Appropriate Assessment Screening of the Maintenance of Glyde & Dee Arterial Drainage Scheme 2023

Draft Report

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Contract

This report describes work commissioned by the Office of Public Works. Hannah Webster of JBA Consulting carried out this work.

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Purpose

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Executive Summary

JBA Consulting has been commissioned by the Office of Public Works (OPW) to carry out Appropriate Assessment screening for the Maintenance of the Glyde & Dee Arterial Drainage Scheme. The assessment is an update of screening completed for the Scheme in 2014.

This screening report assesses the likely significant effects on Natura 2000 sites within the zone of influence of the proposed drainage maintenance activities in the Glyde & Dee Arterial Drainage Scheme. Three source > pathway > receptor chains have been examined to assess the likely impact of drainage maintenance activities on Natura 2000 sites; land, surface water, and groundwater pathways.

From this screening exercise it has been determined that Likely Significant Effects may arise on the following seven Natura 2000 sites as a result of Scheme activities:

- Dundalk Bay SAC (000455)
- Dundalk Bay SPA (004026)
- Stabannan-Braganstown SPA (004091)

A further 7 sites fell within the project Zone of Influence but there was no complete source > pathway > receptor chain for impacts. These sites are Boyne Coast and Estuary SAC, Carlingford Shore SAC, Carlingford Lough SPA, Carlingford Mountain SAC, Clogher Head SAC, River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA.

An Appropriate Assessment is required to determine if the Likely Significant Effects identified in this assessment could have an adverse effect on the integrity of the three Natura 2000 sites and if so whether sufficient avoidance and reduction measures can be applied to the works to avoid any adverse effects.

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Abbreviations

AA	Appropriate Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CJEU	Court of Justice of the European Union
COSD	Conservation Objective Supporting Document
EPA	Environmental Protection Agency
GWB	Groundwater Body
GWD	Groundwater Dependent
IFI	Inland Fisheries Ireland
IROPI	Imperative Reason of Overriding Public Interest
LSE	Likely Significant Effect
NBDC	National Biodiversity Data Centre
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
OPR	Office of the Public Regulator
OPW	Office of Public Works
QI	Qualifying Interest
SAC	Special Area of Conservation
SPA	Special Protection Area
SRP	Source receptor pathway
SWD	Surface Water Dependent
WFD	Water Framework Directive
ZOI	Zone of Influence

1 Introduction

1.1 Background

JBA Consulting has been appointed by the Office of Public Works (OPW), to undertake environmental consultancy services in relation to statutory arterial drainage maintenance activities on the Glyde & Dee Arterial Drainage Scheme. As part of the environmental review process, OPW prepares or commissions an Appropriate Assessment (AA) screening, and if necessary, a Natura Impact Statement (NIS) to inform an Appropriate Assessment, to determine whether the Scheme is likely to have an adverse impact on the integrity of any Natura 2000 sites, in light of its conservation objectives and best scientific knowledge, either alone or in combination with other plans or projects.

The proposed Scheme is the Maintenance of the Glyde & Dee Arterial Drainage Scheme, hereafter referred to as the "Scheme", and is required as part of maintenance activities under the Arterial Drainage Acts of 1945 and 1995, and includes the Rivers Glyde and Dee which drain into Dundalk Bay.

This Appropriate Assessment screening provides the results of the screening appraisal conducted for the Glyde & Dee Arterial Drainage Scheme to complete the first stage of the Appropriate Assessment process in accordance with Regulation 42 of the 2011 Bird and Habitats Regulations, which implements the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) into Irish Law.

1.2 Legislative Context

The Habitats Directive (Directive 92/43/EEC) aims to maintain or restore the favourable conservation status of habitats and species of community interest across Europe. The requirements of Articles 6(3) and 6(4) of the Habitats Directive have been transposed into Irish legislation by means of *inter alia* the European Communities (Birds and Natural Habitats) Regulations 2011-2021 as amended.

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

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

A competent authority, in this case OPW as a public body, can only grant consent for to a plan or project after having determined that it will not adversely affect the integrity of any Natura 2000 site, in light of its conservation objectives and best scientific evidence, either alone or in combination with other plans or projects.

Under article 6(4) of the Directive, if adverse impacts are likely, and in the absence of alternative options, a plan or project must nevertheless proceed for imperative reasons of overriding public interest (IROPI), including social or economic reasons, a Member State is required to take all compensatory measures necessary to ensure the overall integrity of the Natura 2000 site network.

1.3 Appropriate Assessment Process

Guidance on the AA process was produced by the European Commission (EC) in 2002, which was subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DoEHLG), 2010). These guidance documents identify a staged approach to conducting an AA, as shown in Figure 1-1.

Figure 1-1. The Appropriate Assessment Process (DoEHLG, 2010)

1.3.1 Stage 1 - Screening for AA

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

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

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

1.3.2 Stage 2 - AA

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

1.3.3 Stages 3 & 4 – Alternative solutions and IROPI

Where adverse impacts on the integrity of Natura 2000 sites are identified, after mitigation measures have been applied, or the mitigation measures are not certain / capable of being successfully implemented, alternative ways of achieving the objectives of the plan or project that avoid adverse impacts need to be considered. If none can be found, the assessment must demonstrate IROPI and provide suitable compensation.

1.4 Structure of this Report

To provide the competent authority with the relevant information to determine with confidence their conclusions on the Likely Significant Effects of the Scheme to the Natura 2000 sites concerned, this screening assessment presents the following:

- Section 2: Details of the methods used in this assessment.
- Section 3: A detailed description of the proposed scheme and its Zone of Influence (ZOI).
- Sections 4-6: Screening of Natura 2000 sites based on those that are located within the ZOI of the proposed works for each of the key impact pathways.
- Section 7: A summary of the screening assessment.

2 Methodology

This AA Screening has been prepared having regard to the Birds and Habitats Directives, the European Communities (Birds and Natural Habitats) Regulations 2011-2021 as amended and relevant jurisprudence of the EU and Irish courts. The following documents have also been used to provide guidance for the assessment:

- DoEHLG (2010) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government.
- European Commission (EC) (2019) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission.
- EC (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC. European Commission.
- EC (2013) Interpretation Manual of European Union Habitats. Version EUR 28. European Commission.
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater and Coastal, Version 2.1.
- National Parks and Wildlife Service (NPWS) (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report.
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report.
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report.
- OPR (2021) Appropriate Assessment Screening for Development Management. OPR Practice Note PN01.
- Ryan Hanley (2014) Stage 1: Appropriate Assessment Screening Methodology for the Maintenance of Arterial Drainage Schemes.
- Ryan Hanley (2014) Source » Pathway » Receptor Chains for Appropriate Assessment. Arterial Drainage Maintenance Categories.

