Sea defence or coast protection works, tidal barrages	H, i
F02.03	Leisure fishing	L, i
G05	Other human intrusions and disturbances	H, i
G05.01	*Trampling, overuse*	
G05.02	*Shallow surface abrasion/mechanical damage to seabed surface (e.g., by contact with scuba divers/snorkellers, incurred by three-dimensional organisms present on reefs)*	
G05.03	*Penetration/disturbance below surface of the seabed (e.g., by anchoring/mooring on reefs, in Posidonia meadows)*	
G05.04	*Vandalism*	
G05.05	*Intensive maintenance of public parks/cleaning of beaches*	
G05.06	*Tree surgery, felling for public safety, removal of roadside trees*	
G05.07	*Missing or wrongly directed conservation measures*	
G05.08	*Closures of caves or galleries*	
G05.09	*Fences, fencing*	
G05.10	*Overflying with aircrafts (agricultural)*	
G05.11	*Death or injury by collision (e.g., marine mammals)*	
G01.01	Nautical sports	M, i
Location: i = inside, o = outside, b = both Rank: H = high, M = medium, L = low		

5.2.2 River Shannon and River Fergus Estuaries SPA (004077)

This site is located 3km from of the proposed FRS. However, the habitats within Kilkee Bay may provide supporting habitat for the Qualifying Interests of the SPA.

This site is of great ornithological interest, being of international importance on account of the numbers of wintering birds it supports. It also supports internationally important numbers of three species, i.e., Dunlin, Black-tailed Godwit and Redshank. In addition, there are 16 species that have populations of national importance. For several of the bird species, it is the top site in the country. Also of note is that three of the species which occur regularly are listed on Annex I of the E.U. Birds Directive i.e., Whooper Swan, Golden Plover and Bar-tailed Godwit. The site is most effectively censused from the air, and this is carried out most winters (NPWS, 2015).

Qualifying Interests

The River Shannon and River Fergus Estuaries SPA is designated for the following Qualifying Interests:

- A017 Cormorant *Phalacrocorax carbo* breeding and wintering
- A038 Whooper Swan *Cygnus cygnus* wintering
- A046 Light -bellied Brent Goose *Branta bernicla* wintering
- A048 Shelduck *Tadorna tadorna* wintering
- A050 Wigeon *Anas penelope* wintering
- A052 Teal *Anas crecca* wintering
- A054 Pintail *Anas acuta* wintering
- A056 Shoveler *Anas clypeata* wintering
- A062 Scaup *Aythya marila* wintering
- A137 Ringed Plover *Charadrius hiaticula* wintering
- A140 Golden Plover *Pluvialis apricaria* wintering
- A141 Grey Plover *Pluvialis squatarola* wintering
- A142 Lapwing *Vanellus vanellus* wintering
- A143 Knot *Calidris canutus* wintering
- A149 Dunlin *Calidris alpina* wintering
- A156 Black-tailed Godwit *Limosa limosa* wintering
- A157 Bar-tailed Godwit *Limosa lapponica* wintering
- A160 Curlew *Numenius arquata* wintering
- A162 Redshank *Tringa totanus* wintering
- A164 Greenshank *Tringa nebularia* wintering
- A179 Black-headed Gull *Chroicocephalus ridibundus* wintering
- A999 Wetlands and Waterbirds

Given the mobile nature of the Qualifying Interests of this SPA, the proximity of the proposed FRS and in relation to birds recorded during the wintering bird surveys, the following SPA bird species shall be considered in the assessment:

- Cormorant *Phalacrocorax carbo*
- Dunlin *Calidris alpina*

- Curlew *Numenius arquata*
- Redshank *Tringa totanus*

Site Vulnerabilities

Identified negative threats and pressures on the River Shannon and River Fergus Estuaries SPA are listed in Table 5-4.

Table 5-4: Threats and pressures to River Shannon and River Fergus Estuaries SPA (NPWS, 2017b).

Code	Threat or pressure	Ranking and Location
E02	Industrial or commercial areas	H, o
G01.01	Nautical sports	M, i
E03	Discharges	H, i
D03.02	Shipping lanes	M, i
A08	Fertilisation	H, o
F01	Marine and Freshwater Aquaculture	M, i
E01	Urbanised areas, human habitation	H, o
Location: i = inside, o = outside, b = both Rank: H = high, M = medium, L = low		

5.2.3 Mid-Clare Coast SPA (004182)

This site is located 9km northeast of the proposed FRS. However, the habitats with Kilkee Bay may provide supporting habitat for the Qualifying Interests of the SPA.

The Mid-Clare Coast SPA is of high ornithological importance and supports an internationally important population of Purple Sandpiper, and nationally important populations of wintering Barnacle Goose and four wader species (Ringed Plover, Dunlin, Sanderling and Turnstone). In summer it is utilized by a range of breeding seabirds including a nationally important colony of Cormorant. Of particular note is that Barnacle Goose, Storm Petrel, Golden Plover, Great Northern Diver and Red-throated Diver are listed on Annex I of the E.U. Birds Directive. Part of the Mid-Clare Coast SPA is a Wildfowl Sanctuary. (NPWS 2015)

Qualifying Interests

The Mid-Clare Coast SPA is designated for the following Qualifying Interests:

- A017 Cormorant *Phalacrocorax carbo* breeding and wintering
- A045 Barnacle Goose *Branta leucopsis* wintering
- A137 Ringed Plover *Charadrius hiaticula* wintering
- A144 Sanderling *Calidris alba* wintering
- A148 Purple Sandpiper *Calidris maritima* wintering
- A149 Dunlin *Calidris alpina* wintering
- A169 Turnstone *Arenaria interpres* wintering
- A999 Wetlands and Waterbirds

Given the mobile nature of the Qualifying Interests of this SPA, the proximity of the proposed FRS and in relation to birds recorded during the wintering bird surveys, the following SPA bird species shall be considered in the assessment:

- Cormorant *Phalacrocorax carbo*
- Sanderling *Calidris alba*
- Dunlin *Calidris alpina*
- Turnstone *Arenaria interpres*

Site Vulnerabilities

Identified negative threats and pressures on the Mid-Clare Coast SPA are listed in Table 5-5.

