TOBIN

Meath County Council
Newtownmoyaghy Road
Natura Impact Statement

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BUILT ON KNOWLEDGE

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1. INTRODUCTION

Meath County Council are proposing an upgrade of the existing Newtownmoyaghy Road, and a stream diversion, at Newtownmoyaghy in Co. Meath (the proposed development). The Newtownmoyaghy Road, is a local secondary road situated northeast of Kilcock, within the Meath County Council Local Authority Area. This road has become a bypass for vehicles to avoid traffic congestion in Kilcock and Maynooth, with an Annual Average Daily Traffic (AADT) figure of ca. 2,500.

Compaction from traffic and erosion from stream flood events has caused the existing road edge and verge to collapse in discreet sections into the Newtownmoyaghy Stream (EPA Code: 09N02; (also known as the Jenkinstown Stream), which is a tributary of the WFD waterbody Rye_Water_020 [WFD code: IE_EA_09R010300]), which runs adjacent to the road. This has become both a health and safety risk for road users and an environmental risk due to the release of hydrocarbons and other vehicle pollutants entering the adjacent stream via run-off. To resolve the issue, Meath County Council propose to carry out an open channel diversion, in order to facilitate the infilling of the existing stream and widening of the road and road verge. The road will then hold the potential to be developed into a shared cycle and pedestrian path in the future.

The proposed development is not directly connected with or necessary for the management of any European site and hence the requirements of Article 6(3) of the Habitats Directive and Part XAB of the Planning and Development Act 2000, as amended, in respect of Appropriate Assessment (AA) are engaged.

An AA Screening Report was prepared by TOBIN (Appendix A), on behalf of Meath County Council, providing information to enable the competent authority to perform its statutory function to undertake a screening for AA in respect of the proposed development. An AA is required where it cannot be objectively concluded that a project or plan, either alone or in-combination with other projects or plans, is not likely to have significant effects on a European site. The AA Screening Report concluded; in light of best scientific knowledge, in view of the conservation objectives for the relevant European sites and on the basis of objective information, the proposed development, either individually or in-combination with other plans or projects, could have an indirect effect on the following European sites: South Dublin Bay SAC [000210], South Dublin Bay and River Tolka Estuary SPA [004024], North Dublin Bay SAC [00206] and North Bull Island SPA [004006].

This Natura Impact Statement (NIS) was therefore prepared, in accordance with the provisions of the above stated legislation, providing information to enable the competent authority to perform its statutory function to undertake AA in respect of the proposed development. This NIS includes an examination and analysis of the best available scientific knowledge and data in the field to identify and assess the implications of the proposed development on any European sites in view of the conservation objectives of those sites. It considers whether there are ex-situ implications for any European sites, for example from impacts on populations of ex-situ species located outside of European sites, or from impacts on ex-situ supporting habitats. It considers whether the proposed development, by itself or in-combination with other plans or projects, could adversely affect the integrity of any European sites. In reaching a conclusion in this regard, consideration has been given to mitigation measures necessary to avoid or reduce any potential adverse effects.

2. THE APPROPRIATE ASSESSMENT PROCESS

2.1 LEGISLATIVE CONTEXT

The European Communities (EC) Habitats Directive 92/43/EEC or 'the Habitats Directive' and the Council Directive 2009/147/EC on the conservation of wild birds or 'the Birds Directive' have been transposed into Irish law by EC (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011; hereafter referred to as the Birds and Habitats Regulations). The Birds Directive seeks to protect birds of special importance by the designation of SPAs. The Habitats Directive does the same for habitats and other species groups with SACs.

The requirement for an AA is outlined in Article 6(3) and further expanded upon in Article 6(4) of the Habitats Directive. Article 6(3) of the Habitats Directive requires that:

'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 or 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 implications for the site and subject to the provisions of paragraph 4, the competent 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.'

This provision was transposed into Irish law by Part XAB of the Planning and Development Acts, 2000-2017. Section 177U(4) of the said Acts provides for screening for Appropriate Assessment as follows:

'The competent authority shall determine that an appropriate assessment of [...] a proposed development [...] is required if it cannot be excluded, on the basis of objective information, that the [...] proposed development , individually or in combination with other plans or projects, will have a significant effect on a European site.'

Section 177U (5) provides as follows:

'The competent authority shall determine that an appropriate assessment of a [...] proposed development , [...], is not required if it can be excluded, on the basis of objective information, that the [...] proposed development , individually or in combination with other plans or projects, will have a significant effect on a European site.'

Article 6(4) states of the Habitats Directive requires that:

'If, in spite of a negative assessment of the implications for the [Natura 2000] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.'

Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission to other imperative reasons of overriding public interest.

An AA should be based on best scientific knowledge and the competent authority should ensure that expertise such as ecological, geological, and hydrological are utilised, where relevant.

The Court of Justice of the European Union (CJEU) has made a number of rulings in relation to AA, regarding when it is required, its purpose, and the standards it should meet. Consideration has been given to the evolution in interpretation and application of directives and national legislation arising from jurisprudence of the European and Irish courts, in respect of Article 6 of the 'Habitats Directive'.

2.2 Stages Involved in the Appropriate Assessment Process

There are potentially four stages in the AA process, derived from the '*Assessment of Plans and Projects Significantly affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*'. The result of each stage determines whether a further stage in the process is required.

Stage 1: Screening / Test of Significance

This process identifies the likely significant effects upon a European site from a proposed project or plan. Its purpose is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project which is not directly connected with or necessary to the management of the site as a European site, individually or in-combination with other plans or projects is likely to have a significant effect upon the European site, in view of its conservation objectives. A project may be 'screened-in' if there is a possibility or uncertainty of possible effects upon the European site, requiring a Stage Two AA. If there is no evidence to suggest significant effects due to the proposed plan or development the project is 'screened-out' from further assessment.

Stage 2: Appropriate Assessment

In this stage, consideration is given to ascertain whether the plan or project would adversely affect the integrity of a European site(s), either alone or in-combination with other plans or projects, with respect to the European site's structure and function and its conservation objectives. This stage of the assessment is carried out by the consenting authority and is informed by a Natura Impact Statement (NIS). A NIS is required where there is uncertainty as to whether or not an adverse effect arises, uncertainty of the effect itself, or a potential effect has been defined which requires further procedures/mitigation to remove uncertainty of a defined impact (i.e. significant effects cannot be excluded). Where there are adverse effects, an assessment of the potential mitigation to ameliorate those effects is required. If the assessment results in a negative conclusion, i.e., adverse effects on the integrity of a site cannot be excluded (by design or mitigation) or there is uncertainty as to whether an adverse impact arises, then the process must consider alternatives (Stage 3) or proceed to Stage 4.

Stage 3: Assessment of Alternatives

This stage of the potential process arises where adverse effects on the integrity of a European site cannot be excluded and examines alternative ways of achieving the objectives of the project

or plan that avoid adverse impacts on the integrity of the European site. However, in circumstances where there will not be any adverse effects on any European site, the developer places no reliance upon this third stage of the process in the context of this application for planning permission for the proposed development.

Stage 4: Assessment Where Adverse Effects Remain

This is the derogation process of Article 6(4), which examines whether there are imperative reasons of overriding public interest [IROPI] for allowing a project to proceed where adverse effects on the integrity of a European site have been predicted. Compensatory measures must be proposed and assessed as part of this stage and the EU Commission must be informed of the compensatory measures. Again, the developer places no reliance upon this stage of the process in the context of the application for planning permission for the proposed development.

3. METHODOLOGY

3.1 LEGISLATION AND GUIDANCE

This report has been carried out in accordance with the following legislation, guidance, and relevant rulings by the CJEU, the High Court, and the Supreme Court:

- Planning and Development Act 2000, as amended including Part XAB;
- European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011);
- Communication from the Commission on the Precautionary Principle. Office for Official Publications of the European Communities, Luxembourg (European Commission [EC] 2000);
- Managing Natura 2000 Sites – The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC. European Commission (EC, 2019);
- Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (EC, 2013);
- Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government (DoEHLG, 2010);
- 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. Office for Official Publications of the European Communities, Luxembourg (EC, 2007);
- 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, (EC, 2001);
- Appropriate Assessment Screening for Development Management. Office of the Planning Regulator (OPR) Practice Note PN01 (OPR, 2021); and
- Applications for Approval for Local Authority Developments made to An Bord Pleanála under 177AE of the Planning and Development Act, 2000, as amended (Appropriate Assessment) – Guidelines for Local Authorities (An Bord Pleanála, 2013).

Definitions of conservation status, integrity and significance used in this assessment are defined in accordance with '*Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*' (EC, 2019):

- Favourable conservation status (FCS) can only be defined and achieved at the level of the natural range of a species or a habitat type. A broad conservation objective aiming at achieving FCS can therefore only be considered at an appropriate level, such as for example the national, biogeographical or European level. The conservation measures have to correspond to the ecological requirements of the natural habitat types in Annex I and of the species in Annex II present on the site. The ecological requirements of those natural habitat types and species involve all the ecological needs which are deemed necessary to ensure the conservation of the habitat types and species. They can only be defined on a case-by-case basis and using scientific knowledge;
- The integrity of a European site is defined as the coherent sum of the site's ecological structure, function, and ecological processes, across its whole area, which enables it to

sustain the habitats, complex of habitats and/or populations of species for which the site is designated.

- Significant effect should be determined in relation to the specific features and environmental conditions of the protected site concerned by the plan or project, taking particular account of the site's conservation objectives and ecological characteristics.

3.2 Desktop Review and Information Sources

- Review of the National Parks and Wildlife Service (NPWS)[1] site synopsis, Natura 2000 data forms, and Conservation Objectives for European sites within the potential Zone of Influence (ZoI) identified through potential pathways from the proposed development;
- NPWS datasets on Annex I habitats and Annex II species;
- Review of available literature and web data. This included a detailed review of the NPWS database of areas designated (and proposed) for nature conservation and National Biodiversity Data Centre (NBDC)[2] websites and database including mapping and available reports for relevant sites and in particular qualifying interests and special conservation interests described and their conservation objectives;
- Review of Inland Fisheries Ireland (IFI) research data. This included reviewing research studies carried out for the Habitats Directive and Red Data Book fish species within the receiving environment[3] ;
- Information and data on water catchments from the Draft River Basin Management Plan 2022-2027[4] and the Water Framework Directive (WFD) Ireland Database[5] ;
- Geological Survey Ireland (GSI) online mapping[6] ;
- Environmental Protection Agency (EPA) Appropriate Assessment tool[7] ;
- Heritage map viewer[8] ;
- Meath County Development Plan, 2021 – 2027;
- Ireland's 4th National Biodiversity Action Plan, 2023–2030 produced by the Department of Culture, Heritage and the Gaeltacht; and
- Review of previous ecological assessments undertaken within the area.

In addition, aerial photography (Google Maps, Bing Maps) and mapping (Ordnance Survey of Ireland, Geological Survey of Ireland) were used to identify non-designated habitats such as rivers, woodlands, and hedgerows of local ecological importance and invasive species.

3.3 Ecological Field Survey

Multidisciplinary ecological field surveys were undertaken by qualified and experienced TOBIN Ecologists at the proposed development site on the 25th of April and the 30th of May 2023. The study area included the proposed development area and a 150m buffer surrounding the site.

[1] National Parks and Wildlife Service: Maps and Data | National Parks & Wildlife Service (npws.ie)(Accessed: July 2024).
[2] National Biodiversity Data Centre: https://maps.biodiversityireland.ie/Map (Accessed: July 2024).
[3] Inland Fisheries Ireland: Publications | Inland Fisheries Ireland (Accessed: July 2024).
[4] Government of Ireland: gov - Public Consultation on the draft River Basin Management Plan for Ireland 2022-2027 (www.gov.ie) (Accessed: July 2024).
[5] Water Framework Directive Ireland www.wfdireland.ie (Accessed: July 2024).
[6] Geological Survey Ireland: Geological Survey Ireland Spatial Resources (arcgis.com) (Accessed: July 2024)
[7] Environmental Protection Agency: www.catchments.ie (Accessed: July 2024)
[8] The Heritage Council: Heritage Maps (Accessed: July 2024).

The data collected was robust and allowed TOBIN to draw accurate, definitive and coherent conclusions on the possible impacts of the proposed development.

A visual aquatic assessment of the section of Newtownmoyaghy Stream to be diverted, was undertaken during ecological surveys to inform the baseline. The results were as follows:

- At the time of survey, the wetted width of the stream was approximately 1.5m wide on average, the average bank height was 1m, and the average bank width 2m.
- The bank structure was poor, particularly the left bank adjacent to the road, which had evidence of collapse.
- The velocity at the time of survey was low to moderate. Higher flows are known to occur in winter, with low flows in summer. The channel is also known to run dry in sections during low flow periods.
- The flow type was a pool, riffle, glide, with sections of low flow/stagnant water.
- The channel was a straight channel and had a low gradient.
- Excessive growth of aquatic vegetation and presence of algae/fungus was recorded. In-stream vegetation included fool's watercress (Apium nodiflorum), rosebay willowherb (Chamaenerion angustilolium) and brooklime (Veronica beccabunga).
- There was an abundance of overhanging vegetation (low species diversity). Species recorded were hawthorn (Crataegus monogyna), bramble spp. (Rubus fruticosus spp.), ivy (Hedera helix) and harts tongue fern (Asplenium scolopendrium).
- The substrates were composed primarily of fine sediments, silt and organic matter, occasionally interspersed with cobbles and small boulders.
- Pressures recorded included surface water run-off from the adjacent road, litter, and agricultural pressures from the surrounding lands. A film of residue was also noted on the surface of the water.
- No evidence of protected species was recorded, and the watercourse is considered to have limited salmonid potential due to the lack of oxygen-rich gravel beds and signs of poor water quality. There is potential for fish species including minnow (Phoxinus phoxinus) and three-spined stickleback (Gasterosteus aculeatus) to occur.
- Kick sampling was not undertaken due to the lack of suitable habitat and dominance of silt, fine sediments, and organic matter.
- The habitat was evaluated as being of local importance (higher value).

