

Remedial Appropriate Assessment Screening & Remedial Natura Impact Statement- Information for a Stage 1 (AA Screening) and Stage 2 (Natura Impact Statement) AA to accompany a Planning Application for Substitute Consent in respect to a Development at O'Carroll Haulage Crane Hire, Kildimo, Co. Limerick



27th May 2024

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On behalf of: O'Carroll Haulage & Crane Hire Ltd.

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Document Control Sheet			
Project	Remedial Appropriate Assessment Screening & Remedial Natura Impact Statement - Information for a Stage 1 (AA Screening) and Stage 2 (Natura Impact Statement) AA to accompany a planning application for substitute consent in respect to a development at O'Carroll Haulage Crane Hire, Kildimo, Co. Limerick.		
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1. Introduction

The following Remedial Appropriate Assessment (AA) (Screening Stage) and Remedial Natura Impact Statement (rNIS) has been prepared by **Altamar Ltd.** at the request of **O'Carroll Haulage & Crane Hire Ltd.** to accompany a planning application for substitute consent in respect to a development at O'Carroll Haulage Crane Hire, Kildimo, Co. Limerick.

An 'Appropriate Assessment' (AA) / remedial Appropriate Assessment (rAA) is an assessment of the potential effects of any project or plan, on its own, or in combination with other plans or projects, on one or more Natura 2000 sites. Natura 2000 sites are those sites designated as Special Areas of Conservation (SAC) or Special Protection Areas (SPA).

The AA Screening stage examines the likely significant effects of a plan or project, either on its own, or in combination with other plans and projects, upon a Natura 2000 site and considers whether, on the basis of objective scientific evidence, it can be concluded that there are not likely to be significant effects on any European site, in view of best scientific knowledge and the conservation objectives of the relevant European sites.

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

1.1 Altamar Ltd.

Since its inception in 2001, Altamar has been delivering ecological and environmental services to a broad range of clients. Operational areas include: residential; infrastructural; renewable; oil & gas; private industry; Local Authorities; EC projects; and, State/semi-State Departments. Bryan Deegan, the managing director of Altamar, is an Environmental Scientist and Marine Biologist with 28 years' experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. He is currently contracted to Inland Fisheries Ireland as the sole "External Expert" to environmentally assess internal and external projects. He is also chair of an internal IFI working group on environmental assessment. Bryan Deegan (MCIEEM) holds a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic Science and a NCEA National Certificate in Science (Aquaculture).

This report has also been prepared by ecologist Emma Peters BSc Environmental Science. Emma is skilled in bat detection through static detector surveys, dusk emergence, and down re-entry surveys and is a member of Bat Conservation Ireland. Emma is skilled in habitat identification, native and non-native species identification and ecological conservation, having experience in mitigation measures in ecological assessment. Emma is also an active CIEEM and bat conservation Ireland member.

2. Background to the Appropriate Assessment

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

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

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

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

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

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

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

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

Obligations in relation to Appropriate Assessment have been implemented into Irish legislation under Part XAB of the Planning and Development Act 2000 (as amended). In particular, the relevant provisions of Section 177U in relation to AA screening are outlined below:

- '177U.—** (1) *A screening for appropriate assessment of a draft Land use plan or application for consent for proposed development shall be carried out by the competent authority to assess, in view of best scientific knowledge, if that Land use plan or proposed development, individually or in combination with another plan or project is likely to have a significant effect on the European site.*
- (2) ...
- (3) ...
- (4) *The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed development, as the case may be, is required if it cannot be excluded, on the basis of objective information, that the draft Land use plan or proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.*
- (5) *The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed development, as the case may be, is not required if it can be excluded, on the basis of objective information, that the draft Land use plan or proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.'*

The obligations in relation to Substitute Consent have been implemented in Irish legislation under Part XA of the Planning and Development Act 2000 (as amended). In particular, the relevant Section 177G relating to remedial Natura Impact Statement are outlined below:

'177G. — (1) *A remedial Natura impact statement shall contain the following:*

- (a) *a statement of the significant effects, if any, on the relevant European site which have occurred or which are occurring or which can reasonably be expected to occur because the development the subject of the application for substitute consent was carried out;*
- (b) *details of —*
- (i) *any appropriate remedial or mitigation measures undertaken or proposed to be undertaken by the applicant for substitute consent to remedy or mitigate any significant effects on the environment or on the European site;*
 - (ii) *the period of time within which any such proposed remedial or mitigation measures shall be carried out by or on behalf of the applicant;*
- (c) *such information as may be prescribed under section 177N;*
- (d) *and may have appended to it, where relevant, and where the applicant may wish to rely upon same:*
- (i) *a statement of imperative reasons of overriding public interest;*
 - (ii) *any compensatory measures being proposed by the applicant.'*

(Emphasis added)

3. Stages of the Appropriate Assessment

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

1) Screening stage:

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

Conclusions

2) Appropriate Assessment (Natura Impact Statement):

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

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

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

4. Stage 1 Screening Assessment

4.1 Management of the Site

The plan or project is not directly connected with, or necessary to the management of European sites.

4.2 Site Location and Context

The subject site is located at the southwest edge of the Limerick Metropolitan area approximately 1km east of the village of Kildimo in County Limerick and approximately 300m south of the National Secondary Route (N69) Limerick City – Askeaton Road.

The western boundary of the development site adjoins the local road (L3038) which extends south from the N69 route and which contains the established access point to the property. The site comprises established industrial premises consisting of an industrial building and associated hardstand storage area used ancillary the use of the property. The extent of this associated hard standing has been increased and the nature of that extension forms the primary purpose of this application. Metal security fencing bounds the roadside western site boundary to provide operational security and site safety.

Historically, the subject site has been utilised by O'Carroll Crane & Hire Ltd. for commercial business. Activity onsite includes the storage of equipment consisting of crane vehicles, crane parts and associated equipment requiring both internal and external storage. The site includes external hardstanding storage area in addition to the existing industrial structure. The applicant has extended the provision of that hardstanding area to the north of the permitted premises by the introduction of compacted fill material and the concreting the western portion of that fill area to match with the concrete finish of the existing facility. That extended area has been used for the external parking of vehicles, plant and equipment associated with the applicant's business. The applicant installed new palisade type security fencing along the western roadside boundary and security lighting.

A separate third-party industrial premises exists to the immediate south of the subject site. That premises used by Derek Walsh Camper Centre's operations consists of an industrial workshop and associated external storage to the front and rear of the building similar to the applicant. That third-party premises has expanded to the rear incrementally over recent years.

4.3 Description of the Proposed Development

This report has been prepared to accompany a planning application made by O'Carroll Haulage & Crane Hire Ltd. directly to An Bord Pleanála pursuant to the provisions of Section 177E of Part XA ('Substitute Consent') of the Planning and Development Act 2000 (as amended) for retention permission of development at O'Carroll Haulage Crane Hire, Kildimo, Co. Limerick.

The development works the subject of this application consist of:

1. Retention permission for works consisting of;
 - a) the raising of ground levels by filling of land,
 - b) the provision of concrete surface on part of that filled area,
 - c) the use of part of the filled area for hardstanding storage of vehicles, materials and plant associated with the established and permitted use of the existing premises including provision of security fence and lighting;
2. Provision of remedial and mitigation measures including:
 - a) The cessation of use of part of the fill area and facilitating the natural regeneration of that area; and
 - b) The provision of surface water management measures to improve the quality of the existing permitted discharge and the proposed discharge of surface water from the site to existing boundary surface water drains. These measures include provision of: interceptor surface water drains, petrol interceptor, full retention forecourt type separator, attention tank, and introduction of controlled rate of discharge prior to new discharge point to boundary surface water drains via new precast concrete headwall.



Project: Development at O'Carroll Haulage Crane Hire
 Location: Kildimo, Co. Limerick
 Date: 15th May 2024
 Drawn By: Bryan Deegan (Altamar)

ALTEMAR
 Marine & Environmental Consultancy



Figure 1. Site outline.



0 250 500 750 1,000 1,250 m

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Figure 2. Site location.

Drainage

An Engineering Planning Report has been prepared by PUNCH Consulting Engineers to accompany this planning application. This report details the following drainage strategy for the proposed development site in relation to surface water drainage.

Existing Surface Water Drainage

This report details the existing surface water drainage onsite:

'Based on record drawings, client knowledge, a topographical survey and site visits it was established that the following surface water drainage infrastructure is located within the vicinity of the site:

- a) OPW Arterial Drain "A" flows southwest to northeast and ultimately discharges into the River Maigue.*
- b) Open Drain "B" flows west to east and discharges to existing OPW arterial drain "A".*
- c) Open Drain "C" flows east to west and discharges to filter drain "D".*
- d) Filter Drain "D" flows southwest to northeast and discharges into open drain "E".*
- e) Open Drain "E" flows southwest to northeast. The open Drain then flows west to east and discharges to existing OPW arterial drain "A".'*

Surface Water Drainage Constructed Associated with the Retention Planning

As detailed in the Report:

'The following surface water sewers were constructed:

- a) Filter Drain "F" flows east to west discharges into open drain "E".'*

Proposed Surface Water Drainage Network

In relation to the proposed surface water drainage network, this report details the following:

'It is proposed that surface water will be collected and discharged via a mixture of traditional and Sustainable urban Drainage System (SuDS) to the existing open drain "E". Surface water will be pumped at a rate of 3.1l/s from the attenuation tank. A class 2 bypass separator will treat runoff prior to entering the existing drain.'

SUDs Proposals

Further, this report outlines the following SUDs proposals that will be implemented into the onsite surface water drainage system:

'The proposed development has been assessed in relation to Sustainable Urban Drainage Systems (SuDS). A variety of SuDS measures may be adopted to comply with Council recommendations. All SuDS measures are to be implemented with reference to the UK Suds Manual and Limerick City & County Council drainage requirements.

Relatively small volumes of rainwater collected on the respective SuDS devices will enter the surface water sewer network during typical low intensity storms.

The SuDS processes decrease the impact of the development on the receiving environment by providing amenity and biodiversity in many cases. Regular maintenance of the SuDS proposals is required to ensure they are operating to their optimal level throughout their design life.

A site visit revealed that there is a high groundwater table in the area and therefore discharge of surface water to ground is not suitable.

The specific measures adopted for the development comprise of the following:

Bio Retention Areas

The bio-retention areas will incorporate drainage stone/subsoil and will provide a level of additional attenuation within the bio-retention areas. Bioretention systems allow the stormwater to filter downwards through a filter medium removing finer contaminants along the way. The base and sides of the system will be lined and a high-level overflow to the drainage network within the build-up will accommodate removal of water.

CIRIA C753 (The SuDS Manual) Table 24.6 notes that regarding interception design of bio retention areas/modified planters, pavements drained by bio retention areas can be considered to provide Interception, i.e. it can be assumed that there will be zero runoff from the first 5 mm rainfall for 80% of events during the summer and 50% in winter.

Filter Drain

The filter drain provides a level of attenuation storage within the voids in the stone within the trench.

CIRIA C753 (The SuDS Manual) Table 24.6 notes that regarding interception design of infiltration trenches, impermeable areas drained by infiltration trenches can be considered to provide Interception, i.e. it can be assumed that there will be zero runoff from the first 5 mm rainfall for 80% of events during the summer and 50% in winter.

Petrol Interceptor

It is proposed that all surface water run-off from the development will outfall via a bypass separator. This device will remove hydrocarbons and fine sediment particles from the site runoff and lower the risk of downstream contamination following an oil spillage on site.

Bypass separators fully treat all flows generated by rainfall rates of up to 6.5mm/hr. This covers over 99% of all rainfall events. Flows above this rate are allowed to bypass the separator. These separators are used when it is considered an acceptable risk not to provide full treatment for high flows, for example where the risk of a large spillage and heavy rainfall occurring at the same time is small.

Forecourt Separator

It is proposed that a forecourt separator is provided for the fuelling area. Forecourt separators are full retention separators specified to retain on site the maximum spillage likely to occur at the fuelling area. The separator can retain the possible loss of the contents of one compartment of a road tanker, which may be up to 7,600 litres.

Attenuation Tank

An attenuation tank is proposed to reduce the peak runoff from the site. The attenuation tanks are designed to accommodate surface water runoff for the 1 in 100 year rainfall event. The design and simulations also allow for 30% additional rainfall for climate change. As indicated in table 2-1 above, the controlled runoff rate of surface water will be 3.1 l/s.'

The existing site layout plan (unmitigated) and proposed site layout plan (mitigated) are demonstrated in Figures 3 & 4.

Flood Risk Assessment

A Site Specific Flood Risk Assessment has been prepared by PUNCH Consulting Engineers to accompany this planning application. This report concludes with the following:

‘This Site-Specific Flood Risk Assessment has been carried out in accordance with “The Planning System & Flood Risk Management Guidelines” published by the Department of the Environment, Heritage and Local Government in November 2009 and the Limerick Development Plan.

A review of the flood risk in the area was carried out as the site is located near the Maigue River and Faha 24 Stream.

Flood Maps produced as part of the CFRAMS, NIFM and NCFHM were consulted to establish the Flood Zone. It was determined that the proposed development site is currently located in Flood Zone A for fluvial and coastal flooding. The site benefits from the Arterial Drainage Scheme embankments along the Maigue river, but retains a residual risk of flooding in the unlikely event of an embankment breach.

As the site is classed as minor development in accordance with Section 5.28 of the Planning System and Flood Risk Management Guidelines, the Justification Test does not apply. A commensurate assessment of the risks of flooding at the site has been provided in Sections 3 and 4 above.

The proposed development has a residual risk of flooding. However, given the nature of the development and with the adoption of the proposed mitigation measures in Section 4.3, it is deemed appropriate.’

Field Surveys

A site visit was carried out by Altamar ecologist Emma Peters (BSc Environmental Science) on the 03rd May 2024. All accessible areas of the subject site were examined (see Appendix I). In particular, the onsite drainage ditch network was inspected for any signs of silt or petrochemical contamination and pollution. As detailed in the Ecological Report in Appendix I:

FW4- Drainage Ditch

Drainage ditches varying in depth and width lined the west, north and east boundary of the site. These created a hydrological link between the site and the nearby Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. No evidence of silt from the construction of the hardstanding was noted in the drainage ditches. No evidence of petrochemicals was noted in the drainage ditches. The species within and on the banks of this habitat included duckweed (*Lemna minor*), lesser water-parsnip (*Berula erecta*), Watermint (*mentha aquatica*), bog pondweed (*Potamogeton polygonifolius*) and Bulrush (*Typha latifolia*).



Plate 1. Drainage ditch joining the southeast corner of the hardstanding to the east drainage ditch.

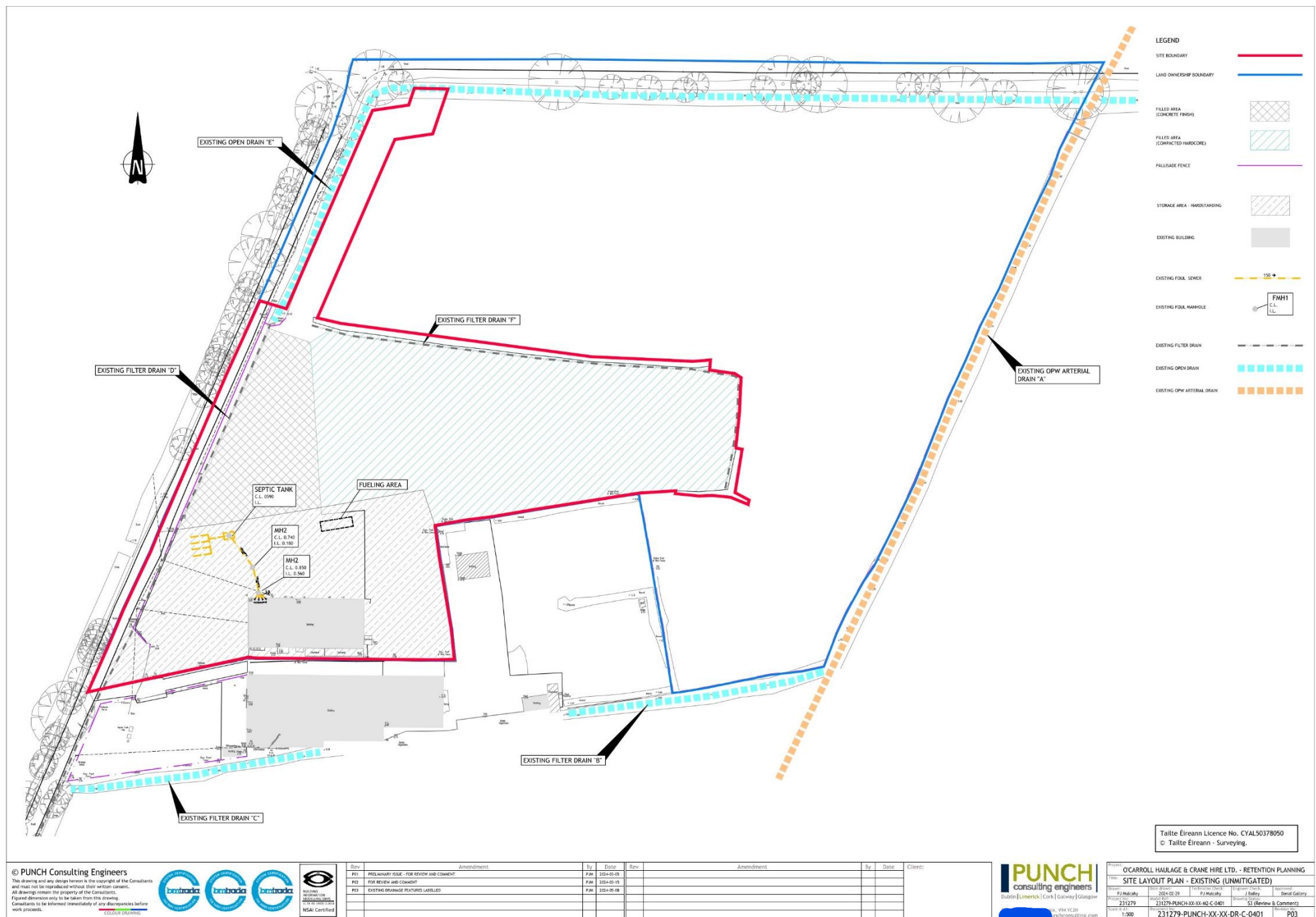


Plate 2. Arterial drainage ditch to the east of the site



Plates 3 & 4. Arterial drainage ditch located to the east of the site.

It should be noted that there was no evidence of silt or petrochemical runoff from the current hardstanding site surface into the adjacent drainage ditch network. As such, there is no evidence to suggest that silt or pollutants are currently entering the drainage ditch network and travelling to downstream Natura 2000 sites. However, out of an abundance of caution, it is considered that a potential pathway for pollution does exist.



4.4 Identification of Relevant European sites (Natura 2000 sites)

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

A key factor in the consideration as to whether or not a particular European site is likely to be affected by the proposed development is its distance from the development location. It is generally, but not necessarily, the case that the greater the distance from the plan or project the smaller the likelihood of impacts. In this case, the nearest European sites to the subject site are 0.7 km away (Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA).

From an examination of information provided by PUNCH Consulting Engineers, EPA waterbody data, and fieldwork undertaken by Altemar, a number of drainage ditches have been noted onsite / proximate to the subject site. As demonstrated in Figure 7, this drainage ditch network connects the subject site to an existing OPW arterial drain to the east of the site (identified as ‘Tonlegee_010’ by the EPA), which in turn outfalls to the Mague River approximately 2.1km (distance along drainage ditch network) downstream of the subject site. As demonstrated in Figures 8 & 9, the drainage ditch network hydrologically connects the subject site to the downstream Lower River Shannon SAC and River Shannon and Fergus Estuaries SPA. Further details relating to the hydrological pathways associated with the **existing arrangement (retention)** and **remedial** elements of this Substitute Consent planning application are outlined below:

Existing Arrangement (Retention)

At present, surface water drainage from the subject site drains (unattenuated) into adjacent drainage ditches. As outlined above, this drainage ditch network ultimately discharges to the Mague River and, by extension, the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. As such, it is considered that a direct hydrological pathway from the subject site to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA currently exists via surface water drainage.

The applicant previously extended the provision of the hardstanding area. Previous works onsite involved the introduction of compacted fill material and the concreting of the western portion of the fill area. As such, soil disturbance, ground fill, and concrete surfacing works were previously carried out onsite. The hardstanding area of the subject site was also previously utilised for external storage of crane vehicles, crane parts, and associated equipment. Given the small scale of the previous works onsite and the minimum distance to the nearest Natura 2000 sites (Lower River Shannon SAC and River Shannon and River Fergus SPA) via the adjacent drainage ditch network (2.1km along the network), it is expected that, in the absence of mitigation, any silt or pollutants from the subject site that may have entered the drainage network settled, were dispersed or diluted within the existing drainage ditch network and did not cause any likely significant impacts on downstream European Sites. The dense nature of the vegetation within the drainage ditch network would provide a significant filtering effect on potential silt and petrochemical pollution.

At present, the subject site consists of a hardstanding area and no further works have occurred onsite. The extended area is not currently being utilised as an external storage area. Surface water runoff and surface water drainage from the site is currently directed to the adjacent drainage ditch network. Following a site inspection, Altemar note that there is no evidence to suggest that silt or pollutants are entering the drainage ditch network and travelling to downstream Natura 2000 sites (Lower River Shannon SAC and River Shannon and River Fergus SPA). However, given that there is no petrol interceptor within the current drainage network, it is considered that, in the absence of mitigation, there is the potential for silt or pollutants to enter the adjacent drainage network during a high rainfall, flooding, or significant fuel spillage event. As such, mitigation measures are required to ensure that there are no likely potential significant effects on the Lower River Shannon SAC and River Shannon and River Fergus SPA as a result of the current site arrangement.

Remedial Measures (Estimated Duration: 6 Months from Permission)

As part of the proposed remedial works, a new surface water drainage system will be installed onsite. It is estimated that remedial measures will be in place within 6 months of consent being granted. This drainage system will incorporate a number of SUDs measures, including an attenuation tank and a petrol interceptor. This surface water drainage network will ultimately outfall to a drainage ditch located to the north of the site (see Figure 4) via a new precast concrete headwall. As a result, surface water drainage from the subject site (after attenuation onsite) will discharge to a drainage ditch network located to the north of the site. This network ultimately outfalls to the Maigne River. Given the nature of the proposed works, the proposed surface water drainage strategy, and out of an abundance of caution, it is considered that there is a direct hydrological pathway from the subject site to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. In the absence of mitigation, it is considered that there is the potential for significant downstream impacts on the qualifying interests of Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA via this direct hydrological pathway. Mitigation measures are required.

In the interest of carrying out a thorough assessment in line with both the Habitats Directive and the precautionary principle, the area of assessment was expanded beyond the ZOI to include designated sites within 15km of the proposed development site, and sites beyond 15km with the potential for a hydrological connection. This was done in the interest of ensuring that any pathways, however indirect or remote, were considered. All Natura 2000 sites within 15km, and beyond 15km with the potential for a hydrological pathway are listed in Table 1. The qualifying interests, and the potential impact of the development on each European site and qualifying interest, are screened in/out in Tables 2 & 3. SAC's and SPA's within 15km are seen in Figures 5 & 6. Watercourses, drainage ditches, SACs and SPAs proximate to the subject site are demonstrated in Figures 7-9. Given that there are no Natura 2000 sites with a direct or indirect pathway beyond 15km of the subject site, no impacts are foreseen on Natura 2000 sites beyond 15km.