Table 5-5: Threats and pressures to Mid-Clare Coast SPA (NPWS 2020).

Code	Threat or pressure	Ranking and Location
G01.01	Nautical sports	M, i
G01.02	Walking, horse riding and non-motorised vehicles	M, i
A04	Grazing	M, o
F02.03	Leisure fishing	M, i
A04	Grazing	M, i
Location: i = inside, o = outside, b = both Rank: H = high, M = medium, L = low		

6 Other Relevant Plans and Projects

As part of the Screening for an Appropriate Assessment, in addition to the proposed works, other relevant projects and plans in the region that may induce cumulative impacts must also be considered at this stage.

The following projects or plans were identified as potential sources of cumulative impacts:

- Clare County Development Plan 2023-2029
- River Basin Management Plan 2022-2027
- Other projects granted planning permission in the vicinity of the site

6.1 Plans

6.1.1 Clare County Development Plan 2023-2029

The Clare County Draft Development plan 2023-2029 sets out five strategic principles including sustainability, by encouraging the integration of economic, environmental, social and cultural considerations into policies and objectives, climate action through the implementation of the National Planning Framework, and resilience to ensure goals are achieved. These strategies are implemented within the legislative and policy context that Ireland has ratified, including the EU birds and habitats directives and the EU biodiversity strategy 2030, but also national and county biodiversity action plans (CCC 2021).

Therefore, provided that any works that may occur as a result of the Plan are assessed for individually or included in the NIS for the Plan, the Plan should not significantly adversely affect relevant Natura 2000 sites in combination with the proposed project.

6.1.2 River Basin Management Plan for Ireland 2022-2027

The Water Framework Directive (Directive 2000/60/EC 2000) requires that all waters, including surface and groundwater sources, are protected and that measures are put in place to ensure quality of these waters is restored to at least 'good' status or good potential by 2027 at the latest. The directive requires reporting of river basin management plans to assess the water bodies, their pressures, and relevant plans towards achieving good status. In implementing the river basin management plan, the objective is to ensure that natural waters are sustainably managed and that freshwater resources are protected so as to maintain and improve Ireland's water environment (DHLGH 2022). Therefore, any development needs to take into consideration the aims and objectives of the management plan.

6.2 Other Projects

Planning applications in the vicinity of the Proposed Project which could act in-combination with the maintenance works at the scheme channels were sought on the planning website MyPlan.ie. Planning applications from the last three years that have been granted permission are considered. Applications for home extensions, internal alterations and retention are not considered.

Table 6-1: Other projects granted planning permission within 2km of the proposed FRS within the last 3 years.

Planning Reference	Address	Application status	Decision date	Summary of development
22825	West End, Kilkee, Co. Clare	Conditional permission	4/11/2022	To construct a new dwelling house with connection to public services and all other associated site works
21884	Kilkee Sub Aqua Club, Pound Street, Kilkee Co Clare	Conditional permission	15/10/2021	To demolish existing Dive Centre Building and close up existing entrance. To construct new Dive Centre Building consisting of 2 No. Rib Storage areas, changing area, toilets office and briefing room. New vehicular entrance, internal road, footpaths and parking spaces and ancillary site works, including connection to public sewer / services
211336	Circular Road, Kilkee, Co Clare	Conditional permission	8/2/2022	To construct dwelling house and connect to existing public services remove existing domestic shed plus all ancillary site works
21804	Circular Road, Kilkee, Co Clare	Conditional permission	22/9/2021	To construct a new dwelling house, site entrance and access road along with all associated site works and ancillary services
22311	Dough, Kilkee, Co. Clare	Conditional permission	21/9/2022	Development which will consist of a dwelling house and proprietary wastewater treatment system & percolation area together with ancillary site works
22395	Strand Line, Kilkee, Co. Clare	Conditional permission	14/4/2023	Development at St Joseph's, Strand Line, Kilkee, Co Clare. 1) Demolition of existing single storey dwelling. 2) Construction of new 3 storey private residence and 3) all associated site works including connection to public services
21605	Carrigaholt Road, Kilkee, Co Clare	Conditional permission	30/7/2021	To construct two no. new dwelling houses, storage shed and all associated site works and ancillary services

6.3 Summary of Cumulative Effects

The projects and plans listed above are considered in combination with the currently proposed project in the screening section (Section 7) below.

7 Screening Assessment

7.1 Introduction

This screening exercise will focus on assessing the potential for significant effects from the project on the Natura 2000 sites identified in Section 5 above, which are:

- Kilkee Reefs SAC
- River Shannon and River Fergus Estuaries SPA
- Mid-Clare Coast SPA

This section identifies the potential impacts which may arise as result of the proposed project. It then goes on to identify how these impacts could potentially impact on Natura 2000 sites listed in Section 5. The significance of potential impacts is also assessed, with any potential in-combination effects also identified.

This section further examines the source > pathway > receptor chains that could potentially result in adverse effects arising on the Kilkee Reefs SAC, River Shannon and River Fergus Estuaries SPA and Mid-Clare Coast SPA.