Invasive species surveys were carried out during the optimal survey period for invasive plants species, which is between April and September (Smith *et al.*, 2000

The aim of the surveys was to determine the presence or absence of protected habitats and species, including Annex I habitats and Annex II and IV species, as well as Annex I birds. The survey was also undertaken to assess the suitability of the habitats within the proposed development site to support protected species.

Further details of the survey methodologies undertaken are presented hereunder:

- Habitat and botanical surveys were undertaken within the proposed development site following the methodology outlined in '*Best Practice Guidance for Habitat Survey and Mapping*' (Smith *et al.,* 2011) and in '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*' (NRA, 2008). The data was recorded, and the habitats encountered during the site visit were classified in

accordance with Fossitt (2000) with reference made to the '*Interpretation Manual of EU Habitats*' (EC, 2013) as appropriate.

- The proposed development site was also searched for evidence of invasive plant species listed in Part 1 of the Third Schedule of S.I No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011. Species protected under Flora (Protection) Order, 2022 (S.I. No. 235/2022) or listed under the Irish Red Data List of Irish Plants were also searched for.
- A walkover survey to detect the presence or likely presence of protected mammal species, likely to occur within and in the study area of the proposed development site was undertaken. This included targeted surveys for otter following guidance outlined in NRA (2008).
- Observations of ornithological activity within the proposed development site were recorded with regards to the Countryside Bird Survey guidelines; 'CBS Manual, Guidelines for Countryside Bird Survey Participants' (CBS, 2012).

3.4 Statement of Authority

This report was prepared by Ecologist Úna Butler (M.Sc. Agr.) and senior reviewed by Senior Ecologist, Laura Kennedy (M.Sc).

Úna has two years post-graduate experience in the environmental consultancy sector. She has been involved in a number of Screenings for Appropriate Assessment, Natura Impact Statements and Ecological Impact Assessments predominantly for large public and private infrastructure projects. She has also carried out numerous surveys for protected and invasive species, and protected habitats.

Laura is an Associate Director and Lead Ecologist with TOBIN Consulting Engineers. She has over 14 years' experience in environmental sciences and environmental consulting. Laura's expertise includes; Project Management, Environmental Impact Assessment Reporting, Appropriate Assessments, terrestrial, ornithological and aquatic ecological surveying, data analysis, environmental monitoring, and preparing technical reports. Laura has a strong technical background as an aquatic ecologist and has extensive field experience in biological and chemical water quality assessment. She has also conducted bird and nest surveys, bat surveys, amphibian surveys, and carried out fish habitat assessments, which included electrofishing, minnow trapping and fish identification.

3.5 Site Location

The proposed development site is located in the townland of Newtownmoyaghy, County Meath which is situated 1.1km east of the town of Kilcock, County Kildare (Figure 3-1).

Figure 3-1: Proposed Development Site Location

3.6 Description of the Proposed Development

The existing road edge and verge of Newtownmoyaghy Road has, in discrete sections, collapsed into the adjacent Newtownmoyaghy Stream due to erosion from stream flood events and the compounding by vehicles passing close to the road/stream interface. As a result, it is proposed to upgrade and widen the existing Newtownmoyaghy Road which will result in the diversion of the Newtownmoyaghy Stream to the northeast of the existing channel, adjacent to an existing treeline, within an area of agricultural grassland. The new channel will then travel south to reconnect to the existing Newtownmoyaghy Stream channel via a box culvert connecting the stream from east to west. The existing mature trees along the east side of the road will be retained, with a minimum amount of tree removal (five trees in total) occurring along the path of the realigned stream. Refer to Figure 3-2 for details of the proposed development scheme plan.

3.6.1 Construction Phase Activities

The following is the expected sequence of activities will be undertaken during the Construction Phase of the proposed development:

- It is anticipated construction will begin in Q2 of 2026 (during low flow periods) and is estimated to continue for a duration of six months.
- Traffic will be maintained along the existing carriageway, while the bypass stream is under construction. The existing carriageway will be unimpeded but may have to operate under a stop-and-go system while the existing stream is being infilled during the last two to three months of the Construction Phase.
- Normal working hours during the Construction Phase are expected to be Monday to Friday 08.00 to 17.00 hours.
- Five trees will be removed to facilitate the channel diversion (as shown in Figure 3-2).

The construction of the new stream channel is expected to involve:

- The new channel will be excavated to a depth of between 1.3 to 2.8m.
- The new open channel will be excavated with all unsuitable material, removed from site to a licensed landfill facility. The volume of material anticipated to be excavated is 4,375m^3 over a two – three week time period. The existing channel will be filled with topsoil and suitable recovered material, subject to meeting suitable grading requirements. Material will be stockpiled on site, outside the 1/10-year flood area, for reuse on infilling the existing channel.
- Silt curtains will be installed instream at the point where the new channel will join back with the Newtownmoyaghy Stream and also between the interface of the stockpiled material and new open channel (see Figure 3-2).
- The new channel will be inspected for any silt buildup that may have occurred during construction. Any additional silt found present, will be removed from the channel prior to the diversion.
- Some riffles, pools, and boulders will be incorporated into the channel to provide aquatic habitat enhancement. The substrate of the new channel bed will consist of imported certified clean gravels.

- The bunding of the existing Newtownmoyaghy Stream using sandbags at two points (point A and B) will be carried out (refer to Figure 3-2).
- Prior to backfilling of the existing stream and bringing into operation the new channel, aquatic surveys will be undertaken. If deemed necessary, a fish salvage will be undertaken (under licence using electrofishing techniques by certified personnel) along the old channel, which will be isolated due to bunding. Translocation of any fish present will take place to the Newtownmoyaghy Stream directly downstream of the proposed development.
- After the fish salvage is completed, the stream will be diverted into the newly formed channel during low flow conditions, outside the 1 in 10-year flood event extents. Due to the low flow conditions under which the channel diversion will take place it is unlikely that overpumping will be required, as the diversion of the flow from the old channel to the new channel will be managed in a gradual fashion. It is anticipated that the diversion of the stream using sandbags will take one to two working days.
- The channel will be graded, with topsoil placed, reseeded, and stabilized as necessary with a geocore/geojut material to prevent erosion.
- The channel will be fenced on the eastern bank (boundary of farmland).
- An estimated 15m long box culvert will be installed at where the proposed diversion will pass from the east side of the road to the west side before re-connecting into the existing stream. Two trees will be removed to accommodate the new box culvert. A second box culvert will be installed at Ch. 100m to provide access to the farmland between the existing road and newly diverted stream.

Following the diversion of the stream to the new channel, the Construction Phase of the old channel will include:

- Dewatering of the old stream channel will be undertaken prior to the infilling works.
- The channel will be backfilled with suitable backfill material previously excavated from the new channel and a mix of washed and imported free draining pea-gravel for the filter drain and compacted clause 808 gravel material adjacent to the road surface.

The road upgrade and resurfacing Construction Phase is expected to consist of:

- Resurfacing the road with a 150mm layer of dense bituminous macadam and finished with a double layer finish of tar and chip as existing.
- The road level will be raised in areas where the flood waters are modelled to be in excess of 175mm, by 150 to 175mm, in order to ensure the safety of road users during future flood events. Where the road is raised, an equivalent volumetric of storage to the raised section will be provided for in the newly formed bypass channel.
- A Type 3 Single (6.0m) carriageway and widened grass verge will then be constructed.
- A standard filter drain will be installed with a 400mm slotted pipe along the new roadside edge of the Newtownmoyaghy Road. This will cater for road surface run-off and localised land drainage to the west of the existing road. This water will be directed back to the stream via an outlet head wall. A petrol interceptor will also be installed at the end of the 400mm slotted pipe.

3.6.2 Operational Phase Activities

During the operational phase, the proposed development site will continue to function as a road. As mentioned above, all surface water run-off from the new carriageway as part of the proposed development will flow through a standard filter drain containing a 400mm diameter slotted pipe which will then enter the Newtownmoyaghy Stream at the downstream end of the scheme.

As stated in Section 3.6.1 , the newly diverted stream will be fenced along the eastern bank with the existing mature beech treeline to the west acting as a riparian habitat. This will be similar to what is currently observed along the old channel. Bank stabilisation will be in place through geocore/geojut material to prevent erosion.

The new open channel section will operate as a 2 stage channel to facilitate a depth of water in a tighter cross sectional area in the channel at low flow, washed gravel in the bed of the channel, along with the addition of pools and boulders, will help to enhance the properties of the channel for aquatic life.

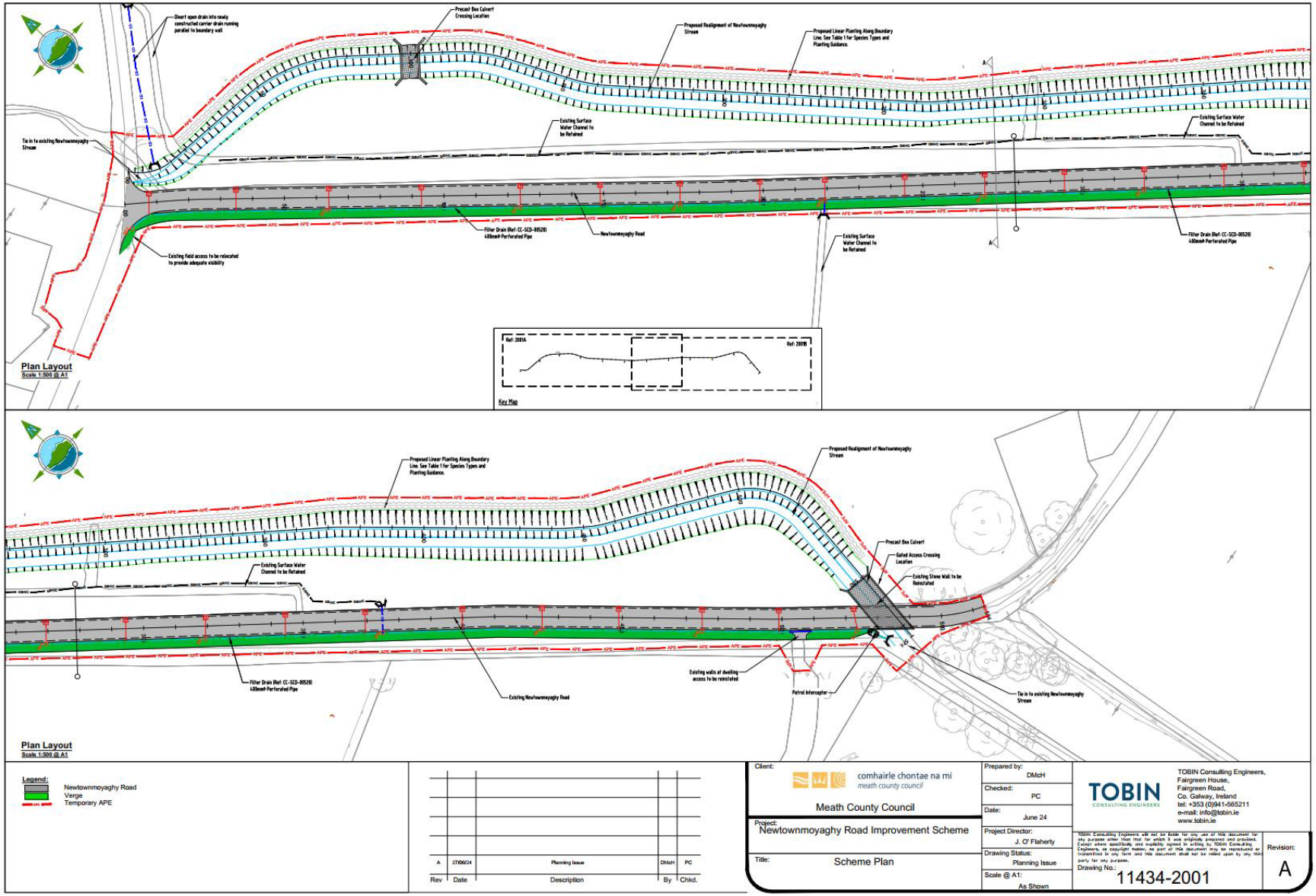

Figure 3-2: Scheme Plan

4. DESCRIPTION OF THE EXISTING ENVIRONMENT

4.1 BASELINE ENVIRONMENT- DESKTOP REVIEW RESULTS

The findings of the desktop review are summarised hereunder.

4.1.1 Surface Water Features

The Newtownmoyaghy Stream (WFD code for Rye_Water_020: IE_EA_09R010300) will be diverted as part of the proposed development. This stream was assigned 'Good' water quality status for the WFD 2016-2021 period. The Newtownmoyaghy Stream flows in an easterly direction, ultimately discharging into Dublin Bay, approximately 37km downstream of the proposed development site.

Table 4-1 lists the WFD waterbodies and the hydrological pathway from the proposed development site to Dublin Bay, and their corresponding water quality status.