Table 1. Proximity to NATURA 2000 sites within 15km

European Site	Code	Distance	Direct Hydrological / Biodiversity Connection
<i>Special Areas of Conservation</i>			
Lower River Shannon SAC	IE002165	0.7 km	Yes
Askeaton Fen Complex SAC	IE002279	3.4 km	No
Curraghchase Woods SAC	IE000174	5.3 km	No
Tory Hill SAC	IE000439	10.8 km	No
<i>Special Protection Areas</i>			
River Shannon and River Fergus Estuaries SPA	IE004077	0.7 km	Yes

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

European Site (Site Code)	Qualifying Interests	Conservation Objectives	Approximate Distance (at the closest point)	Screened IN / OUT	Potential for Significant Effects?
Special Areas of Conservation (SAC)					
Lower River Shannon SAC (IE002165)	- Sandbanks which are slightly covered by sea water all the time [1110] - Estuaries [1130] - Mudflats and sandflats not covered by seawater at low tide [1140] - Coastal lagoons [1150] - Large shallow inlets and bays [1160] - Reefs [1170] - Perennial vegetation of stony banks [1220] - Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] - Salicornia and other annuals colonising mud and sand [1310] - Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] - Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] - Water courses of plain to montane levels with the	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	0.7 km terrestrial distance. There is a hydrological pathway from the subject site to this SAC via onsite drainage ditch network.	IN	The subject site is located 0.7km from the Lower River Shannon SAC. There is a drainage ditch network located onsite that ultimately discharges to the Mague River (>2km of flow distance from the site) and, as demonstrated in Figure 8, the Lower River Shannon SAC. Given the minimum distance to this SAC (0.7km), and out of an abundance of caution, it is considered that there is a direct hydrological pathway from the subject site to this SAC via surface water drainage. Impacts which have occurred <u>Existing Arrangement</u> The applicant previously extended the provision of the hardstanding area. Previous works onsite involved the introduction of compacted fill material and the concreting of the western portion of the fill area. As such, soil disturbance, ground fill, and concrete surfacing works were previously carried out onsite. The hardstanding area of the subject site was also previously utilised for external storage of crane vehicles, crane parts, and associated equipment. Given the small scale of the previous works onsite and the minimum distance to this SAC via the adjacent drainage ditch network (2.1km along the network), it is expected that, in the absence of mitigation, any silt or pollutants from the subject site that may have entered the drainage network settled, were dispersed or diluted within the existing drainage ditch network and did not cause any likely significant downstream impacts on this SAC. This is primarily due

European Site (Site Code)	Qualifying Interests	Conservation Objectives	Approximate Distance (at the closest point)	Screened IN / OUT	Potential for Significant Effects?
	<i>Ranunculion fluitantis</i> and Callitricho-Batrachion vegetation [3260] • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] • Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] • <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] • <i>Petromyzon marinus</i> (Sea Lamprey) [1095] • <i>Lampetra planeri</i> (Brook Lamprey) [1096] • <i>Lampetra fluviatilis</i> (River Lamprey) [1099] • <i>Salmo salar</i> (Salmon) [1106] • <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] • <i>Lutra lutra</i> (Otter) [1355]				to the dense nature of the vegetation within the drainage ditches proximate to the site. <u>Remedial Measures</u> No elements of the proposed remedial measures have previously occurred onsite. No significant impacts on this SAC have occurred as a result of the proposed remedial measures. Impacts which are occurring <u>Existing Arrangement</u> At present, the subject site consists of a hardstanding area and no further construction works are occurring onsite. The extended area is not currently being utilised as an external storage area. Surface water runoff and surface water drainage from the site is currently directed to the adjacent drainage ditch network. Following a site inspection, Altemar note that there is no evidence to suggest that silt or pollutants are entering the drainage ditch network and travelling downstream to this SAC. In the absence of mitigation measures, no significant impacts on this SAC are presently occurring as a result of the existing arrangement onsite. <u>Remedial Measures</u> No elements of the proposed remedial measures are occurring onsite. No significant impacts on this SAC are occurring as a result of the proposed remedial measures. Impacts that can reasonably be expected to occur <u>Existing Arrangement</u> Given that there is no petrol interceptor within the current drainage network, it is considered that, in the absence of mitigation, there is the future potential for silt or pollutants to

European Site (Site Code)	Qualifying Interests	Conservation Objectives	Approximate Distance (at the closest point)	Screened IN / OUT	Potential for Significant Effects?
					enter the adjacent drainage network during a high rainfall, flooding, or fuel spillage event. Out of an abundance of caution, mitigation measures are required to ensure that no significant impacts on this SAC can be reasonably expected to occur as a result of the current site arrangement. <u>Remedial Measures</u> It is estimated that remedial measures will be in place within 6 months of consent being granted. As part of the proposed remedial works, a new surface water drainage system will be installed onsite. This drainage system will incorporate a number of SUDs measures, including an attenuation tank and a petrol interceptor. This surface water drainage network will ultimately outfall to a drainage ditch located to the north of the site (see Figure 4) via a new precast concrete headwall. As a result, surface water drainage from the subject site (after attenuation onsite) will discharge to a drainage ditch network located to the north of the site. This network ultimately outfalls to the Mague River. Given the nature of the proposed works, the proposed surface water drainage strategy, and out of an abundance of caution, it is considered that there is a direct hydrological pathway from the subject site to the Lower River Shannon SAC. In the absence of mitigation, it is considered that there is the potential for significant downstream impacts on the qualifying interests of Lower River Shannon SAC during construction and operation via this direct hydrological pathway. Mitigation measures are required.

European Site (Site Code)	Qualifying Interests	Conservation Objectives	Approximate Distance (at the closest point)	Screened IN / OUT	Potential for Significant Effects?
					Overall Assessment In a strict application of the precautionary principle, it has been concluded that significant effects on the Lower River Shannon SAC are likely, in the absence of future mitigation measures, from the proposed retention and remedial elements of the proposed development. This is as a result of the direct hydrological connection of the Lower River Shannon SAC to the proposed project via the surface water drainage strategy. For this reason, it is necessary to proceed to a NIS on the effects of the project on this site in view of its conservation objectives. Significant effects are likely in the absence of mitigation measures. NIS is required.
Special Protection Areas					
River Shannon and River Fergus Estuaries SPA (IE004026)	• Cormorant (<i>Phalacrocorax carbo</i>) [A017] • Whooper Swan (<i>Cygnus cygnus</i>) [A038] • Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] • Shelduck (<i>Tadorna tadorna</i>) [A048] • Wigeon (<i>Anas penelope</i>) [A050] • Teal (<i>Anas crecca</i>) [A052] • Pintail (<i>Anas acuta</i>) [A054] • Shoveler (<i>Anas clypeata</i>) [A056] • Scaup (<i>Aythya marila</i>) [A062]	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SPA has been selected.	0.7 km terrestrial distance. There is a hydrological pathway from the subject site to this SPA via onsite drainage ditch network.	IN	The subject site is located 0.7km from the River Shannon and River Fergus Estuaries SPA. There is a drainage ditch network located onsite that ultimately discharges to the Maigue River (>2km water flow distance) and, as demonstrated in Figure 9, the River Shannon and River Fergus Estuaries SPA. Given the minimum distance to this SPA (0.7km), and out of an abundance of caution, it is considered that there is a direct hydrological pathway from the subject site to this SPA via surface water drainage. Impacts which have occurred <u>Existing Arrangement</u> The applicant previously extended the provision of the hardstanding area. Previous works onsite involved the introduction of compacted fill material and the concreting of the western portion of the fill area. As such, soil disturbance, ground fill, and concrete surfacing works were previously carried out onsite. The hardstanding area of the subject site was also

European Site (Site Code)	Qualifying Interests	Conservation Objectives	Approximate Distance (at the closest point)	Screened IN / OUT	Potential for Significant Effects?
	• Ringed Plover (<i>Charadrius hiaticula</i>) [A137] • Golden Plover (<i>Pluvialis apricaria</i>) [A140] • Grey Plover (<i>Pluvialis squatarola</i>) [A141] • Lapwing (<i>Vanellus vanellus</i>) [A142] • Knot (<i>Calidris canutus</i>) [A143] • Dunlin (<i>Calidris alpina</i>) [A149] • Black-tailed Godwit (<i>Limosa limosa</i>) [A156] • Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] • Curlew (<i>Numenius arquata</i>) [A160] • Redshank (<i>Tringa totanus</i>) [A162] • Greenshank (<i>Tringa nebularia</i>) [A164] • Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] • Wetland and Waterbirds [A999]				previously utilised for external storage of crane vehicles, crane parts, and associated equipment. Given the small scale of the previous works onsite and the minimum distance to this SPA via the adjacent drainage ditch network (2.1km along the network), it is expected that, in the absence of mitigation, any silt or pollutants from the subject site that may have entered the drainage network settled, were dispersed or diluted within the existing drainage ditch network and did not cause any likely significant downstream impacts on this SPA. This is primarily due to the dense nature of the vegetation within the drainage ditches proximate to the site <u>Remedial Measures</u> No elements of the proposed remedial measures have previously occurred onsite. No significant impacts on this SPA have occurred as a result of the proposed remedial measures. Impacts which are occurring <u>Existing Arrangement</u> At present, the subject site consists of a hardstanding area and no further works are occurring onsite. The extended area is not currently being utilised as an external storage area. Surface water runoff and surface water drainage from the site is currently directed to the adjacent drainage ditch network. Following a site inspection, Altamar note that there is no evidence to suggest that silt or pollutants are entering the drainage ditch network and travelling downstream to this SPA. In the absence of mitigation measures, no significant impacts on this SPA are presently occurring as a result of the existing arrangement onsite. <u>Remedial Measures</u>

European Site (Site Code)	Qualifying Interests	Conservation Objectives	Approximate Distance (at the closest point)	Screened IN / OUT	Potential for Significant Effects?
					No elements of the proposed remedial measures are occurring onsite. No significant impacts on this SPA are occurring as a result of the proposed remedial measures. Impacts that can reasonably be expected to occur <u>Existing Arrangement</u> Given that there is no petrol interceptor within the current drainage network, it is considered that, in the absence of mitigation, there is the future potential for silt or pollutants to enter the adjacent drainage network during a high rainfall, flooding, or fuel spillage event. As such, mitigation measures are required to ensure that no significant impacts on this SPA can be reasonably expected to occur as a result of the current site arrangement. It should be noted that the potential removal of concrete and hardcore hardstanding areas onsite has the potential to introduce silt and pollutants into adjacent drainage ditches with a hydrological pathway to this SPA. <u>Remedial Measures</u> It is estimated that remedial measures will be in place within 6 months of consent being granted. As part of the proposed remedial works, a new surface water drainage system will be installed onsite. This drainage system will incorporate a number of SUDs measures, including an attenuation tank and a petrol interceptor. This surface water drainage network will ultimately outfall to a drainage ditch located to the north of the site (see Figure 4) via a new precast concrete headwall. As a result, surface water drainage from the subject site (after attenuation onsite) will discharge to a drainage ditch network located to the north of the site. This network

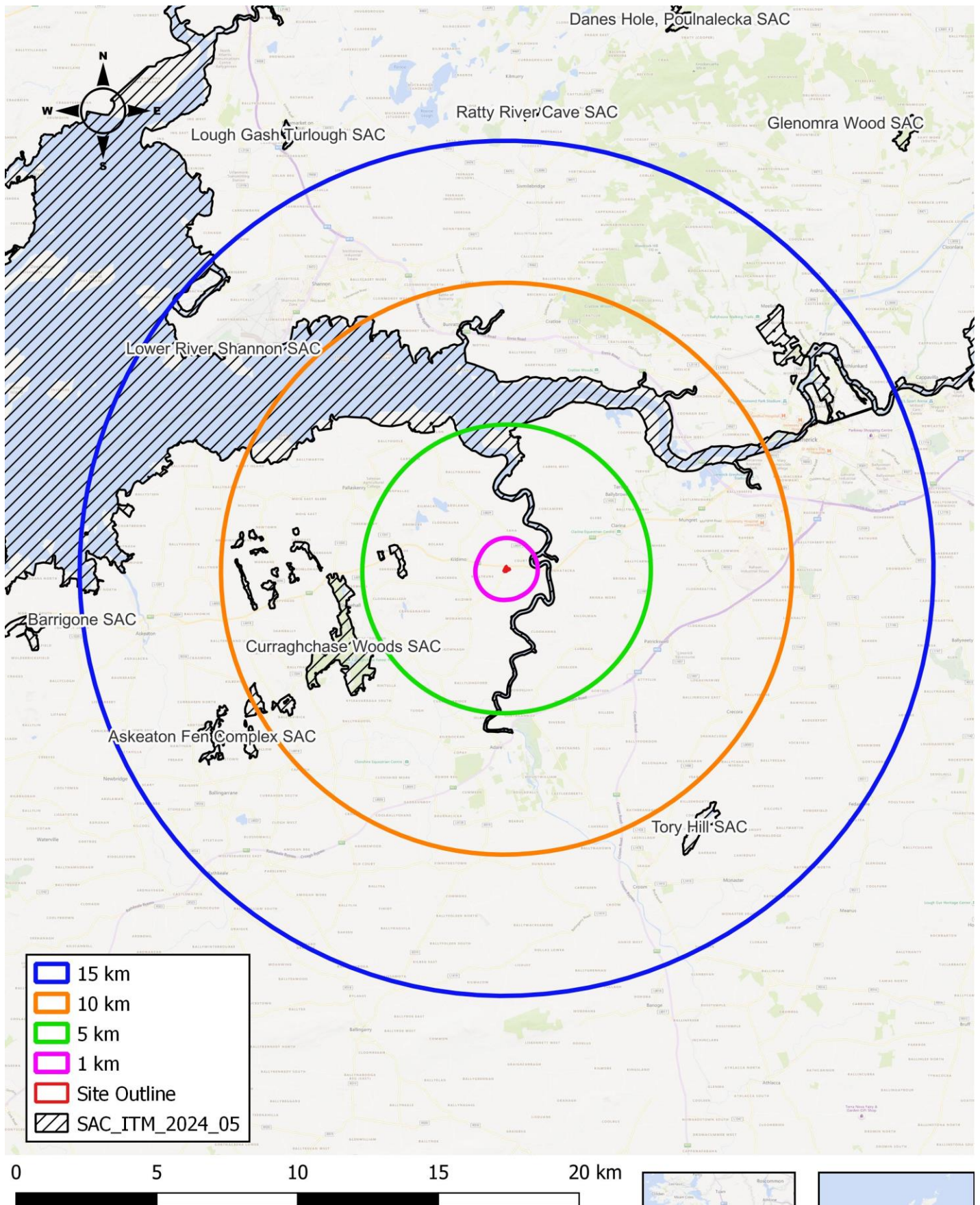
European Site (Site Code)	Qualifying Interests	Conservation Objectives	Approximate Distance (at the closest point)	Screened IN / OUT	Potential for Significant Effects?
					ultimately outfalls to the Mague River. Given the nature of the proposed works, the proposed surface water drainage strategy, and out of an abundance of caution, it is considered that there is a direct hydrological pathway from the subject site to the River Shannon and River Fergus Estuaries SPA. In the absence of mitigation, it is considered that there is the potential for significant downstream impacts on the qualifying interests of River Shannon and River Fergus Estuaries SPA during construction and operation via this direct hydrological pathway. Mitigation measures are required. Noise and Vibration Impacts Given the nature of the previous / existing / proposed works onsite, and the minimum distance to this SPA (0.7 km), it is considered that no significant noise or vibration impacts on the qualifying interests of this SPA have occurred, are occurring, or are reasonably expected to occur as a result of the existing arrangement or the proposed remedial measures. Overall Assessment In a strict application of the precautionary principle, it has been concluded that significant effects on the River Shannon and River Fergus Estuaries SPA are likely, in the absence of mitigation measures, from the proposed retention and remedial elements of the proposed development. This is as a result of the direct hydrological connection of the River Shannon and River Fergus Estuaries SPA to the proposed project via the surface water drainage strategy. For this reason, it is necessary to proceed to a NIS on the effects of the project on this site in view of its conservation objectives. Significant effects are likely in the absence of mitigation measures. NIS is required

Table 1. Initial screening of European sites within 15km and European sites beyond 15km with potential of hydrological connection to the proposed development – Screened OUT for stage 2 AA.

European Site (Site Code)	Qualifying Interests	Conservation Objectives	Approximate Distance (at the closest point)	Screened IN / OUT	Potential Significant Effects?
Special Areas of Conservation (SAC)					
Askeaton Fen Complex SAC (IE002279)	- Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] - Alkaline fens [7230]	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	3.4 km terrestrial distance. There is considered to be no potential source-pathway-receptor linkage to this SAC.	OUT	The subject site is located 3.4km from the Askeaton Fen Complex SAC. There is considered to be no potential source-pathway-receptor linkage to this SAC. Impacts which have occurred <u>Existing Arrangement & Remedial Measures</u> Given that there is no potential source-pathway-receptor linkage to this SAC, it is considered that no potential impacts on this SAC have occurred as a result of previous works carried out onsite. Previous activities (construction and operations) were confined to the subject site. No impacts on this SAC have occurred due to the previous use of the subject site for external parking / storage. In the absence of mitigation measures, no likely significant effects on this SAC have occurred. Impacts which are occurring <u>Existing Arrangement & Remedial Measures</u> Given that there is no potential source-pathway-receptor linkage to this SAC, it is considered that there are no current impacts on this SAC. In the absence of mitigation measures, no likely significant effects on this SAC are occurring. Impacts that can reasonably be expected to occur <u>Existing Arrangement & Remedial Measures</u> There is no potential source-pathway-receptor linkage from the subject site to this SAC. Therefore, in the absence of mitigation measures, no significant effects are likely to occur to this SAC as a result of the proposed works onsite. In summary, there were/are/will be no significant effects on the qualifying interests of Askeaton Fen Complex SAC, occurring in any timeframe assessed in this report.

European Site (Site Code)	Qualifying Interests	Conservation Objectives	Approximate Distance (at the closest point)	Screened IN / OUT	Potential Significant Effects?
Curraghchase Woods SAC (IE000174)	- Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] <i>Taxus baccata</i> woods of the British Isles [91J0] <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	5.3 km terrestrial distance. There is considered to be no potential source-pathway-receptor linkage to this SAC.	OUT	The subject site is located 5.3km from the Curraghchase Woods SAC. There is considered to be no potential source-pathway-receptor linkage to this SAC. Impacts which have occurred <u>Existing Arrangement & Remedial Measures</u> Given that there is no potential source-pathway-receptor linkage to this SAC, it is considered that no potential impacts on this SAC have occurred as a result of previous works carried out onsite. Previous activities (construction and operations) were confined to the subject site. No impacts on this SAC have occurred due to the previous use of the subject site for external parking / storage. In the absence of mitigation measures, no likely significant effects on this SAC have occurred. Impacts which are occurring <u>Existing Arrangement & Remedial Measures</u> Given that there is no potential source-pathway-receptor linkage to this SAC, it is considered that there are no current impacts on this SAC. In the absence of mitigation measures, no likely significant effects on this SAC are occurring. Impacts that can reasonably be expected to occur <u>Existing Arrangement & Remedial Measures</u> There is no potential source-pathway-receptor linkage from the subject site to this SAC. Therefore, in the absence of mitigation measures, no significant effects are likely to occur to this SAC as a result of the proposed works onsite. In summary, there were/are/will be no significant effects on the qualifying interests of Curraghchase Woods SAC, occurring in any timeframe assessed in this report.

European Site (Site Code)	Qualifying Interests	Conservation Objectives	Approximate Distance (at the closest point)	Screened IN / OUT	Potential Significant Effects?
Tory Hill SAC (IE000439)	- Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] - Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210] - Alkaline fens [7230]	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	10.8 km terrestrial distance. There is considered to be no potential source-pathway-receptor linkage to this SAC.	OUT	The subject site is located 10.8 km from the Tory Hill SAC. There is considered to be no potential source-pathway-receptor linkage to this SAC. Impacts which have occurred <u>Existing Arrangement & Remedial Measures</u> Given that there is no potential source-pathway-receptor linkage to this SAC, it is considered that no potential impacts on this SAC have occurred as a result of previous works carried out onsite. Previous activities (construction and operations) were confined to the subject site. No impacts on this SAC have occurred due to the previous use of the subject site for external parking / storage. In the absence of mitigation measures, no likely significant effects on this SAC have occurred. Impacts which are occurring <u>Existing Arrangement & Remedial Measures</u> Given that there is no potential source-pathway-receptor linkage to this SAC, it is considered that there are no current impacts on this SAC. In the absence of mitigation measures, no likely significant effects on this SAC are occurring. Impacts that can reasonably be expected to occur <u>Existing Arrangement & Remedial Measures</u> There is no potential source-pathway-receptor linkage from the subject site to this SAC. Therefore, in the absence of mitigation measures, no significant effects are likely to occur to this SAC as a result of the proposed works onsite. In summary, there were/are/will be no significant effects on the qualifying interests of Tory Hill SAC, occurring in any timeframe assessed in this report.