7.2 Impact Identification

An impact identification exercise was carried out to determine the potential impacts from the project. This is not intended to be exhaustive at this point, but to determine the requirement for bringing forward the project to Stage 2 Appropriate Assessment, and to determine which pathways for impact to the SAC/SPAs are viable, taking into account the nature of the source. The precautionary principal is applied at this Stage 1 Appropriate Assessment.

Table 7-1: Preliminary identification of potential sources of impact.

Potential impact	Pathway
Release of sedimentation from instream works	Hydrological
Release of nutrients onto the reefs (via all sediment, but including via the release of existing nutrient rich sediment on the riverbed).	Hydrological
Release of pollutants from machinery	Hydrological
Dust from imported material for building the new embankment/removal of material/raising embankment heights	Air
Emissions from machinery	Air
Impacts on instream species leading to reducing foraging for QI species	Land (Species)
Disturbance of QI birds	Land (Species)
Invasive Non-native Species - spread of existing, introduction via imported material.	Land (spread) and Hydrological (spread)

7.3 Assessment Criteria

Potential adverse impacts that could cause a significant effect on the qualifying interests of the Natura 2000 sites, during the construction and operational phases of the project, could impact on the sites via surface water pathways, groundwater pathways and land and air pathways. Using the source-pathway-receptor model allows impacts to be eliminated if no viable pathway or receptor is present.

- Surface water pathways: Pollution and sedimentation can have impacts on surface water quality, and impact species dependent on instream water quality. Pollution and sedimentation can also impact on the quality of surface water dependent habitats.
- Groundwater pathways: Impacts include contamination of groundwater, disruption of groundwater flow, or abstraction of water can impact on groundwater quality and quality of groundwater dependent habitats.
- Land impacts can occur through direct physical impact (i.e., loss of supporting habitat) and air pathways can occur through emissions of airborne particles or pollutants, or through noise and visual disturbance.

The proposed project has the potential for impact on the Qualifying Interests of the Kilkee Reefs SAC due to the presence of a direct hydrological connection between the proposed works and the SAC. Due to its proximity to the site, the proposed project also poses potential impacts to the Kilkee Reefs SAC via land and air pathways.

Some Qualifying Interests of the Natura 2000 sites are not likely to be significantly impacted due to the location of the works in relation to their distribution e.g. Caves 8330] are located >1.5km from the project area, and no pathway for impact from the project was considered viable for this type of ecological receptor.

From the baseline and desktop surveys, the QI habitats and species present in the immediate surrounds of the proposed FRS, and therefore those most likely to be impacted by the works are listed below.

Therefore, Kilkee Bay SAC QI Habitats and species with the potential for impacted by the works include:

- Large shallow inlets and bays [1160]
- Reefs [1170]
- QI wintering bird species of the River Shannon and Fergus Estuaries SPA and Mid-Clare Co that have been recorded using the Kilkee Bay area during the bird surveys:
    - Cormorant *Phalacrocorax carbo* [A017],
    - Dunlin *Calidris alpina* [A149],
    - Curlew *Numenius arquata*, [A160],
    - Redshank *Tringa totanus* [A162],
    - Turnstone *Arenaria interpres* [A169],
    - Sanderling *Calidris alba* [A144], and
    - Wetlands and Waterbirds [A999].

The rationale for including/excluding impacts via the main pathways is given in more detail in the following section.

7.3.1 Surface Water Pathways

There are several surface water pathways between the proposed FRS and the Kilkee Reefs SAC via the Victoria, Well and Atlantic streams. The two main works sites are located adjacent to these watercourses, which drain into Kilkee Bay (and hence the Kilkee Reefs SAC) ≤100m downstream. QIs at this distance include Large shallow inlets and bays [1160] and Reefs [1170] (NPWS 2014d).