2.1 Desktop Study

A desktop study was conducted in May 2022 of available published and unpublished information, along with a review of data available on the NPWS and National Biodiversity Data Centre (NBDC) web-based databases, to identify key habitats and species (including legally protected and species of conservation concern) that may be present within ecologically relevant distances from the Scheme as explained below. The data sources below were consulted for the desktop study:

- NBDC data within the surrounding 10 km grid squares of the Scheme, within the past 10 years. Data was gathered from 12 No. 10 km grid squares to encompass the entire works of the Scheme.
- NPWS website (www.npws.ie), (https://www.npws.ie/), where site synopses, Natura 2000 data forms and conservation objectives were obtained along with Annex 1 habitat distribution data and status reports.
- National Biodiversity Data Centre (NBDC) Maps (http://maps.biodiversityireland.ie/#/Map)
- Environmental Protection Agency (EPA) maps website (https://gis.epa.ie/EPAMaps/)

- Water Maps (www.watermaps.wfdireland.ie)
- Review of previous surveys for Arterial Drainage activities including the screening assessments and habitat maps for the schemes completed in the previous review cycle (JBA 2018), to the extent only that the information contained therein was still up to date best scientific knowledge.
- OPW database of habitat mapping of SAC and SPA Channels, and incidental records of protected and invasive species (reviewed May 2022).

In addition, information on the geology, hydrology and Water Framework Directive status were gathered from the Environment Protection Agency's Geoportal (EPA 2020).

2.2 Screening Method

A screening method was developed in 2014 to cover the unique nature of the maintenance of Arterial Drainage Schemes (Ryan Hanley 2014a), hereafter the 'Ryan Hanley method'. The approach used a source-receptor-pathway (SRP) process to identify combinations of activities, ecological features and connecting pathways that could result in Likely Significant Effects (Ryan Hanley 2014b).

The SRP approach was also identified by OPR (2021) as best-practice for assessing the impact of projects. Maintenance of Arterial Drainage Schemes present a combination of attributes different from one-off projects, in that it is a programme of actions undertaken in a cyclical manner. The actions are generally small-scale and time limited but can cover a large geographic area.

The Ryan Hanley method was re-appraised in the light of recent guidance on AA (OPR 2021) as well as accumulated knowledge of the impacts of Arterial Drainage Schemes from ongoing audits of the maintenance works across the country. Since 2014 there have also been a number of rulings of the CJEU in relation of Appropriate Assessment that have altered the way the Habitats Directive is applied in practice.

Each element of the SPR pathway was reviewed in turn as set out below. It is important to note that assessment is for the maintenance activities of the Scheme, rather than impacts when it was created.

2.2.1 Source of Impacts

Impacts documented in any audit notes were collated and checked (as well as discussing with the auditors) against the original list, along with other impacts found by searching the grey literature and Article 17 reports relating to specific species. Audit notes include illustrations of the work and highlight the extent of any potential problems. The original sources of impacts were found to be comprehensive, with no new sources of impact added.

Given that the assessment is for the maintenance of the Scheme, rather than impacts when it was created, no evidence could be found of impacts of river maintenance activity via a groundwater pathway on any Natura 2000 site. In some situations, there is a very small possibility of impacts via groundwater pathways.

The sources of impacts are based on a reasonable worst-case scenario. In many cases audits of OPW works identify the use of best practice. However, in 2020 and 2021, 10% and 6% of audits achieved a poor score respectively, and the impacts of this poor performance are what is assessed here.

The sources of impact assessed are shown in Table 2-1.

Table 2-1. Details of potential sources of impact

Activity	Impact
Disturbance of species and habitats	
Vehicle movement along MAC and	Habitat disturbance/compaction

Activity	Impact
during operation; vehicle operations in bridge and sluice maintenance	Species disturbance from adjacent habitat: Noise Visual Vibration
Channel maintenance – silt and vegetation removal	Removal of Annex 1 habitat
	Removal of habitat for species, direct mortality, displacement, reduction of food availability
Bridge maintenance	Loss of bat roosts
Embankment maintenance	Loss of Otter habitat through mowing
	Loss of bird habitat through mowing
Release of suspended solids	
Silt and vegetation management; sluice maintenance	Release of solids downstream – impacting FWPM, other aquatic and riparian species
Silt and vegetation management; sluice maintenance	Release of solids downstream – stress to fish
Silt and vegetation management; sluice maintenance	Smothering of aquatic vegetation
Release of nutrients/changes in nutrient levels	
Silt and vegetation maintenance	Release from dredged material into bankside habitat
	Re-suspension of deposited nutrients
Vegetation cutting	Release from decaying cut material into embankment and channel
	Release from plant material cut and floating downstream in channel
Changes in water levels	
Silt and vegetation management	Removal of blockages lowers upstream surface water level
Silt and vegetation management	Removal of blockages changes upstream groundwater levels

The following activities were considered as a potential source of impact but, consistent with Ryan Hanley (2014b) were found not to present any potential risk:

- creation of site compounds and haul roads – these are rarely needed and if so use existing farmland. New compounds or haul roads in or adjacent to designated sites would be subject to a separate appropriate assessment
- Light pollution – working hours and safe working practice means that maintenance activities are only conducted in the daytime.
- Excavation beyond design level – this is not permitted as part of maintenance activities. Any alteration to the base level and maximum capacity of a channel would be subject to a separate appropriate assessment where it had the potential to impact on designated sites.
- Hydrocarbon and chemical spillage – there is no risk of significant chemical or hydrocarbon spillage taking place as the volumes used are tiny and the machinery is modern equipment of a high standard which uses biodiesel.

- Exhaust emissions and air quality – the amount of emissions to the air from maintenance activities is negligible due to the small size of the maintenance crews and the low number of vehicles necessary for the works. By clearing blockages there may also be impacts.
- Migration of fish – the proposed works do not result in channel obstruction and only a very short-term disturbance that might interrupt migration. Consultation with Inland Fisheries Ireland (IFI) ensures that instream works are conducted during the most appropriate season. Therefore, obstruction to fish migration does not occur as a result of the Scheme.
- Disturbance of birds in supporting habitat – the small number of machines and small size of maintenance crew are little different from typical agricultural activities, and therefore there will be no additional disturbance to bird species in supporting habitat. The disturbance impact in habitat within the SAC is included as noted above, and it is only supporting habitat outside the SAC which is excluded. Where possible, vegetation removal is undertaken outside of the breeding bird season, which runs from March to August (inclusive). All nesting birds are protected from disturbance by the Wildlife Act 2000 (as amended), and so all maintenance activities undertaken as part of the Scheme must comply with this legislation.

2.2.2 Pathways

The potential pathways for impacts are assessed as follows:

1 Land – direct result of maintenance works including vehicle movement as well as storage areas and vegetation management.

2 Surface water – impacts can be carried downstream in the normal flow of water. Upstream impacts may also be transmitted where the level of the water is altered.

3 Groundwater – in very rare circumstances, the maintenance works may alter the condition of the groundwater, which can be transmitted downgradient.