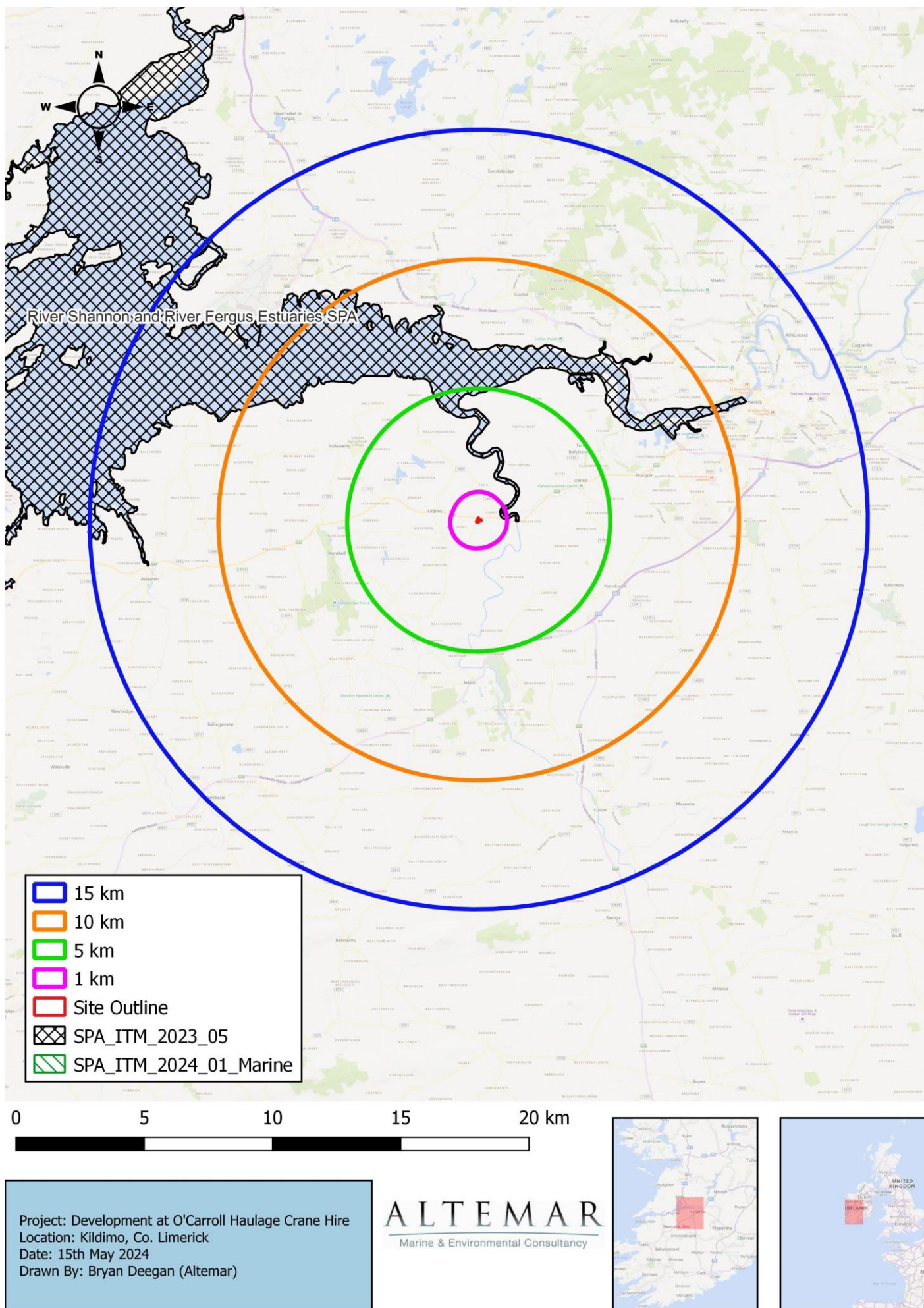


Project: Development at O'Carroll Haulage Crane Hire
 Location: Kildimo, Co. Limerick
 Date: 15th May 2024
 Drawn By: Bryan Deegan (Altamar)

ALTEMAR
 Marine & Environmental Consultancy



Figure 5. Special Areas of Conservation (SAC) within 15km of proposed development



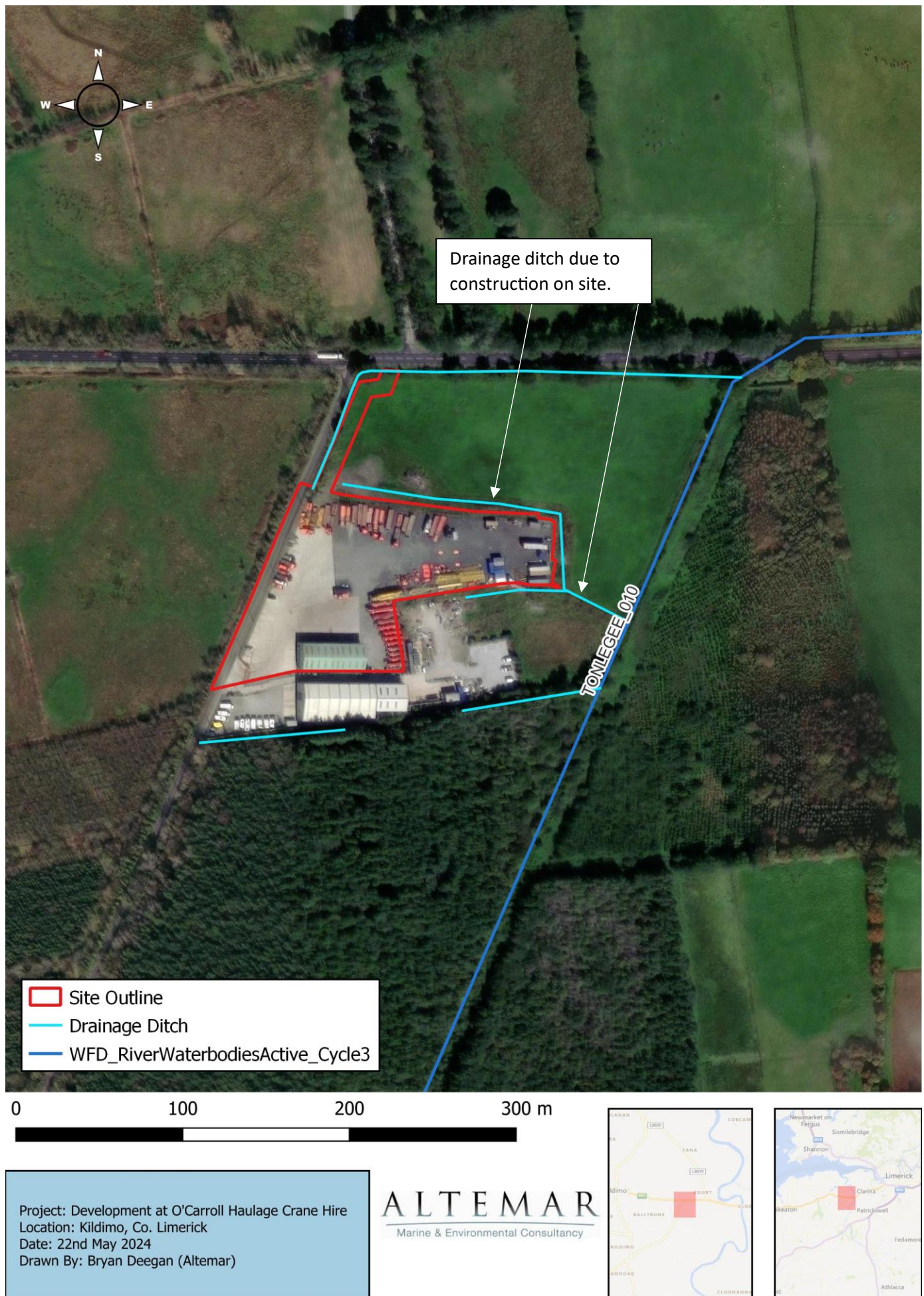
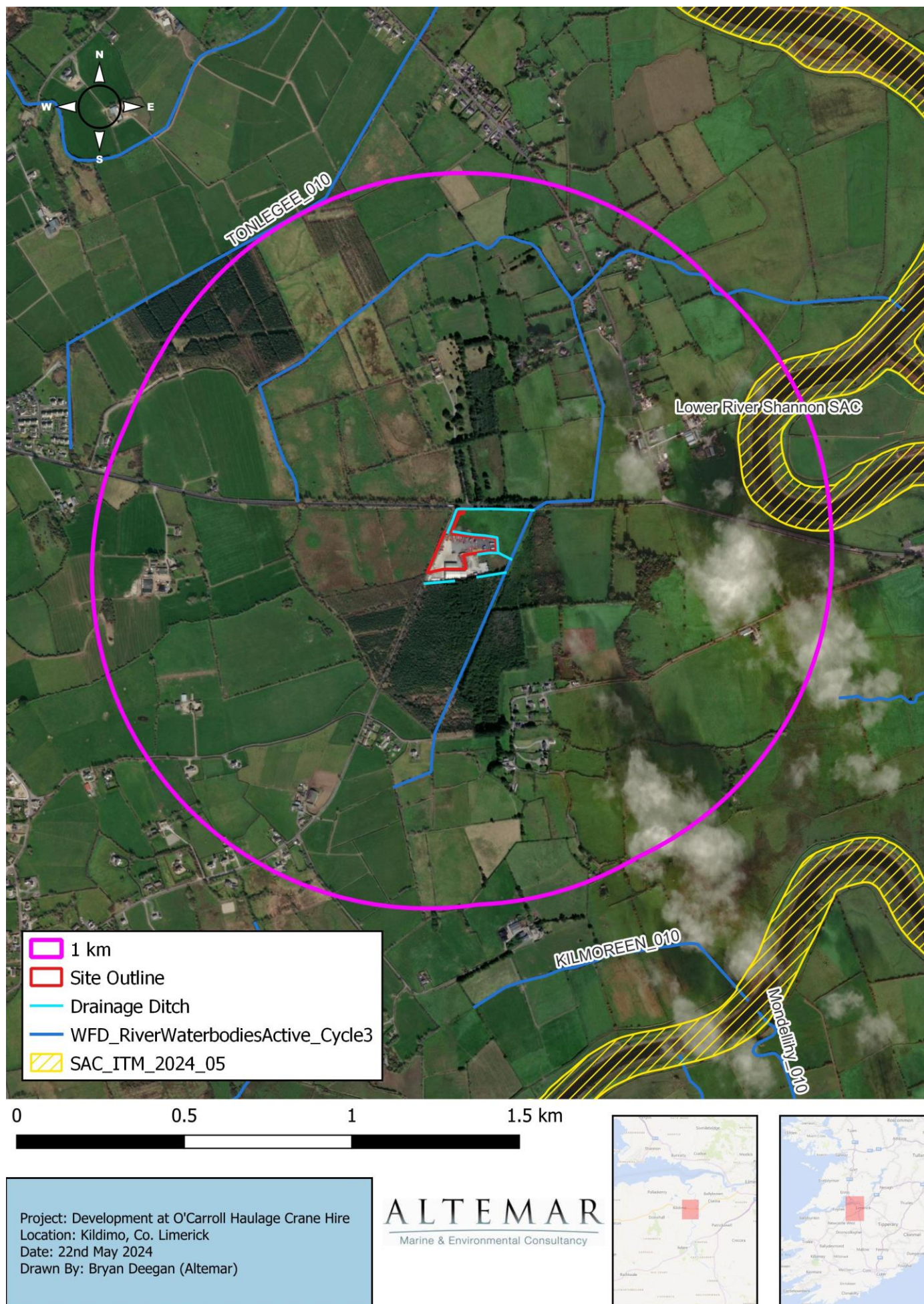


Figure 7. Watercourses and drainage networks within close proximity to the proposed development



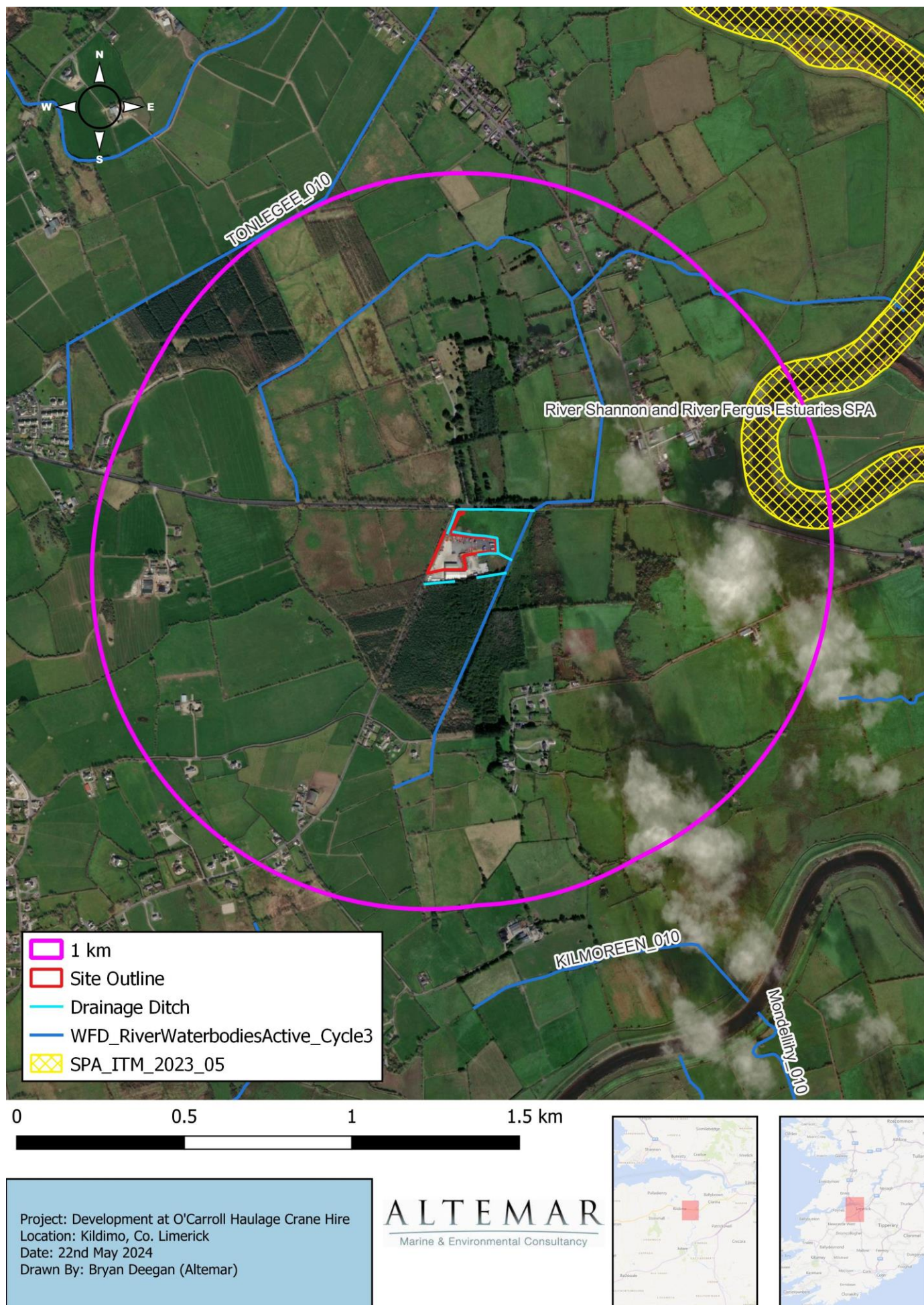


Figure 9. Watercourses, drainage channels / ditches, and SPAs proximate to the proposed development

4.5 In-Combination Effects

The following is a list of planning applications as identified on the Department of Housing, Local Government and Heritage's 'National Planning Application Database' portal²:

Table 4. In-combination effects considered

Ref. No.	Address	Proposal
21101	Court, Kildimo, Co. Limerick	the construction of a 150 square metre covered storage building and all ancillary site works
201132	Balleycasey, Kildimo, Co. Limerick	the construction of a dwelling house, domestic garage, entrance, installation of a proprietary treatment system and polishing filter, and all associated site works
19572	Court, Kildimo, Co. Limerick	a change of house type and alterations to site boundaries under previously approved planning permission ref. no. 17/1017 together with all associated site works
18985	Court, Kildimo, Co. Limerick	alterations to permitted site boundaries under governing permission planning ref. no. 17/1016 and all associated site works
171017	Court, Kildimo, Co. Limerick	the construction of an entrance, dwelling house, garage, domestic waste water treatment system with polishing filter and all associated site works
171016	Court, Kildimo, Co. Limerick	the construction of an entrance, dwelling house, garage, domestic waste water treatment system with polishing filter and all associated site works
17958	Court, Kildimo, Co. Limerick	the construction of a workshop extension to the rear of the existing workshop. Retention permission for external hardstanding yard and to retain existing workshop use from commercial to light industrial use
17794	Court, Kildimo, Co. Limerick	a workshop extension to the rear of the existing workshop. Retention permission for external hardstanding yard and to retain existing workshop use from commercial to light industrial use

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

From a review of the above, it is concluded that no projects in the vicinity of the proposed development would be seen to have a significant in combination effect on Natura 2000 sites.

² <https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=9cf2a09799d74d8e9316a3d3a4d3a8de>

5. Remedial Appropriate Assessment Screening Conclusions

An initial screening of the existing arrangement and the proposed works, using the precautionary principle (without the use of any standard construction phase controls or mitigation measures) and the Source/Pathway/Receptor links between the existing arrangement / proposed works and European sites with the potential to result in significant effects on the conservation objectives and features of interest of the European sites was carried out in Tables 2 and 3. Based on best scientific knowledge and objective information and assessment, the possibility of significant effects caused by the project was excluded for the following European sites within 15km in addition to sites beyond 15km with a direct/indirect pathway:

- Askeaton Fen Complex SAC
- Curraghchase Woods SAC
- Tory Hill SAC

Given the nature of the proposed works, the direct hydrological pathway from the subject site to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA via a drainage ditch network currently servicing the site, and out of an abundance of caution, it is considered that the potential ZOI of the proposed works extends beyond the site outline to include Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. Out of an abundance of caution, in the absence of mitigation measures, it is considered that there is the potential for petrochemicals, contamination, or silt laden material to enter the drainage network and result in downstream impacts on Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA.

Acting on a strictly precautionary basis, a remedial Natura Impact Statement (rNIS) is required in respect of the effects of the project on the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA because it cannot be excluded on the basis of best objective scientific information following screening, in the absence of control or mitigation measures that the plan or project, individually and/or in combination with other plans or projects, will have a significant effect on the named European Site/s.

An rNIS or Stage 2 Appropriate Assessment is not required for the effects of the project on all other listed Natura sites and those beyond 15km because it can be excluded based on the best objective scientific information following screening that the plan or project, individually and/or in combination with other plans or projects, will have a significant effect on the European Site/s.

A remedial Natura Impact Statement (rNIS) is required for the proposed development.

6. Stage 2: Natura Impact Statement

A Natura Impact Statement (NIS) is Stage 2 of the Appropriate Assessment process. In the case of the proposed development, acting on a strictly precautionary basis, a remedial NIS is required in respect of the effects of the project on the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA (due to the potential for downstream impacts during construction and operation of retention and elements of the project via the surface water drainage network), because it cannot be excluded on the basis of best objective scientific information, in the absence of control or mitigation measures, following screening that the plan or project, individually and/or in combination with other plans or projects, will have a significant effect on the named European Site/s.

A Stage 2 Appropriate Assessment or NIS is not required for the effects of the project on all other listed Natura sites within, and sites beyond, 15km because, it can be excluded, on the basis of the best objective scientific information following screening, that the plan or project, individually and/or in combination with other plans or projects, will have not a significant effect on the European Site/s.

The rNIS evaluates the potential for direct, indirect effects, alone or in combination with other plans and projects having taken into account the use of mitigation measures.

A further review of the Conservation Objectives and features of interest is necessary to determine if significant effects are likely to impact the Lower River Shannon SAC and Lower River Shannon and River Fergus Estuaries SPA.

6.1 Lower River Shannon SAC (Site code: 002165)³

Lower River Shannon SAC is located 0.7 km from the planning boundary. Out of an abundance of caution, it is considered that there is a direct hydrological connection to the Lower River Shannon SAC via surface water drainage. Surface water is currently directed (and will continue to be directed) to an existing drainage network which flows in a northeasterly direction for approximately 2.1 km (distance along the drainage network) before ultimately discharging to the Mague River and, consequently, Lower River Shannon SAC.

6.1.1 Site Characteristics

The Lower River Shannon SAC is very large, long site approximately 14 km wide and 120 km long, encompassing: the drained river valley which forms the River Shannon estuary; the broader River Fergus estuary, plus a number of smaller estuaries e.g. Poulmasherry Bay; the freshwater lower reaches of the Shannon River, between Killaloe and Limerick, plus the freshwater stretches of much of the Feale and Mulkear catchments; a marine area at the mouth of the Shannon estuary with high rocky cliffs to the north and south; ericaceous heath on Kerry Head and Loop Head; and several lagoons. The underlying geology ranges from Carboniferous limestone (east of Foynes) to Namurian shales and flagstones (west of Foynes) to Old Red Sandstone (at Kerry Head). The salinity of the system varies daily with the ebb and flood of the tide and with annual rainfall fluctuations seasonally.

6.1.2 Quality and Importance

The site contains many Annexed habitats, including the most extensive area of estuarine habitat in Ireland. A good range of Annexed species are also present, including the only known resident population of *Tursiops truncatus* in Ireland, all three Irish species of lamprey, and a good population of *Salmo salar*. A number of birds listed on the EU Birds Directive either winter or breed in the site. The site is internationally important for waterfowl with more than 50,000 individuals occurring in winter. Several species listed in the Irish Red Data Book are present, perhaps most notably the only known Irish populations of *Scirpus triqueter*.

6.1.3 Vulnerability

The estuarine habitat and associated species are vulnerable to land reclamation, industrial development, water pollution (from industrial, agricultural and domestic sources) and spread of *Spartina*. The wintering birds and breeding terns are also vulnerable to disturbance (e.g. from shooting and aircraft). The dolphins are vulnerable

³ NATURA Standard Data Form for Lower River Shannon SAC

to underwater aquatic disturbance, entanglement in fishing gear and collision with fast moving craft. The main threats to the terrestrial habitats are over-grazing, while the rivers and associated annexed species are threatened by water pollution and flood relief works (e.g. dredging). Sublittoral sediments and submerged sand banks could be threatened by future wind-farm developments.

The Qualifying Interests (QI) (Features of Interest) and the National conservation status of the QI for Lower River Shannon SAC are seen in Table 5. The Site specific conservation objectives for European sites are seen in Table 6.

Table 5. Qualifying Interests, Conservation Status, Management Objectives, Conditions underpinning site integrity for Lower River Shannon SAC.

Qualifying Interests, Conservation Status, Management Objectives, Conditions underpinning site integrity for relevant European sites		
European Site Name & Code	Qualifying Interests	Current Conservation Status & Trend
Lower River Shannon SAC IE002165	Sandbanks which are slightly covered by sea water all the time [1110]	Favourable
	Estuaries [1130]	Inadequate
	Mudflats and sandflats not covered by seawater at low tide [1140]	Inadequate
	Coastal lagoons [1150]	Bad
	Large shallow inlets and bays [1160]	Bad
	Reefs [1170]	Inadequate
	Perennial vegetation of stony banks [1220]	Inadequate
	Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	Inadequate
	Salicornia and other annuals colonising mud and sand [1310]	Favourable
	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]	Inadequate
	Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]	Inadequate
	Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and Callitriche-Batrachion vegetation [3260]	Inadequate
	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) [6410]	Bad
	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnus incana</i> , <i>Salix alba</i>) [91E0]	Bad
	<i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]	Bad
	<i>Petromyzon marinus</i> (Sea Lamprey) [1095]	Bad
	<i>Lampetra planeri</i> (Brook Lamprey) [1096]	Favourable
	<i>Lampetra fluviatilis</i> (River Lamprey) [1099]	Unknown
	<i>Salmo salar</i> (Salmon) [1106]	Inadequate
	<i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349]	Favourable
	<i>Lutra lutra</i> (Otter) [1355]	Favourable

Lower River Shannon SAC (002165) site specific conservation objectives for European sites as outlined in the Conservation objectives document (NPWS, 2012):

Table 7. Site specific conservation objectives for European sites

1029 Freshwater Pearl Mussel *Margaritifera margaritifera*

To restore the favourable conservation condition of Freshwater Pearl Mussel in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Kilometres	Maintain at 7km. See map 15	This conservation objective applies to the freshwater pearl mussel population in the Cloon River, Co. Clare only (see also the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (Government of Ireland, 2009b)). The Cloon population is confined to the main channel and is distributed from Croany Bridge to approx. 1.5km upstream of Clonderalaw Bridge (Ross, 2008; DEHLG, 2010)
Population size	Number of adult mussels	Restore to 10,000 adult mussels	The Cloon population was estimated as less than 10,000 in 2009 (DEHLG, 2010)
Population structure: recruitment	Percentage per size class	Restore to least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length	Mussels of no more than 65mm are considered 'young mussels' and may be found buried in the substratum and/or beneath adult mussels. Mussels of no more than 30mm are 'juvenile mussels' and are always buried in the substratum. No juvenile or young mussels were found in the Cloon in 2007, with the smallest mussel measuring 80.3mm (Ross, 2008). A single 'young mussel' measuring 61.3mm was recorded in 2009 (DEHLG, 2010)
Population structure: adult mortality	Percentage	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	5% is considered the cut-off between the combined errors associated with natural fluctuations and sampling methods and evidence of true population decline. 1% of dead shells is considered to be indicative of natural losses. The Cloon failed the target for dead shells in 2009, with 31% dead shells across the single transect counted. There were no previous data on the number of live adults (DEHLG, 2010)
Habitat extent	Kilometres	Restore suitable habitat in more than 3.3km (see map 15) and any additional stretches necessary for salmonid spawning	The species' habitat covers stretches of a short coastal river; and is a combination of 1) the area of habitat adult and juvenile mussels can occupy and 2) the area of spawning and nursery habitats the host fish can occupy. Fish nursery habitat typically overlaps with mussel habitat. Fish spawning habitat is generally adjacent to mussel habitat, but may lie upstream of the generalised mussel distribution. Only those salmonid spawning areas that could regularly contribute juvenile fish to the areas occupied by adult mussels should be considered. The availability of mussel habitat and fish spawning and nursery habitats are determined by flow and substratum conditions. The habitat for the species is currently unsuitable for the survival of adult mussels or the recruitment of juveniles (DEHLG, 2010). The target is based on the stretches of river identified, from a combination of dedicated survey and incidental records, as having habitat for the species
Water quality: macroinvertebrate and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Restore water quality-macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93	These EQRs correspond to high ecological status for these two Water Framework Directive biological quality elements. They represent high water quality with very low nutrient concentrations (oligotrophic conditions). The habitat in the Cloon failed both standards during 2009 sampling for the Sub-basin Management Plans (DEHLG, 2010). See also The European Communities Environmental Objectives (Surface Water) Regulations 2009 (Government of Ireland, 2009a)
Substratum quality: filamentous algae (macroalgae), macrophytes (rooted higher plants)	Percentage	Restore substratum quality-filamentous algae: absent or trace (<5%); macrophytes: absent or trace (<5%)	The habitat in the Cloon failed both standards during 2009 sampling for the Sub-basin Management Plans, with cover abundance values of up to 50% recorded for filamentous algae and 80% for macrophytes (DEHLG, 2010). Recruitment of juvenile mussels is being prevented by the poor quality of the river substrata