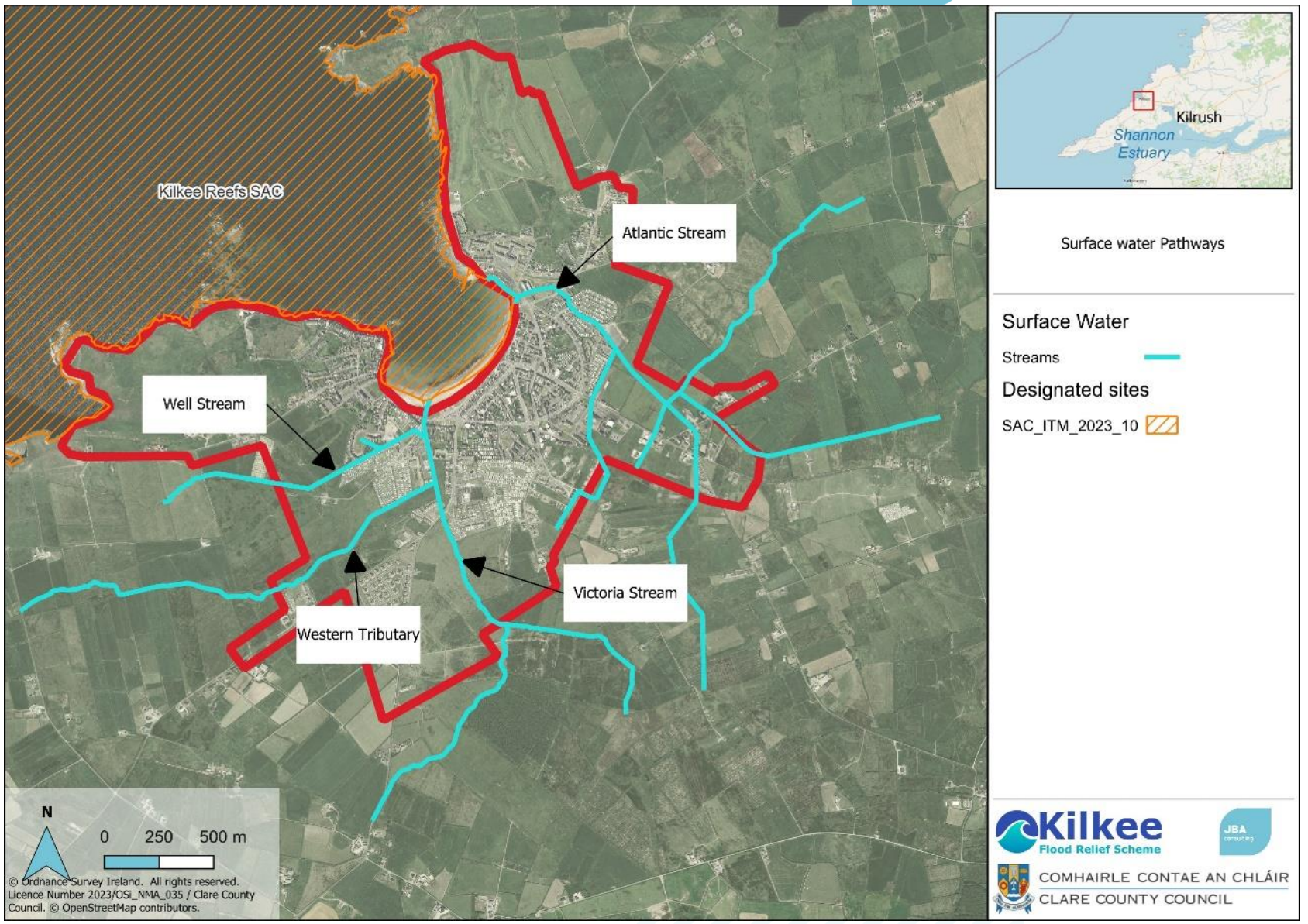

Figure 7-1: Surface water pathways.

Potential effects via the surface water pathway from this project during the construction and operational phases are discussed separately below.

Construction Phase

During site preparation, removal of existing infrastructure, excavations, piling and construction of new walls and embankments, there is potential for accidental release of suspended solids, nutrients and pollutants (including accidental spillages from machinery) into the adjacent Victoria, Well or Atlantic streams and hence the Kilkee Reefs SAC associated habitats downstream during the construction phase, and QI species using supporting habitat within Kilkee Bay.

Some sections of the FRS are adjacent to the Kilkee Reefs SAC, and supporting habitat in Kilkee Bay for QI bird species recorded foraging in the area (see Section 4.3.2 Birds). Release of suspended solids, dust, hydrocarbons from construction activities could have significant effects on water quality, turbidity, smothering etc. within the Kilkee Reefs SAC, and hence impact prey availability for QI species within supporting habitat in Kilkee Bay.

Construction works can impact directly on fish populations through the direct mortality of adult cohorts and/or juvenile fish in addition to killing eggs on/or within river substrata should chemicals such as hydrocarbons or concrete be introduced into the water column. Indirect impacts can occur as a result of the smothering of spawning substrata with suspended solids making them unviable for spawning and thus reducing the longer-term prospects of survival for fish populations. Significant repair works such as flood defence wall installation or reparation works may give rise to the release of suspended solids downstream.

Impacts on aquatic species in-stream may have indirect impacts on foraging QI bird species in Kilkee Bay. However, given the distance to the SPAs, the low numbers of birds recorded throughout the wintering bird surveys (not significant percentages of the populations recorded using the Mid-Clare Coast SPA and River Shannon and River Fergus Estuaries SPA), and the habitat type present not being optimal for the wetland and waterbird QIs recorded; these are not anticipated to have significant adverse effects on the conservation objectives for these species.

Therefore, in the absence of mitigation, there is the potential for significant effects on the Kilkee Reef SAC as a result of the construction phase of the proposed project.

Significant adverse effects on wintering wetland and waterbirds [A999], Cormorant [A017], Dunlin [A149], Curlew [A160], Redshank [A162], Sanderling [A144] and Turnstone [A169] are not anticipated.

Operational Phase

Once operational, the FRS will reduce the flood area in urban parts of Kilkee, reducing the likelihood of pollutants being mobilised and entering the watercourse during flood events. Point sources which will be protected from flooding include houses, roads, cars and parking areas, and sewers.

The flood defence walls and embankments will be permanent structures that are not anticipated to result in additional discharges to surface waterbodies connected to the SAC during the operational phase of the FRS.

Periodic maintenance of embankments and drainage features (i.e., clearing build-up of silt/vegetation) will contribute to additional sediment emissions to watercourses. This is not anticipated to have significant adverse effects on the Kilkee Reefs SAC or QI bird species.

Therefore, in the absence of mitigation, significant effects via surface water pathways are not anticipated during the operational phase of the proposed FRS.

7.3.2 Groundwater Pathways

Construction Phase

Given the proximity of the proposed FRS to the Victoria, Well and Atlantic streams, it is anticipated that any connection to groundwater or the water table is expected to be connected to these streams, and therefore is a surface water pathway. There are no groundwater-dependent QIs of any Natura 2000 sites present within the project ZoI.

Therefore, significant adverse effects via groundwater pathways are not anticipated during the construction phase of the proposed FRS.

Operational Phase

No potential for significant effects via groundwater pathways has been identified for the operational phase of the proposed FRS.

Due to the nature of the proposed works, there are no potential significant effects expected via groundwater pathways to any Natura 2000 sites.