Table 4-1: Hydrological Pathway from the Proposed Development Site

WFD Waterbody	WFD Code	Water Quality Status
RYE WATER_020 (Newtownmoyaghy Stream)	IE_EA_09R010300	Good
RYE WATER_030	IE_EA_09R010400	Poor
RYE WATER_040	IE_EA_09R010600	Moderate
LIFFEY_150	IE_EA_09L011900	Good
LIFFEY_160	IE_EA_09L012040	Poor
LIFFEY_170	IE_EA_09L012100	Poor
LIFFEY_180	IE_EA_09L012350	Poor
LIFFEY_190	IE_EA_09L012360	Poor
Liffey Estuary Upper	IE_EA_090_0400	Good
Liffey Estuary Lower	IE_EA_090_0300	Moderate
Dublin Bay	IE_EA_090_0000	Good

4.1.2 Groundwater Features

The proposed development site is located within the Dublin Groundwater Body (European Code: IE_EA_G_008). The Groundwater Body WFD status 2016-2021 is assessed as being of 'Good' water quality.

The underlying bedrock of the proposed development site is part of the Lucan Formation. The formation comprises dark-grey to black, occasionally cherty, micritic limestones. There are rare dark coarser grained limestones, interbedded dark-grey calcar limestones. Groundwater and surface water interactions of the Dublin Groundwater body are described as Poorly productive

bedrock. In general permeability in these rock units are likely to be low (1-10m2/d) (Creighton et al., 1979).

4.1.3 National Biodiversity Data Centre

A review of the NBDC database[9] was conducted for the 2km Irish grid squares, N83Z and N84V, within which the proposed development is situated. Records of otter (*Lutra lutra*) , the Annex II species under the Habitats Directive, were noted within the two grid squares encompassing the site. No Annex I bird species or Third Schedule invasive plant species were recorded in either grid square.

4.1.4 European Sites

The proposed development site does not overlap with the boundaries of any European site. The closest European site to the proposed development site is the Rye Water Valley/Carton SAC (Site Code: 001398), located approximately 5km east . This site is designated for petrifying springs with tufa formation (7220), narrow-mouthed whorl snail (*Vertigo angustior*) (1014), and Desmoulin's whorl snail (*Vertigo moulinsiana*) (1016). The proposed development is located within the Liffey and Dublin Bay WFD Catchment (Catchment ID: 09) and is also hydrologically connected to three SACs and two SPAs. These include the Rye Water Valley/Carton SAC (hydrological distance of 6km downstream) and the South Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA, North Dublin Bay SAC and North Bull Island SPA, all of which are located 37km downstream. All European sites within 15km of the proposed development site, or hydrologically connected, are illustrated on Figure 6-1.

4.2 EXISTING ENVIRONMENT- FIELD STUDY RESULTS

4.2.1 Habitats and Flora

During the ecological field survey on the 25th of April the proposed development site was found to comprised of buildings and artificial surfaces (BL3) (tarmac road) with linear features including treelines (WL2), hedgerows (WL1), drainage ditches (FW4), a depositing/lowland river (FW2), and stone walls and other stonework (BL1) bordering the Newtownmoyaghy Road. Flat fields of improved agricultural grassland (GA1) (for sheep rearing) and arable crops (BC1) were recorded at the eastern and western boundaries of the proposed development site,

Treelines that run adjacent to the Newtownmoyaghy Road contained mature species of horse chestnut (*Aesculus hippocastanum*), beech (*Fagus sylvatica*) and pedunculate oak (*Quercus robur*), standing at a height of approximately 15m.

Riparian vegetation recorded on both sides of the Newtownmoyaghy Stream included hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), bramble (*Rubus fruticosus sp.*), ivy (*Hedera hibernica*), hart's tongue (*Asplenium scolopendrium*) and black nightshade (*Solanum nigrum*).

[9] Maps - Biodiversity Maps (biodiversityireland.ie). Accessed: July 2024

Aquatic species present within the Newtownmoyaghy Stream included fool's watercress (*Apium nodiflorum*), rosebay willowherb (*Chamaenerion angustilolium*) and brooklime (*Veronica beccabunga*).

4.2.2 Mammals and Birds

During the survey, no evidence of any Annex I habitats or Annex II species were recorded within the proposed development. No evidence of otter activity, such as holts or scat, were recorded within the study area (the proposed development site plus a 150m buffer) during the survey No Annex I bird species were recorded within the study area.

4.2.3 Non-native Invasive Species

No Third Schedule invasive plant species were recorded within the proposed development boundary. Invasive species checks were carried out during the optimal survey period for invasive plant species, which is between April and September (Smith *et al.*, 2000).

5. OVERVIEW OF POTENTIAL IMPACTS

An overview of potential impacts from the Construction Phase and Operational Phase of the proposed development on the receiving environment is discussed hereunder. There are several elements associated with the proposed works that may give rise to direct and indirect impacts on the receiving environment that have the potential to result in likely significant effects on European sites within the ZoI (Section 5.3).

5.1 CONSTRUCTION PHASE

Potential Construction Phase impacts associated with the proposed development are discussed hereunder.

5.1.1 Loss of Habitat

The upgrade of the Newtownmoyaghy Road and diversion of the Newtownmoyaghy Stream will result in ca. 0.5 hectares (ha) of habitat loss. This habitat is predominantly comprised of agricultural grassland used for sheep grazing, and arable crop fields. In addition to this, it is proposed to remove five trees (mature beech) in order to facilitate the upgrade of the Newtownmoyaghy Road.

5.1.2 Introduction or Spread of Invasive Non-Native Species

No Third Schedule invasive plant species were recorded within the proposed development site boundary. Therefore, there is no potential for the proposed development to accidently spread such species to any European sites within the ZoI of the proposed development.

However, in the absence of any mitigation measures, potential risks associated with indirectly introducing invasive non-native species to European sites exist, via contaminated imported substrate material for the proposed new channel, which will connect to the Newtownmoyaghy Stream and flow in an easterly direction towards South Dublin Bay SAC and the Rye Water Valley/Carton SAC.

5.1.3 Runoff of Sediment and/or Construction Pollution

Site clearance, excavation activities and the stockpiling of material have the potential to result in sediment laden runoff, if not appropriately managed.

In addition, the proposed instream works within the Newtownmoyaghy Stream for the channel diversion (Section 3.6.1) could result in sediment and/or construction pollution discharging downstream, which could pose a significant risk to water quality both in the Newtownmoyaghy Stream and the Rye Water Valley/Carton SAC, which, as previously mentioned, is located at a hydrological distance of ca. 6km downstream from the proposed development site, as well as further downstream to the South Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA, North Dublin Bay SAC and North Bull Island SPA, which are located in Dublin Bay, ca. 37km downstream.

Increased silt loading in watercourses can stunt aquatic plant growth, limit dissolved oxygen capacity and overall reduce the ecological quality of watercourses, with the most critical period associated with low flow conditions. Surface water runoff can also be contaminated by leaks and

spills of fuel, oil or other construction material from construction vehicles/machinery if not appropriately managed. This could result in the degradation of water quality and impacts to aquatic fauna and flora.

5.1.4 Groundwater Impacts

The groundwater vulnerability within the footprint of the proposed development is classified as 'Low' groundwater vulnerability.

Borehole logs did not encounter bedrock at any location. The predominant soil type is firm dark grey slightly sandy gravelly clay with some clayey gravel lenses. The strength of the cohesive deposits typically increased with depth and was firm to stiff or stiff below 2.00m below ground level in the majority of the exploratory holes. The new channel will be excavated to a maximum depth of 2.8m with a 1:3 ration slope. See Appendix A-II for the new channel excavation depths.

There are no karst features within the proposed development or their immediate surrounds. The site is underlain by the Dublin Groundwater Body (IE_EA_G_008) in the vicinity of the proposed development. This groundwater body was classified as 'Good' status in 2021 and the groundwater waterbodies risk score is considered to be 'Under Review'. Groundwater and surface water interactions of the Dublin groundwater body are described as poorly productive bedrock. In general, permeability in these rock units is likely to be low (1-10m^2/d) (Creighton *et al.,* 1979).

The three qualifying interests of the Rye Water Valley/Carton SAC are located at Leixlip, more than 10km east of the proposed development. Based on the geology, there is no potential groundwater connectivity between the proposed development and the Rye Water Valley/Carton SAC. The proposed development will not affect groundwater levels, groundwater flows, springs or groundwater quality at the Louisa Bridge site, where the qualifying interests have been recorded within the SAC (NPWS, 2013a). The development will not affect the springs at Louisa bridge which support the tufa/wetland habitat nor will it affect the flooding regime at this location. The Construction Phase impacts will not be of sufficient magnitude to affect the quality or extent of suitable habitats in the Rye Water Valley/Carton SAC that support the narrow-mouthed whorl snail or the Desmoulin's whorl snail.

5.1.5 Dust

The temporary generation of dust in the locality of the works area is likely to arise due to general Construction Phase activities (i.e., movement of construction vehicles and machinery, road upgrade works, excavation activities of the new channel). Plant communities may be affected by dust deposition (effects on photosynthesis, respiration, transpiration) which could in turn, alter community structure. The Institute of Air Quality Management provide guidelines which prescribes potential dust emission risk classes to ecological receptors (Holman *et al.*, 2014). The guidelines specify that receptor sensitivity is 'High' up to 20m from the source and reduces to 'Medium' at 50m.

5.1.6 Noise and Disturbance

The proposed construction works will result in a temporary increase in noise levels due to the presence of construction vehicles and machinery. The construction works will also result in an

increase in personnel and traffic movement to and from the site. However, considering the distance to the nearest European site (ca. 5km), there is no potential for noise and disturbance impacts, which are likely to occur within 100-150m of the proposed development (Section 5.3), on any European site.

5.2 Operational Phase

Potential Operational Phase impacts associated with the proposed development are discussed hereunder.

5.2.1 Stormwater

A standard filter drain containing a 400mm diameter slotted pipe, will be installed along the new roadside edge (Newtownmoyaghy Road). The water flowing to this drain will be filtered back to the Newtownmoyaghy Stream from an outlet head wall (Appendix A-I). This filter drain will help with restricting a more direct route for hydrocarbons, when compared to an open drain or piped system, from entering the Newtownmoyaghy Stream via surface water run-off.

5.3 Determining the Zone of Influence

Guidance in AA of plans and projects in Ireland notes that a distance of 15km is recommended for the identification of relevant European sites (DEHLG, 2010). For some projects, the distance could be much less than 15km, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in-combination effects.

Additionally, the source-pathway-receptor model (OPR, 2021) was used to identify a list of 'relevant' European sites (i.e. those which could be potentially affected). This conceptual model is a standard tool in environmental assessment. In order for an effect to occur, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism means there is no likelihood for the effect to occur. In the context of the proposed development, the model comprises:

- Source (s) – potential impacts from the proposed development , e.g. the runoff of sediment/construction pollution;
- Pathway (s) – hydrological, physical or ecological connectivity between the proposed development and the European site; and
- Receptor (s) – qualifying interests and/or special conservation interests of the European sites.

In order to inform the source-pathway-receptor model, the ZoI needs to be established. The Chartered Institute of Ecology and Environmental Management (CIEEM) defines the ZoI of a project as the area(s) over which ecological features may be affected by the biophysical changes caused by the proposed project and associated activities (CIEEM, 2018).

In order to appraise the ZoI of the proposed development , the likely key biophysical changes associated with the proposed development were determined having regard to their characteristics, set out in Section 4of this report.

Impacts associated with the loss of habitats will be confined to the proposed development site boundary. The ZoI is, therefore, defined as all lands within the proposed development boundary.

With regards potential water quality degradation effects associated with the release of sediment and other pollutants to surface water, the ZoI of the proposed development is considered to include receiving water bodies adjacent to, or downstream of the proposed development site. The distance downstream is associated with the current biological condition

of the accepting water body and its capacity to accept and assimilate sediment and other pollutants. Considering the sources for impacts on European sites, for the definition of the ZoI for impacts associated with water pollution, hydrological connectivity is not considered effective past the first water body of depositional nature (e.g., lake water body; transitional water body). The hydrological pathway for impacts from the proposed development will therefore include all surface water bodies from the proposed development location until the Liffey Estuary Lower (WFD code: IE_EA_090_0300).

In terms of groundwater, the site is underlain by deep soils (limestone tills with gravelly lenses) and is not within the zone of contribution to any Groundwater Dependent Terrestrial Ecosystems (GWDTE). The spatial limits of groundwater effects are therefore considered as <50m from the proposed development site.

Excavation activities may result in the temporary generation of dust in the locality of the works area. The Institute of Air Quality Management provide guidelines; 'Guidance on the Assessment of Dust from Demolition and Construction' (Holman et al., 2014), which prescribes potential dust emission risk classes to ecological receptors and notes receptor sensitivity is 'High' up to 20m from the source and reduces to 'Medium' at 50m. The spatial limit of dust impacts was therefore established as 50m from the proposed development site boundary.

Noise from the construction activity has the potential to cause disturbance to resting, foraging and commuting qualifying and special conservation interest species. Individual species will elicit differing behavioural responses to disturbance at different distances from the source of disturbance. Below is a summary of the documented zones of influence for varying species.

- Transport Infrastructure Ireland (formally the National Roads Authority) has produced a series of best practice planning and construction guidelines for the treatment of certain protected mammal species (i.e. otter), which indicate that disturbance to terrestrial mammals would not extend beyond 150m (NRA, 2008).
- Cutts *et al.* (2013) notes that different types of disturbance stimuli are characterised by different avifaunal reactions, however as a general rule of thumb, a distance of 300m can be used to represent the maximum likely disturbance distance for waterfowl. However, disturbance to species will be considered individually.

The ZoI for noise/disturbance was therefore established as the proposed development site plus a 300m buffer.