Substratum quality: sediment	Occurrence	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment	The habitat for the species is currently unsuitable for the recruitment of juveniles owing to sedimentation of the substratum. In many locations, it is also unsuitable for the survival of adult mussels (DEHLG, 2010). Significant sedimentation has been recorded during all recent mussel monitoring surveys (Ross, 2008; DEHLG, 2010). Recruitment of juvenile mussels is being prevented by the poor quality of the river substrate
Substratum quality: oxygen availability	Redox potential	Restore to no more than 20% decline from water column to 5cm depth in substrate	Differences in redox potential between the water column and the substrate correlate with differences in oxygen levels. Juvenile mussels require full oxygenation while buried in gravel. In suitable habitat, there should be very little loss of redox potential between the water column and underlying gravels. Redox potential measurements in 2009 yielded losses of 32.3 - 43.5% (average of 39%) at 5cm depth (DEHLG, 2010)
Hydrological regime: flow variability	Metres per second	Restore appropriate hydrological regimes	The availability of suitable freshwater pearl mussel habitat is largely determined by flow (catchment geology being the other important factor). In order to restore the habitat for the species, flow variability over the annual cycle must be such that: 1) high flows can wash fine sediments from the substratum, 2) low flows do not exacerbate the deposition of fines and 3) low flows do not cause stress to mussels in terms of exposure, water temperatures, food availability or aspects of the reproductive cycle
Host fish	Number	Maintain sufficient juvenile salmonids to host glochidial larvae	Salmonid fish are host to the larval form of the freshwater pearl mussel and, thus, they are essential to the completion of the life cycle. 0+ and 1+ fish are typically used, both because of the habitat overlaps and the development of immunity with age in the fish. Fish presence is considered sufficient, as higher densities and biomass of fish are indicative of enriched conditions in mussel rivers. Geist et al. (2006) found that higher densities of host fish coincided with eutrophication, poor substrate quality for pearl mussels and a lack of pearl mussel recruitment, while significantly lower densities and biomass of host fish were associated with high numbers of juvenile mussels. Fish movement patterns must be such that 0+ fish in the vicinity of the mussel habitat remain in the mussel habitat until their 1+ summer. No fish stocking should occur within the mussel habitat, nor any works that may change the salmonid balance or residency time. The Cloon freshwater pearl mussel population appears to favour native brown trout, with 17.2% of 1+ and older trout caught in 2009 hosting glochidia (DEHLG, 2010). Therefore, it is particularly important that trout are not out-competed by stocked fish

1095 Sea Lamprey *Petromyzon marinus*

To restore the favourable conservation condition of Sea Lamprey in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	Artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting the species to lower stretches and restricting access to spawning areas. See Gargan et al. (2011). Specific barriers serve to constrain the up- river migration of sea lamprey. The upper extent of the SAC in the R. Fergus is delineated by a barrier to migration. Barriers are also present in the Mulkear and Feale
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007)
Juvenile density in fine sediment	Juveniles/m2	Juvenile density at least 1/m2	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003)
Extent and distribution of spawning habitat	m2 and occurrence	No decline in extent and distribution of spawning beds	Lampreys spawn in clean gravels. Surveys by Inland Fisheries Ireland (IFI) commonly indicated accumulations of redds downstream of major weirs. (See also Gargan et al., 2011)
Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Despite observed spawning activity, sampling for ammocoetes consistently fails to find these in many sampling stations and never in any great numbers

1096 Brook Lamprey *Lampetra planeri*

To maintain the favourable conservation condition of Brook Lamprey in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	% of river accessible	Access to all water courses down to first order streams	Artificial barriers can block or cause difficulties to brook lampreys' migration, both up- and downstream, thereby possibly limiting the species to specific stretches and creating genetically isolated populations (Espanhol et al., 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	Attribute and target based on data from Harvey and Cowx (2003). It is impossible to distinguish between brook and river lamprey juveniles in the field (Gardiner, 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m2	Mean catchment juvenile density of brook/river lamprey at least 2/m2	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m2 in optimal conditions and more than 2/m2 on a catchment basis
Extent and distribution of spawning habitat	m2 and occurrence	No decline in extent and distribution of spawning beds	Spawning site and redd attributes established by IFI (Rooney et al., in press)
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Many sites with suitable larval attributes i.e. fine sediment in low velocity habitat, are found not to contain larval lamprey. This may be a function of chance or probability, or may be a consequence of insufficient recruitment to fill all spatial niches. Occupancy in excess of 50% of sites would be 'reasonable' for the Irish catchments examined to date (King et al., unpublished data)

1099 River Lamprey *Lampetra fluviatilis*

To maintain the favourable conservation condition of River Lamprey in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	% of river accessible	Access to all water courses down to first order streams	Artificial barriers can block or cause difficulties to river lampreys' migration, both up- and downstream, thereby possibly limiting species to specific stretches and creating genetically isolated populations (Espanhol et al., 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present	Attribute and target based on data from Harvey and Cowx (2003). It is impossible to distinguish between river and brook lamprey juveniles in the field (Gardiner 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m ²	Mean catchment juvenile density of river/brook lamprey at least 2/m ²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m ² in optimal conditions and more than 2/m ² on a catchment basis
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds	
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Many sites with suitable larval attributes i.e. fine sediment in low velocity habitat, are found not to contain larval lamprey. This may be a function of chance or probability, or may be a consequence of insufficient recruitment to fill all spatial niches. Occupancy in excess of 50% of sites would be 'reasonable' for the Irish catchments examined to date (King et al., unpublished data)

1106 Atlantic Salmon *Salmo salar* (only in fresh water)

To restore the favourable conservation condition of Salmon in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmon's upstream migration, thereby limiting the species to lower stretches and restricting access to spawning areas. The large hydro-electric station at Ardnacrusha and the Parteen regulating weir present considerable obstructions to upstream passage of salmon on the Shannon main channel. While both have fish passes installed, upstream migration of salmon is still problematical. Further weirs upstream on the Shannon also restrict access to spawning habitat. No such obstacles, causing significant fish passage issues for salmon are present on the Feale and Mulkear rivers
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded	A conservation limit is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee of the National Salmon Commission's annual model output of CL attainment levels. See SSC (2010). Stock estimates are either derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The salmon stocks in the Shannon above the impoundments are significantly below their Conservation Limits. Salmon stocks in the Feale and Mulkear rivers are above CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	Target is threshold value for rivers currently exceeding their conservation limit (CL). The abundance of salmon fry at monitored sites on the Shannon main channel, above the hydro-electric station, is significantly below this target
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (<i>Lepeophtheirus salmonis</i>). On the Shannon main channel, salmon smolt abundance may be significantly affected by mortality passing through hydro- electric turbines

Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	Salmon spawn in clean gravels. Artificial barriers are currently preventing salmon from accessing suitable spawning habitat on the Shannon main channel
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)

1110 Sandbanks which are slightly covered by sea water all the time

To maintain the favourable conservation condition of Sandbanks which are slightly covered by sea water all the time in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat distribution	Occurrence	The distribution of sandbanks is stable, subject to natural processes. See map 3	Distribution established using the Valentia Island to River Shannon Admiralty Chart (no. 1819_0)
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area was estimated as 1,353ha using the Valentia Island to River Shannon Admiralty Chart (no. 1819_0)
Community distribution	Hectares	Conserve the following community type in a natural condition: Subtidal sand to mixed sediment with <i>Nephtys</i> spp. community complex. See map 9	The likely area of the community was derived from a sandbank survey in 2007 (Aquafact, 2007) and a subtidal survey in 2010 (Aquafact, 2011a). See marine supporting document for further details

1130 Estuaries

To maintain the favourable conservation condition of Estuaries in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 4	Habitat area was estimated as 24,273ha using OSI data and the Transitional Water Body area as defined under the Water Framework Directive
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex; Estuarine subtidal muddy sand to mixed sediment with gammarids community complex; Subtidal sand to mixed sediment with <i>Nucula nucleus</i> community complex; Subtidal sand to mixed sediment with <i>Nephtys</i> spp. community	The likely area of these communities was derived from intertidal and subtidal surveys undertaken in 2010 (Aquafact, 2011a and c). See marine supporting document for further details

Attribute	Measure	Target	Notes
		complex; Furoid-dominated intertidal reef community complex; Faunal turf-dominated subtidal reef community; and Anemone-dominated subtidal reef community. See map 9	

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 5	Habitat area was estimated using OSI data as 8,808ha
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sand with <i>Scolecipis squamata</i> and <i>Pontocrates</i> spp. community; and Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex. See map 9	The likely area of these communities was derived from an intertidal survey in 2010 (Aquafact, 2011c). See marine supporting document for further details

1150 *Coastal lagoons

To restore the favourable conservation condition of Coastal lagoons in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes. Favourable reference area 33.4ha- Shannon	Areas calculated from spatial data derived from Oliver, 2007. Site codes IL031- IL034. See lagoon supporting document for further details

		Airport Lagoon 24.2ha; Cloonconeen Pool 3.9ha; Scatterry Lagoon 2.8ha; Quayfield and Poulaweala Loughs 2.5ha. See map 6	
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 6	Sites IL031-IL034 in Oliver, 2007. See lagoon supporting document for further details
Salinity regime	practical salinity units (psu)	Median annual salinity and temporal variation within natural ranges	The lagoons in the site vary from oligohaline to euhaline. See lagoon supporting document for further details
Hydrological regime	Metres	Annual water level fluctuations and minima within natural ranges	Lagoons listed for this site are all considered to be shallow. See lagoon supporting document for further details
Barrier: connectivity between lagoon and sea	Permeability	Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management	The lagoons within this site exhibit a variety of barrier types including cobble/shingle, karst and artificial embankment. See lagoon supporting document for further details
Water quality: chlorophyll a	µg/L	Annual median chlorophyll a within natural ranges and less than 5µg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Water quality: Molybdate Reactive Phosphorus (MRP)	mg/L	Annual median MRP within natural ranges and less than 0.1mg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Water quality: Dissolved Inorganic Nitrogen (DIN)	mg/L	Annual median DIN within natural ranges and less than 0.15mg/L	Target based on Roden and Oliver, 2010). See lagoon supporting document for further details
Depth of macrophyte colonisation	Metres	Macrophyte colonisation to maximum depth of lagoons	As these lagoons are all shallow, it is expected the macrophytes should extend to their deepest points. See lagoon supporting document for further details
Typical plant species	number and m2	Maintain number and extent of listed lagoonal specialists, subject to natural variation	Species listed in Oliver, 2007. See lagoon supporting document for further details
Typical animal species	number	Maintain listed lagoon specialists, subject to natural variation	Species listed in Oliver, 2007. See lagoon supporting document for further details
Negative indicator species	Number and % cover	Negative indicator species absent or under control	Low salinity, shallow water and elevated nutrient levels increase the threat of un- natural encroachment by reedbeds

1160 Large shallow inlets and bays

To maintain the favourable conservation condition of Large shallow inlets and bays in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 7	Habitat area was estimated as 35,282ha using OSi data and the Transitional Water Body area as defined under the Water Framework Directive
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sand with <i>Scolecopsis squamata</i> and <i>Pontocrates</i> spp. community; Intertidal sand to	The likely area of these communities was derived from intertidal and subtidal surveys in 2010 (Aquafact, 2011a and c). See marine supporting document for further details

Attribute	Measure	Target	Notes
		mixed sediment with polychaetes, molluscs and crustaceans community complex; Subtidal sand to mixed sediment with <i>Nucula nucleus</i> community complex; Subtidal sand to mixed sediment with <i>Nephtys</i> spp. community complex; Furoid-dominated intertidal reef community complex; Mixed subtidal reef community complex; Faunal turf-dominated subtidal reef community; Anemone- dominated subtidal reef community; and <i>Laminaria</i>-dominated community complex. See map 9	

1170 Reefs

To maintain the favourable conservation condition of Reefs in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat distribution	Occurrence	The distribution of Reefs is stable, subject to natural processes. See map 8	Distribution is established from intertidal and subtidal reef surveys in 2010 (Aquafact, 2011b and c)
Habitat area	Hectares	The permanent habitat area is stable, subject to natural processes. See map 8	Habitat area was estimated as 21,421ha from the 2010 intertidal and subtidal reef survey (Aquafact 2011b and c)
Community distribution	Hectares	Conserve the following reef community types in a natural condition: Furoid-dominated intertidal reef community complex; Mixed subtidal reef community complex; Faunal turf-dominated subtidal reef community; Anemone- dominated subtidal reef community; and <i>Laminaria</i>-dominated community complex. See map 9	Based on the 2010 intertidal and subtidal reef survey (Aquafact, 2011b and c). See marine supporting document for further details

1220 Perennial vegetation of stony banks

To maintain the favourable conservation condition of Perennial vegetation of stony banks in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	Current area unknown. It was recorded to be present but extent was not mapped from nine sub-sites during the National Shingle Beach Survey (Moore and Wilson, 1999): Ross Bay, Kilbaha Bay, Cloonconeene Lough and Rinevella Bay, Carrigholt Bay, Ballymacrinan Bay, Bunaclogga Bay, Corcas and Sandhills, Bromore and Ballybunnon. NB further unsurveyed areas maybe present within the site
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map10 for recorded locations	Full distribution currently unknown. An excellent array of shingle beaches is known to occur, including three that are ranked of high interest (Ross Bay, Bunaclogga Bay and Cloonconeene Lough and Rinevella), the last of which is associated with a lagoonal system (Moore and Wilson, 1999). Habitat likely to be more widespread. See coastal habitats supporting document for further details. See also the conservation objective for coastal lagoons (1150)
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Moore and Wilson (1999). Shingle features are relatively stable in the long-term and shingle beaches within this SAC appear to be functioning naturally with few artificial restrictions to beach dynamics (Moore and Wilson, 1999). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Moore and Wilson (1999). Lichens are present at Ross Bay and Cloonconeene and Rinevella Bay indicating a degree of stability. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the typical vegetated shingle flora including the range of sub-communities within the different zones	The Carrigholt sub-site is a small site with a diverse flora. The Bunaclogga Bay sub-site supports yellow horned-poppy (<i>Glaucium flavum</i>), which contributes to the site's high interest ranking. Based on data from Moore and Wilson (1999). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Moore and Wilson (1999). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details

1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

To maintain the favourable conservation condition of Vegetated sea cliffs in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat length	Kilometres	Area stable or increasing, subject to natural processes, including erosion. For sub-sites mapped: Kilbaha- 4.1km; Ladder Rock- 1.0km; Moyarta- 0.9km; Lisheencrony- 1.1km; Burrane- 0.2km; Kerry Head- 33.4km; Ballybunion- 15.6km; Kilclogher- 4.9km; Loop Head- 6.1km. See map 11	Based on data from the Irish Sea Cliff Survey (ISCS) (Barron et al., 2011). Nine sub-sites were identified using a combination of aerial photos and the DCENR helicopter viewer. The length of each cliff was measured (in some cases the cliff was measured in sections) to give a total estimated area of 67.3km within the SAC. Cliffs are linear features and are therefore measured in kilometres. Length of cliff likely to be underestimated. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 11	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). Most of the SAC west of Kilcredaun Point and Kilconly Point is bounded by high rocky sea cliffs. Both hard and soft cliffs occur in this SAC (ISCS; Browne, 2005). See coastal habitats supporting document for further details
Physical structure: functionality and hydrological regime	Occurrence of artificial barriers	No alteration to natural functioning of geomorphological and hydrological processes due to artificial structures	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). Maintaining natural geomorphological processes including natural erosion is important for the health of vegetated sea cliff. Hydrological processes maintain flushes and in some cases tufa formations that can be associated with sea cliffs. Freshwater seepage was noted from the cliffs at Loop Head and Kilclogher. Stream or cascade was noted from Kerry Head. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of sea cliff habitat zonation including transitional zones, subject to natural processes including erosion and succession	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). At Loop Head sub-site the zones recorded were: splash, crevice ledge and ungrazed coastal grassland on hard cliffs. At Kerry Head sub-site the zones recorded were: splash, pioneer, crevice ledge, ungrazed/grazed coastal grassland on hard cliffs and coastal grassland on soft cliffs. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in the Irish Sea cliff survey (Barron et al., 2011)	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). See coastal habitats supporting document for further details
Vegetation composition: bracken and woody species	Percentage	Cover of bracken (<i>Pteridium aquilinum</i>) on grassland and/or heath to be less than 10%. Cover of woody species on grassland and/or heath to be less than 20%	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). See coastal habitats supporting document for further details

1310 *Salicornia* and other annuals colonizing mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle - 0.005ha; Inishdea, Owenshere - 0.003ha; Knock - 0.029ha; Querin - 0.185ha; Rinevilla Bay - 0.001ha. See map 12	Based on data from Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). Habitat recorded at five of the ten sub-sites surveyed and mapped, giving a total estimated area of 0.223ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 12 for known distribution	Based on data from McCorry and Ryle (2009). Habitat recorded at six out of ten sub-sites by McCorry and Ryle (2009).NB further unsurveyed areas maybe present within the site. <i>Salicornia</i> is an annual species, so its distribution can vary significantly from year to year. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Sediment supply is particularly important for this pioneer saltmarsh community, as the distribution of this habitat depends on accretion rates. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from McCorry and Ryle (2009). Creeks deliver sediment throughout saltmarsh system. Creeks and pan structures well developed in the larger sections of the marsh at Carrigafoyle, Shepperton/Fergus Estuary and Inishdea/Owenshere. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	This pioneer saltmarsh community requires regular tidal inundation. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the presence of species-poor communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)	Based on data from McCorry and Ryle (2009). Species of local distinctiveness recorded include sea wormwood (<i>Seriphidium maritimum</i>), meadow barley (<i>Hordeum secalinum</i>) and hard grass (<i>Parapholis strigosa</i>) (McCorry and Ryle, 2009; internal NPWS files). See coastal habitats supporting document for further details
Vegetation structure: negative indicator species- <i>Spartina anglica</i>	Hectares	No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1%	Based on data from McCorry and Ryle (2009). <i>Spartina</i> was recorded at all sub-sites and is considered a significant threat to the habitat. See coastal habitats supporting document for further details

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle- 6.774ha; Barrigone, Aughinish- 10.288ha; Beagh- 0.517ha; Bunratty- 26.939ha; Shepperton, Fergus Estuary- 37.925ha; Inishdea, Owenshere- 18.127ha; Killadysert, Inishcorker- 2.604ha; Knock- 0.576ha; Querin- 3.726ha; Rinevilla Bay- 11.883ha. See map 12	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle 2009). Ten sub-sites that supported Atlantic salt meadow were mapped (119.36ha) and additional areas of potential saltmarsh (376.07ha) were identified from an examination of aerial photographs, giving a total estimated area of 495.43ha. Saltmarsh habitat also occurs at 11 other sub-sites within the SAC (Curtis and Sheehy-Skeffington, 1998). NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 12 for mapped distribution	Based on data from McCorry and Ryle (2009). Within the sites surveyed by the SMP, estuary type saltmarsh over a mud substrate is most common and ASM is the dominant saltmarsh habitat. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). Embankments along much of the shoreline are a feature of this SAC. These embankments were erected in the past and much of the site has been remodelled and large areas of land reclaimed as a result. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession	Based on data from McCorry and Ryle (2009). Creeks and pan structures well developed at the larger sections of ASM in the Carrigafoyle sub-site. At the ASM at Shepperton, Fergus Estuary, the larger patches still retain a natural creek and salt pan structure. At Inishdea, Owenshere sub-site within some of the intact saltmarsh, there is a complex network of creeks, salt pans and depressions. At Killadysart, Inishcorker and Querin, creek and pan development is generally poor. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). Zonations to other saltmarsh habitats as well as brackish and terrestrial habitats were recorded at all sub-sites. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). All of the sub-sites are grazed to some extent. Overgrazing was noted from Carrigafoyle, Shepperton, Fergus Estuary and Knock sub-sites. See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of the saltmarsh area vegetated	Based on data from McCorry and Ryle (2009). Some poaching was noted from most of the sub-sites. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)	See coastal habitats supporting document for further details

Attribute	Measure	Target	Notes
Vegetation structure: negative indicator species- <i>Spartina anglica</i>	Hectares	No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1%	Based on data from McCorry and Ryle (2009). <i>Spartina</i> is a major element of the vegetation at all sub-sites in this SAC. See coastal habitats supporting document for further details

1349 Bottlenose Dolphin *Tursiops truncatus*

To maintain the favourable conservation condition of Bottlenose Dolphin in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use. See map 16 for suitable habitat	See marine supporting document for further details
Habitat use: critical areas	Location and hectares	Critical areas, representing habitat used preferentially by bottlenose dolphin, should be maintained in a natural condition. See map 16	Attribute and target based on Ingram and Rogan (2002), Englund et al. (2007), Englund et al. (2008), Berrow (2009), Berrow et al. (2010) and review of data from other studies. See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the bottlenose dolphin population at the site	See marine supporting document for further details

1355 Otter *Lutra lutra*

To restore the favourable conservation condition of Otter in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range in Shannon catchment estimated at 70.5% (Bailey and Rochford 2006)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 596.8ha above high water mark (HWM); 958.9ha along river banks/ around ponds	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 4,461.6ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (NPWS, 2007; Kruuk, 2006)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 500.1km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 125.6ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)

Attribute	Measure	Target	Notes
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk, 2006; Kruuk and Moorhouse, 1991)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006) and wrasse and rockling in coastal waters (Kingston et al., 1999)
Barriers to connectivity	Number	No significant increase. For guidance, see map 17	Otters will regularly commute across stretches of open water up to 500m. e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

*To restore the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:*

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle- 4.193ha; Barrigone, Aughinish- 2.407ha; Bunratty- 0.865ha; Inishdea, Owenshere- 11.609ha; Killadysert, Inishcorker- 0.705ha; Knock- 0.143ha, Querin- 0.008ha; Rinevilla Bay- 2.449ha. See map 12	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). Eight sub-sites that support Mediterranean salt meadow were mapped (22.379ha) and additional areas of potential saltmarsh (25.646ha) were identified from an examination of aerial photographs, giving a total estimated area of 48.025ha. Saltmarsh habitat also occurs at 11 other sub-sites within the SAC (Curtis and Sheehy-Skeffington, 1998). NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 12 for known distribution	Based on data from McCorry and Ryle (2009). Within the sites surveyed by the SMP, estuary type saltmarsh over a mud substrate is most common. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). Embankments along much of the shoreline are a feature of this SAC. These embankments were erected in the past and much of the site has been remodelled and large areas of land reclaimed because of them. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from the Saltmarsh Monitoring Project (McCorry and Ryle, 2009). The MSM at Carrigafoyle contains some large salt pans. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Mediterranean salt meadow is found high up in the saltmarsh but requires occasional tidal inundation. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). Zonations to other saltmarsh habitats as well as brackish and terrestrial habitats were recorded at most sub-sites. See coastal habitats supporting document for further details

Attribute	Measure	Target	Notes
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). All of the sub-sites are grazed to some extent. Overgrazing was noted from Inishdea, Owenshere and Knock sub-sites. See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	Based on data from McCorry and Ryle (2009). Some poaching was noted from most of the sub-sites. See coastal habitats supporting document for further details
Vegetation composition: typical species	Percentage cover	Maintain range of sub-communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)	See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1%	Based on data from McCorry and Ryle (2009). <i>Spartina</i> is a major element of the vegetation at all sub-sites in this SAC. See coastal habitats supporting document for further details