7.3.3 Land and Air Pathways

No direct physical impacts will occur on the Kilkee Reefs SAC, Mid-Clare Coast SPA or River Shannon and River Fergus Estuaries SPA.

Disturbance and Noise

Construction Phase

Construction works along the boundary of the Kilkee Reefs SAC and supporting habitat for QI bird species in Kilkee Bay will generate noise and disturbance as a result of machinery operation and workforce movement during the construction phase of the project.

Cormorant, Dunlin, Curlew, Turnstone, Redshank, and Sanderling, QIs of the SPAs within the project ZoI were observed feeding at several locations within Kilkee Bay. In particular, Cormorant, Dunlin and Turnstone have been observed on the eastern end of Kilkee Bay, in proximity to the Atlantic stream outfall, which is to be reconstructed as part of the FRS works.

Black-headed Gull, a QI of the River Shannon and River Fergus Estuaries SPA, were only observed flying overhead, and not feeding or roosting around Kilkee Bay; however, using the precautionary principle, it is assumed that they may be feeding within Kilkee Bay.

The QI bird species mentioned may be affected through noise and physical disturbance impacts during the construction phase of the FRS due to the presence of machinery and increased human presence in the vicinity of supporting habitat.

However, due to distance of the FRS works from the western end of Kilkee Bay, species only recorded at this end of Kilkee Bay, i.e., Curlew, Redshank, and Sanderling are not considered likely to suffer disturbance impacts during the construction phase of the FRS.

Additionally, it was noted during wintering bird surveys of Kilkee Bay that bird species feeding in the area are subject to regular disturbance by humans and dogs walking on the beach and steps at the north-eastern edge at the outfall of the Atlantic Stream. This was observed to deter more disturbance prone birds from using the site, but gulls continued to use the reefs at the north-eastern.

Section 4.3.2 indicates that the populations of QI birds utilising the relevant areas in Kilkee are low, and a weak link with the QI populations i.e. the site is not of high value to birds that may travel from SPAs to use this site for foraging.

Hence, due to the

- temporary nature of the works;
- the relatively small section of supporting habitat in which works are to take place;
- the non-breeding nature of the habitat;
- the distance from the SPAs; and
- the ongoing daily disturbance at the site from people
- the low numbers of QI species utilising the area

it is considered that the QI bird species using supporting habitats within Kilkee Bay are not likely to suffer significant effects via noise and disturbance impact pathways.

Operational Phase

No significant noise and disturbance effects are anticipated during the operational phase of the proposed project.

Therefore, in the absence of mitigation, wintering wetland and waterbirds [A999], in particular Cormorant [A017], Dunlin [A149], Curlew [A160], Redshank [A162],

Sanderling [A144] and Turnstone [A169] are not expected to suffer significant effects via noise and disturbance pathways as a result of the proposed FRS.

Air

Construction Phase

Construction works will require the use of machinery which will lead to potential increase in air emissions in the works area. Significant effects on QI bird species using Kilkee Bay are not anticipated as a result of minor air emissions during the construction phase.

Some mobilisation of dust could be anticipated during the construction of new embankments (including removal/importation of material), especially during drier, windier periods. Tidal areas are likely to carry away any sedimentation but areas of reefs [1170] that are only covered intermittently at very high tides may be subject to a fallout of dust particles. However, this habitat is not considered to be vulnerable from air pollution impacts. Therefore impacts on Kilkee Reefs SAC are not anticipated due to the

- temporary nature of the works;
- the low mobilisation potential of the works involved i.e. no major sources of dust are anticipated
- the distance of the works are from the reefs (most dust will fall out in the immediate vicinity of the works)
- the tidal nature of the reefs which will wash away mobilised sediment.
- the non-sensitive nature of the habitat present (e.g. subjected to sediment from the sand on the beach)

Therefore, in the absence of mitigation, there is no potential for significant effects via mobilisation of dust on QI habitats of Kilkee Reefs SAC during the construction phase.

Operational Phase

During the operational phase, no significant air and climate effects are expected as a result of the proposed FRS.

Due to the nature and scale of the proposed FRS, QIs of Natura 2000 sites are not likely to suffer significant effects via air pathways as a result of the proposed FRS during the operational phase.

Invasive Non-native Species

Construction Phase

A stand of Japanese Knotweed is present on the east bank of the Victoria stream where a new flood embankment is proposed to be constructed. This stand is currently being treated by Clare County Council, but will likely be present on-site during the construction phase of the FRS. Three-cornered Garlic has been recorded north of the Cluain na Mara estate, in the field through which the Western Tributary is to be diverted.

Construction works are likely to cause the spread of Japanese Knotweed and Three-cornered Garlic beyond the site in the absence of mitigation measures. Japanese Knotweed and Three-cornered Garlic are listed on the Third Schedule of Regulation S.I. 477/2011 – European Communities (Birds and Natural Habitats Regulations) 2011 and is subject to restrictions under Regulations 49 and 50. This means that it is illegal to allow or cause the dispersal or spread of Japanese Knotweed or Three-cornered Garlic; specific work methods will be required in the vicinity of this invasive species during construction.

However, due to the nature of the Natura 2000 sites within the project ZoI (marine habitats) it is not likely for the invasive non-native species Japanese Knotweed or Three-cornered Garlic to spread to any QIs of Natura 2000 sites, and hence there is no potential for significant effects on Natura 2000 sites.