6. EUROPEAN SITES WITHN THE ZOI

6.1 CONCLUSIONS OF APPROPRIATE ASSESSMENT SCREENING REPORT

As noted, TOBIN have undertaken an AA Screening Report which is included in Appendix A of this report. The AA screening process considered potential likely significant effects which may arise during the Construction Phase and Operational Phase of the proposed development. The conclusion of the AA Screening was as follows:

'Using best scientific knowledge through an assessment of the source-pathway-receptor model, which considered the ZoI of effects from the proposed development, and the potential in-combination effects with other plans or projects, it is the considered the opinion of TOBIN that the possibility for likely significant effects on the South Dublin Bay SAC [000210], South Dublin Bay and River Tolka Estuary SPA [004024], North Dublin Bay SAC [00206] and North Bull Island SPA [004006] exists as a result of the proposed development. Therefore, a Stage 2 Appropriate Assessment is required.'

Thus, this NIS was prepared in accordance with the provisions of Article 6(3) of the Habitats Directive and Part XAB of the Planning and Development Act 2000, as amended, providing information to enable the competent authority to perform its statutory function to undertake an AA in respect of the proposed development.

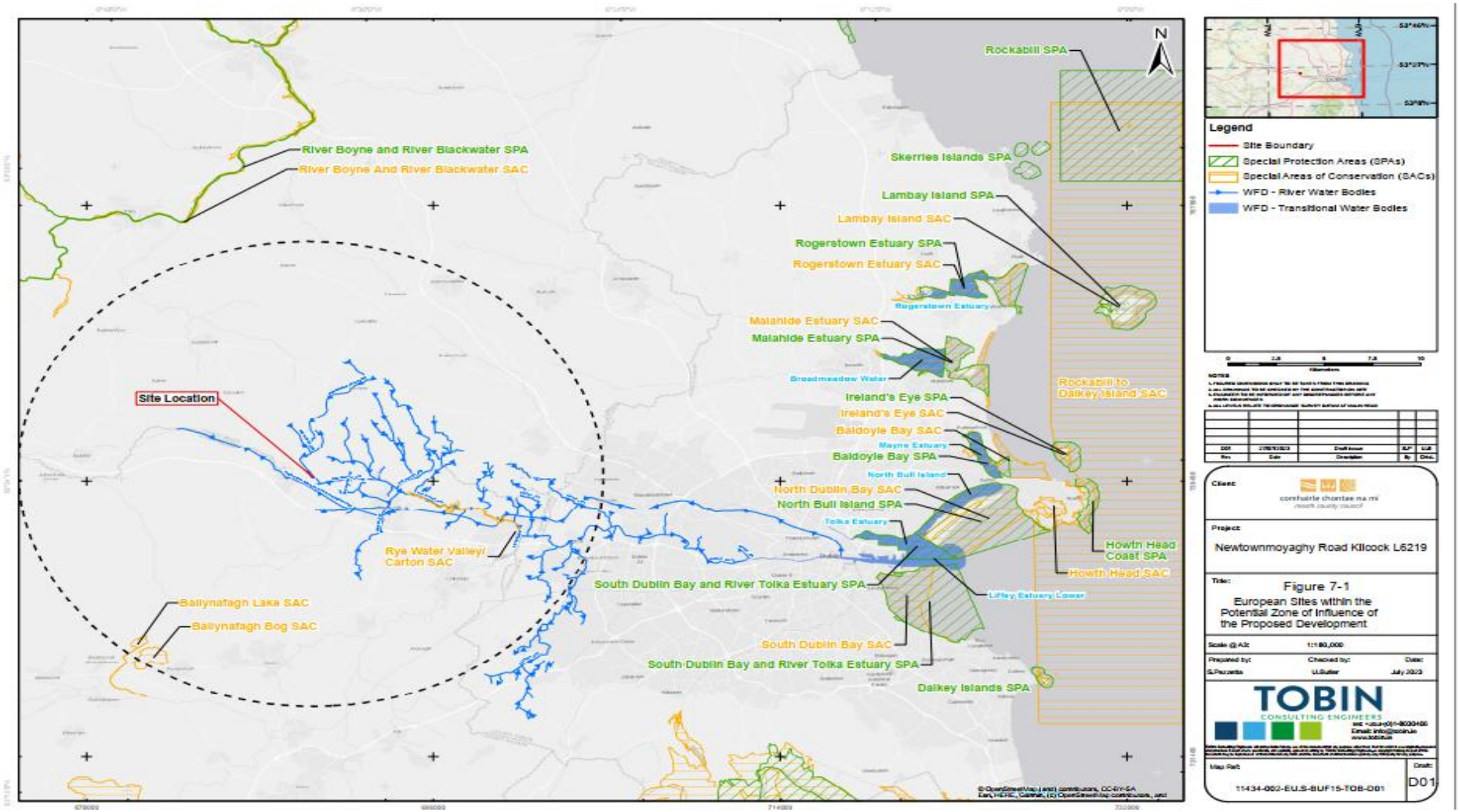

Figure 6-1: European Sites Within the Potential Zone of Influence of the Proposed Development

7. NATURA IMPACT STATEMENT

7.1 DESCRIPTION OF EUROPEAN SITES AND ASSESSMENT OF ADVERSE EFFECTS ON SITE INTEGRITY

It has been determined, in the absence of any mitigation measures, the proposed development has the potential to result in likely significant effects on the qualifying interests and special conservation interests of the South Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA, North Dublin Bay SAC and North Bull Island SPA. An assessment of the potential adverse effects on the integrity of these four European sites is presented hereunder.

7.2 SOUTH DUBLIN BAY SAC (000210)

South Dublin Bay SAC is located approximately 37km downstream of the proposed development and consists of a coastal system, with extensive sand and mudflats, and incipient dune formations (NPWS, 2013b). This site lies south of the River Liffey in County Dublin and extends from the South Wall to the west pier at Dun Laoghaire. It is an intertidal site with extensive areas of sand and mudflats. The sediments are predominantly sands but grade to sandy muds near the shore at Merrion Gates. The main channel which drains the area is Cockle Lake. South Dublin Bay is also an internationally important bird site.

7.2.1 Qualifying Interests

The South Dublin Bay SAC is designated for four qualifying interest habitats, as listed below:

- Tidal mudflats and sandflats [1140]
- Annual vegetation of drift lines [1210]
- Salicornia and other annuals colonising mud and sand [1310]
- Embryonic shifting dunes [2110]

Table 7-1: Qualifying Interests, Conservation Objectives and Location of the Qualifying Interests in the South Dublin Bay SAC

Qualifying Interest (QI)	Conservation Objectives	Population and Distribution of the Species/Habitat Within the Site
Tidal mudflats and sandflats [1140]	To maintain the favourable conservation condition of mudflats and sandflats not covered by seawater at low tide.	A review of the site's conservation objectives report (NPWS, 2013b) indicated that this Annex I habitat covers approximately 720ha of the SAC.
Annual vegetation of drift lines [1210]	A site-specific conservation objective is not currently available for this qualifying interest for the South Dublin SAC, therefore the conservation objective from the nearby North Dublin Bay SAC, with equivalent qualifying interest habitats, was applied: To restore the favourable conservation condition of annual vegetation of drift lines.	This habitat is difficult to measure in view of its dynamic nature, which means it can appear within a site from year to year. During the 2009 Coastal Monitoring Project Survey, this habitat was found to cover an area of 52.15ha of North Dublin Bay. It has not been mapped for the South Dublin Bay SAC.

Qualifying Interest (QI)	Conservation Objectives	Population and Distribution of the Species/Habitat Within the Site
Salicornia and other annuals colonising mud and sand [1310]	A site-specific conservation objective is not currently available for this qualifying interest for the South Dublin SAC, therefore the conservation objective from the nearby North Dublin Bay SAC, with equivalent qualifying interest habitats, was applied: To restore the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand.	This habitat was estimated to cover an approximate area of 29.10ha of the North Dublin Bay SAC, including mosaics (McCorry, 2007). It has not been mapped for the South Dublin Bay SAC.
Embryonic shifting dunes [2110]	A site-specific conservation objective is not currently available for this qualifying interest for the South Dublin SAC, therefore the conservation objective from the nearby North Dublin Bay SAC, with equivalent qualifying interest habitats, was applied: To restore the favourable conservation condition of embryonic shifting dunes.	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney *et al.,* 2013). Embryo dunes were surveyed and mapped at two sub-sites, giving a total estimated area of 6.07ha of the North Dublin Bay SAC. It has not been mapped for the South Dublin Bay SAC.

7.2.2 Potential Direct and Indirect Effects on the SAC

The potential for direct and indirect effects on the qualifying interests of South Dublin Bay SAC associated with the proposed development are discussed hereunder.

7.2.2.1 Construction Phase

7.2.2.1.1 Direct Effects

The proposed development will not occur within this European site. Therefore, there will be no direct habitat loss to the South Dublin Bay SAC as a result of the proposed development.

7.2.2.1.2 Indirect Effects

Water Quality Impacts

Discharges of pollutants or silt-laden waters (of sufficient magnitude) into the Newtownmoyaghy Stream holds the potential to travel downstream to this SAC. Instream works, site clearance, excavation activities and the stockpiling of material could result in sediment laden runoff or pollutants being dispersed into the Newtownmoyaghy Stream and eventually to the South Dublin Bay SAC, if not appropriately managed.

Silt can blanket plant populations, particularly benthic communities, leading to loss or degradation of the Annex I habitats within the SAC.

If surface water runoff was to become contaminated with fuels or oils from construction vehicle/machinery leaks or spills, this could also pose a significant risk to plant life and benthic communities in the SAC.

Dust Impacts

The proposed construction works will include excavation activities which have the potential to result in the generation of dust within the immediate area. Movement of HGVs associated with the construction works are likely to be 'Small' trackout movements, which equates to dust occurring up to 50m from the site (Section 5.1.5). At the closest point, the South Dublin Bay SAC is located approximately 33km (straight line measurement) from the proposed development site, thus there is no potential for the generation of dust to impact this SAC.

Noise Impacts

There is no potential for the disturbance of the qualifying interests of this SAC as all qualifying interests are habitats and are therefore not sensitive to noise.

7.2.2.2 Operation Phase

7.2.2.2.1 Direct Effects

No operational activities will occur outside of the proposed development boundary. Therefore, there will be no direct effects on the South Dublin Bay SAC.

7.2.2.2.2 Indirect Effects

Surface water runoff will be filtered through a standard filter drain, installed along the road's edge, as discussed in Section 5.2.1. This water will be filtered back to the Newtownmoyaghy Stream which will help with restricting a more direct route for hydrocarbons, when compared to an open drain or piped system, from entering the Newtownmoyaghy Stream via surface water run-off and subsequently travelling to the South Dublin Bay SAC.

Table 7-2: Evaluation of Potential Adverse Effects on the Qualifying Interests of South Dublin Bay SAC

Attributes and Measures	Target	Potential for Adverse Effects
Mudflats and sandflats not covered by seawater at low tide		
Habitat area (hectares)	The permanent habitat is stable or increasing, subject to natural processes	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat area. There is no potential for significant adverse effects on habitat area.
Community extent (hectares)	Maintain the extent of the *Mytilus edulis* dominated community, subject to natural processes.	**Yes**, the proposed development has the potential to result in the release of hydrocarbons and/or silt to the SAC, and by doing so, lowering the water quality for *Mytilus edulis*. **This could result in a significant adverse effect on the community extent**.
Community structure *Mytilus edulis* density (individuals/m^2)	Conserve the high quality of the *Mytilus edulis* dominated community, subject to natural processes.	**Yes**, the proposed development has the potential to result in the release of hydrocarbons and/or silt to the SAC, and by doing so, lowering the water quality for *Mytilus edulis*. **This could result in a significant adverse effect on the community structure**.
Community distribution (hectares)	Conserve the following community types in a natural condition: Fine sand to sandy mud with *Pygospio elegans* and *Crangon crangon community complex;* fine sand *with Spio martinensis* community complex.	**Yes,** degradation of water quality has the potential to negatively affect the extent, density and distribution of the benthic communities within the habitat. A change or decrease in the community extent, density and distribution would constitute a **significant adverse effect on community distribution.**
Annual vegetation of drift lines		
Habitat area (hectares)	Area increasing, subject to natural processes, including erosion and succession.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat area. There is no potential for significant adverse effects on habitat area.
Habitat distribution (occurrence)	No decline, or change in habitat distribution, subject to natural processes.	**Yes,** a sudden increase of silt or pollution to this habitat as a result of the proposed development could change the structure of this habitat. **This could result in a significant adverse effect on the habitat distribution.**

Attributes and Measures	Target	Potential for Adverse Effects
Physical structure: functionality and sediment supply (presence/absence of physical barriers)	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.	No, the natural supply of sediment is an important process for the habitat. The natural flow and ebb of the tide will not be altered by the proposed development. There will be no change on the natural circulation of sediment and organic matter. There is no potential for significant adverse effects on physical structure.
Vegetation structure: zonation (% cover at the representative number of monitoring stops	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, zonation and composition of the species. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could result in a significant adverse effect on the vegetation structure and composition.**
Vegetation composition: typical species and sub-species (% cover at a representative number of monitoring stops)	Maintain the presence of species-poor communities with typical species: sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*), prickly saltwort (*Salsola kali*) and oraches (*Atriplex spp.*)	
Vegetation composition: negative indicator species (% cover)	Negative indicator species (including non-natives) to represent less than 5% cover	No, no invasive species were recorded within the proposed development site, therefore, the proposed development will not result in the spread of invasive species. There is no potential for significant adverse effects on vegetation composition.
Salicornia and other annuals colonising mud and sand		
Habitat area (hectares)	Area stable or increasing, subject to natural processes, including erosion and succession.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat area. There is no potential for significant adverse effects on habitat area or distribution.
Habitat distribution (occurrence)	No decline, or change in habitat distribution, subject to natural processes.	
Physical structure: sediment supply (presence/absence of physical barriers)	Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions	No, the natural supply of sediment is an important process for the habitat. The natural flow and ebb of the tide will not be altered by the proposed development. There will be no change on the natural circulation of sediment and organic matter. There is no potential for significant adverse effects on physical structure.