2.2.3 Receptors

The receptors are any of the Natura 2000 sites in Ireland and their Qualify Interest features. A full list of the habitats and species and whether they are considered to be dependent on ground or surface water are given in the appendices of Ryan Hanley (2014b).

2.2.4 Zone of Influence

The Zone of Influence from drainage maintenance activities is generally very small. Small crews operate a single machine and hand tools, or sometimes a pontoon or weed-cutting boat. The majority of impacts will occur within the immediate vicinity of the works (<10m). However, some effects may be transmitted further afield. For noise, vibration and visual disturbance impacts on species can occur at some distance. The TIDE toolkit suggests 500m is a useful precautionary distance, particularly near estuaries (Cutts et al. 2013). There is evidence that Greenland White-fronted Geese are disturbed at 600m (Ryan Hanley 2014a) so on a precautionary basis this distance is used for screening sites for land impacts.

Some SACs are designated for mobile species that use aquatic and riparian habitat, including Otter, Salmon, Lamprey, White-clawed Crayfish as well as bird species for SPA sites. Although by definition the SAC provides the core area of their habitat, scheme channels may form part of supporting habitat. For the purpose of screening for likely significant effects, it is assumed that the most important supporting habitat for Crayfish and other invertebrates will be within 300m of the SAC (Robinson 2000), and for Otters that have much larger ranges (Chanin 2003), up to 20km, but in all cases only where surface water pathways exist for the species to move between Scheme channels and the SAC. No additional screening distance is used for fish as their core habitat will be with the SACs, and the works do not present barriers to migration.

Effects transmitted through groundwater and surface water can be carried some distance, although the dilution effect of surface water means that at longer distances impacts are reduced significantly. In-channel maintenance works are also not introducing new suspended solids to the system, but rather mobilising material that has settled out since the previous maintenance period, and streams where there are higher levels of silt to clear as part of maintenance are likely to have higher baseline levels of suspended solids in the water. Works to embankments, including riparian disturbance could mobilise additional suspended solids if not managed carefully. There is no published evidence of how quickly any suspended solids released during maintenance activities remain at levels that would impact on wildlife, but based on experience and professional opinion, effects rarely persist more than 2km downstream due to the small-scale nature of the works. However, a precautionary distance of 5km is used for screening of sites for surface water impacts. The same detail applies to nutrients released into the water, for which new nutrients are not added, and those re-mobilised will also be quickly diluted. The screening distance is extended to 35km downstream for sites designated for Freshwater Pearl Mussel due to their unique sensitivity to suspended solids (NPWS 2022).

Upstream impacts are limited to changing water levels. Observation of OPW channels during previous walkover surveys and maintenance audits have shown that build up of silt and vegetation in the channel is not strong enough to create changes in water levels of more than a few centimetres. On removal of the obstruction the impacts on upstream water level are only conveyed a limited distance as there are a range of control levels throughout a river system, including natural areas such as bedrock reaches as well as artificial structures such as bridges. It is unlikely that any clearance will result in changes in water levels more than 1km upstream, but a precautionary distance of 3km is used for the screening assessment to identify potentially sensitive sites.

2.3 The Likely Significant Effects Test

The test for AA screening is whether the Scheme could have a 'Likely Significant Effect' (LSE) on any Natura 2000 site. A likely significant effect is defined as any effect that could undermine the conservation objectives of a Natura 2000 site, either alone or in combination with other plans or projects. There must be a causal connection between the Scheme and the qualifying interest of the site which could result in possible significant effects on the site. This is consistent with the approach to assessing LSE used in Ryan Hanley (2014a). The LSE test is a lower threshold for the screening assessment than 'adverse effect on site integrity' considered at the full Appropriate Assessment stage as screening is intended to be a preliminary examination for potential effects.

The Zone of Influence was used to identify Natura 2000 sites that could be impacted by the project. For each of these sites, the Qualifying Interest features and their associated conservation objectives were identified, and the possibility of LSE was determined by a combination of location, ecological and hydrological connectivity, sensitivity of receptor and magnitude of the source of impact.

2.4 In-combination Screening

The possibility of in-combination effects are considered only at a high level. Where sites are otherwise screened out, an assessment of whether the Scheme will have any effect at all is made. Where there is no effect at all via a pathway, there is no possibility of in-combination effects. Where an LSE is identified, the in-combination assessment is carried forwards to the Stage 2 Appropriate Assessment and presented in the Natura Impact Statement (NIS).

2.5 Presentation of the results of the Screening Assessment

The remainder of this report presents the results of carrying out the Likely Significant Effects test to identify if any sites need to be taken forwards for further assessment or whether all effects can be screened out.

3 Scheme Description

3.1 The Glyde & Dee Scheme and Proposed Works

The Glyde & Dee Arterial Drainage Scheme is in County Louth. It includes 761.0km of watercourse, 9.9km of embankment (Figure 3-1 and Figure 3-2) with over 100 accommodation bridges (Figure 3-3). They drain primarily agricultural land from west to east, with the two main rivers, the Glyde and the Dee, forming a confluence by the coast before their outfall into Dundalk Bay. All of the embankments present in the Scheme fall within this coastal section.

3.2 Drainage Maintenance Activities

Arterial Drainage Maintenance includes a range of operations such as silt and vegetation management, mowing and structure maintenance, and listed as channel, embankment or structure maintenance in Table 3-1 below. It is required to retain the arterial drainage scheme design capacity. For the purpose of the screening assessment, it is assumed that any of the activities shown in Table 3-1 could occur on any of the channels.

Table 3-1. OPW Drainage Maintenance Types

Category	Maintenance Type	Code
Channel Maintenance	Silt and vegetation management	A
	Aquatic vegetation cutting	B
	Bank protection	C
	Bush cutting/Branch trimming	D
	Tree cutting	E
	Other	K
Embankment Maintenance	Bush cutting/Branch trimming	D
	Tree cutting	E
	Mulching	F
	Mowing	G
	Gate installation	H
Structural Maintenance	Sluice maintenance	I
	Bridge maintenance	J
	Bank protection	C
	Bush cutting/Branch trimming	D
	Tree cutting	E