7.3.4 Cumulative Impact / In-combination Effects

As the proposed project is likely to result in temporary and localised impacts on Natura 2000 sites during the construction phase of the proposed FRS, and based on the screening statements of the above plans and planning applications, there is the potential for other projects granted planning permission, such as the demolition and reconstruction of the Dive Centre Building and associated site works (planning reference: 21884) to have in-combination effects via surface water pathways during its construction phase, if carried out at the same time as the proposed FRS construction works, due to its location along the Atlantic stream. This has the potential to cause cumulative/in-combination effects on the Kilkee Reefs SAC.

7.3.5 Do Nothing Impact

If the 'do-nothing' approach is adopted and the development of the Kilkee FRS does not take place, flooding events will keep occurring within the residential and road/access areas of the town, resulting in reoccurring and long-term socio-economic pressures on the local community. This could result in the requirement for emergency works or ad-hoc remedial measures in the future, such as sandbags and re-pointing of walls, which may negatively affect Natura 2000 sites if they proceed without the coherent and rational approach of a flood relief scheme.

7.4 Summary

Due to the site location and the nature and scale of the proposed project, significant effects via groundwater and land and air pathways to the listed Natura 2000 sites are not anticipated, either alone or in combination with other projects. Significant effects via surface water pathways are anticipated on the Kilkee Reefs SAC.

7.4.1 Secondary Impacts on the Natura 2000 Sites

<table>
<tr><th>Project Elements</th><th colspan="3">Comment</th></tr>
<tr><td>Size and scale</td><td colspan="3">The proposed FRS is located within Kilkee town. Proposed works are to take place in two main sites for fluvial options: the Victoria stream and adjoining lands to the west of the study area and the Atlantic stream and adjoining lands to the east.</td></tr>
<tr><td>Land-take</td><td colspan="3">There will be no direct land take from any Natura 2000 sites.</td></tr>
<tr><td rowspan="4">Distance from Natura 2000 site or key features of the site</td><td>Natura 2000 site</td><td>Direct distance</td><td>Hydrological distance</td></tr>
<tr><td>Kilkee Reefs SAC</td><td>70m</td><td>70m</td></tr>
<tr><td>River Shannon and River Fergus Estuaries SPA</td><td>3km</td><td>No hydrological connection</td></tr>
<tr><td>Mid-Clare Coast SPA</td><td>9km</td><td>13km via marine waterbody</td></tr>
<tr><td>Resource requirements (water abstraction</td><td colspan="3">There will be no resource abstraction from any Natura 2000 sites for the proposed project.</td></tr>
</table>

Project Elements	Comment
etc.)	
Emissions (disposal to land, water or air)	*Construction Phase:* Surface and Ground Water During construction, there is the potential for pollutants such as dust, silt, oils, concrete washings, etc. within the proposed sites to enter into the Victoria, Well or Atlantic streams due to the proximity and nature of the proposed FRS works. The Kilkee Reefs SAC and its QI habitats are c. 100m from the proposed sites. Significant effects on groundwater are not anticipated during construction. Due to the proximity of the proposed FRS to the Victoria, Well and Atlantic streams, any connection to groundwater or the water table is expected to be connected to these watercourses, and therefore is a surface water pathway. Land and Disturbance (noise, visual) During construction, there will be increased noise and disturbance to QI bird species, however these increases will be temporary and localised and are not anticipated to have significant adverse effects on QIs of any Natura 2000 sites. Air The level of increase in air emissions during construction is not expected to have significant adverse effects on Natura 2000 sites in terms of air quality. *Operational Phase:* The operation of the proposed FRS is not expected to have significant effects any Natura 2000 sites, due to the nature of the proposed project.
Excavation requirements	Excavation depths are not expected to exceed 1.5m. Significant effects on Natura 2000 sites via groundwater pathways have been screened out.
Transportation requirements	The proposed FRS will not generate a significant volume of additional vehicular traffic. The level of increase is not likely to have any significant adverse transport-related environmental effects.
Duration of construction, operation, decommissioning etc.	The FRS is expected to be constructed over 15 months. Decommissioning is not anticipated. Operation will be permanent and will require maintenance works.

7.4.2 Likely Changes to the Natura 2000 sites

Potential Impact	Comments
Reduction of habitat area	There may temporary or permanent reduction in habitat areas for QIs of the Kilkee Reefs SAC if QI habitats are impacted by surface water emissions during the construction phase, given the direct connection between the construction works and Kilkee Bay via the Atlantic stream outfall culvert.
Disturbance to key species	*Temporary Impacts:* The construction works will be at distance from Natura 2000 sites within the ZoI of the proposed FRS; construction works are likely to temporarily increase the noise level and disturbance locally to any QI birds species

Potential Impact	Comments
	within a small section of Kilkee Bay. The reefs and beach in Kilkee Bay where QIs have been recorded are 70m from the site at the closest, but the majority of construction works are not likely to disturb birds using this area. *Permanent Impacts*: Once the scheme is built no permanent impacts from noise or disturbance is expected to QI bird species.
Habitat or species fragmentation	There will be no temporary or permanent habitat or species fragmentation as the project poses no restrictions to habitats or species of the Natura 2000 sites.
Reduction in species density	There will be no temporary or permanent reduction in species density within any of the Natura 2000 sites, or any QIs of these sites.
Changes in key indicators of conservation value (water quality etc.)	Potential temporary changes to key elements (i.e., water quality) Natura 2000 sites are anticipated.
Climate change	Not applicable

7.4.3 Likely Impacts on the Natura 2000 Sites

Potential Impact	Comments
Interference with the key relationships that define the structure of the site	There will be no interference with the key relationships that define the structure of the sites.
Interference with key relationships that define the function of the site	There will be no interference with the key relationships that define the function of the sites.