Attributes and Measures	Target	Potential for Adverse Effects
Physical structure: creeks and pans (occurrence)	Maintain creek and pan structure, subject to natural processes, including erosion and succession	No, creek density is influenced by sediment supply and tidal influence. The proposed development will not interfere with the natural sediment supply and tidal influence. There is no potential for significant adverse effects on physical structure.
Physical structure: flooding regime (hectares flooded; frequency)	Maintain natural tidal regime	No, the proposed development has no potential to disrupt the natural tidal regime of this habitat. There is no potential for significant adverse effects on physical structure.
Vegetation structure: zonation (occurrence)	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, zonation and composition of the species. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could result in a significant adverse effect on vegetation structure and composition.**
Vegetation composition: typical species and sub-communities (% cover)	Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009)	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, and zonation. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could constitute a significant adverse effect on the vegetation composition.**
Vegetation structure: negative indicator species- *Spartina anglica*	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	No, no common cordgrass was identified within the proposed development site, there is therefore no potential for the proposed development to spread common cordgrass to this SAC. There is no potential for significant adverse effects on vegetation structure.
Embryonic shifting dunes		
Habitat area (hectares)	Area stable or increasing, subject to natural processes, including erosion and succession.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat area. There is no potential for significant adverse effects on habitat area or distribution.
Habitat distribution (occurrence)	No decline or change in habitat distribution, subject to natural processes	

Attributes and Measures	Target	Potential for Adverse Effects
Physical structure: functionality and sediment supply (presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	No, the natural supply of sediment is an important process for the habitat. The natural flow and ebb of the tide will not be altered by the proposed development. There will be no change on the natural circulation of sediment and organic matter. There is no potential for significant adverse effects on physical structure.
Vegetation structure: zonation (occurrence)	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, zonation and composition of the species. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could result in a significant adverse effect on vegetation structure and composition.**
Vegetation composition: plant health of foredune grasses	More than 95% of sand couch (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)	
Vegetation composition: typical species and sub-communities (% cover at a representative number of monitoring stops)	Maintain the presence of species-poor communities with typical species: sand couch (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*)	
Vegetation composition: negative indicator species (% cover)	Negative indicator species (including non-native species) to represent less than 5% cover	No, no invasive species were recorded within the proposed development site, therefore, the proposed development will not result in the spread of invasive species. There is no potential for significant adverse effects on vegetation composition.

7.3 SOUTH DUBLIN BAY AND RIVER TOLKA ESTUARY SPA (004024)

The South Dublin Bay and River Tolka Estuary SPA comprises a substantial part of Dublin Bay. It includes the intertidal area between the River Liffey and Dun Laoghaire, and the estuary of the River Tolka to the north of the River Liffey, as well as Booterstown Marsh (NPWS, 2014). A portion of the shallow marine waters of the bay is also included. The SPA is of ornithological importance as it supports an internationally important population of light-bellied brent goose and nationally important populations of a further nine wintering species.

7.3.1 Special Conservation Interests

The South Dublin Bay and River Tolka Estuary SPA is designated for thirteen special conservation interest species, as well as wetlands, as detailed below:

- Light-bellied brent goose (*Branta bernicla hrota*) [A046]
- Oystercatcher (*Haematopus ostralegus*) [A130]
- Ringed plover (*Charadrius hiaticula*) [A137]
- Grey plover (*Pluvialis squatarola*) [A141]
- Knot (*Calidris canutus*) [A143]
- Sanderling (*Calidris alba*) [A144]
- Dunlin (*Calidris alpina*) [A149]
- Bar-tailed godwit (*Limosa lapponica*) [A157]
- Redshank (*Tringa totanus*) [A162]
- Black-headed gull (*Chroicocephalus ridibundus*) [A179]
- Roseate tern (*Sterna dougallii*) [A192]
- Common tern (*Sterna hirundo*) [A193]
- Arctic tern (*Sterna paradisaea*) [A194]
- Wetland and Waterbirds [A999]

Table 7-3: Special Conservation Interests, Conservation Objectives, and Location of the Special Conservation Interests in the South Dublin Bay and River Tolka Estuary SPA

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[10]
Light-bellied brent goose (*Branta bernicla hrota*) [A046]	To maintain the favourable conservation condition of light-bellied brent goose in South Dublin Bay and River Tolka Estuary SPA.	The migratory light-bellied brent geese spend winter within Ireland and belong to the east Canadian High Arctic population. Counts of this species undertaken at the South Dublin Bay and River Tolka Estuary SPA during I-WeBS in November 2011 and February 2012, combined with the high-tide count of 622 on 10/01/12, exceeded the threshold of international importance. Brent geese were recorded in a total of 15 subsites across the survey period. Peak numbers during low tide surveys were recorded within subsite 0UL41, 0U465, 0UL48 and 0UL43 for the four low tide surveys, respectively. The subsite peak count of 1,341 Brent geese was recorded for 0U465 on 04/11/11. Brent geese are grazers and are known for their preference for foraging in intertidal areas with the Eelgrass Zostera sp. (Robinson *et al.,* 2004). Brent geese foraged intertidally across a total of 14 subsites, the maximum number recorded in any one subsite was 640 (0U465) on the 4/11/11. This species feeds by day and roost by night. Bull Island is their principal roosting site and they return to this SPA at dusk from both intertidal and inland feeding areas (Benson 2009). This species is considered to be 'favourable' in terms of population trends.
Oystercatcher (*Haematopus ostralegus*) [A130]	To maintain the favourable conservation condition of oystercatcher in South Dublin Bay and River Tolka Estuary SPA.	This polytypic species, the nominate species of which breeds in western and northern Europe, includes those that breed within Ireland. Irish-breeding birds are partial migrants, some moving south during winter while others remain on the Irish coast. Wintering birds are supplemented by breeding birds from Iceland and the Faeroe Islands (Wernham *et al.,* 2002). Whole site numbers peaked in October 2011 when 1,997 oystercatchers were recorded, representing numbers of all-Ireland importance. A total of 2,225 individuals were recorded during a high tide survey on the 10/01/12.

[10] Information obtained from the Conservation Objectives Supporting Document (Version 1). NPWS, October 2014. Available at: https://www.npws.ie/sites/default/files/publications/pdf/South%20Dublin%20Bay%20and%20River%20Tolka%20Estuary%20SPA%20(004024)%20Conservation%20objectives%20supporting%20document%20-%20[Version%201].pdf

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[10]
		This species was recorded across 18 subsites, and nine subsites supported the species in all five surveys: 0U460, 0U462, 0U465,0U469, 0UL40, 0UL41, 0UL44, 0UL47 and 0UL48. Oystercatchers primarily forage on tidal flats, although they can be found foraging along non-estuarine coastlines and may be seen foraging terrestrially for earthworms. Cockles (*Cerastoderma edule*) and blue mussels (*Mytilus edulis*) are favoured prey items of the oystercatcher and are 'universally important during winter' (Zwarts *et al.,* 1996) because these bivalves live in the upper sediment of tidal flats. Oystercatchers were recorded foraging within 18 subsites overall across intertidal, supratidal and terrestrial habitats. Relatively low numbers of oystercatchers were recorded roosting/other during low tide surveys, apart from a number of exceptions. A total of 711 oystercatchers roosted supratidal during the high tide survey, the largest proportion (345) within 0UL48. During November 2011 roost survey (spring tide), oystercatchers roosted across eight sites. This species is considered to be 'favourable' in terms of population trends.
Ringed plover (*Charadrius hiaticula*) [A137]	To maintain the favourable conservation condition of ringed plover in South Dublin Bay and River Tolka Estuary SPA.	The ringed plover breeds across arctic and temperate zones from the east coast of Baffin Island, Greenland, across northern Europe and the Russian tundra to the coasts of the Bering Sea. Of the three subspecies, the nominate subspecies *C. h. hiaticula* breeds in northern Europe (including Ireland) and winters in Europe and north-west Africa. Total site numbers of ringed plovers peaked at 118 individuals on 05/12/21. A total of 47 ringed plover were recorded during the high tide survey. Ringed plover were recorded in a total of six subsites throughout the survey programme while 0UL40 was the only subsite to support the species during all four low tide surveys and held peak numbers on 04/11/11. Ringed plovers are 'visual foragers' searching the sediment surface for the visible signs of prey. Their diet is relatively broad, consisting of small crustaceans, molluscs and polychaete worms, isopods, amphipods and insects. All ringed plovers forage intertidally and were distributed across a total of six subsites throughout the survey programme. Low numbers of ringed plover roosting/other were recorded during all surveys i.e., only two records were made of roosting/other behaviour during low tide surveys (in 0UL48) while 42 ringed plovers

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[10]
		roosted within 0U462 during the high tide survey (NPWS, 2013b). This species is thought to be highly faithful to roost sites (Rehfisch *et al.*, 2003). This species is considered to be 'favourable' in terms of population trends.
Grey plover (*Pluvialis squatarola*) [A141]	Grey plover is proposed for removal from the list of Special Conservation Interests for South Dublin Bay and River Tolka Estuary SPA. As a result, a site-specific conservation objective has not been set for this species.	In Ireland, grey plovers occur as both passage and wintering birds and are though to originate from Russian breeding populations (Wernham *et al.,* 2002). Grey plovers were recorded in a total of 11 subsites throughout the entire survey programme. Whole-site counts of grey plover surpassed the threshold of all-Ireland importance in all except the November 2011 survey (51). The peak low tide count was 173 individuals but the highest overall count was made during the high tide survey (432). During winter, grey plovers mainly forage intertidally and have characteristic mode of foraging whereby they stand motionless watching the mudflat surface before snatching a prey item (often a worm) from the sediment surface. Grey plover eat a wide range of prey species. During surveys, this species was found to forage across ten subsites. During low tide surveys, relatively few grey plovers were recorded in roosting/other behaviour with the exception of 0U464, which recorded a maximum of 38 individuals during all four low tide surveys. This species is considered to be 'unfavourable' in terms of population trends
Knot (*Calidris canutus*) [A143]	To maintain the favourable conservation condition of knot in South Dublin Bay and River Tolka Estuary SPA.	Two population of knot are recognised in Western Eurasia and Africa, *C. c. canutus* and *C. c. islandica.* The knot that winter in Ireland are almost entirely comprised of the islandica population. Knot were recorded within 12 subsites overall and in all four low tide surveys in 0U462, 0U465 and 0U466. Knots are specialist mud and sandflat foragers, pecking visible items off the surface and probing to the depth that their bill will allow. Preferred prey items are bivalve molluscs (Dekinga and Pierma, 1993). Six subsites recorded foraging knot in three or more low tide surveys. Peak numbers were held by 0U4666. A good number of knot were recorded roosting during most low tide surveys, with the largest number (1,750) being held by 0U464. This species is considered to be 'favourable' in terms of population trends.

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[10]
Sanderling (*Calidris alba*) [A144]	To maintain the favourable conservation condition of sanderling in South Dublin Bay and River Tolka Estuary SPA.	It was previously thought that most sanderling wintering in Ireland and Britain were of Siberian origin, but there is now thought to be considerable overlap in the wintering range of Siberian and Greenland breeding populations (Delaney *et al.*, 2009). Sanderlings peaked early October 2011 when 357 individuals were recorded across the whole site, surpassing the threshold for all-Ireland Importance. A total of 182 were recorded during the high tide survey (10/01/12). Often foraging along the tide line where they search for prey such as sandhoppers, this species is characteristic of sandy shorelines, however, proportions are found along non-estuarine coastlines (Crowe, 2005). Sanderlings were found to be foraging intertidally across six subsites. 0U462 and 0U468 held foraging individuals at all four low tide surveys. Peak numbers were recorded for 0U462, 0UL41 and 0U460., three adjoining subsites in South Dublin Bay. Sanderlings were rarely recorded roosting during the main survey programme and just 25 individuals roosted intertidally during the high tide survey (0UL40). This species is considered to be 'favourable' in terms of population trends.
Dunlin (*Calidris alpina*) [A149]	To maintain the favourable conservation condition of dunlin in South Dublin Bay and River Tolka Estuary SPA.	The majority of dunlin wintering in Ireland are *C. a. alpina* that originate from the western part of their breeding range and moult mainly in the Wadden Sea before starting to arrive in Ireland during October (Crowe, 2005). Ireland has a small and declining breeding population of *Calidris alpina schinzii* which are believed to winter mainly in west Africa (Delaney *et al.*, 2009). Overall dunlin were recorded within 12 subsites. Numbers of dunlin rose from 264 in October 2011 to a peak of 3,636 recorded on 05/12/11. All counts except that on 05/10/11 represented numbers of all-Ireland importance. A total of 2,487 dunlin were recorded during the high tide survey (10/01/12). The dunlin diet is relatively wide and although this species shows preference for muddier areas within sites, their distribution can often be widespread with no clear patterns. The majority of dunlin were recorded foraging during surveys. Relatively few dunlin were recorded in roosting/other behaviour during low tide surveys, with the exception of 140 individuals within 0U464 on 02/02/12. The largest roost was recorded in 0U462