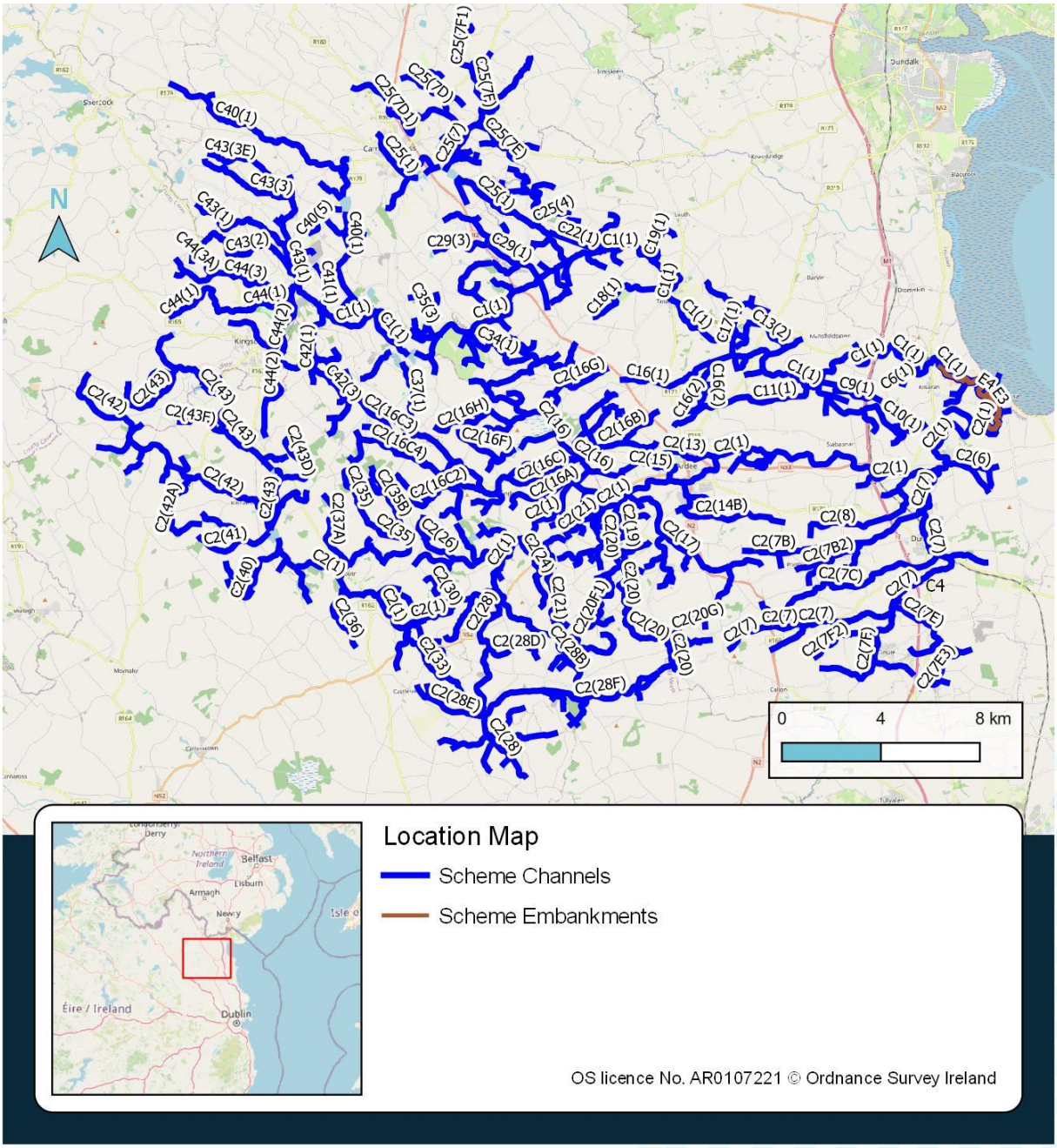

Figure 3-1. Location of Scheme channels and embankments

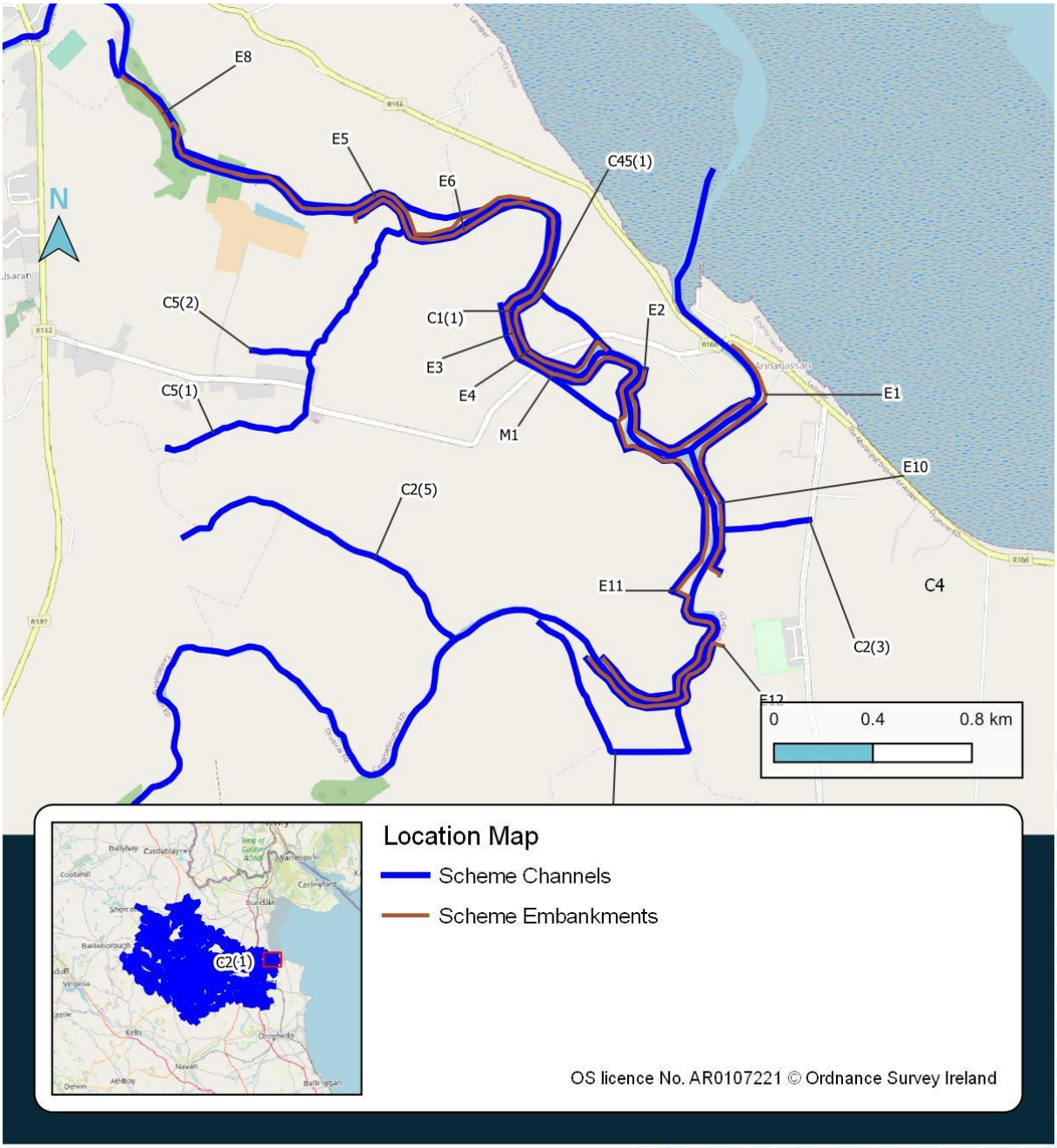

Figure 3-2. Location of Scheme channels and embankments near the coast

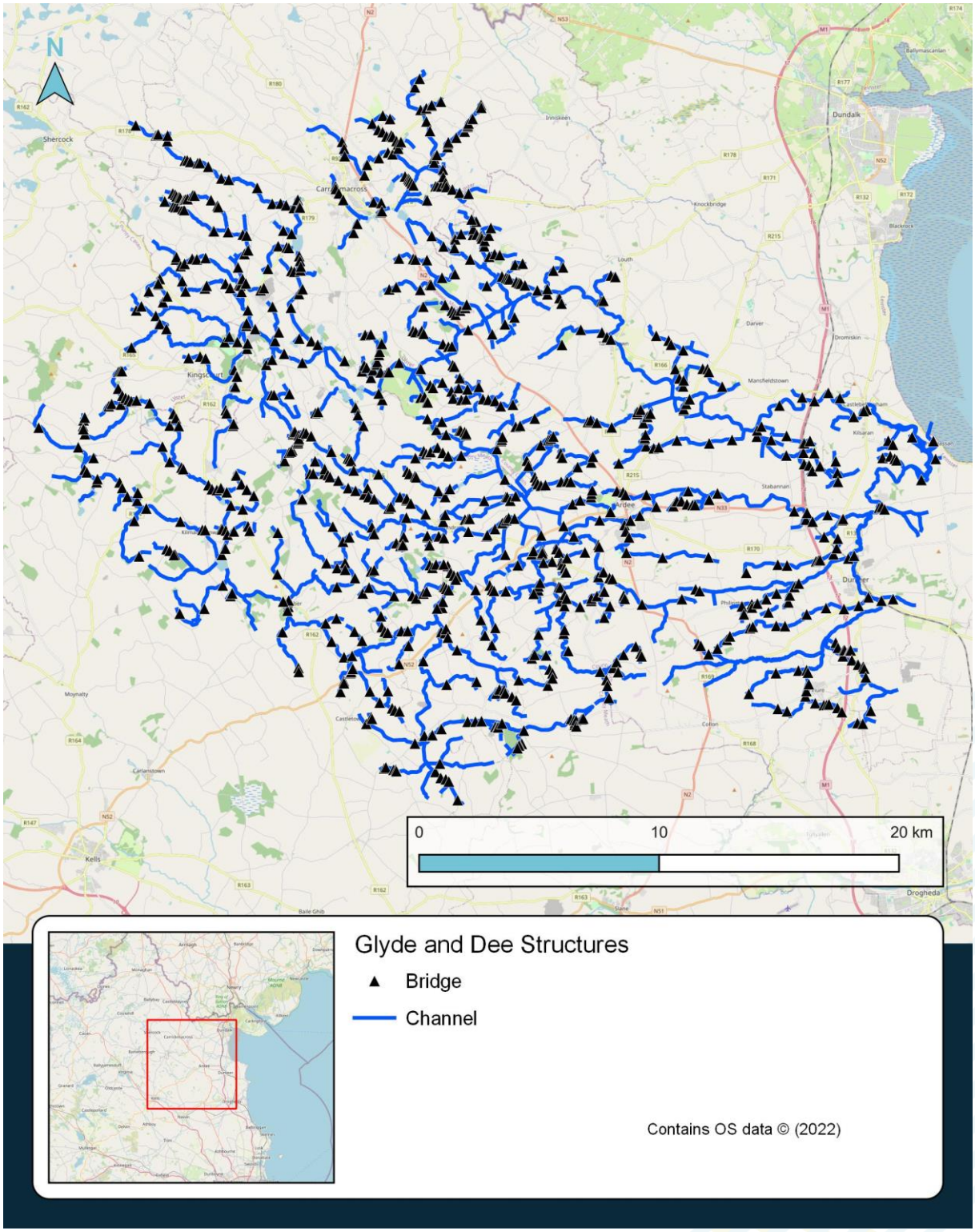

Figure 3-3. Location of Scheme structures

4 Screening for Land Pathway

The relevant ZoI for land pathways is up to 0.6km from the scheme watercourses. There are three Natura 2000 sites within this distance, all of which have Scheme channels within them.

Table 4-1. Land pathway screening

Statutory Designated Site Name (Site Code)	0.6km Buffer Zone	0.01km (Overlap)
Type of Impact	Indirect impacts for noise and visual disturbance through air pathways	Direct impacts from physical disturbance of habitats through land pathways
Dundalk Bay SAC (000455)	Yes	Yes
Dundalk Bay SPA (004026)	Yes	Yes
Stabannan-Braganstown SPA (004091)	Yes	Yes

There is potential for a drainage maintenance activity to affect the Qualifying Interests of the Natura 2000 sites within the zone of influence of a scheme. This is assessed based on the distribution or potential distribution of the QI features relative to the scheme channels. The results of this are summarised in Table 4-2.

Table 4-2. Land pathway review of distances

EU Code	Species/Habitats	Maintenance activity location relative to designated site boundary	Qualifying Interest/Special Conservation Interests location relative to drainage maintenance activity	Location of Impact	Result
Dundalk Bay SAC (000455)					
1130	Estuaries	0m/Overlap	Maintenance works will only be undertaken at the southern boundary of the SAC, far beyond the boundary of the estuarine habitat as detailed in NPWS (2011a).	10m	No LSE
1140	Perennial vegetation of stony banks	0m/Overlap	Confirmed adjacent to scheme channels at the outfall of the rivers.	10m	LSE
1140	Mudflats and sandflats not covered by seawater at low tide	0m/Overlap	Mudflats and sandflats are located throughout SAC and surround the channel which enters the site, and as such fall within 10m of this habitat.	10m	LSE
1310	Salicornia and other annuals colonizing mud and sand	0m/Overlap	Confirmed adjacent to scheme channels at the outfall of the rivers.	10m	LSE
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0m/Overlap	Confirmed adjacent to scheme channels at the outfall of the rivers.	10m	LSE