7.4.1 Indication of Significance of Effects

Potential Impact	Indicators
Loss (Estimated percentage of lost area of habitat)	No Natura 2000 sites will experience a direct loss in habitat area.
Fragmentation	Fragmentation of habitat and/or species may occur if part of any QI habitats of the Kilkee Reefs SAC are lost as a result in significant effects on water quality during the construction phase.
Disruption & disturbance	Significant disruption and/or disturbance to QIs of the SAC or SPAs within the project ZoI is not anticipated. Disturbance during the construction phase will be temporary and negligible due to the low numbers of birds recorded using the site, and availability of similar habitat in the vicinity.
Change to key elements of the site (e.g., water quality etc.)	Potential temporary changes to key elements (i.e., water quality) of the Kilkee Reefs SAC is anticipated. Potential change in flow of water off the land into the Victoria, Well and Atlantic streams and hence the Kilkee Reefs SAC may occur during the

Potential Impact	Indicators
	operational phase. This is not anticipated to significant affect any Natura 2000 sites.

7.4.2 Unknown Magnitude of Impacts

Following initial screening and based upon best scientific judgement, it is concluded that likely significant effects are anticipated from the project on the following Natura 2000 sites either alone or in combination with any other plans or projects:

- Kilkee Reefs SAC

7.5 Concluding Statement

On the basis of the screening exercise carried out above, it cannot be concluded that the possibility of any significant effects on the Kilkee Reefs SAC as a result of the proposed Flood Relief Scheme in Kilkee, Co. Clare via surface water pathways during the construction phase of the project can be screened out.

In carrying out this AA screening, mitigation measures have not been taken into account.

Given the potential for significant effects on the Natura 2000 site as a result of the proposed FRS during the construction phase, this report determines that this proposed project must progress to the next stage, Stage 2: Appropriate Assessment / Natura Impact Statement (NIS), so that mitigation measures may be outlined and incorporated into the proposed construction works, in order to safeguard Natura 2000 sites from any significant adverse effects via the source-receptor-pathways highlighted in this report.

Appendices

A Protected Species Recorded Within 5km of the Site Over the Last 10 Years (NBDC, 2023)

Species name	Date of last record	Dataset	Designation
Amphibians			
Common Frog *Rana temporaria*	16/03/2018	Amphibians and reptiles of Ireland	EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Smooth Newt *Lissotriton vulgaris*	08/09/2019	Amphibians and reptiles of Ireland	Protected Species: Wildlife Acts
Birds			
Barn Owl *Tyto alba*	25/02/2019	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Red List
Barn Swallow *Hirundo rustica*	27/06/2016	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Black-legged Kittiwake *Rissa tridactyla*	13/04/2016	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Red List
Common Kestrel *Falco tinnunculus*	11/08/2014	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Red List
Common Redshank *Tringa totanus*	02/01/2023	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Red List
Common Starling *Sturnus vulgaris*	28/08/2016	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Eurasian Curlew *Numenius arquata*	16/05/2021	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section II Bird Species || Birds of Conservation Concern - Red List
Eurasian Oystercatcher *Haematopus ostralegus*	18/07/2017	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Red List
Eurasian Tree Sparrow *Passer montanus*	03/07/2016	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
European Shag *Phalacrocorax aristotelis*	08/06/2016	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Great Cormorant *Phalacrocorax carbo*	08/06/2016	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Grey Wagtail *Motacilla cinerea*	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Red List
Hen Harrier *Circus cyaneus*	12/07/2019	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex I Bird Species || Birds of Conservation Concern - Amber List

Species name	Date of last record	Dataset	Designation
Herring Gull *Larus argentatus*	21/08/2016	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
House Martin *Delichon urbicum*	15/07/2017	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
House Sparrow *Passer domesticus*	28/08/2016	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Mute Swan *Cygnus olor*	26/08/2016	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Northern Fulmar *Fulmarus glacialis*	08/06/2016	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Northern Gannet *Morus bassanus*	13/04/2016	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Northern Wheatear *Oenanthe oenanthe*	24/04/2020	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Peregrine Falcon *Falco peregrinus*	29/11/2015	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex I Bird Species
Red-billed Chough *Pyrrhocorax pyrrhocorax*	19/09/2015	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex I Bird Species || Birds of Conservation Concern - Amber List
Fish			
Basking Shark *Cetorhinus maximus*	03/09/2021	Explore Your Shore	Threatened Species: OSPAR Convention
Invertebrates			
Dark Green Fritillary *Argynnis aglaja*	12/07/2018	Atlas of Butterflies in Ireland 2021	Threatened Species: Vulnerable
Marsh Fritillary *Euphydryas aurinia*	09/09/2020	Atlas of Butterflies in Ireland 2021	EU Habitats Directive >> Annex II || Threatened Species: Vulnerable
Small Heath *Coenonympha pamphilus*	24/06/2018	Atlas of Butterflies in Ireland 2021	Threatened Species: Near threatened
Wall *Lasiommata megera*	12/05/2020	Atlas of Butterflies in Ireland 2021	Threatened Species: Endangered
Large Red Tailed Bumble Bee *Bombus (Melanobombus) lapidarius*	28/08/2016	Bees of Ireland	Threatened Species: Near threatened
Dog Whelk *Nucella lapillus*	03/07/2016	General Biodiversity Records from Ireland	Threatened Species: OSPAR Convention
Mammals			