3260 Water courses of plain to montane levels with the *Ranunculon fluitantis* and *Callitricho-Batrachion* vegetation

To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculon fluitantis* and *Callitricho-Batrachion* vegetation in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Kilometres	Area stable or increasing, subject to natural processes	Three sub-types of high conservation value are known to occur in the site. See Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details. Note: rooted macrophytes should be absent or trace (< 5% cover) in freshwater pearl mussel (<i>Margaritifera margaritifera</i>) habitat. The freshwater pearl mussel (1029) conservation objective takes precedence over this objective for habitat 3260 in the Cloon River within this SAC, because the mussel requires environmental conditions closer to natural background levels
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 13	See Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	See Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details
Hydrological regime: tidal influence	Daily water level fluctuations - metres	Maintain natural tidal regime	See Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details
Hydrological regime: freshwater seepages	Metres per second	Maintain appropriate freshwater seepage regimes	See Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details
Substratum composition: particle size range	Millimetres	The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (frequently sands, gravels and cobbles)	Although many of the high-conservation-value sub-types are dominated by coarse substrata, for certain sub-types, notably triangular club-rush (<i>Schoenoplectus triqueter</i>) and opposite-leaved pondweed (<i>Groenlandia densa</i>), fine substrata are required. See Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details
Water quality: nutrients	Milligrams per litre	The concentration of nutrients in the water column should be sufficiently low to prevent changes	The specific targets may vary among sub-types. See Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details

Attribute	Measure	Target	Notes
		in species composition or habitat condition	
Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition	See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details
Floodplain connectivity	Area	The area of active floodplain at and upstream of the habitat should be maintained	See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details
Riparian habitat	Area	The area of riparian woodland at and upstream of the bryophyte-rich sub-type should be maintained	See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details. See also the conservation objective for Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) (91E0)

6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinia caerulea*)

To maintain the favourable conservation condition of *Molinia* meadows on calcareous, peaty or clayey-silt laden soils (*Molinia caerulea*) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Full extent of this habitat in this site is currently unknown- see distribution below
Habitat distribution	Occurrence	No decline, subject to natural processes	This habitat has been recorded on the eastern bank of the Shannon, just north of Castleconnell, Co. Limerick (NPWS internal files). Full distribution of this habitat in this site is currently unknown and it almost certainly occurs elsewhere. The Irish semi- natural grasslands survey will cover Co. Limerick in 2012 and additional information is likely to be available following this survey
Vegetation structure: broadleaf herb: grass ratio	Percentage	Broadleaf herb component of vegetation between 40 and 90%	Attribute and target based on O'Neill et al. (2010)
Vegetation structure: sward height	Percentage	30-70% of sward between 10 and 80cm high	Attribute and target based on O'Neill et al. (2010)
Vegetation composition: typical species	Number	At least 7 positive indicator species present, including 1 "high quality" species	List of positive indicator species, including high quality species, identified by O'Neill et al. (2010). Note that purple moor-grass (<i>Molinia caerulea</i>) is a positive indicator species, but not necessarily an essential component of the habitat
Vegetation composition: notable species	Number	No decline, subject to natural processes	A number of notable species have been recorded in this habitat at this site including smooth brome (<i>Bromus racemosus</i>), pale sedge (<i>Carex pallescens</i>) and blue-eyed grass (<i>Sisyrinchium bermudiana</i>) (Reynolds et al., 2006)
Vegetation composition: negative indicator species	Percentage	Negative indicator species collectively not more than 20% cover, with cover by an individual species less than 10%. Non-native invasive species, absent or under control	List of negative indicator species identified by O'Neill et al. (2010)
Vegetation composition: negative indicator moss species	Percentage	Bog mosses (<i>Sphagnum</i> spp.) not more than 10% cover;	Attribute and target based on O'Neill et al. (2010)

Attribute	Measure	Target	Notes
		hair mosses (<i>Polytrichum</i> spp.) not more than 25% cover	
Vegetation structure: woody species and bracken (<i>Pteridium aquilinum</i>)	Percentage	Cover of woody species and bracken not more than 5% cover	Attribute and target based on O'Neill et al. (2010)
Physical structure: bare ground	Percentage	Not more than 10% bare ground	Attribute and target based on O'Neill et al. (2010)

91E0 *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)

To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least c.8.5ha for sites surveyed. See map 14	Minimum area, based on 5 sites surveyed by Perrin et al. (2008) - site codes 1286, 1577, 1857, 1861, 1995. See woodland habitats supporting document for further details. NB further areas are likely to be present within the SAC
Habitat distribution	Occurrence	No decline. Surveyed locations shown on map 14	Distribution based on Perrin et al.(2008). NB further areas are likely to be present within the SAC
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). Topographical and land-ownership constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008). See woodland habitats supporting document for further details
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008). See woodland habitats supporting document for further details
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Alder and oak regenerate poorly. Ash often regenerates in large numbers although few seedlings reach pole size
Hydrological regime: flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	Periodic flooding is essential to maintain alluvial woodlands along river floodplains
Woodland structure: dead wood	m3 per hectare; number per hectare	At least 30m3/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem

Attribute	Measure	Target	Notes
		diameter (greater than 20cm diameter in the case of alder)	
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-data and other rare or localised species. Perrin and Daly (2010) list four sites as containing potential ancient/long established woodland. See woodland habitats supporting document for further details
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008)
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including alder (<i>Alnus glutinosa</i>), willows (<i>Salix</i> spp) and, locally, oak (<i>Quercus robur</i>) and ash (<i>Fraxinus excelsior</i>)	Species reported in Perrin et al. (2008). See woodland habitats supporting document for further details
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common invasive species in this woodland type: Himalayan balsam (<i>Impatiens glandulifera</i>), giant hogweed (<i>Heracleum mantegazzianum</i>), sycamore (<i>Acer pseudoplatanus</i>)

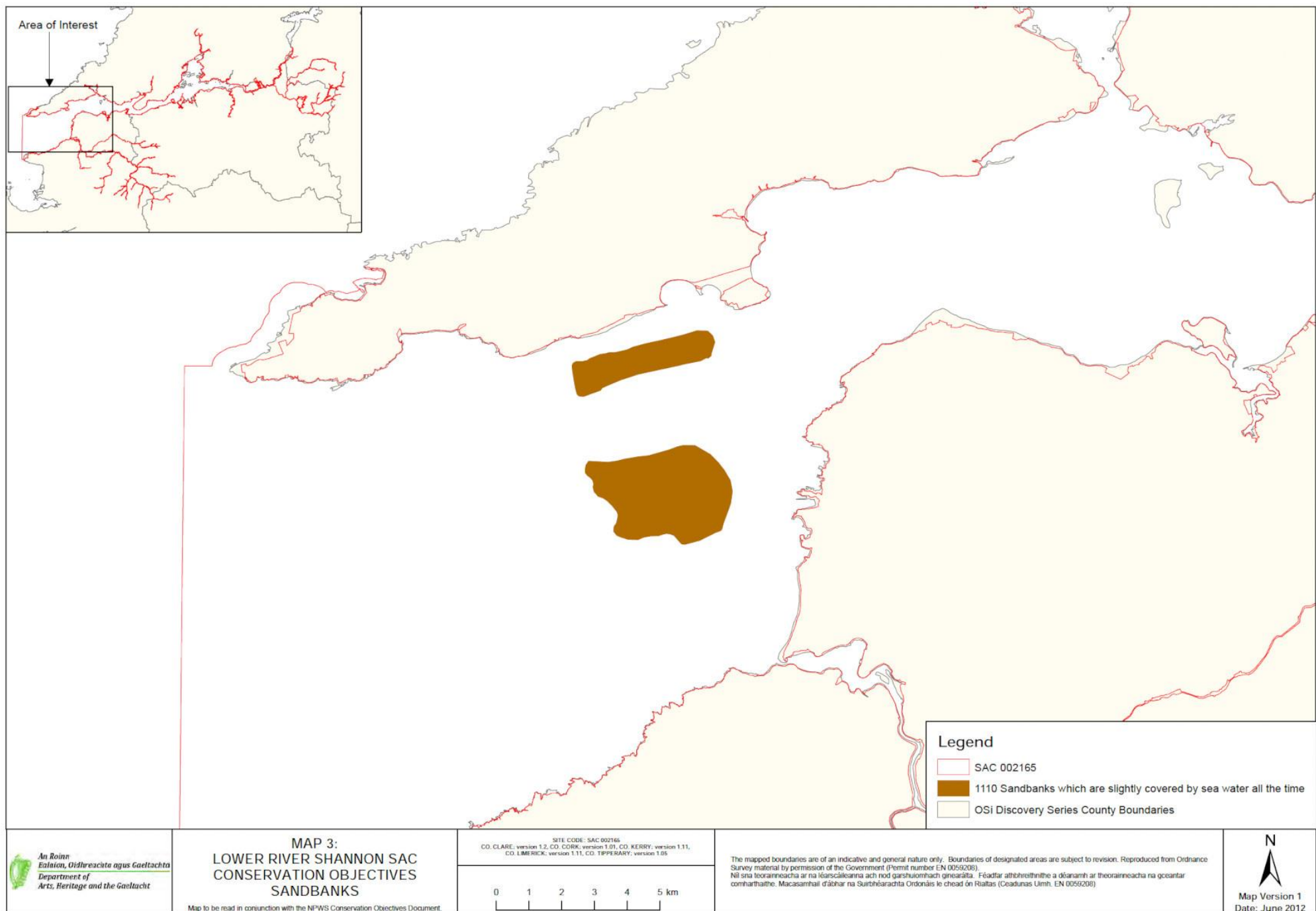


Figure 10. Extent of Sandbanks slightly covered by sea water all the time in Lower River Shannon SAC

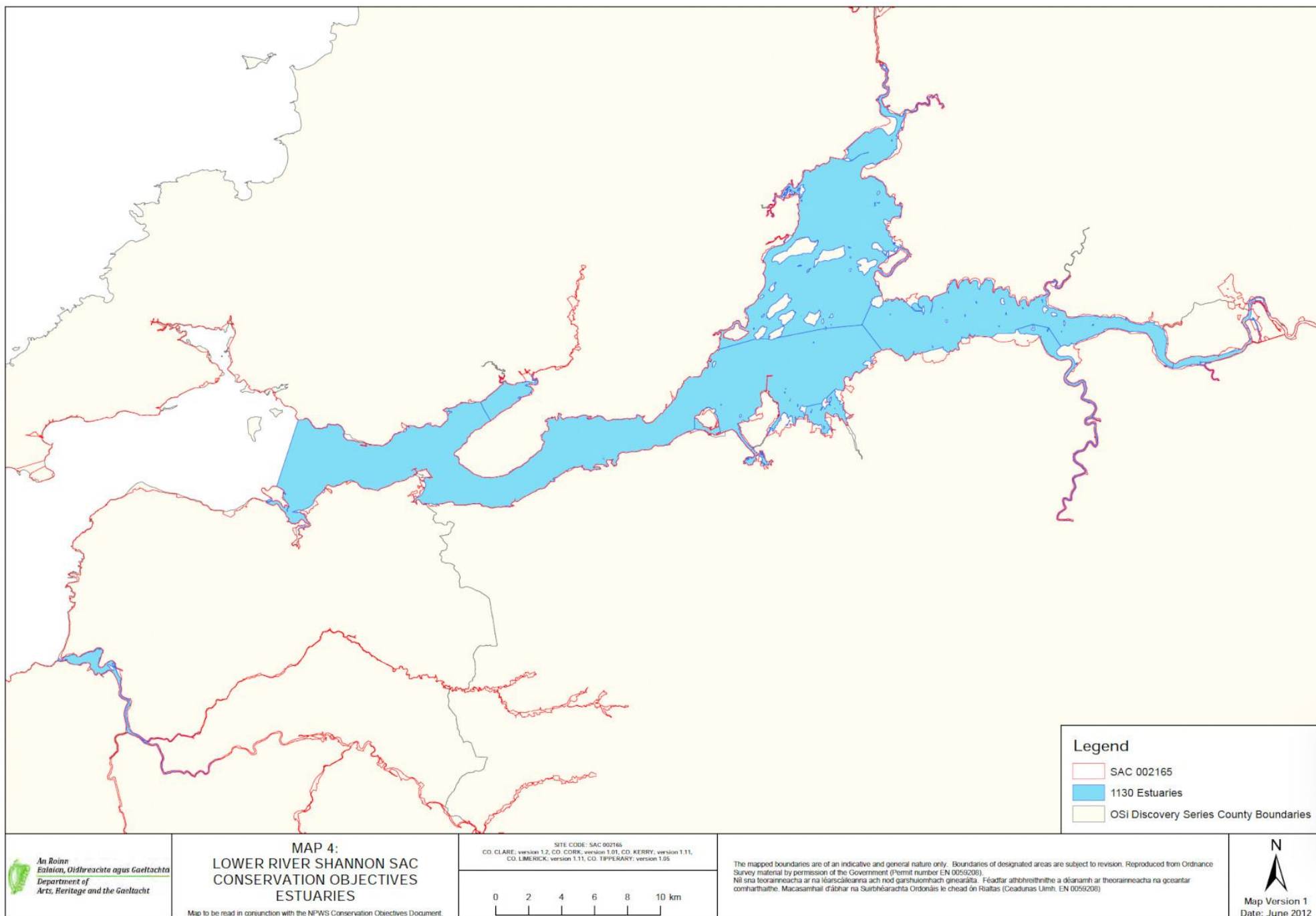


Figure 11. Estuaries in Lower River Shannon SAC

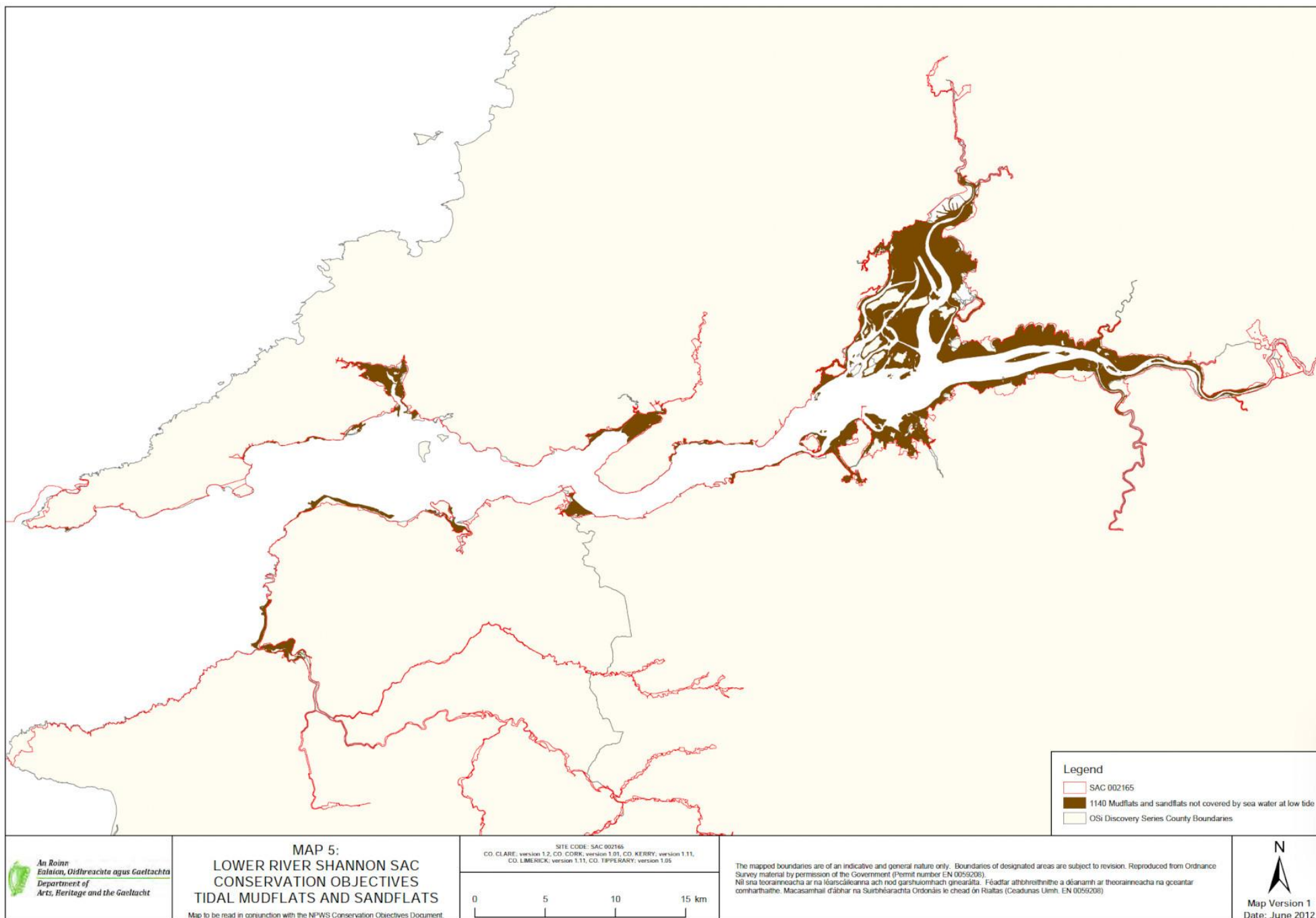


Figure 12. The Extent of Mudflats and Sandflats Not Covered by Sea Water at Low Tide in Lower River Shannon SAC