EU Code	Species/Habitats	Maintenance activity location relative to designated site boundary	Qualifying Interest/Special Conservation Interests location relative to drainage maintenance activity	Location of Impact	Result
1410	Mediterranean salt meadows (Juncetalia maritimi)	0m/Overlap	Confirmed adjacent to scheme channels at the outfall of the rivers.	10m	LSE
Dundalk Bay SPA (004026)					
A043	Greylag Goose *Anser anser*	0m/Overlap	The COSD (NPWS, 2011b) identifies that subsites 0Z474 and 0Z473 where drainage maintenance works will be undertaken is not of importance for this species. All other subsites are >300m from where drainage maintenance works are proposed.	>300m	No LSE
A046	Light-bellied Brent Goose *Branta bernicla hrota*	0m/Overlap	The COSD (NPWS, 2011b) identifies that subsites 0Z474 and 0Z473 where drainage maintenance works will be undertaken is of importance for these species.	100m	LSE
A048	Shelduck *Tadorna tadorna*	0m/Overlap		100m	LSE
A052	Teal *Anas crecca*	0m/Overlap		100m	LSE
A053	Mallard *Anas platyrhynchos*	0m/Overlap		100m	LSE
A054	Pintail *Anas acuta*	0m/Overlap		100m	LSE
A065	Common Scoter *Melanitta nigra*	0m/Overlap	The COSD (NPWS, 2011b) identifies that subsites 0Z474 and 0Z473 where drainage maintenance works will be undertaken is not of importance for this species. All other subsites are >300m from where drainage maintenance works are proposed.	300m (nest)	No LSE
A069	Red-breasted Merganser *Mergus serrator*	0m/Overlap	The COSD (NPWS, 2011b) identifies that subsites 0Z474 and 0Z473 where drainage maintenance works will be undertaken is of importance for these species.	100m	LSE
A130	Oystercatcher *Haematopus ostralegus*	0m/Overlap		100m	LSE
A137	Ringed Plover *Charadrius hiaticula*	0m/Overlap		100m	LSE
A140	Golden Plover *Pluvialis apricaria*	0m/Overlap		200m (Nest) (B)	LSE
A141	Grey Plover *Pluvialis squatarola*	0m/Overlap		100m	LSE
A142	Lapwing *Vanellus vanellus*	0m/Overlap		100m	LSE
A143	Knot *Calidris canutus*	0m/Overlap		100m	LSE
A149	Dunlin *Calidris alpina*	0m/Overlap		100m	LSE

EU Code	Species/Habitats	Maintenance activity location relative to designated site boundary	Qualifying Interest/Special Conservation Interests location relative to drainage maintenance activity	Location of Impact	Result
A156	Black-tailed Godwit *Limosa limosa*	0m/Overlap		100m	LSE
A157	Bar-tailed Godwit *Limosa lapponica*	0m/Overlap		300m (nest)	LSE
A160	Curlew *Numenius arquata*	0m/Overlap		100m	LSE
A162	Redshank *Tringa totanus*	0m/Overlap		100m	LSE
A179	Black-headed Gull *Chroicocephalus ridibundus*	0m/Overlap		100m	LSE
A182	Common Gull *Larus canus*	0m/Overlap		100m	LSE
A184	Herring Gull *Larus argentatus*	0m/Overlap		100m	LSE
Stabannan and Braganstown SPA (004091)					
A043	Greylag Goose *Anser anser*	0m/Overlap	Little information is available as to the areas of the SPA which are important for this species. Therefore, the precautionary principle has been adopted.	>300m	LSE

4.1.1 Screening for SAC sites with mobile species

There are no riverine or riparian SAC sites upstream of the Scheme channels. Downstream the Scheme channels flow into tidal waters. There are three coastal sites within 15km, Carlingford Shore SAC, Clogher Head SAC and Boyne Coast and Estuary SAC but none include mobile marine mammal species as QI features so these sites are screened out from further assessment.

4.1.2 Summary

The Scheme includes maintenance activities within the SPA, and in the absence of mitigation, could result in direct impacts on **Dundalk Bay SAC**, **Dundalk Bay SPA** and **Stabannan and Braganstown SPA**. The potential for Likely Significant Effects requires further assessment, which will include consideration of in-combination impacts. For the screened out sites, there are no effects at all alone so no in-combination effects are possible.

5 Screening for Surface Water Pathways

5.1 Freshwater Pearl Mussel Screening

There are no sites designated for Freshwater Pearl Mussel within 35km downstream of the proposed works. This is confirmed at the Scheme is outside the catchment boundary for Freshwater Pearl Mussel sites provided by NPWS (NPWS 2022).

5.2 Other Surface Water Impacts

There are four Natura 2000 sites within the same surface water catchment and sub-catchments with Scheme channels, as detailed in Table 5-1. All three contain Scheme channels and have surface water dependent QI features.

Table 5-1. Surface water pathway screening

Statutory Designated (Site Code)	Is site within the same surface water catchment as the scheme?	Is there surface water connectivity with the scheme?	Does the site contain SWD Qualifying Interests/Special Conservation Interests?
Dundalk Bay SAC(000455)	Yes	Yes	Yes
Dundalk Bay SPA (004026)	Yes	Yes	Yes
Stabannan-Braganstown SPA (004091)	Yes	Yes	Yes
River Boyne and River Blackwater SAC (002299)	No	No	NA