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[10]
		where 1,100 dunlin roosted alongside bar-tailed godwit and oystercatcher on the seaward side of a sand dune to the north of the subsite. A further 850 dunlin roosted intertidally close by. This species is considered to be 'favourable' in terms of population trends.
Black-tailed godwit (*Limosa lapponica*) [A157]	To maintain the favourable conservation condition of bar-tailed godwit in South Dublin Bay and River Tolka Estuary SPA.	Four populations of black-tailed godwits are recognised, three population of the nominate *L. l. limosa* and one L. l. *islandica* , the latter of which breeds almost exclusively in Iceland and winters in Britain, Ireland, Spain, Portugal, and Morocco (Delaney *et al.*, 1999). Recoveries and sightings confirm that the black-tailed godwits wintering in Ireland are of the *islandica* population. Black-tailed godwits were recorded across 12 subsites overall and six subsites recorded this wader in all four low tide surveys. Numbers of black-tailed godwits peaked early with 855 recorded on 05/10/11, representing numbers of international importance. A total of 808 black-tailed godwits were counted during the high tide survey. This long-billed species forage within intertidal flats for their preferred prey of bivalves, however, this species is relatively adaptable, utilising other habitats for foraging (where available), such as terrestrial grassland, coastal marshes or freshwater callows. Black-tailed godwits foraged intertidally within 12 subsites. Substantial numbers roosted intertidally within 0U466 in all surveys, a maximum number of 650 was recorded on the 05/10/11.
Redshank (*Tringa totanus*) [A162]	To maintain the favourable conservation condition of redshank in South Dublin Bay and River Tolka Estuary SPA.	The taxonomy of this species has proved complex, but five populations are recognised currently, including *T.t. Britannica,* a small and declining population that breeds in Britain and Ireland, and *T. t. robusta* which breeds in Iceland and the Faeroes and winters in Britain, Ireland and the Northern Sea area (Delaney *et al.,* 2009). Redshank were recorded within 15 subsites overall and all bar one recorded this wader in all four low tide surveys. Total numbers of redshank were variable across the survey months but all surveys recorded numbers that surpassed the threshold of all Ireland importance. Numbers peaked at 1,196 on 05/10/11, likely due to the presence of some passage birds. Numbers then dropped to just 522 during the February low tide count. A total of 954 redshank were recorded during the high tide survey. This species forage by pecking the surface or proving within intertidal mudflats, favouring the muddier sections of the sites. A particularly favoured prey is the burrowing amphipod *Corophium*

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[10]
		volutator. Redshank foraged widely across the site and within 15 subsites overall, while a total of 14 subsites supported foraging redshank in all four low tides. Roosting behaviour was recorded within 12 subsites overall during low tide surveys. The October 2011 survey recorded the greatest number roosting/other intertidally when 383 redshank were recorded within nine subsites. This species is considered to be 'favourable' in terms of population trends.
Black-headed gull (*Chroicocephalus ridibundus*) [A179]	To maintain the favourable conservation condition of black-headed gull in South Dublin Bay and River Tolka Estuary SPA.	The black-headed gull is the most widespread breeding seabird within Ireland, breeding both inland and along the coast. Wintering numbers are also boosted by birds arriving from northern and eastern Europe (Wernham *et al.*, 2004). More than 2,000 birds were recorded in all low tide surveys, the peak was 2,933 individuals counted on 02/02/12. Black-headed gulls were recorded within 19 subsites overall (all except 0UL52). The subsite peak of 631 individuals was recorded for 0UL43. This species was recorded foraging intertidally in 14 subsites. 0Ul40 held peak numbers during the first three low tide surveys and numbers ranked as second highest on the first survey date. A greater number of black-headed gulls were recorded as roosting/other behaviour than foraging. Intertidal roosting/other was recorded across 15 subsites overall. Merne *et al.* (2009) noted the importance of Dublin Bay for five species of gull throughout the year, as both a daytime feeding and loafing site, and a night-time roost site. Additionally, survey data suggests that Dublin Bay is a major staging area for black-headed gulls prior to spring migration, a maximum of 39,535 black-headed gulls were recorded in February. The dusk roost undertaken as part of the 2011/12 Waterbird Survey Programme recorded a total of 40,585 black-headed gulls. This species is considered to be 'unfavourable' in terms of population trends.
Roseate tern (*Sterna dougallii*) [A192]	To maintain the favourable conservation condition of roseate tern in South Dublin	This species breed in Dublin Docks, on a man-made structure known as the 'E.S.B Dolphin.' Evening surveys of roosting terns in South Dublin Bay and River Tolka Estuary SPA confirm the conservation importance of the south Dublin Bay area during the post-breeding/pre-migration period. Up to 11,700, 9,025 and 8,020 terns were recorded in 2006, 2007 and 2010, respectively.

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[10]
	Bay and River Tolka Estuary SPA.	Given the counting conditions (i.e. low light levels and long distance recording) it was rarely possible to identify the terns to species level but the majority of the birds appear to have been common terns (*Sterna hirundo*), with smaller numbers of Arctic and roseate terns (*S. paradisaea, S. dougallii*) (sandwich, little and black terns (*S. sandvicensis, S. albifrons, Chlidonias niger*) were also recorded) (Merne *et al.*, 2008; Merne 2010). At least 645 roseate tern have been recorded here during the aforementioned survey years. This estimate does not factor in turnover rates and therefore the total number of roseate tern using this SPA may be significantly higher. Evening observations of terns arriving to the roosting area indicated that most flew in from an easterly and southeasterly direction leading the surveyors to suggest they were feeding in the shallow waters of the Kish/Bray and Burford Banks (Merne *et al.,* 2008). During the breeding season, roseate terns can make extensive use of marine waters adjacent to their breeding colonies. Key prey items include small, schooling marine fish, very rarely small crustaceans. Key habitats include shallow and upwelling areas, including tide rips and shoals and over sandy bottoms. Merne *et al.* (2008) described the main roosting area as the exposed sand banks in south Dublin Bay primarily between the Martello Towers at Sandymount (319524, 232021) and Williamstown (320796, 229979). Terns have been occasionally recorded outside of this area on adjacent sandflats extending to Irishtown/South Bull Wall and to Blackrock but these birds eventually join the birds roosting in the main area (Merne *et al.,* 2008).
Common tern (*Sterna hirundo*) [A193]	To maintain the favourable conservation condition of common tern in South Dublin Bay and River Tolka Estuary SPA.	This species breed in Dublin Docks, on a man-made structure known as the 'E.S.B Dolphin.' Evening surveys of roosting terns in South Dublin Bay and River Tolka Estuary SPA confirm the conservation importance of the south Dublin Bay area during the post-breeding/pre-migration period. Up to 11,700, 9,025 and 8,020 terns were recorded in 2006, 2007 and 2010, respectively. Given the counting conditions (i.e. low light levels and long distance recording), it was rarely possible to identify terns to species level but the majority of the birds appear to have been common terns (*Sterna hirundo*), with smaller numbers of Arctic and roseate terns (*S. paradisaea, S. dougallii*); sandwich, little and black terns (S*. sandvicensis, S. albifrons, Chlidonias niger*) were also recorded (Merne *et al.,* 2008; Merne 2010). At least 4,887 common tern have been recorded here during the aforementioned survey years. This estimate does not factor in turnover rates and therefore the total number of common tern using this SPA may be significantly higher. Evening observations of arriving terns to the primary roosting area indicated that most flew into Dublin Bay from an easterly and southeasterly direction leading the surveyors to suggest the bird

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[10]
		were feeding in the shallow waters of the Kish/Bray and Burford Banks (Merne *et al.,* 2008). During the breeding season, common terns can make extensive use of marine waters adjacent to their breeding colonies. Key prey items include small fish, crustaceans, insects and occasionally squid. Key habitats include shallow coastal waters, bays, inlets, shoals, tidal-rips, drift lines, beaches, saltmarsh creeks, lakes, ponds or rivers. Merne *et al.* (2008) described the main roosting area as the exposed sand banks in south Dublin Bay, primarily between the Martello Towers of at Sandymount (319524, 232021) and Williamstown (ITM 320796, 229979). Terns have been occasionally recorded outside of this area on adjacent sandflats extending to Irishtown/South Bull Wall and to Blackrock, but these birds eventually joined the birds roosting in the main area (Merne *et al.,* 2008).
Arctic tern (*Sterna paradisaea*) [A194]	To maintain the favourable conservation condition of arctic tern in South Dublin Bay and River Tolka Estuary SPA.	This species breeds in Dublin Docks, on a man-made structure known as the 'E.S.B Dolphin.' Evening surveys of roosting terns in South Dublin Bay and River Tolka Estuary SPA confirm the conservation importance of the south Dublin Bay area during the post-breeding/pre-migration period. Up to 11,700, 9,025 and 8,020 terns were recorded in 2006, 2007 and 2010, respectively. Given the counting conditions (i.e. low light levels and long distance recording) it was rarely possible to identify the terns to species level but the majority of the birds appear to have been common terns (*Sterna hirundo*), with smaller numbers of Arctic and roseate terns (*S. paradisaea, S. dougallii*); sandwich, little and black terns (*S. sandvicensis, S. albifrons, Chlidonias niger*) were also recorded (Merne *et al.,* 2008; Merne 2010). At least 200 Arctic tern have been recorded here during the aforementioned survey years. This estimate does not factor in turnover rates and therefore the total number of Arctic tern using this SPA may be significantly higher. Terns associated with the roost are thought to feed during the day in the wider Dublin Bay area, but direct survey evidence is incomplete. Evening observations of arriving terns to the primary roosting area indicated that most flew into Dublin Bay from an easterly and southeasterly direction leading the surveyors to suggest the birds were feeding in the shallow waters of the Kish/Bray and Burford Banks (Merne *et al.,* 2008). During the breeding season Arctic terns can make extensive use of marine waters adjacent to their breeding colonies. The foraging range maximum was 20.6km, the mean maximum was 12.24km, while the mean was 11.75km (Birdlife International, 2014). As these foraging range estimates relate to birds during the breeding season, the distances between post-breeding roost sites and feeding areas may be greater.

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[10]
Wetlands and Waterbirds [A999]	To maintain the favourable conservation condition of the wetland habitat in South Dublin Bay and River Tolka Estuary SPA as a resource for the regularly occurring migratory waterbirds that utilise it.	Wetlands are distributed throughout the entirety of the SPA boundary, with the exception of the solid causeway running through the centre of the site. Waterbirds have been recorded throughout the SPA.

7.3.2 Potential Direct and Indirect Effects on the SPA

The potential for direct and indirect effects on the special conservation interests of South Dublin Bay and River Tolka and Estuary SPA associated with the proposed development are discussed hereunder.

7.3.2.1 Construction Phase

7.3.2.1.1 Direct Effects

Loss of Habitat

The proposed development will not occur within this European site. Therefore, there will be no direct habitat loss to the South Dublin Bay and River Tolka Estuary SPA as a result of the proposed development.

7.3.2.1.2 Indirect Effects

Water Quality Impacts

Discharges of pollutants or silt-laden waters (of sufficient magnitude) into the Newtownmoyaghy Stream holds the potential to travel downstream to this SPA. Instream works, site clearance, excavation activities and the stockpiling of material could result in sediment laden runoff or pollutants being dispersed into the Newtownmoyaghy Stream and eventually to the South Dublin Bay and River Tolka SPA, if not appropriately managed.

Increased silt loading in watercourses can stunt aquatic plant growth, limit dissolved oxygen capacity and overall reduce the ecological quality of watercourses, with the most critical period associated with low flow conditions.

If surface water runoff was to become contaminated with fuels or oils from construction vehicle/machinery leaks or spills, this could also pose a significant risk to plant life in the SPA.

Water impacts could pose a risk to the special conservation interests of the SPA via their food sources such as fish and macroinvertebrate populations.

Dust Impacts

The proposed construction works will include excavation activities which have the potential to result in the generation of dust within the immediate area. Movement of HGVs associated with the construction works are likely to be 'Small' trackout movements, which equates to dust occurring up to 50m from the site (Section 5.1.5). At the closest point, the South Dublin Bay and River Tolka SPA is located approximately 29km east (straight line distance) from the proposed development site, thus there is no potential for the generation of dust to impact this SPA.

Noise Impacts

As mentioned above, the proposed development site is located 29km from this SPA; therefore, due to this considerable distance, there is no risk of noise disturbance of the special conservation interests.

7.3.2.2 Operation Phase

7.3.2.2.1 Direct Effects

No operational activities will occur outside of the proposed development boundary. Therefore, there will be no direct effects on the South Dublin Bay and River Tolka and Estuary SPA.

7.3.2.2.2 Indirect Effects

Surface water runoff will be filtered through a standard filter drain, installed along the road's edge, as discussed in Section 5.2.1. This water will be filtered back to the Newtownmoyaghy Stream which will reduce the potential for traffic and vehicle pollution entering the stream, when compared to the existing open drain system, and subsequently travelling to the South Dublin Bay and River Tolka and Estuary SPA.