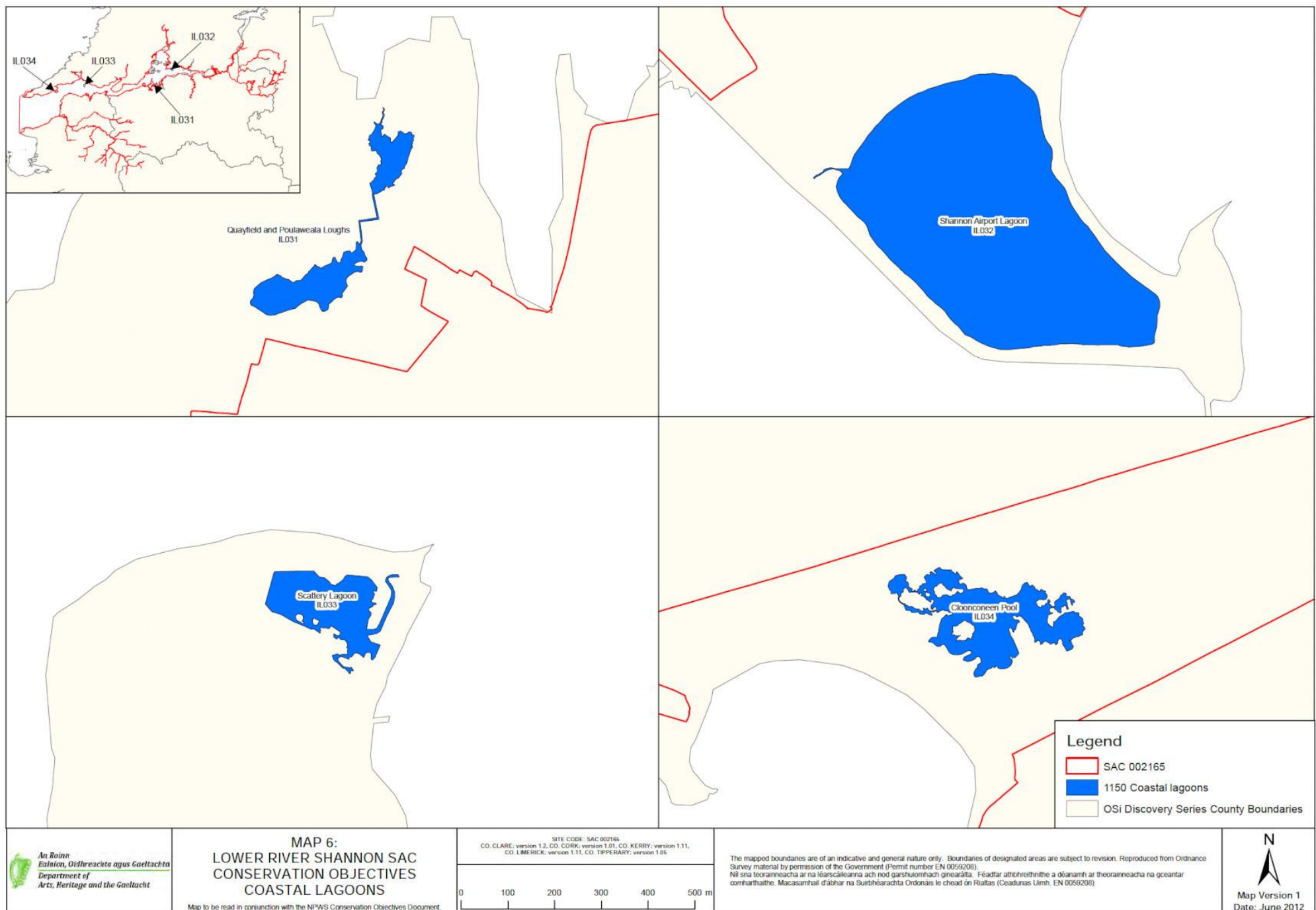


Figure 13. Coastal Lagoons in Lower River Shannon SAC

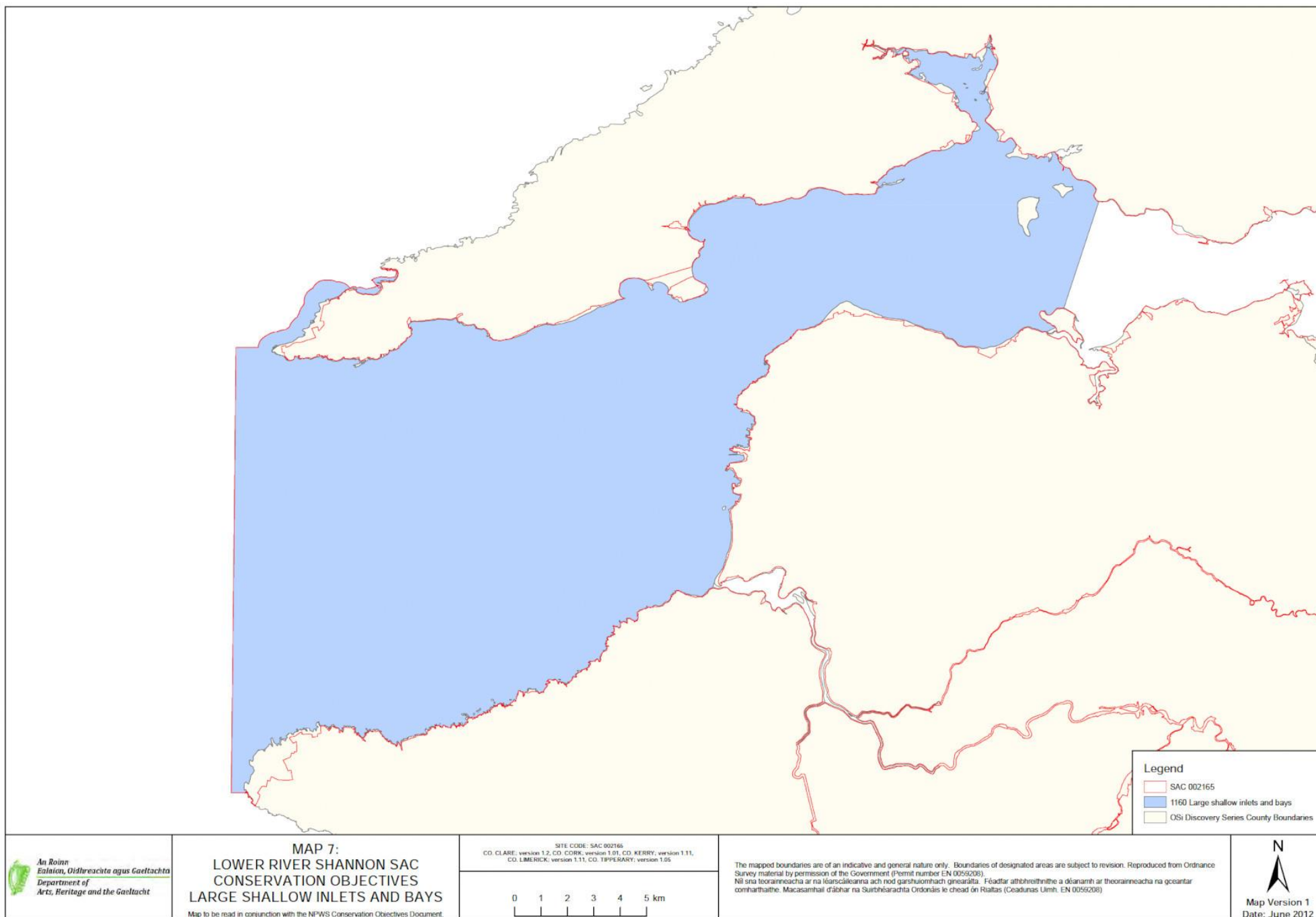


Figure 14. Large Shallow Inlets and Bays in Lower River Shannon SAC

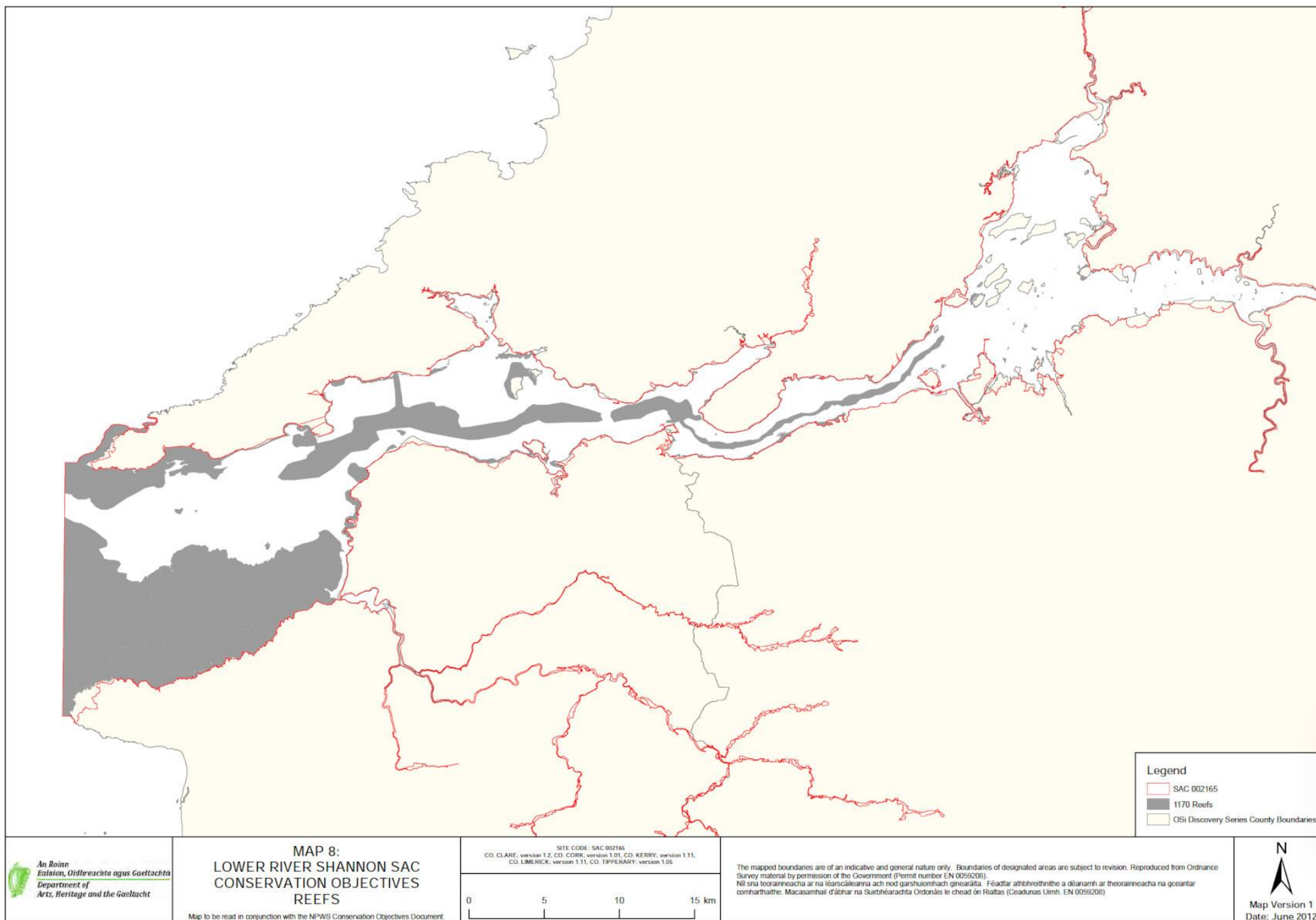


Figure 15. Reefs in Lower River Shannon SAC

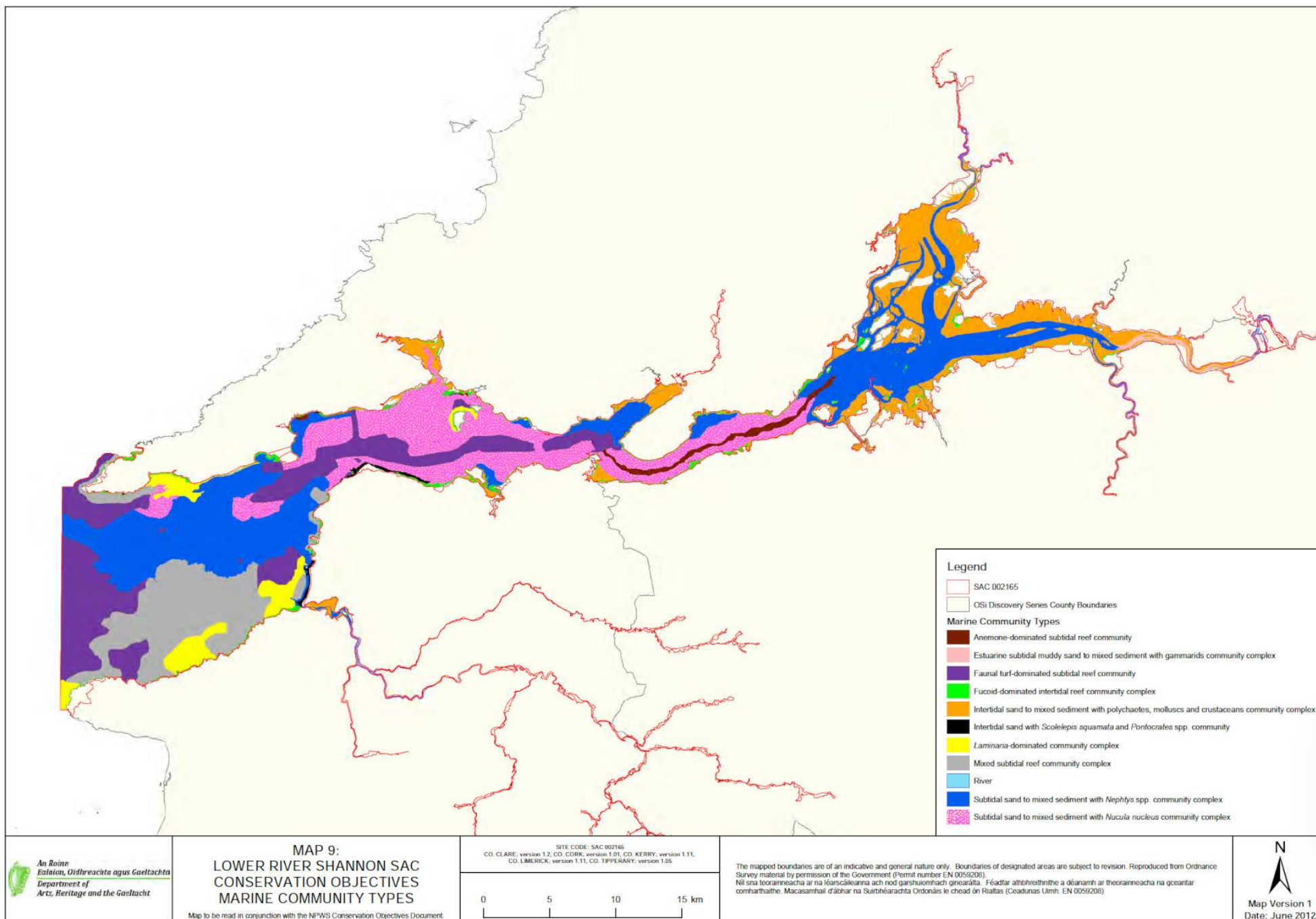


Figure 16. Marine Community Types in Lower River Shannon SAC

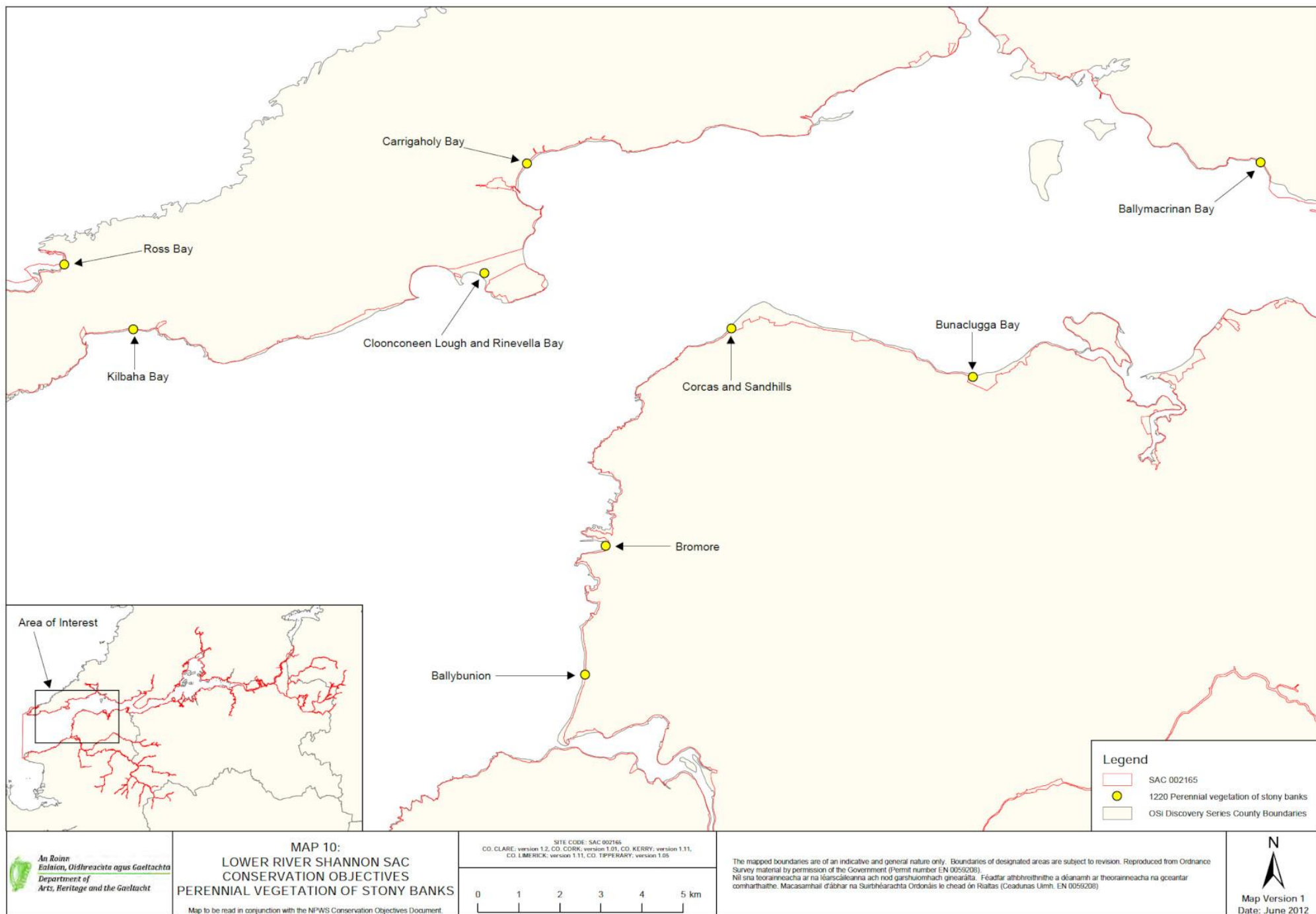


Figure 17. Perennial Vegetation in Lower River Shannon SAC

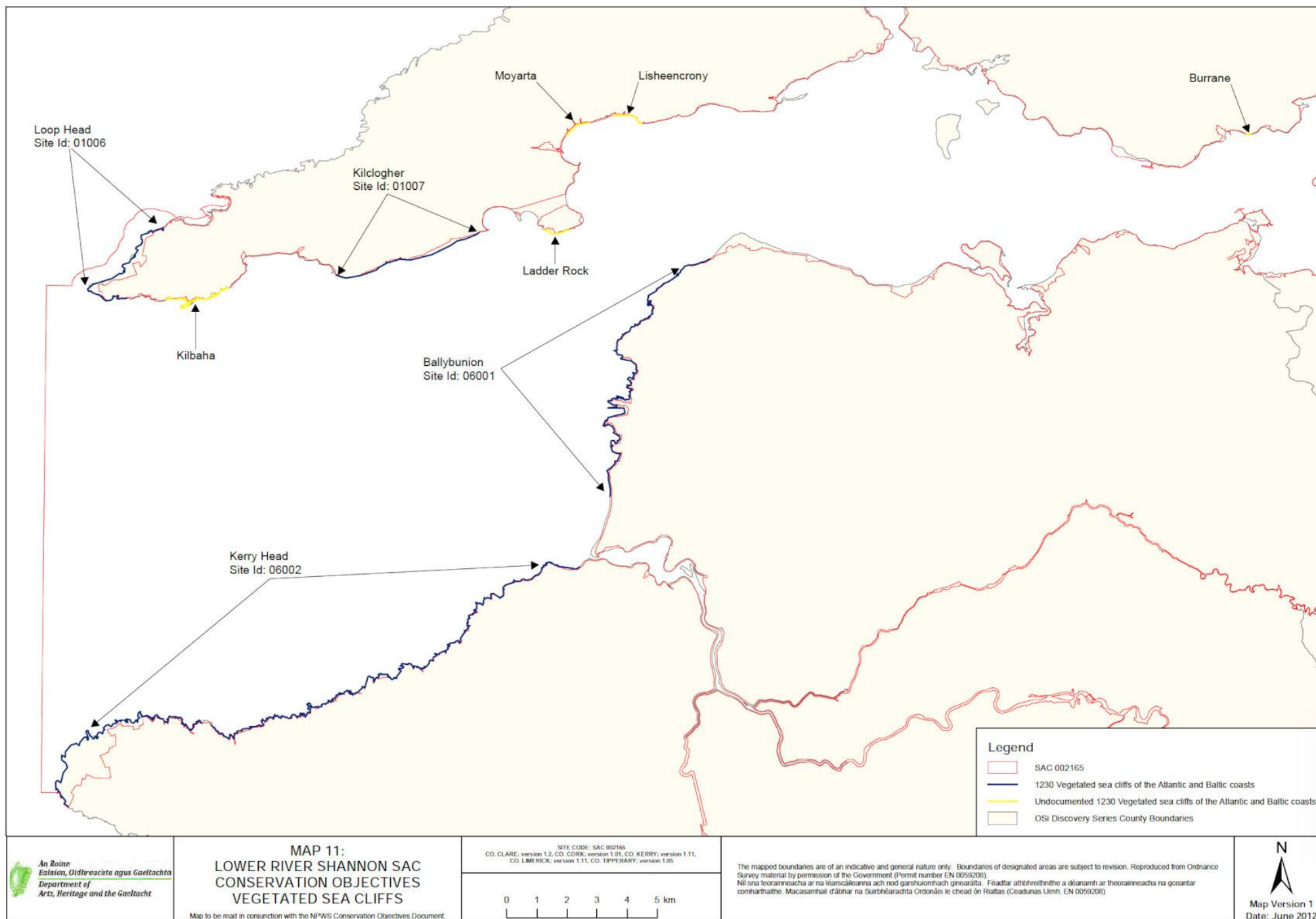


Figure 18. Vegetative Sea Cliffs in Lower River Shannon SAC

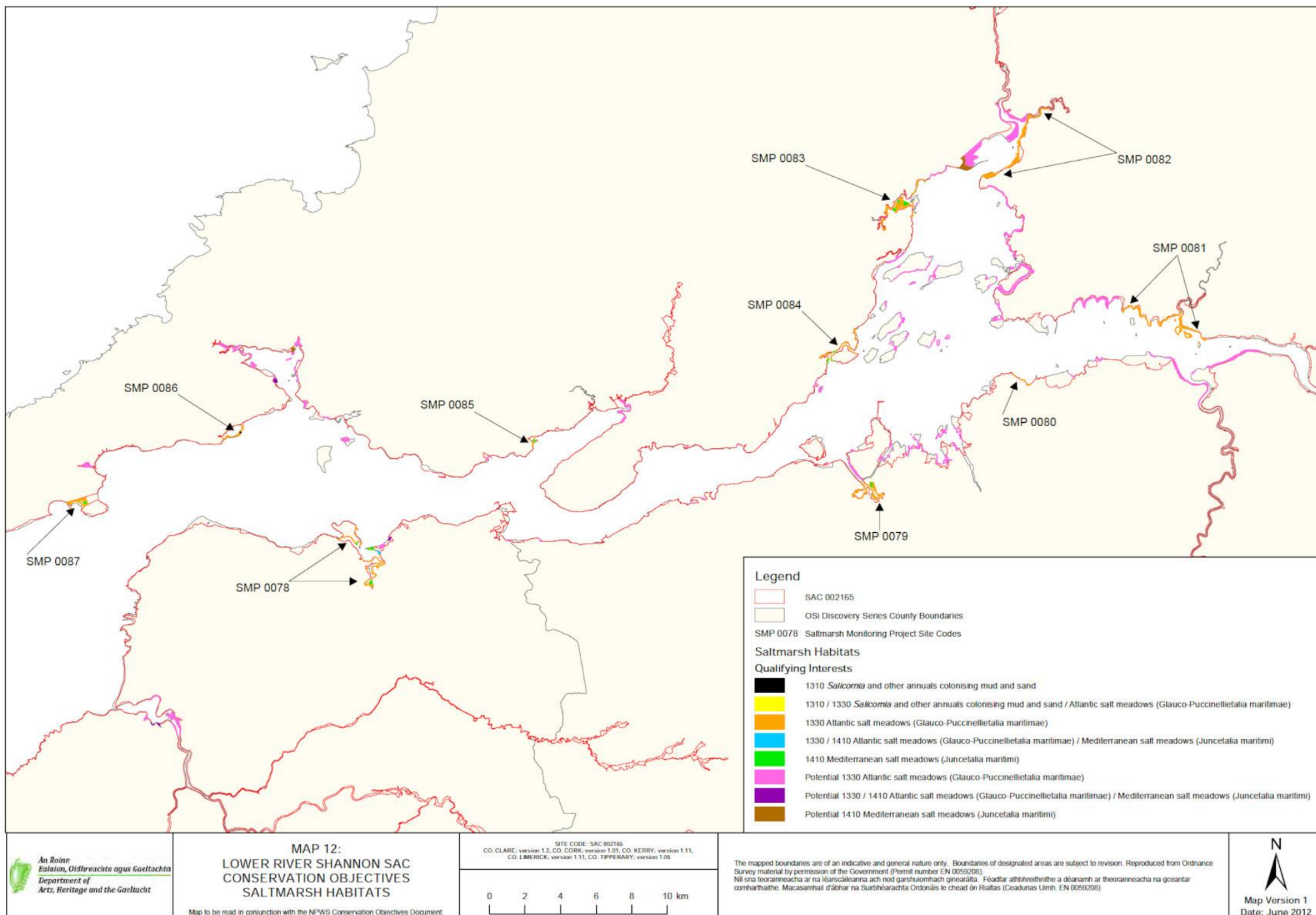


Figure 19. Saltmarsh Habitats in Lower River Shannon SAC

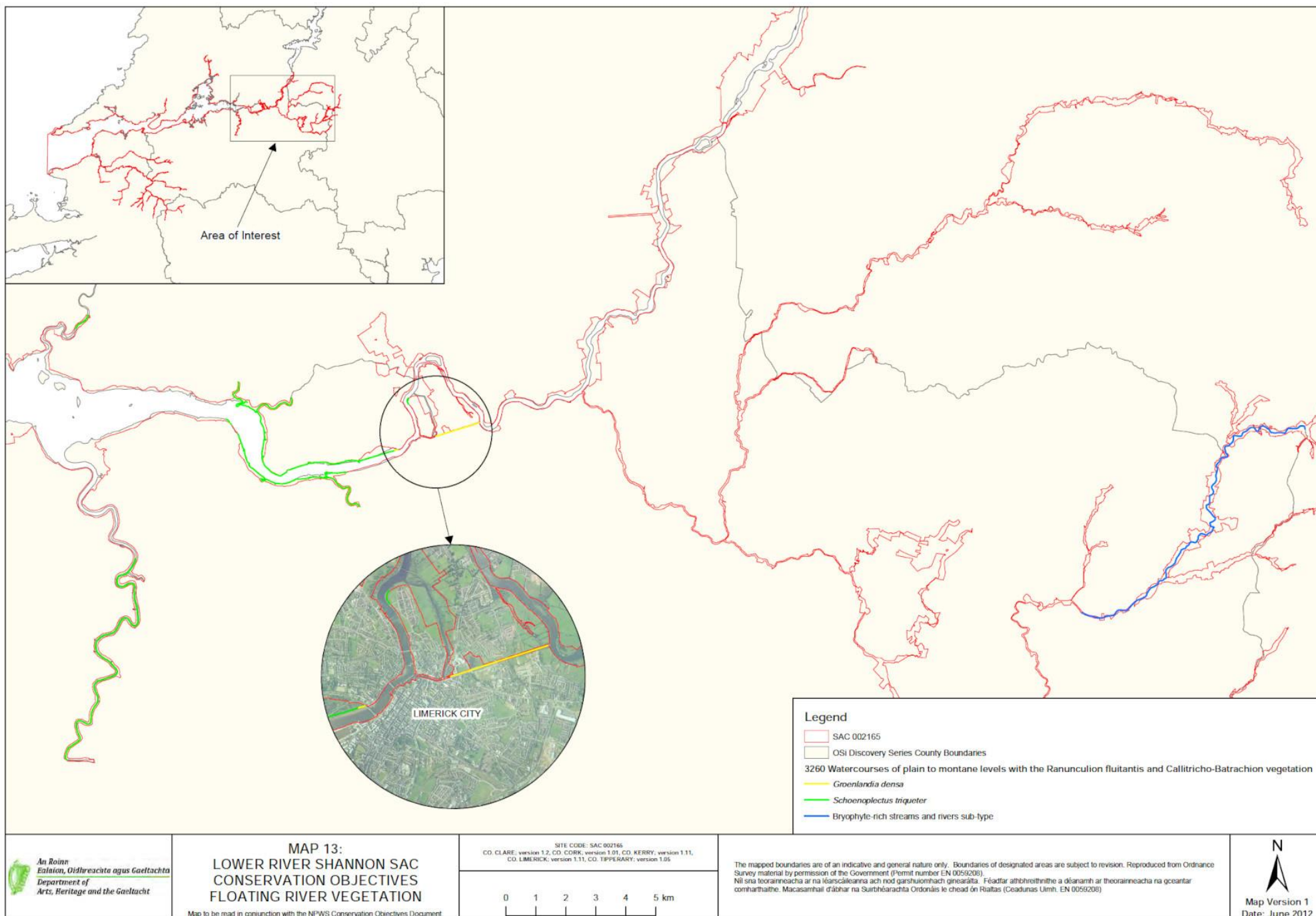


Figure 20. Watercourses of plain to montane levels in Lower River Shannon SAC

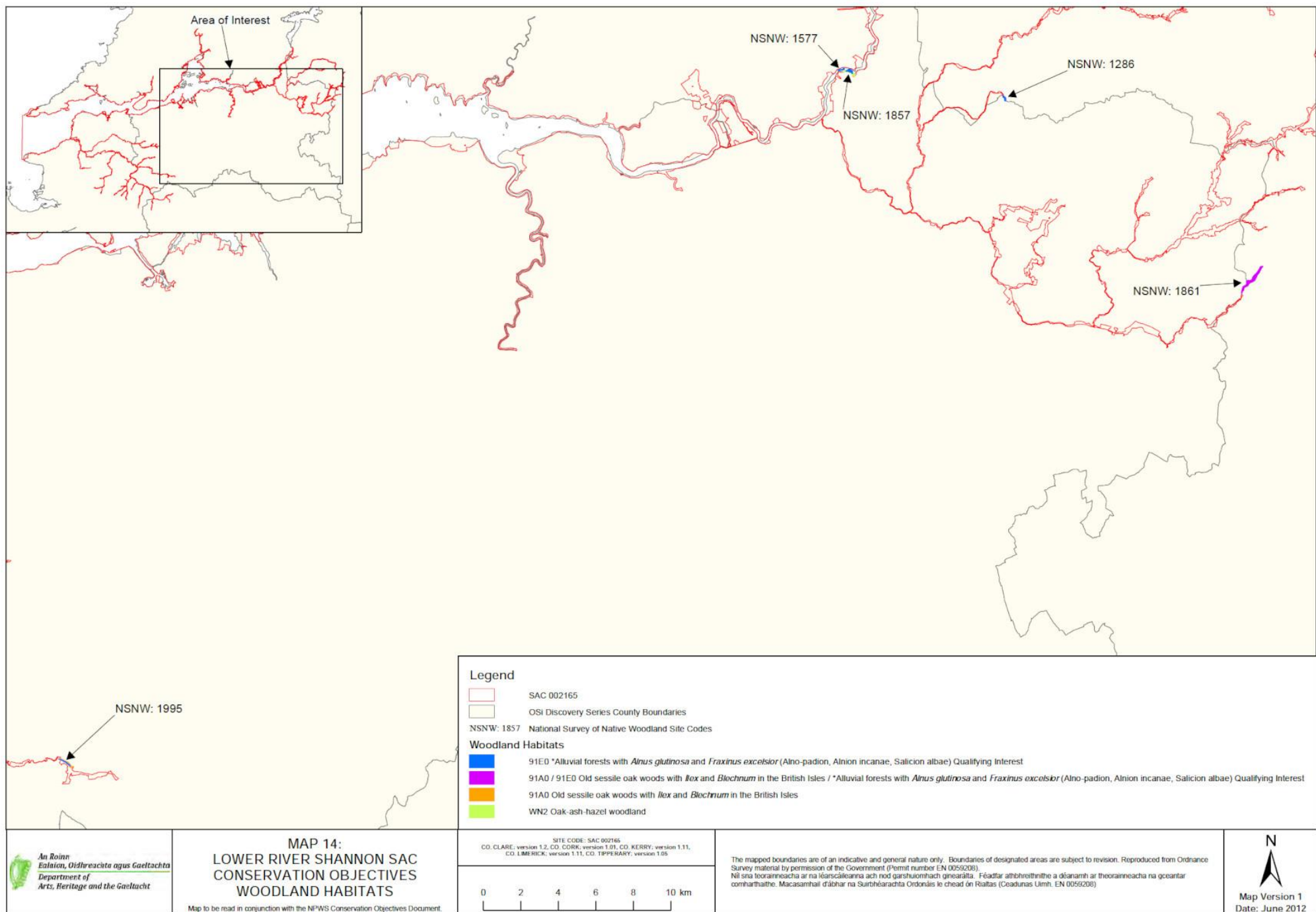


Figure 21. Woodland Habitats in Lower River Shannon SAC

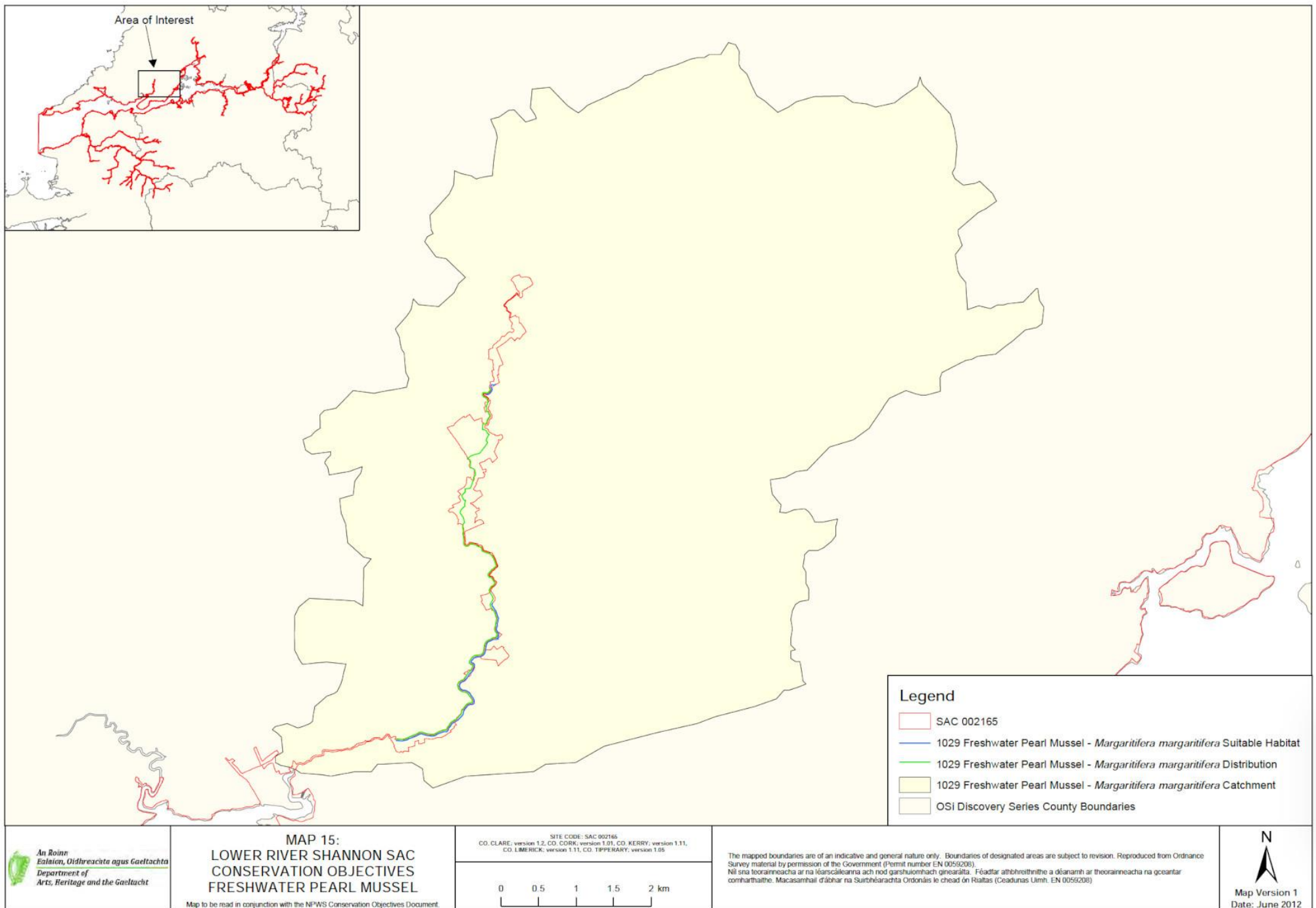


Figure 22. Freshwater Pearl Mussel in Lower River Shannon SAC

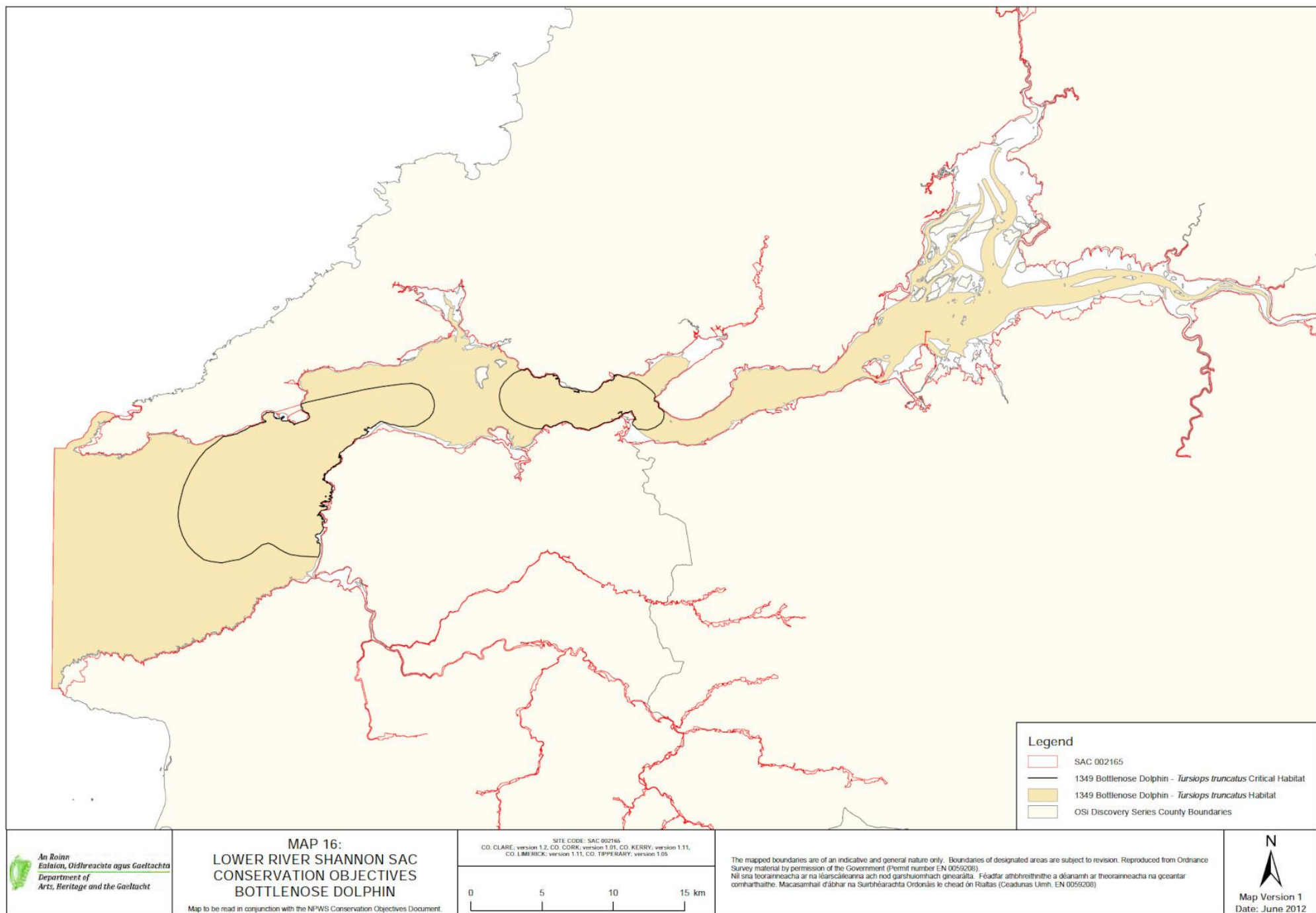


Figure 23. Bottlenose Dolphin Habitats in Lower River Shannon SAC

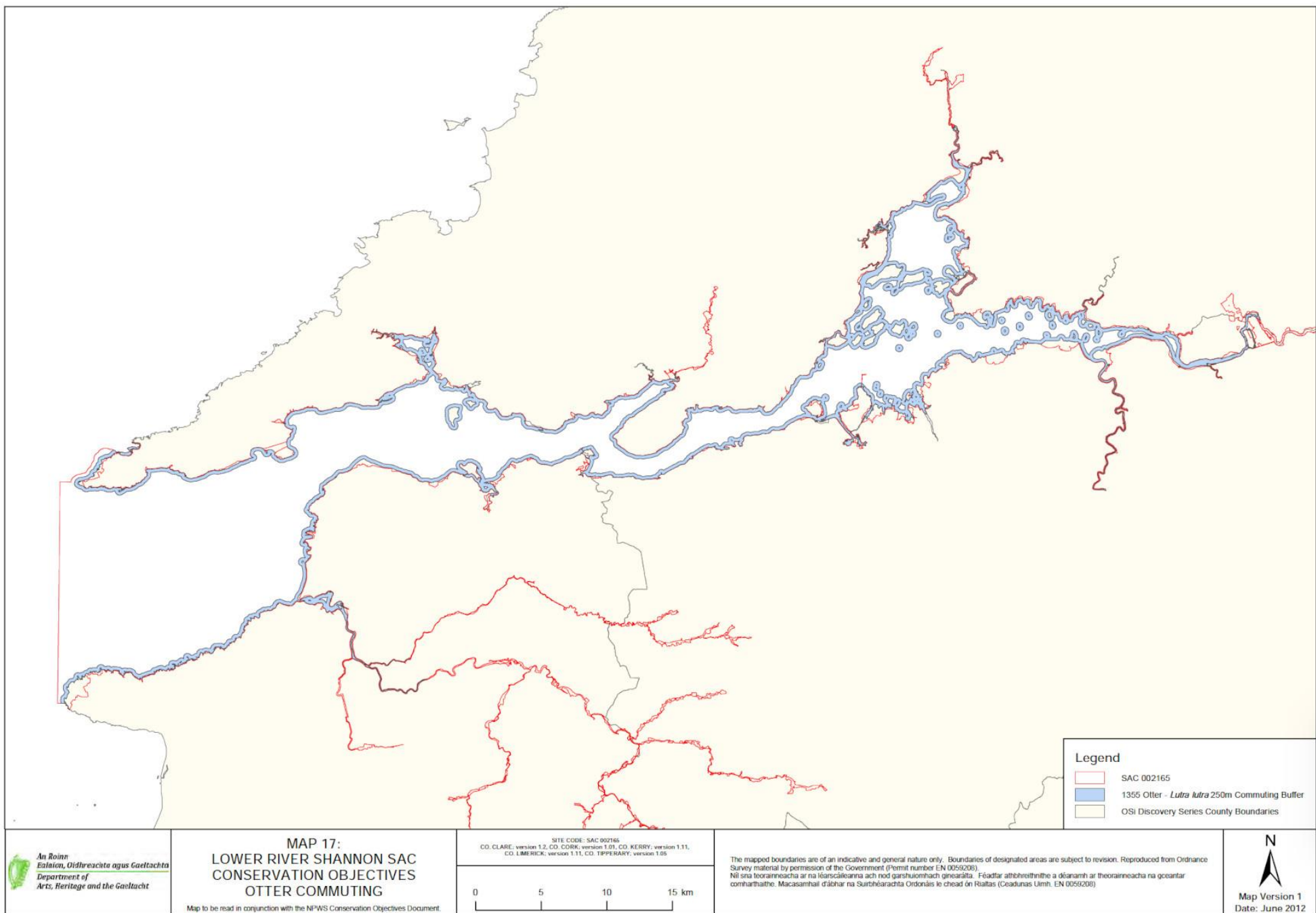


Figure 24. Otter Commuting Buffer in Lower River Shannon SAC

6.2 River Shannon and River Fergus Estuaries SPA (Site code: 004026)⁴

River Shannon and River Fergus Estuaries SPA is located 0.7 km from the planning boundary. Out of an abundance of caution, it is considered that there is a direct hydrological connection to the River Shannon and River Fergus Estuaries SPA via surface water drainage. Surface water is currently directed (and will continue to be directed) to an existing drainage network which flows in a northeasterly direction for approximately 2.1 km (distance along the drainage network) before ultimately discharging to the Mague River and, consequently, River Shannon and River Fergus Estuaries SPA.

6.2.1 Site Characteristics

The River Shannon and River Fergus Estuaries form the largest estuarine complex in Ireland. The site comprises all of the estuarine habitat west from Limerick City and south from Ennis, extending west as far as Killadysert and Foynes on the north and south shores of the Shannon respectively (a distance of some 25 km from east to west). Also included are several areas in the outer Shannon estuary, notably Clonderalaw Bay and Poulnasherry Bay. The site has vast expanses of intertidal flats. The main macro-invertebrate community is a *Macoma- Scrobicularia-Nereis* community which provides a rich food resource for the wintering birds. Eelgrass (*Zostera spp.*) is present in places. The intertidal flats are often fringed with salt marsh vegetation, areas which provide important high tide roost sites for the birds. In the innermost parts of the estuaries, the tidal channels or creeks are fringed with species such as *Phragmites australis* and *Scirpus spp.* *Spartina anglica* is frequent in parts.

6.2.2 Quality and Importance

This is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl. It has internationally important populations of *Calidris alpina*, *Limosa limosa* and *Tringa totanus*. A further 16 species have populations of national importance. The site is particularly significant for *Calidris alpina* (11% of national total), *Pluvialis squatarola* (7.5% of total), *Vanellus vanellus* (6.5% of total), *Tringa tetanus* (6.1% of total) and *Tadorna tadorna* (6.0% of total). It has *Cygnus cygnus*, *Pluvialis apricaria* and *Limosa lapponica* in significant numbers. The site was formerly frequented by a population of *Anser albifrons flavirostris* but these have now abandoned the area. The site provides both feeding and roosting areas for the wintering birds and habitat quality for most of the estuarine habitats is good.

6.2.3 Vulnerability

The site receives pollution from several sources, including industry and agriculture, but it is not known if this has any significant impacts on the wintering birds. Reclamation of land is a threat near to the urbanised and industrial areas. Aquaculture occurs and may increase in the future. *Spartina* is well established and may threaten the estuarine habitats. Some disturbance occurs from boating activities.

The Special Conservation Interests (SCIs) for the River Shannon and River Fergus Estuaries SPA and the National conservation status of the QI are seen in Table 7.

⁴ NATURA Standard Data Form for River Shannon and River Fergus Estuaries SPA (004077)

Table 7. Special Conservation Interests (SCIs) for River Shannon and River Fergus Estuaries SPA and National status

Qualifying Interests, Conservation Status, Management Objectives, Conditions underpinning site integrity for relevant European sites		
European Site Name & Code	Qualifying Interests	Current Conservation Status & Trend
River Shannon and River Fergus Estuaries SPA IE004077	Cormorant (<i>Phalacrocorax carbo</i>) [A017]	Amber
	Whooper Swan (<i>Cygnus cygnus</i>) [A038]	Amber
	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]	Amber
	Shelduck (<i>Tadorna tadorna</i>) [A048]	Amber
	Wigeon (<i>Anas penelope</i>) [A050]	Green
	Teal (<i>Anas crecca</i>) [A052]	Amber