Species name	Date of last record	Dataset	Designation
Bottle-nosed Dolphin *Tursiops truncatus*	30/07/2020	IWDG Casual Cetacean Sightings	EU Habitats Directive >> Annex II & IV || Protected Species: Wildlife Acts
Common Dolphin *Delphinus delphis*	08/01/2020	IWDG Cetacean Strandings Database	EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Common Porpoise *Phocoena phocoena*	07/10/2017	IWDG Cetacean Strandings Database	EU Habitats Directive >> Annex II & IV || Protected Species: Wildlife Acts || Threatened Species: OSPAR Convention
Grey Seal *Halichoerus grypus*	19/02/2023	Explore Your Shore	EU Habitats Directive >> Annex II & V || Protected Species: Wildlife Acts
Humpback Whale *Megaptera novaeangliae*	27/05/2016	IWDG Casual Cetacean Sightings	EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Killer Whale *Orcinus orca*	14/07/2019	IWDG Casual Cetacean Sightings	EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Long-finned Pilot Whale *Globicephala melas*	31/10/2020	IWDG Cetacean Strandings Database	EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Minke Whale *Balaenoptera acutorostrata*	11/07/2020	IWDG Casual Cetacean Sightings	EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Risso's Dolphin *Grampus griseus*	01/08/2014	IWDG Cetacean Strandings Database	EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Striped Dolphin *Stenella coeruleoalba*	09/12/2018	IWDG Cetacean Strandings Database	EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Eurasian Badger *Meles meles*	31/12/2015	Badger Setts of Ireland Database	Protected Species: Wildlife Acts
Eurasian Pygmy Shrew *Sorex minutus*	17/06/2018	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts
Irish Hare *Lepus timidus subsp. hibernicus*	22/05/2017	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts
Irish Stoat (Mustela erminea subsp. hibernica)	27/04/2018	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts
Pine Marten *Martes martes*	29/07/2021	Mammals of Ireland 2016-2025	EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
West European Hedgehog *Erinaceus europaeus*	07/07/2021	Hedgehogs of Ireland	Protected Species: Wildlife Acts
Reptiles			
Common Lizard *Zootoca vivipara*	10/09/2019	Amphibians and reptiles of Ireland	Protected Species: Wildlife Acts

Species name	Date of last record	Dataset	Designation
Leathery Turtle (Dermochelys coriacea)	22/01/2017	IWDG Cetacean Strandings Database	EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts || Threatened Species: OSPAR Convention

B Invasive Species Recorded within a 5km Radius over the Last 10 Years (NBDC, 2023)

Species name	Date of last record	Dataset	Designation
Flora			
Wireweed *Sargassum muticum*	26/05/2022	Explore Your Shore	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Japanese Knotweed *Reynoutria japonica*	22/08/2022	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Sycamore *Acer pseudoplatanus*	28/05/2018	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species
Three-cornered Garlic *Allium triquetrum*	25/04/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species || Regulation S.I. 477 (Ireland)
Invertebrates			
Jenkins' Spire Snail *Potamopyrgus antipodarum*	09/08/2016	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	Medium Impact Invasive Species
Mammals			
Brown Rat *Rattus norvegicus*	22/05/2018	Mammals of Ireland 2016-2025	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
European Rabbit *Oryctolagus cuniculus*	03/04/2018	Mammals of Ireland 2016-2025	Medium Impact Invasive Species
House Mouse *Mus musculus*	03/01/1969	Northern Ireland Mammal Database	High Impact Invasive Species

C Wintering Bird Scoping Surveys – Winter 2022

Species name	No.	Site	Designation
20/01/2022			
Greenshank *Tringa nebularia*	4	1	Irish Wildlife Acts
Oystercatcher *Haematopus ostralegus*	29	1	Irish Wildlife Acts; Bird of Conservation Concern – Red List
Oystercatcher	7	3	Irish Wildlife Acts; Bird of Conservation Concern – Red List
Curlew *Numenius arquata*	21	1	Irish Wildlife Acts; Bird of Conservation Concern – Red List
Turnstone *Arenaria interpres*	5	1	Irish Wildlife Acts; Bird of Conservation Concern – Amber List
Common Common Snipe *Gallinago gallinago*	35	8	Irish Wildlife Acts; Bird of Conservation Concern – Red List
22/02/2022			
Oystercatcher	10	1	Irish Wildlife Acts; Bird of Conservation Concern – Red List
Common Common Snipe	41	8	Irish Wildlife Acts; Bird of Conservation Concern – Red List
Common Common Snipe	7	12	Irish Wildlife Acts; Bird of Conservation Concern – Red List
Stonechat *Saxicola torquata*	1	9	Irish Wildlife Acts
Kingfisher *Alcedo atthis*	1	9	Irish Wildlife Acts; Bird of Conservation Concern – Amber List; Annex I – E.U. Birds Directive
Goldfinch *Carduelis carduelis*	1	9	Irish Wildlife Acts
Starling *Sturnus vulgaris*	77	9	Irish Wildlife Acts; Bird of Conservation Concern – Amber List
Rook *Corvus frugilegus*	18	9	Irish Wildlife Acts
Herring Gull *Larus argentatus*	30	1	Irish Wildlife Acts; Bird of Conservation Concern – Amber List
30/03/2022			
Juvenile Gull *Larus* spp.	3	1	Irish Wildlife Acts
Cormorant *Phalacrocorax carbo*	1	1	Irish Wildlife Acts; Bird of Conservation Concern – Amber List
Herring Gull	8	1	Irish Wildlife Acts; Bird of Conservation Concern – Amber List
Common Common Snipe	3	10	Irish Wildlife Acts; Bird of Conservation Concern – Red List
Common Common Snipe	1	9	Irish Wildlife Acts; Bird of Conservation Concern – Red List
Dunnock / Hedge Accentor *Prunella modularis*	1	1	Irish Wildlife Acts

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