Table 7-4: Evaluation of Potential Adverse Effects on the Special Conservation Interests of the South Dublin Bay and River Tolka Estuary SPA

Attributes and Measures	Target	Potential for Adverse Effects
Light-bellied Brent Goose, Oystercatcher, Ringed Plover, Grey Plover, Knot, Sanderling, Dunlin, Bar-Tailed Godwit, and Black-headed Gull		
Population Trend (Percentage change)	Long term population trend stable and increasing.	**Yes,** a degradation of water quality due to the potential release of hydrocarbons or sediment into the Newtownmoyaghy Stream could impact special conservation interests and/or their prey in the downstream intertidal and subtidal habitats in which these species forage. A decrease of prey could result in a decrease of the carrying capacity of the foraging habitats for the designated special conservation interest species. This could potentially affect the long-term population trend for these special conservation interest species and change their distribution range. A change in population trend and distribution would **constitute a significant adverse effect.**
Distribution (Range, timing and intensity of use of areas)	No significant decrease in the range, timing or intensity of use of areas, other than that occurring from natural patterns of variation.	
Common Tern		
Breeding population abundance: apparently occupied nests (AON's)	No significant decline.	**Yes,** a degradation of water quality due to the potential release of hydrocarbons or sediment into the Newtownmoyaghy Stream could impact special conservation interests and/or their prey in the downstream intertidal and subtidal habitats in which these species forage. A decrease of prey could result in a decrease of the carrying capacity of the foraging habitats for the designated special conservation interest species. This could potentially affect the breeding and therefore the long-term population of this special conservation interest species. A change in breeding population abundance would **constitute a significant adverse effect.**
Productivity rate: fledged young per breeding pair	No significant decline.	**Yes,** a degradation of water quality due to the potential release of hydrocarbons or sediment into the Newtownmoyaghy Stream could impact special conservation interests and/or their prey in the downstream intertidal and subtidal habitats in which these species forage. A decrease of prey could result in a decrease of the carrying capacity of the foraging habitats for the designated special conservation interest species. This could potentially affect the productivity rate and therefore the long-term population of this special conservation interest species. A change in productivity rate would **constitute a significant adverse effect.**

Attributes and Measures	Target	Potential for Adverse Effects
Passage population: individuals	No significant decline.	**Yes,** a degradation of water quality due to the potential release of hydrocarbons or sediment into the Newtownmoyaghy Stream could impact special conservation interests and/or their prey in the downstream intertidal and subtidal habitats in which these species forage. A decrease of prey could result in a decrease of the carrying capacity of the foraging habitats for the designated special conservation interest species. This could potentially affect the passage populations of this special conservation interest species. A change in passage populations would **constitute a significant adverse effect.**
Distribution: breeding colonies	No significant decline.	**Yes,** a degradation of water quality due to the potential release of hydrocarbons or sediment into the Newtownmoyaghy Stream could impact special conservation interests and/or their prey in the downstream intertidal and subtidal habitats in which these species forage. A decrease of prey could result in a decrease of the carrying capacity of the foraging habitats for the designated special conservation interest species. This could potentially affect the distribution of breeding colonies of this special conservation interest species. A change in distribution would **constitute a significant adverse effect.**
Distribution: roosting areas	No significant decline.	No, the proposed development is located outside the SPA boundary. No works will occur within the SPA boundary. There will be no loss of roosting areas. There is no potential for significant adverse effects on distribution or roosting areas.
Prey biomass available	No significant decline.	**Yes,** a degradation of water quality due to the potential release of hydrocarbons or sediment into the Newtownmoyaghy Stream could impact special conservation interests and/or their prey in the downstream intertidal and subtidal habitats in which these species forage. A decrease of prey biomass available could result in a decrease of the carrying capacity of the foraging habitats for the designated special conservation interest species. A change in prey biomass available would **constitute a significant adverse effect.**
Barriers to connectivity (number; location; shape; area)	No significant increase.	No, the proposed development is located outside the SPA boundary. No works will occur within the SPA boundary. There will be no barriers to connectivity. There is no potential for significant adverse effects on connectivity.

Attributes and Measures	Target	Potential for Adverse Effects
Disturbance at breeding site	Human activities should occur at levels that do not adversely affect the breeding common tern population.	No, the proposed development is located outside the SPA boundary. No works will occur within the SPA boundary. There will be no disturbance at breeding sites. There is no potential for significant adverse effects in relation to disturbance at breeding sites.
Disturbance at roosting site	Human activities should occur at levels that do not adversely affect the numbers of common tern among the post-breeding aggregation of terns.	No, the proposed development is located outside the SPA boundary. No works will occur within the SPA boundary. There will be no disturbance at roosting sites. There is no potential for significant adverse effects in relation to disturbance at roosting sites.
Arctic Tern and Roseate Tern		
Passage Populations	No significant decline.	**Yes,** a degradation of water quality due to the potential release of hydrocarbons or sediment into the Newtownmoyaghy Stream could impact special conservation interests and/or their prey in the downstream intertidal and subtidal habitats in which these species forage. A decrease of prey could result in a decrease of the carrying capacity of the foraging habitats for the designated special conservation interest species. This could potentially affect the passage populations of these special conservation interest species. A change in passage populations would **constitute a significant adverse effect.**
Distribution: roosting areas	No significant decline.	No, the proposed development is located outside the SPA boundary. No works will occur within the SPA boundary. There will be no disturbance at roosting sites. There is no potential for significant adverse effects in relation to disturbance at roosting sites.
Prey biomass available	No significant decline.	**Yes,** a degradation of water quality due to the potential release of hydrocarbons or sediment into the Newtownmoyaghy Stream could impact special conservation interests and/or their prey in the downstream intertidal and subtidal habitats in which these species forage. A decrease of prey biomass available could result in a decrease of the carrying capacity of the foraging habitats for the designated special conservation interest species. A change in prey biomass available would **constitute a significant adverse effect.**

Attributes and Measures	Target	Potential for Adverse Effects
Barriers to connectivity	No significant increase.	No, the proposed development is located outside the SPA boundary. No works will occur within the SPA boundary. There will be no barriers to connectivity. There is no potential for significant adverse effects on connectivity.
Disturbance at roosting site	Human activities should occur at levels that do not adversely affect the numbers of Arctic and roseate tern among the post-breeding aggregation of terns.	No, the proposed development is located outside the SPA boundary. No works will occur within the SPA boundary. There will be no disturbance at roosting sites. There is no potential for significant adverse effects in relation to disturbance at roosting sites.
Wetland and Waterbirds [A999]		
Habitat area (hectares)	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2,192 hectares, other than that occurring from natural patterns of variation.	No, the proposed development is located outside the SPA boundary. No works will occur within the SPA boundary. There will be no loss of habitat area. There is no potential for significant adverse effects on habitat area.

7.4 North Dublin Bay SAC (000206)

The North Dublin Bay SAC is an excellent example of a coastal site with all the main habitats represented. The site holds good examples of nine habitats that are listed on Annex I of the E.U. Habitats Directive; one of these is listed with priority status (fixed coastal dunes with herbaceous vegetation). Several of the wintering bird species have populations of international importance, while some of the invertebrates are of national importance. The site contains a number of rare and scarce plants including some which are legally protected.

7.4.1 Qualifying Interests

- Mudflats and sandflats not covered by seawater at low tide [1140]
- Annual vegetation of drift lines [1210]
- Salicornia and other annuals colonising mud and sand [1310]
- Atlantic salt meadow (*Glauco-Puccinellietalia maritimae*) [1330]
- Petalwort (*Petalophyllum ralfsii)* [1395]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]
- Embryonic shifting dunes [2110]
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]
- Fixed coastal dunes with herbaceous vegetation (grey dunes)* [2130]
- Humid dune slacks [2190]

Table 7-5: Qualifying Interests, Conservation Objectives and Location of the Qualifying Interests in the North Dublin Bay SAC

Qualifying Interest *indicates a priority habitat	Conservation Objectives	Population and Distribution of the Species/Habitat Within the Site
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 North Dublin Bay SAC.	This habitat predominantly runs the entirety of the coastline touching the SAC and also along a large strip down the centre of the SAC and covers an area of approximately 578ha.
Annual vegetation of drift lines	To restore the favourable conservation condition of annual vegetation of drift lines in North Dublin Bay SAC.	This habitat is difficult to measure in view of its dynamic nature, which means it can appear within a site from year to year. During the 2009 Coastal Monitoring Project Survey, this habitat was found to cover an area of 52.15ha.
Salicornia and other annuals colonising mud and sand	To restore the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in North Dublin Bay SAC.	This habitat was estimated to cover an approximate area of 29.10ha, including mosaics (McCorry, 2007).
Atlantic salt meadow *(Glauco-Puccinellietalia maritimae*)	To maintain the favourable conservation condition of Atlantic salt meadows *(Glauco- Puccinellietalia maritimae*) in North Dublin Bay SAC.	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007), Atlantic salt meadow (ASM) was surveyed and mapped at a single site, giving an estimated area of 81.84ha, including mosaics.
Petalwort (*Petalophyllum ralfsii*)	To maintain the favourable conservation condition of petalwort in North Dublin Bay SAC.	The known population of *Petalophyllum ralfsii* at Bull Island occurs along the track that cuts through the alder marsh, south and east of St. Anne's Golf Club (data from NPWS surveys and Campbell [2013]).
Mediterranean salt meadows (*Juncetalia maritimi*)	To maintain the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritime*) in North Dublin Bay SAC.	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007), one sub-site that supports Mediterranean Salt Meadow (MSM) was surveyed and mapped, giving an estimated area of 7.98ha, including mosaics.
Embryonic shifting dunes	To restore the favourable conservation condition of embryonic shifting dunes in North Dublin Bay SAC.	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney *et al.,* 2013), embryo dunes were surveyed and mapped at two sub-sites, giving a total estimated area of 6.07ha.

Qualifying Interest *indicates a priority habitat	Conservation Objectives	Population and Distribution of the Species/Habitat Within the Site
Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	To restore the favourable conservation condition of shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in North Dublin Bay SAC.	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney *et al.*, 2013), these dunes were surveyed and mapped at two sub-sites, giving a total estimated area of 3.18ha.
Fixed coastal dunes with herbaceous vegetation (grey dunes)*	To restore the favourable conservation condition of fixed coastal dunes with herbaceous vegetation ('grey dunes') in North Dublin Bay SAC.	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney *et al.*, 2013), this habitat was surveyed and mapped at two sub-sites to give a total estimated area of 104.85ha.
Humid dune slacks	To restore the favourable conservation condition of humid dune slacks in North Dublin Bay SAC.	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney *et al.,* 2013), this habitat was surveyed and mapped at two sub-sites to give a total estimated area of 12.11ha.

7.4.2 Potential for Direct and Indirect Effects on the SAC

The potential for direct and indirect effects on the qualifying interests of the North Dublin Bay SAC associated with the proposed development are discussed hereunder.

7.4.2.1 Construction Phase

7.4.2.1.1 Direct Effects

Loss of Habitat

The proposed development will not occur within this European site. Therefore, there will be no direct habitat loss to the North Dublin Bay SAC as a result of the proposed development.

7.4.2.1.2 Indirect Effects

Water Impacts

Discharges of pollutants or silt-laden waters (of sufficient magnitude) into the Newtownmoyaghy Stream holds the potential to travel downstream to this SAC. Instream works, site clearance, excavation activities and the stockpiling of material could result in sediment laden runoff or pollutants being dispersed into the Newtownmoyaghy Stream and eventually to the North Dublin Bay SAC, if not appropriately managed.

Increased silt loading in watercourses can stunt aquatic plant growth, limit dissolved oxygen capacity and overall reduce the ecological quality of watercourses, with the most critical period associated with low flow conditions. Silt can blanket plant populations, particularly benthic communities, leading to loss or degradation of Annex I habitats within the SAC.

If surface water runoff was to become contaminated with fuels or oils from construction vehicle/machinery leaks and spills, this could also pose a significant risk to plant life in the SAC.

Dust Impacts

The proposed construction works will include excavation activities which have the potential to result in the generation of dust within the immediate area. Movement of HGVs associated with the construction works are likely to be 'Small' trackout movements, which equates to dust occurring up to 50m from the site (Section 5.1.5). At the closest point, the SAC is located approximately 33km (straight line measurement) of the proposed development site, thus there is no potential for the generation of dust to impact this SAC.

Noise Impacts

There is no potential for the disturbance of the qualifying interests of this SAC as all qualifying interests are habitats and are therefore not sensitive to noise.

7.4.2.2 Operation Phase

7.4.2.2.1 Direct Effects

No operational activities will occur outside of the proposed development boundary. Therefore, there will be no direct effects on the North Dublin Bay SAC.

7.4.2.2.2 Indirect Effects

Surface water runoff will be filtered through a standard filter drain, installed along the road's edge, as discussed in Section 5.2.1. This water will be filtered back to the Newtownmoyaghy Stream which will greatly reduce the potential for traffic and vehicle pollution entering the stream, when compared to the current open drain system, and subsequently travelling to the North Dublin Bay SAC.

Table 7-6: Evaluation of Potential Adverse Effects on the Qualifying Interests of North Dublin Bay SAC

Attributes and Measures	Target	Potential for Adverse Effects
Mudflats and sandflats not covered by seawater at low tide		
Habitat area (hectares)	The permanent habitat is stable or increasing, subject to natural processes	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat area. There is no potential for significant adverse effects on habitat area.
Community extent (hectares)	Maintain the extent of the *Mytilus edulis* dominated community, subject to natural processes.	**Yes**, the proposed development has the potential to result in the release of hydrocarbons and/or silt to the SAC, and by doing so, lowering the water quality for *Mytilus edulis*. **This could result in a significant adverse effect on the community extent**.
Community structure *Mytilus edulis* density (individuals/m^2)	Conserve the high quality of the *Mytilus edulis* dominated community, subject to natural processes	**Yes**, the proposed development has the potential to result in the release of hydrocarbons and/or silt to the SAC, and by doing so, lowering the water quality for *Mytilus edulis*. **This could result in a significant adverse effect on the community structure**.
Community distribution (hectares)	Conserve the following community types in a natural condition: Fine sand to sandy mud with *Pygospio elegans* and *Crangon crangon community complex;* fine sand with *Spio martinensis* community complex.	**Yes,** degradation of water quality has the potential to negatively affect the extent, density and distribution of the benthic communities within the habitat. A change or decrease in the community extent, density and distribution would constitute a **significant adverse effect on community distribution.**
Annual vegetation of drift lines		
Habitat area (hectares)	Area increasing, subject to natural processes, including erosion and succession.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat area. There is no potential for significant adverse effects on habitat area.
Habitat distribution (occurrence)	No decline, or change in habitat distribution, subject to natural processes.	**Yes,** a sudden increase of silt or pollution to this habitat as a result of the proposed development could change the structure of this habitat. **This could result in a significant adverse effect on the habitat distribution.**

Attributes and Measures	Target	Potential for Adverse Effects
Physical structure: functionality and sediment supply (presence/absence of physical barriers)	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.	No, the natural supply of sediment is an important process for the habitat. The natural flow and ebb of the tide will not be altered by the proposed development. There will be no change on the natural circulation of sediment and organic matter. There is no potential for significant adverse effects on physical structure.
Vegetation structure: zonation (% cover at the representative number of monitoring stops	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, zonation and composition of the species. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could result in a significant adverse effect on the vegetation structure and composition.**
Vegetation composition: typical species and sub-species (% cover at a representative number of monitoring stops)	Maintain the presence of species-poor communities with typical species: sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*), prickly saltwort (*Salsola kali*) and oraches (*Atriplex spp.*)	
Vegetation composition: negative indicator species (% cover)	Negative indicator species (including non-natives) to represent less than 5% cover	No, no invasive species were recorded within the proposed development site, therefore, the proposed development will not result in the spread of invasive species. There is no potential for significant adverse effects on vegetation composition.
Salicornia and other annuals colonising mud and sand		
Habitat area (hectares)	Area stable or increasing, subject to natural processes, including erosion and succession.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat area. There is no potential for significant adverse effects on habitat area or distribution.
Habitat distribution (occurrence)	No decline, or change in habitat distribution, subject to natural processes.	
Physical structure: sediment supply (presence/absence of physical barriers)	Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions	No, the natural supply of sediment is an important process for the habitat. The natural flow and ebb of the tide will not be altered by the proposed development. There will be no change on the natural circulation of sediment and organic matter. There is no potential for significant adverse effects on physical structure.