	Pintail (<i>Anas acuta</i>) [A054]	Red
	Shoveler (<i>Anas clypeata</i>) [A056]	Red
	Scaup (<i>Aythya marila</i>) [A062]	Amber
	Ringed Plover (<i>Charadrius hiaticula</i>) [A137]	Green
	Golden Plover (<i>Pluvialis apricaria</i>) [A140]	Red
	Grey Plover (<i>Pluvialis squatarola</i>) [A141]	Amber
	Lapwing (<i>Vanellus vanellus</i>) [A142]	Red
	Knot (<i>Calidris canutus</i>) [A143]	Amber
	Dunlin (<i>Calidris alpina</i>) [A149]	Red
	Black-tailed Godwit (<i>Limosa limosa</i>) [A156]	Amber
	Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]	Amber
	Curlew (<i>Numenius arquata</i>) [A160]	Red
	Redshank (<i>Tringa totanus</i>) [A162]	Red
	Greenshank (<i>Tringa nebularia</i>) [A164]	Green
	Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]	Red
	Wetland and Waterbirds [A999]	N/A

The attribute, measure and target of the site-specific conservation Objectives for River Shannon and River Fergus Estuaries SPA are seen in Table 8.

Table 8. Attribute, measure and target of the site conservation objectives for River Shannon and River Fergus Estuaries SPA.

Attribute	Measure	Target
Whooper Swan (<i>Cygnus cygnus</i>) [A038]; Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]; Shelduck (<i>Tadorna tadorna</i>) [A048]; Wigeon (<i>Anas penelope</i>) [A050]; Teal (<i>Anas crecca</i>) [A052]; Pintail (<i>Anas acuta</i>) [A054]; Shoveler (<i>Anas clypeata</i>) [A056]; Scaup (<i>Aythya marila</i>) [A062]; Ringed Plover (<i>Charadrius hiaticula</i>) [A137]; Golden Plover (<i>Pluvialis apricaria</i>) [A140]; Grey Plover (<i>Pluvialis squatarola</i>) [A141]; Lapwing (<i>Vanellus vanellus</i>) [A142]; Knot (<i>Calidris canutus</i>) [A143]; Dunlin (<i>Calidris alpina</i>) [A149]; Black-tailed Godwit (<i>Limosa limosa</i>) [A156]; Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]; Curlew (<i>Numenius arquata</i>) [A160]; Redshank (<i>Tringa totanus</i>) [A162]; Greenshank (<i>Tringa nebularia</i>) [A164]; Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] (Maintain or Restore Favourable Condition)		
Population trend	Percentage change	Long term population trend stable or increasing
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by waterbird species other than that occurring from natural patterns of variation
Cormorant (<i>Phalacrocorax carbo</i>)		
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline
Productivity rate	Mean number	No significant decline
Distribution: breeding colonies	Number; location; area (hectares)	No significant decline
Prey biomass available	Kilogrammes	No significant decline
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase
Disturbance at the breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding cormorant population
Population trend	Percentage change	Long term population trend stable or increasing
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by cormorant other than that occurring from natural patterns of variation
A999 Wetlands & Waterbirds (maintain favourable condition)		
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 32,261ha, other than that occurring from natural patterns of variation

7. Analysis of the Potential Impacts on the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA.

The development works the subject of this application consist of:

1. Retention permission for works consisting of;
 - a) the raising of ground levels by filling of land,
 - b) the provision of concrete surface on part of that filled area,
 - c) the use of part of the filled area for hardstanding storage of vehicles, materials and plant associated with the established and permitted use of the existing premises including provision of security fence and lighting;
2. Provision of remedial and mitigation measures including:
 - a) The cessation of use of part of the fill area and facilitating the natural regeneration of that area; and
 - b) The provision of surface water management measures to improve the quality of the existing permitted discharge and the proposed discharge of surface water from the site to existing boundary surface water drains. These measures include provision of: interceptor surface water drains, petrol interceptor, full retention forecourt type separator, attention tank, and introduction of controlled rate of discharge prior to new discharge point to boundary surface water drains via new precast concrete headwall.

7.1 Construction Impacts

Retention Permission

No construction works are proposed as part of the retention permission element of this project. As a result, no construction impacts are foreseen.

Remedial Permission

The construction of the proposed surface water management network would potentially impact on the existing ecology of the site and the surrounding area. These potential construction impacts would include impacts that may arise during the site clearance, re-profiling of the site, and installation of the proposed SUDs measures. The potential impacts are outlined in Table 10.

Construction phase mitigation measures are required on site particularly as there is potential for silt laden runoff, dust, or contamination to enter the existing drainage ditch / channel network and with potential for downstream impacts.