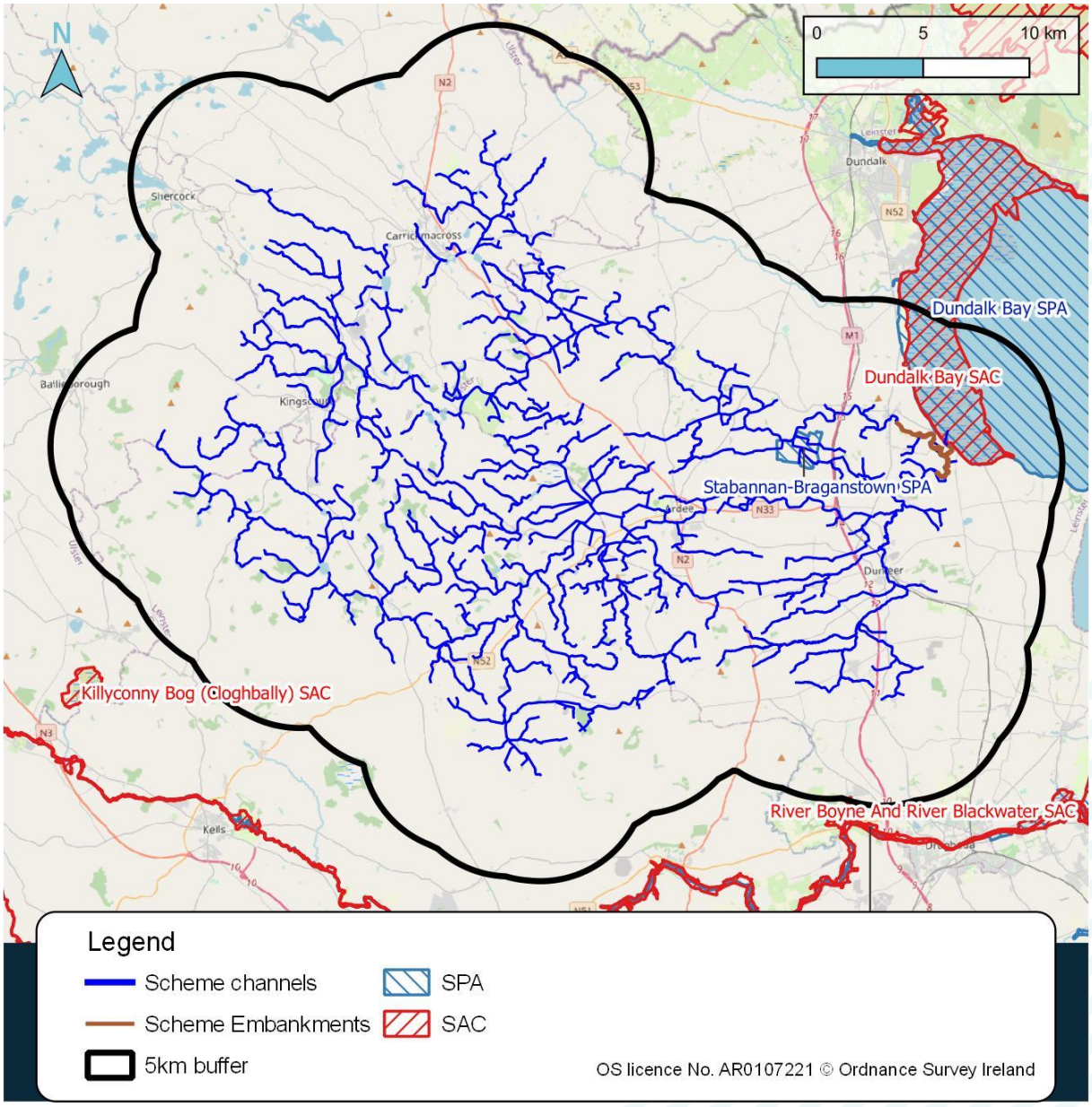

Figure 5-1. Surface water screening to 5km

Table 5-2 summarises the results of this stage for the SAC and Table 5-3 provides the results for the SPAs.

Table 5-2. Surface Water screening for SAC QI features

EU Code	SWD QI	Drainage Activity location relative to SWD QI	QI distribution	Conclusion
Dundalk Bay SAC (000455)				
1130	Estuaries	Within and upstream of SAC	Works are proposed to take pace both within and immediately upstream of the estuary.	LSE
1140	Mudflats and sandflats not covered by seawater at low tide	Within and upstream of SAC	Mudflats and saltmarsh are abundant and widespread within Dundalk Bay. A single watercourse flows into the bay, upon which maintenance works will take place and as such potential impacts are anticipated.	LSE
1310	Salicornia and other annuals colonizing mud and sand	Within and upstream of SAC	Salicornia flats are known to be abundant within the bay and are heavily associated with the saltmarshes which is even more abundant.	LSE

Table 5-3. Surface Water screening for SPA QI features

SWD habitats present	Annex I Habitat	QI likely to occur	Drainage maintenance activity location	Desktop Study Comment	Concl-usion
Dundalk Bay SPA (004026)					
Estuaries [MW4]	Estuaries (1130)	See list in box below	Within and upstream of SPA	Most of this SPA is comprised of estuarine habitat. Drainage maintenance is proposed for several watercourses within 3km of this habitat.	LSE
QI likely to occur in habitat: Light-bellied Brent Goose, Shelduck, Teal, Mallard, Pintail, Common Scoter , Red-breasted Merganser, Oystercatcher, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Black-headed Gull, Common Gull, Herring Gull, Wetlands & Waterbirds					
Mudflats and sandflats [LS2, LS3, LS4, LS5]	Mudflats and sandflats not covered by seawater at low tide (1140)	See box below	Within and upstream of SPA	This site contains numerous mudflats and sandflats which become exposed at low tide. Drainage maintenance works are proposed within 3km of this site.	LSE
QI likely to occur in habitat: Light-bellied Brent Goose, Shelduck, Oystercatcher, Ringed Plover, Grey Plover, Lapwing, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Redshank, Black-headed Gull, Common Gull, Herring Gull, Wetlands & Waterbirds					
Saltmarsh [CM1]	Salicornia and other annuals colonizing mud and sand (1310)	See box below	Within and upstream of SPA	Saltmarshes are present in the SPA within 3km of watercourses upon which works are proposed.	LSE
QI likely to occur in habitat: Dunlin, Black-tailed Godwit, Curlew, Redshank, Black-headed Gull, Common Gull, Herring Gull, Wetlands & Waterbirds					

Stabannan-Braganstown SPA (004091)				
None of the key habitat types for which this site is designated are identified as being SWD	Greylag Goose	Within and upstream of SPA	NPWS (2004) reports that this site is predominantly improved grassland and arable crops; these are not surface water dependent habitats.	No LSE

5.2.1 Summary

In conclusion, the above steps have determined that two Natura 2000 sites will require a Stage 2 Appropriate Assessment to be undertaken, Dundalk Bay SAC and Dundalk Bay SPA. The in-combination assessment is carried forwards to Stage 2. For the two sites screened out, there are no impacts alone and therefore no impacts are possible in-combination.

6 Screening for Ground Water Pathways

This assessment was determined based on the location of the relevant Natura 2000 sites within the relevant groundwater bodies (GWBs) containing Scheme channels. Each qualifying interest of the screened in Natura 2000 site, was then assessed individually for potential to be impacted. The location of the drainage maintenance activity works relative to the Natura 2000 sites and qualifying interests were considered to determine relevance at this stage, along with GWD habitat typology.

The Glyde and Dee Arterial Drainage Scheme is located across 10 groundwater bodies (GWB). Eight GWBs do not contain any Natura 2000 sites. There are 9 sites (5 SACs and 4 SPAs) located within the other two GWBs and therefore remain within the screening assessment, as detailed in Table 6-1. Only three of these are within the 3km screening distance for groundwater impacts.

Table 6-1. Groundwater pathway screening

GWB name (EU_Code) and flow regime	Natura 2000 Site (Site Code)	Site within 3km of scheme channels?
Louth (IEGBNI_NB_G_019) Poorly productive bedrock	Dundalk Bay SPA (004026)	Yes
	Dundalk Bay SAC (000455)	Yes
	Stabannan-Braganstown SPA (004091)	Yes
	Carlingford Mountain SAC (000453)	No
	Clogher Head SAC (001459)	No
	Carlingford Shore SAC (002306)	No
	Carlingford Lough SPA (004078)	No
Wilkinstown (IE_EA_G_010) Poorly productive bedrock	River Boyne and River Blackwater SPA (004232)	No
	River Boyne And River Blackwater SAC (002299)	No

Table 6-2. Review of QI features and ground water dependence

Habitats as per Natura 2000 Standard Data Form, Site Synopsis or COSD	Potential GWB Habitats supporting QIs: Fossitt 2000 (Annex I)	GWD Habitat Typology	Drainage maintenance activity location relative to Natura 2000 site	Result
Dundalk Bay SAC (000455)				
Estuaries	NA	Not GWD	NA	No LSE
Perennial vegetation of stony banks	NA	Not GWD	NA	No LSE
Mudflats and sandflats not covered by seawater at low tide	NA	Not GWD	NA	No LSE
Salicornia and other annuals colonizing mud and sand	NA	Not GWD	NA	No LSE
Atlantic salt meadows (Glauco-	NA	A	Upgradient – but not dependent on	No LSE