Designated European Sites

The proposed development is not within a designated conservation site. A direct pathway exists via surface water to European sites (Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA) downstream from the proposed development site via the existing drainage ditch network leading to the Maigne River (>2km flow distance). The construction of remedial elements of the proposed development would potentially impact on the drainage ditch network and downstream watercourse through silt laden runoff and pollution entering the surface water system and being discharged from the site to the drainage network. These potential construction impacts on European sites are seen in Table 9. Runoff during site clearance, re-profiling, the construction and operation of project elements including the drainage network, could enter the surface water system which leads to the European sites of concern. Compliance with the Water Pollution Acts and monitoring would be seen as the primary method of ensuring no significant impact on designated conservation sites. Mitigation measures are required to ensure that the proposed development will not impact on the conservation objectives of the European sites within the Maigne River.

7.2 Operational Impacts

Once the remedial elements of the project are completed, surface water runoff will comply with SUDS and will discharge to an existing drainage network located along the northern boundary of the site. This drainage network ultimately outfalls to the Maigne River and, by extension, the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. Mitigation measures will be required to ensure that water quality is maintained prior to discharging to the surface water drainage network.

8. Mitigation Measures and Monitoring

Mitigation measures that will be carried out in relation to the proposed project are outlined in Table 10.

Table 9. Potential for adverse effects on the qualifying interests and conservation objectives of European sites

European Site & Site Code	Qualifying Interests	Potential for Adverse Effects
Lower River Shannon SAC	Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachium</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinietalia caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]	As a result of the deeper excavations what would be required for the attenuation and petrochemical interceptor, there is potential for greater effects than would have taken place during the initial hard standing development stage. Dust and contaminated surface water runoff on site during construction or operation (remedial elements of the project) may lead to silt or contaminated materials from site entering the existing surface water drainage network which ultimately discharges to Lower River Shannon SAC. Concrete, silt or pollution could enter the surface water runoff during construction works, including the installation of the precast headwall into a drainage ditch to the north of the site. If on-site concrete production is required or cement works are carried out in the vicinity of drains, there is potential for contamination of the surface water network. The use of plant and machinery, as well as the associated temporary storage of construction materials, oils, fuels and chemicals could lead to pollution on site or in adjacent drainage networks. The storage of topsoil or works onsite could lead to dust, soil or silt laden runoff entering adjacent drainage networks. Given the nature of the works, all of these effects would be expected to be localised in nature restricted to the immediate vicinity of the site and would have little effect on European sites. However, without the presence of mitigation measures there is a potential for downstream effects if significant quantities of pollution or silt were introduced into the drainage network, leading to the Lower River Shannon SAC. Out of an abundance of caution, given the nature of the potential effects outlined above, the proposed project could impact on the: 1) Habitat area and community distribution of estuaries [1130] 2) Habitat area and community distribution of mudflats and sandflats not covered by seawater at low tide [1140] 3) Habitat area, community distribution, physical structure: function and sediment supply, vegetation structure: zonation, vegetation composition: typical species and sub-communities and vegetation composition: negative indicator species of perennial vegetation of stony banks [1220]. 4) Habitat area, Habitat distribution, Physical structure: sediment supply, Physical structure: creeks and pans, Physical structure: flooding regime, Vegetation structure: zonation, Vegetation structure: vegetation height, Vegetation structure: vegetation cover, Vegetation composition: typical species and

Table 9. Potential for adverse effects on the qualifying interests and conservation objectives of European sites

European Site & Site Code	Qualifying Interests	Potential for Adverse Effects
	Petromyzon marinus (Sea Lamprey) [1095] Lampetra planeri (Brook Lamprey) [1096] Lampetra fluviatilis (River Lamprey) [1099] Salmo salar (Salmon) [1106] Tursiops truncatus (Common Bottlenose Dolphin) [1349] Lutra lutra (Otter) [1355]	subcommunities, Vegetation structure: negative indicator species-<i>Spartina anglica</i> of <i>Salicornia</i> and other annuals colonising mud and sand [1310]. 5) Habitat area, Habitat distribution, Physical structure: sediment supply, Physical structure: creeks and pans, Physical structure: flooding regime, Vegetation structure: zonation, Vegetation structure: vegetation height, Vegetation structure: vegetation cover, Vegetation composition: typical species and subcommunities, Vegetation structure: negative indicator species –1330 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) 6) Habitat area, Habitat distribution, Physical structure: functionality sediment supply, Vegetation structure: zonation, Vegetation composition: plant health of fore dune grasses, Vegetation composition: typical species and subcommunities Vegetation composition: negative indicator species of 1410 Mediterranean salt meadows (<i>Juncetalia maritimi</i>) The mitigation measures outlined should be carried out to ensure that no silt or pollution enters the Lower River Shannon SAC from the construction or operation phases of the proposed project (including retention and remedial elements of the project) and create localised pollution. Mitigation measures are required to ensure that surface water runoff is clean and uncontaminated before reaching the SAC.
River Shannon and River Fergus Estuaries SPA	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Whooper Swan (<i>Cygnus cygnus</i>) [A038] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Scaup (<i>Aythya marila</i>) [A062] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Golden Plover (<i>Pluvialis apricaria</i>) [A140]	As a result of the deeper excavations what would be required for the attenuation and petrochemical interceptor, there is potential for greater effects than would have taken place during the initial hard standing development stage. Dust and contaminated surface water runoff on site during construction or operation (remedial elements of the project) may lead to silt or contaminated materials from site entering the existing surface water drainage network which ultimately discharges to Lower River Shannon SAC. Concrete, silt or pollution could enter the surface water runoff during construction works, including the installation of the precast headwall into a drainage ditch to the north of the site. If on-site concrete production is required or cement works are carried out in the vicinity of drains, there is potential for contamination of the surface water network. The use of plant and machinery, as well as the associated temporary storage of construction materials, oils, fuels and chemicals could lead to pollution on site or in adjacent drainage networks. The storage of topsoil or works onsite could lead to dust, soil or silt laden runoff entering adjacent drainage networks. Given the nature of the works, all of these effects would be expected to be localised in nature restricted to the immediate vicinity of the site and would have little effect on European sites. However, without the presence of mitigation

Table 9. Potential for adverse effects on the qualifying interests and conservation objectives of European sites

European Site & Site Code	Qualifying Interests	Potential for Adverse Effects
	Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Greenshank (<i>Tringa nebularia</i>) [A164] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	measures there is a potential for downstream effects if significant quantities of pollution or silt were introduced into the drainage network, leading to the River Shannon and River Fergus Estuaries SPA. Given the nature of the potential effects outlined above, the proposed project could affect the: 1. Cormorant (<i>Phalacrocorax carbo</i>) [A017], Whooper Swan (<i>Cygnus cygnus</i>) [A038], Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046], Shelduck (<i>Tadorna tadorna</i>) [A048], Wigeon (<i>Anas penelope</i>) [A050], Teal (<i>Anas crecca</i>) [A052], Pintail (<i>Anas acuta</i>) [A054], Shoveler (<i>Anas clypeata</i>) [A056], Scaup (<i>Aythya marila</i>) [A062], Ringed Plover (<i>Charadrius hiaticula</i>) [A137], Golden Plover (<i>Pluvialis apricaria</i>) [A140], Grey Plover (<i>Pluvialis squatarola</i>) [A141], Lapwing (<i>Vanellus vanellus</i>) [A142], Knot (<i>Calidris canutus</i>) [A143], Dunlin (<i>Calidris alpina</i>) [A149], Black-tailed Godwit (<i>Limosa limosa</i>) [A156], Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157], Curlew (<i>Numenius arquata</i>) [A160], Redshank (<i>Tringa totanus</i>) [A162], Greenshank (<i>Tringa nebularia</i>) [A164], Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] 2. The habitat area of wetlands [A999]. Mitigation measures are required to limit the effect of the project on the qualifying interests of the proposed development site.

Table 10. Mitigation measure

Sensitive Receptors	Potential Impacts on SPA & SAC	Mitigation Measures to Prevent Impacts on Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA
Lower River Shannon SAC River Shannon and River Fergus Estuaries SPA	• Habitat degradation • Dust deposition • Pollution • Silt ingress from site runoff • Downstream impacts • Negative impacts on aquatic species and qualifying interests.	As outlined in the Engineering Planning Report prepared by PUNCH Consulting Engineers to accompany this planning application, the implementation of the proposed remedial measures will act as mitigation measures for the Existing Arrangement (retention) and will thus produce the following impacts on local surface water drainage: <i>‘With the inclusion of attenuation, restricted surface water discharge, SuDS measures and proprietary treatment, there will be a decrease in peak surface water run-off and an increase in surface water quality discharging to the existing surface water network as a result of the proposed development.’</i> Additionally, the following mitigation measures will be implemented: <u>Construction – Contamination of hydrological pathways leading to European Sites</u> • Appointment of an ecologist to oversee enabling works and the implementation of mitigation measures outlined. • Staging of project to reduce risks to drainage ditches from contamination • Earthwork operations will be carried out such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. • Any discharges to the existing drainage network during construction must be discussed with the ecologist and undergo desilting and petrochemical interception. • Local drains will be protected from dust, silt and contaminated surface water throughout the works. • Local silt traps established throughout site as discussed with the ecologist. • Mitigation measures on site include dust control, stockpiling away from drains • Stockpiling of loose materials will be kept to a minimum of 20m from drains. • Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system. • Fuel, oil and chemical storage will be sited within a bunded area. The bund will be at least 50m away from drains, or ditches or, excavations and other locations where it may cause pollution. • Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. Any water-filled excavations, that require pumping will not directly discharge to the surface water network. Prior to discharge of water from excavations adequate filtration will be provided to ensure no deterioration of water quality. • Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system. • Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. • During the construction works silt traps will be put in place in the vicinity of all runoff channels and open drains to prevent sediment entering the surface water network.

Table 10. Mitigation measure

Sensitive Receptors	Potential Impacts on SPA & SAC	Mitigation Measures to Prevent Impacts on Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA
		- On-site inspections will be carried out by project ecologist during enabling works and until drainage connection is complete. - Maintenance of any drainage structures (e.g. de-silting operations) must not result in the release of contaminated water to the surface water network. - No entry of solids or concrete to the associated drainage network during the connection of pipework <u>Construction - Dust</u> - Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic. - Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and / or windy conditions. - Vehicles exiting the Site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads. - Public roads outside the Site will be regularly inspected for cleanliness and cleaned as necessary. - Material handling systems and Site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods. - During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions. - Dust may enter the surface water drainage system via air or surface water with potential downstream impacts. Mitigation measures will be carried out reduce dust emissions to a level that avoids the possibility of adverse effects on European Sites. The main activities that may give rise to dust emissions during construction include the following: - Excavation of material; - Materials handling and storage; - Movement of vehicles (particularly HGV's) and mobile plant. - Contaminated surface runoff - Trucks leaving the site with excavated material will be covered so as to avoid dust emissions along the haulage routes. - Speed limits on site (15kmh) to reduce dust generation and mobilisation. - Regular inspections of the site and boundary should be carried out to monitor dust, records and notes on these inspections should be logged. - Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. - Make the complaints log available to the local authority when asked.

Table 10. Mitigation measure

Sensitive Receptors	Potential Impacts on SPA & SAC	Mitigation Measures to Prevent Impacts on Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA
		- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book. - Road sweeping will be in place in adjacent roads when required or requested by the project ecologist. <u>Construction - Monitoring</u> - Undertake daily on-site and off-site inspection, where receptors are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces within 100 m of site boundary, integrity of the silt control measures, with cleaning and / or repair to be provided if necessary. - Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. - Fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period. - Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. - Cover, seed or fence stockpiles to prevent wind whipping. - Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic. - Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions. - Regular inspection of surface water run-off and any sediment control measures e.g. silt traps will be carried out during the Construction Phase. Regular auditing of construction / mitigation measures will be undertaken e.g. concrete pouring, refuelling in designated areas etc. - Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the Site and the suitable distance of topsoil piles from surface water drains will be maintained. <u>Construction - Measures Specific to Earthworks</u> - Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. - Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. - Only remove the cover in small areas during work and not all at once. - During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust. - The Contractor will be required to consult with an ecologist prior to the beginning of works to identify any additional measures that may be appropriate and/or required.

Table 10. Mitigation measure

Sensitive Receptors	Potential Impacts on SPA & SAC	Mitigation Measures to Prevent Impacts on Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA
		<u>Construction - Storage/Use of Materials, Plant & Equipment</u> • Materials, plant and equipment shall be stored in the proposed site compound location; • All oils, fuels and other hazardous liquid materials shall be clearly labelled and stored in an upright position in an enclosed bunded area within the proposed development site compound. The capacity of the bunded area shall conform with EPA Guidelines – hold 110% of the contents or 110% of the largest container whichever is greater; • Fuel may be stored in the designated bunded area or in fuel bowzers located in the proposed compound location. Fuel bowzers shall be double skinned and equipped with certificates of conformity or integrity tested, in good condition and have no signs of leaks or spillages; • Waters collected in drip trays must be assessed prior to discharge. If classified as contaminated, they shall be disposed by a permitted waste contractor in accordance with current waste management legal and regulatory requirements; • All persons working will receive work specific induction in relation to material storage arrangements and actions to be taken in the event of an accidental spillage. Daily environmental toolbox talks / briefing sessions will be conducted for all persons working to outline the relevant environmental control measures and to identify any environment risk areas/works. <u>Operation</u> • Standard hydrocarbon interception will be put in place. • A project ecologist will be appointed to oversee completion of all landscape and drainage works.

9. Adverse Effects on the conservation objectives of European sites likely to occur from the project (post mitigation)

A robust series of mitigation measures will be carried out. These have been developed by a multidisciplinary project team. These would ensure that surface water entering the surface water drainage network and ultimately the Mague River is clean and uncontaminated, that dust levels are controlled on site, and that operational measures are in place to prevent pollution. Early implementation of ecological supervision on site at initial mobilisation and enabling works is seen as an important element to the proposed project, particularly in relation to the implementation of surface water runoff mitigation.

With the successful implementation of the outlined mitigation measures, no significant impacts are foreseen from the construction or operation of the proposed project (including both retention and remedial elements of the project). Residual impacts of the proposed project will be localised to the immediate vicinity of the subject site and would not adversely affect the integrity of designated sites. The construction and operational mitigation proposed for the development satisfactorily addresses the potential impacts on designated conservation sites through the application of the construction and operational phase controls as outlined above. No significant adverse impacts on the conservation objectives of European sites are likely following the implementation of the mitigation measures outlined above.

10. Conclusion

In a strict application of the precautionary principle, it has been concluded that mitigation measures are required to prevent impacts on the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. Impacts are likely from the proposed project (including both retention and remedial elements) in the absence of mitigation measures, primarily as a result of the direct hydrological connection from the site to downstream European Sites (Lower River Shannon SAC & River Shannon and River Fergus Estuaries SPA) via the existing surface water drainage ditch network. As a result, there is potential for downstream impacts from the project via silt, dust, and petrochemical pollution. For this reason, a rNIS was carried out to assess whether the proposed project, either alone or in combination with other plans or projects, in view of best scientific knowledge and in view of the sites' conservation objectives, will adversely affect the integrity of the European Site. All other European sites were screened out at initial screening.

Mitigation measures will be in place to ensure there are no significant impacts on the surface water network that leads to conservation sites. A project ecologist will be appointed to oversee works in relation to the construction works and the implementation of mitigation measures as outlined on site. The implementation of mitigation measures outlined, which will be followed, will be sufficient to prevent adverse effects on the integrity of European sites.

The construction and operation of this development (retention elements) would not be deemed to have a significant impact on the integrity of European sites. Following the implementation of the mitigation measures outlined, the construction and operation of this development (remedial elements) would not be deemed to have a significant impact on the integrity of European sites. No significant impacts are likely on European sites, alone in combination with other plans and projects based on the implementation of standard construction phase mitigation measures.

These reports present a remedial Appropriate Assessment Screening and rNIS for the proposed development. The rNIS outlines the information required for the competent authority to screen for appropriate assessment and to determine whether or not the proposed development, either alone or in combination with other plans or projects, in view of best scientific knowledge and in view of the sites' conservation objectives, will adversely affect the integrity of the European site.

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

No significant effects are likely on European sites, their features of interest or conservation objectives. The proposed project will not will adversely affect the integrity of European sites.

11. References

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11. NPWS (2018) Conservation Objectives: Askeaton Fen Complex SAC 002279. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
12. NPWS (2023) Conservation Objectives: Curraghchase Woods SAC 000174. Version 2. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
13. NPWS (2018) Conservation Objectives: Tory Hill SAC 000439. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
14. NPWS (2012) Conservation Objectives: River Shannon and River Fergus Estuaries SPA 004077. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Appendix I – Altemar Site Visit: Ecological Report

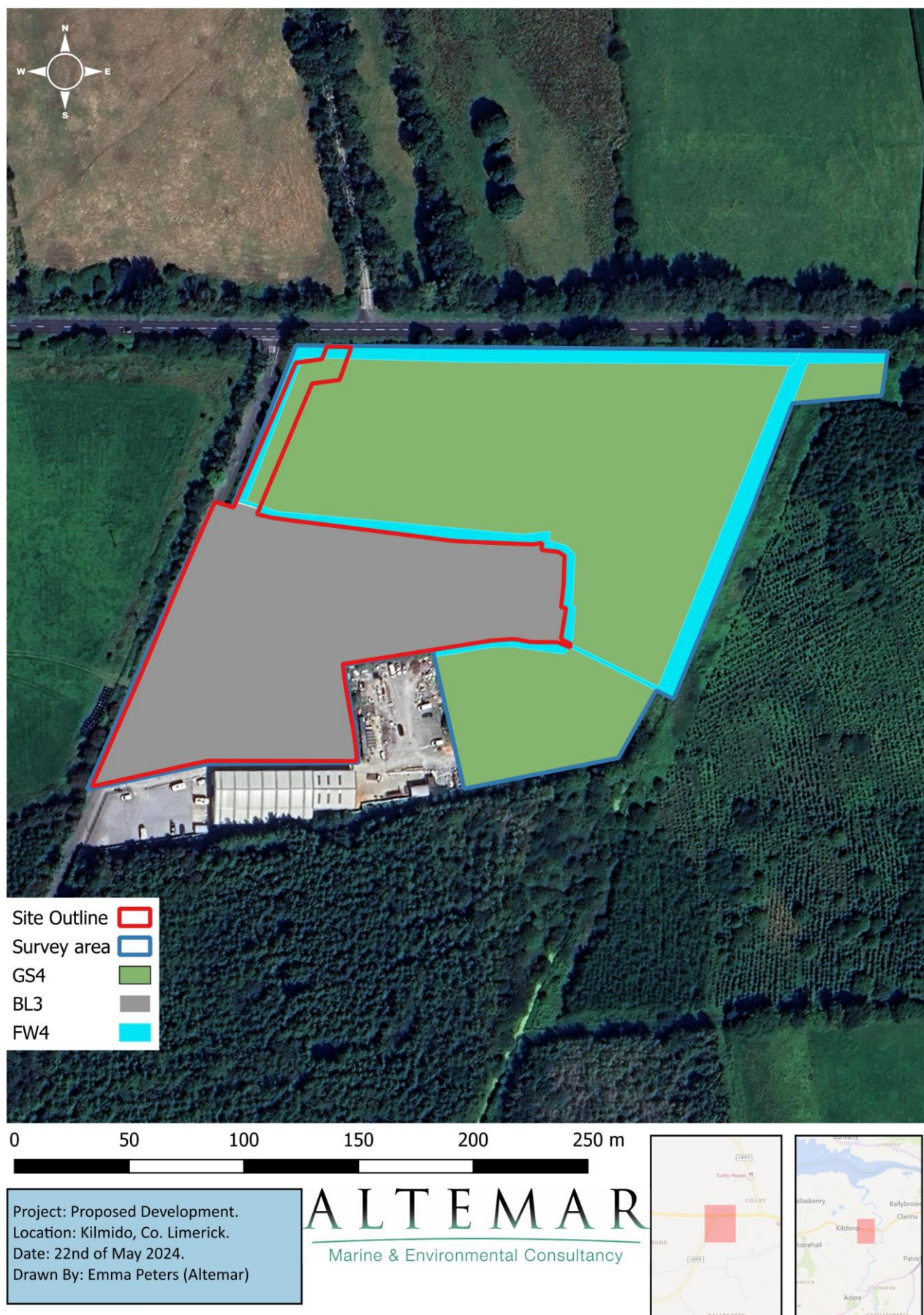


Figure A1. A map denoting the habitats with in and outside of the site boundary. The width of the drainage ditches (FW4) has been exaggerated for greater visibility. Habitats mapped in according to Fossitt (2000) from site visit on 3rd of May 2024.

BL3- Built land and artificial surfaces.

The built areas onsite consisted of a mechanics garage, concrete pavement and some gravel which was holding various vehicles and machinery. No vegetation was growing with in this area however on the outskirts species including common ragwort (*Jacobaea vulgaris*), dandelions (*Taraxacum officinale* agg.), coltsfoot (*Tussilago farfara*), willow (*Salix* sp.) saplings, lesser hawksbit (*Leontodon saxatilis*), common figwort (*Scrophularia nodosa*), leafed doc (*Rumex obtusifolius*), water doc (*Rumex hydrolapathum*), common sorrel (*Rumex acetosa*) and meadow vetchling (*Lathyrus pratensis*) grew.



Plate 1. Concrete pavement.



Plate 2. Gravel hardstanding.

GS4- Wet Grassland

The wet grassland consisted of species such as willow (*Salix sp.*) saplings, bulrush (*Typha latifolia*), curled doc (*Rumex crispus*), field horsetail (*Equisetum arvense*), meadowsweet (*Filipendula ulmaria*), creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*), compact rush (*Juncus conglomeratus*), *Carex sp.*, Cuckoo-flower (*Cardamine pratensis*), small bushes of hawthorn (*Crataegus monogyna*), field bindweed (*Convolvulus arvensis*), nettles (*Urtica dioica*), , creeping cinquefoil (*Potentilla reptans*), cowslip (*Primula veris*), Watermint (*mentha aquatica*), white clover (*Trifolium repens*), red clover (*Trifolium pratense*) and meadow foxtail grass (*Alopecurus pratensis*) throughout.



Plate 3. Wet grassland.



Plate 4. Wet grassland.

FW4- Drainage Ditch

Drainage ditches varying in depth and width lined the west, north and east boundary of the site. These created a hydrological link between the site and the nearby Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. No evidence silt from the construction of the hardstanding was noted in the drainage ditch. No evidence of petrochemicals was noted in the drainage ditches. The species within and on the banks of this habitat included duckweed (*Lemna minor*), lesser water-parsnip (*Berula erecta*), Watermint (*mentha aquatica*), bog pondweed (*Potamogeton polygonifolius*) and Bulrush (*Typga latifolia*).



Plate 5. Drainage ditch joining the southeast corner of the hardstanding to the east drainage ditch.



Plate 6 & 7. Arterial drainage ditch to the east of the site.



Plate 8. Arterial drainage ditch located to the east of the site.

Evaluation of Habitats

The subject site is the grounds for a crane hire business. The habitats according to Fossitt (2000) include built land (BL3) for holding large machinery, vehicles and equipment, Wet Grassland (GS4) and Drainage ditches (FW4). A 100km/p/hr main road traverse just beyond the northern boundary and the River Shannon and River Fergus Estuaries SPA and Lower River Shannon SAC is ~700m east of the site.

Plant species.

The plant species encountered at the various locations on site are detailed above. No protected, rare or invasive species were noted onsite.

Terrestrial mammals

No signs of badgers (*Meles meles*) or otters (*Lutra lutra*) inhabiting or foraging were noted onsite.

Amphibians/reptiles

No Frogs (*Rana temporaria*) or tadpoles were noted onsite. The wet grassland habitat and drainage ditches could prove useful to frogs.

Birds

No birds of conservation importance were noted onsite.