Puccinellietalia maritimae)			groundwater discharge	
Mediterranean salt meadows (Juncetalia maritimi)	NA	A	Upgradient – but not dependent on groundwater discharge	No LSE
Dundalk Bay SPA (004026)				
Estuaries [MW4]	Estuaries (1130)	N/A – not GWD	N/A	No LSE
Mudflats and sandflats [LS2, LS3, LS4, LS5]	Mudflats and sandflats not covered by seawater at low tide (1140)	N/A – not GWD	N/A	No LSE
Saltmarsh [CM1]	Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410]	A	Upgradient – but not dependent on groundwater discharge	No LSE
Stabannan-Braganstown SPA (004091)				
None of the key habitat types for which this site is designated are identified as being GWD	N/A	N/A	N/A	No LSE
Note: GWD Habitat Typology after Table 5.1 Kilroy et al (2008) in Ryan Hanley (2014a) - A = Type A, Groundwater Discharge Zone Wetlands				

With the absence of any groundwater dependent features, there is no receptor and therefore there is no possibility of Likely Significant Effects. In summary, there are no sites with LSE resulting from groundwater pathways.

7 Screening Summary

From this screening exercise it has been determined that Likely Significant Effects may arise at Natura 2000 sites as a result of the Scheme. The sites and the pathways to impact are shown in Table 7-1, along with sites that were considered but screened out. The location of the screened in sites is shown in Figure 7-1.

Table 7-1. Screening Assessment summary

Site	Pathway of Impact			Comment
	Surface Water	Land	Groundwater	
Boyne Coast and Estuary SAC (001957)	NA	No LSE	NA	Coastal and marine sites within 15km but no mobile receptors likely to be present in or near Scheme channels
Carlingford Shore SAC (002306)	NA	No LSE	NA	
Clogher Head SAC (001459)	NA	No LSE	NA	
Dundalk Bay SAC(000455)	LSE	LSE	No LSE	Habitats at Dundalk Bay SAC have been deemed vulnerable to maintenance works which may reach the site via surface water and land and air pathways.
Dundalk Bay SPA (004026)	LSE	LSE	No LSE	Bird species within Dundalk Bay SPA have been deemed vulnerable to maintenance works which may reach the site via surface water and land and air pathways.
Stabannan-Braganstown SPA (004091)	No LSE	LSE	No LSE	Bird species within this SPA have been deemed vulnerable to maintenance works which may reach the site land and air pathways only.
Carlingford Mountain SAC (000453)	NA	NA	No LSE	No significant impacts, via any of the three pathways, have been identified as part of this assessment.
Carlingford Lough SPA (004078)	NA	NA	No LSE	
River Boyne and River Blackwater SPA (004232)	No LSE	NA	No LSE	
River Boyne and River Blackwater SAC (002299)	No LSE	NA	No LSE	

This means that three sites are carried forwards for Appropriate Assessment. The Appropriate Assessment is required to determine if these Likely Significant Effects could have an adverse effect on the integrity of the sites and if so whether sufficient avoidance and reduction measures can be applied to the works.

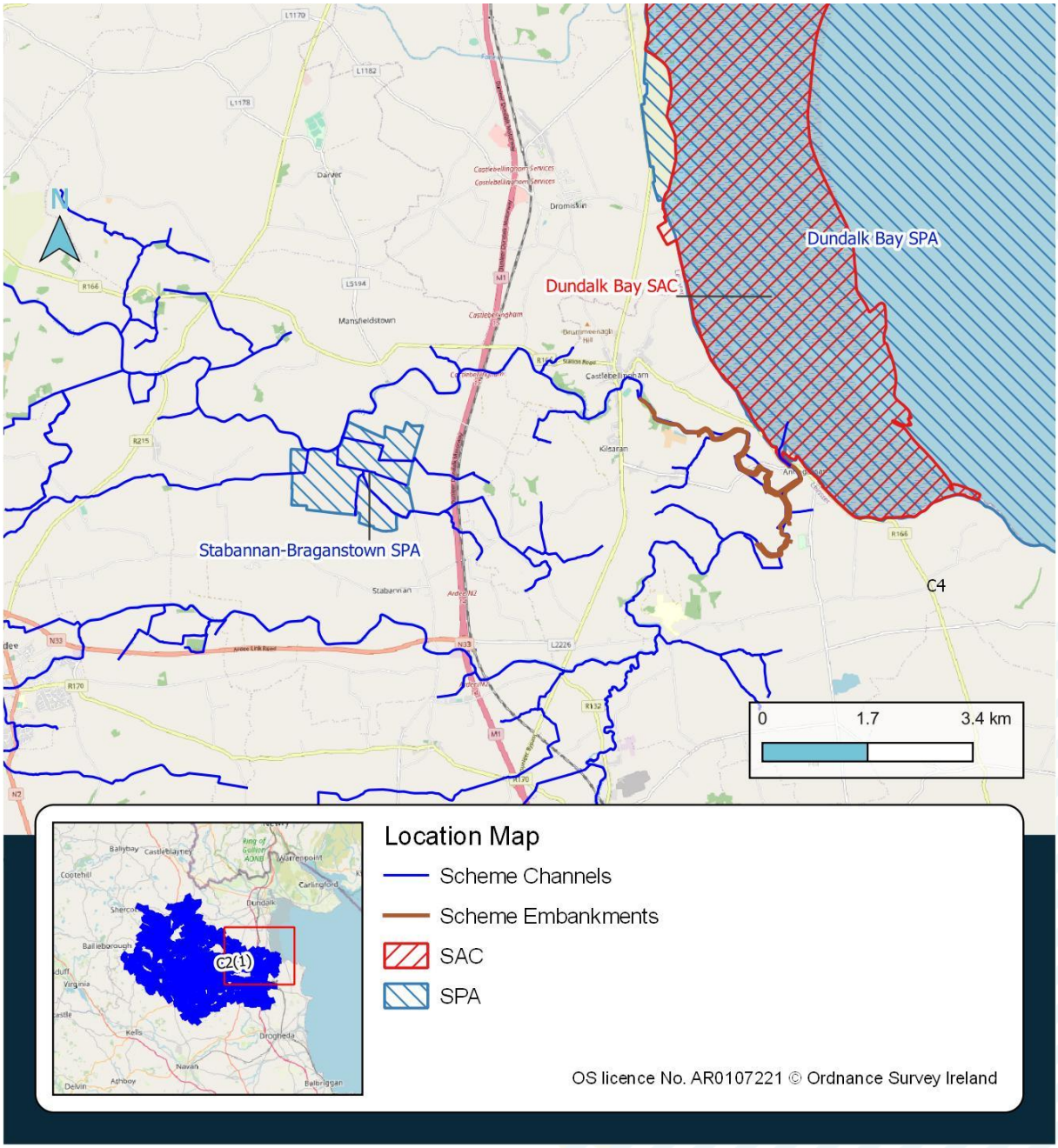

Figure 7-1. Natura 2000 sites screened in

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