Attributes and Measures	Target	Potential for Adverse Effects
Physical structure: creeks and pans (occurrence)	Maintain creek and pan structure, subject to natural processes, including erosion and succession	No, creek density is influenced by sediment supply and tidal influence. The proposed development will not interfere with the natural sediment supply and tidal influence. There is no potential for significant adverse effects on physical structure.
Physical structure: flooding regime (hectares flooded; frequency)	Maintain natural tidal regime	No, the proposed development has no potential to disrupt the natural tidal regime of this habitat. There is no potential for significant adverse effects on physical structure.
Vegetation structure: zonation (occurrence)	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, zonation and composition of the species. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could result in a significant adverse effect on vegetation structure and composition.**
Vegetation composition: typical species and sub-communities (% cover)	Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009)	
Vegetation structure: negative indicator species-*Spartina anglica*	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	No, there is no potential for the proposed development to spread common cordgrass to this SAC. There is no potential for significant adverse effects on vegetation structure.
Atlantic salt meadow (*Glauco-Puccinellietalia maritimae*)		
Habitat area (hectares)	Area stable or increasing, subject to natural processes, including erosion and succession.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat area. There is no potential for significant adverse effects on habitat area or distribution.
Habitat distribution (occurrence)	No decline or change in habitat distribution, subject to natural processes.	
Physical structure: sediment supply (presence/absence of physical barriers)	Maintain natural circulation of sediments and organic matter, without any physical obstructions	No, the natural supply of sediment is an important process for the habitat. The natural flow and ebb of the tide will not be altered by the proposed development. There will be no change on the natural circulation of sediment and organic matter. There is no potential for significant adverse effects on physical structure.

Attributes and Measures	Target	Potential for Adverse Effects
Physical structure: creeks and pans (occurrence)	Maintain creek and pan structure, subject to natural processes, including erosion and succession	No, creek density is influenced by sediment supply and tidal influence. The proposed development will not interfere with the natural sediment supply and tidal influence. There is no potential for significant adverse effects on physical structure.
Physical structure: flooding regime (hectares flooded; frequency)	Maintain natural tidal regime	No, the proposed development has no potential to disrupt the natural tidal regime of this habitat. There is no potential for significant adverse effects on physical structure.
Vegetation structure: zonation (occurrence)	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, and zonation. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could constitute a significant adverse effect on the vegetation structure and composition.**
Vegetation structure: vegetation cover (% cover at a representative number of monitoring stops	Maintain more than 90% area outside creeks vegetated	
Vegetation composition: typical species and sub-communities (% cover at a representative sample of monitoring stops)	Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009)	
Vegetation structure: negative indicator species – *Spartina anglica* (hectares)	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	No, there is no potential for the proposed development to spread common cordgrass to this SAC. There is no potential for significant adverse effects on vegetation structure.
Mediterranean salt meadows (*Juncetalia maritimi*)		
Habitat area (hectares)	Area stable or increasing, subject to natural processes, including erosion and succession.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat

Attributes and Measures	Target	Potential for Adverse Effects
Habitat distribution (occurrence)	No decline or change in habitat distribution, subject to natural processes.	area. There is no potential for significant adverse effects on habitat area or distribution.
Physical structure: sediment supply (presence/absence of physical barriers)	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions	No, the natural supply of sediment is an important process for the habitat. The natural flow and ebb of the tide will not be altered by the proposed development. There will be no change on the natural circulation of sediment and organic matter. There is no potential for significant adverse effects on physical structure.
Physical structure: creeks and pans (occurrence)	Maintain creek and pan structure, subject to natural processes, including erosion and succession	No, creek density is influenced by sediment supply and tidal influence. The proposed development will not interfere with the natural sediment supply and tidal influence. There is no potential for significant adverse effects on physical structure.
Physical structure: flooding regime (hectares flooded; frequency)	Maintain natural tidal regime	No, the proposed development has no potential to disrupt the natural tidal regime of this habitat. There is no potential for significant adverse effects on physical structure.
Vegetation structure: zonation (occurrence)	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, zonation and composition of the species. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could result in a significant adverse effect on vegetation structure and composition.**
Vegetation structure: vegetation height (centimetres)	Maintain structural variation in the sward	No, impacts to sward height is influenced by grazing. The proposed development will not result in grazing of the habitat within this SAC. There will therefore be no impact on vegetation height. There is no potential for significant adverse effects on vegetation structure.
Vegetation composition: typical species and sub communities (% cover at the representative sample of monitoring stops)	Maintain range of sub-communities with characteristic species listed in SMP (McCorry and Ryle, 2009)	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, and zonation. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could constitute a significant adverse effect on the vegetation composition.**

Attributes and Measures	Target	Potential for Adverse Effects
Vegetation structure: negative indicator species- *Spartina anglica*	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	No, there is no potential for the proposed development to spread common cordgrass to this SAC. There is no potential for significant adverse effects on vegetation structure.
Petalwort (*Petalophyllum ralfsii*)		
Distribution of populations (number and geographical spread of populations)	No decline.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat area. There is no potential for significant adverse effects on distribution of populations, population size, or area of suitable habitat.
Population size (number of individuals)	No decline. Population at Bull Island estimated at a maximum of 5,824 thalli. Actual population is more likely to be 5% of this, or c. 300 thalli	
Area of suitable habitat (hectares)	No decline. Area of suitable habitat at Bull Island is estimated at c. 0.04ha.	
Hydrological conditions: soil and moisture (occurrence)	Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but not subject to prolonged inundation by flooding in winter	No, the proposed development will not alter the flow of water within the Newtownmoyaghy Stream. Therefore, there is no potential for the proposed development to impact the hydrological conditions of this downstream SAC. There is no potential for significant adverse effects on the hydrological conditions.
Vegetation structure: height and cover (centimetres and percentage)	Maintain open, low vegetation with a high percentage of bryophytes (small acrocarps and liverwort turf) and bare ground	No, impacts to sward height is influenced by grazing. The proposed development will not result in grazing of the habitat within this SAC. There will therefore be no impact on vegetation height. There is no potential for significant adverse effects on vegetation structure.
Embryonic shifting dunes		
Habitat area (hectares)	Area stable or increasing, subject to natural processes, including erosion and succession.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat

Attributes and Measures	Target	Potential for Adverse Effects
Habitat distribution (occurrence)	No decline or change in habitat distribution, subject to natural processes	area. There is no potential for significant adverse effects on habitat area or distribution.
Physical structure: functionality and sediment supply (presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	No, the natural supply of sediment is an important process for the habitat. The natural flow and ebb of the tide will not be altered by the proposed development. There will be no change on the natural circulation of sediment and organic matter. There is no potential for significant adverse effects on physical structure.
Vegetation structure: zonation (occurrence)	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, and zonation. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could constitute a significant adverse effect on the vegetation structure and composition.**
Vegetation composition: plant health of foredune grasses	More than 95% of sand couch (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e., green plant parts above ground and flowering heads present)	
Vegetation composition: typical species and sub-communities (% cover at a representative number of monitoring stops)	Maintain the presence of species-poor communities with typical species: sand couch (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*)	
Vegetation composition: negative indicator species (% cover)	Negative indicator species (including non-native species) to represent less than 5% cover	No, no invasive species were recorded within the proposed development site, therefore, the proposed development will not result in the spread of invasive species. There is no potential for significant adverse effects on vegetation composition.
Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)		
Habitat area (hectares)	Area stable or increasing, subject to natural processes including erosion and succession.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat

Attributes and Measures	Target	Potential for Adverse Effects
Habitat distribution (occurrence)	No decline, or change in habitat distribution, subject to natural processes.	area. There is no potential for significant adverse effects on habitat area or distribution.
Physical structure: functionality and sediment supply (presence or absence of physical barriers)	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.	No, the natural supply of sediment is an important process for the habitat. The natural flow and ebb of the tide will not be altered by the proposed development. There will be no change on the natural circulation of sediment and organic matter. There is no potential for significant adverse effects on physical structure.
Vegetation structure: zonation (occurrence)	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, zonation and composition of the species. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could result in a significant adverse effect on vegetation composition.**
Vegetation composition: plant health of dune grasses (% cover)	95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present).	
Vegetation composition: typical species and subcommunities (Percentage cover at a representative number of monitoring stops)	Maintain the presence of species-poor communities dominated by marram grass (*Ammophila arenaria*) and/or lymegrass (*Leymus arenarius*).	
Vegetation composition: negative indicator species (Percentage cover)	Negative indicator species (including non-natives) to represent less than 5% cover	No, no invasive species were recorded within the proposed development site, therefore, the proposed development will not result in the spread of invasive species. There is no potential for significant adverse effects on vegetation composition.
Fixed coastal dunes with herbaceous vegetation (grey dunes)*		
Habitat area (hectares)	Area stable or increasing, subject to natural processes including erosion and succession.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat

Attributes and Measures	Target	Potential for Adverse Effects
Habitat distribution (occurrence)	No decline, or change in habitat distribution, subject to natural processes.	area. There is no potential for significant adverse effects on habitat area or distribution.
Physical structure: functionality and sediment supply (presence/ absence of physical barriers)	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.	No, the natural supply of sediment is an important process for the habitat. The natural flow and ebb of the tide will not be altered by the proposed development. There will be no change on the natural circulation of sediment and organic matter. There is no potential for significant adverse effects on physical structure.
Vegetation structure: zonation (occurrence)	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, zonation and composition of the species. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could result in a significant adverse effect on vegetation structure and composition.**
Vegetation structure: bare ground (% cover)	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes.	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, zonation and composition of the species. Impacts on the vegetation species, cover and zonation could result in a change in the vegetation structure across the habitat which **could result in a significant adverse effect on vegetation structure and composition.**
Vegetation structure: sward height (centimetres)	Maintain structural variation within sward.	No, impacts to sward height is influenced by grazing. The proposed development will not result in grazing of the habitat within this SAC. There will therefore be no impact on vegetation height. There is no potential for significant adverse effects on vegetation structure.
Vegetation composition: typical species and sub-communities (% cover at a representative number of monitoring stops)	Maintain range of sub-communities with typical species listed in Delaney *et al.* (2013)	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, and zonation. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could constitute a significant adverse effect on the vegetation composition.**
Vegetation composition: negative indicator species	Negative indicator species (including non-natives) to represent less than 5% cover.	No, no invasive species were recorded within the proposed development site, therefore, the proposed development will not result in the spread of

Attributes and Measures	Target	Potential for Adverse Effects
(including *Hippophae rhamnoides*) (% cover)		invasive species. There is no potential for significant adverse effects on vegetation composition.
Vegetation composition: scrub/trees (% cover)	No more than 5% cover or under control.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. As scrub/trees are terrestrial habitats with no intrinsic dependence on surface water interactions to support the vegetation composition or structure, any potential water quality impacts associated with the proposed development pose no risk of affecting the percentage cover of scrub/trees in this SAC.
Humid dune slacks		
Habitat area (hectares)	Area increasing, subject to natural processes including erosion and succession.	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. There will be no loss of habitat area. There is no potential for significant adverse effects on habitat area or distribution.
Habitat distribution (occurrence)	No decline or change in habitat distribution, subject to natural processes.	
Physical structure: functionality and sediment supply (presence/absence of physical barriers)	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.	No, the natural supply of sediment is an important process for the habitat. The natural flow and ebb of the tide will not be altered by the proposed development. There will be no change on the natural circulation of sediment and organic matter. There is no potential for significant adverse effects on physical structure.
Physical structure: hydrological and flooding regime (water table levels; groundwater fluctuations (metres)	Maintain natural hydrological regime.	No, the proposed development will not alter the flow of water within the Newtownmoyaghy Stream. Therefore, there is no potential for the proposed development to impact the hydrological conditions of this downstream SAC. There is no potential for significant adverse effects on the hydrological conditions.
Vegetation structure: zonation (occurrence)	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, zonation and composition of the species. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could**

Attributes and Measures	Target	Potential for Adverse Effects
		result in a significant adverse effect on vegetation structure and composition.
Vegetation structure: bare ground (% cover)	Bare ground should not exceed 5% of dune slack habitat, with the exception of pioneer slacks which can have up to 20% bare ground	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, zonation and composition of the species. Impacts on the vegetation species, cover and zonation could result in a change in the vegetation structure across the habitat which **could result in a significant adverse effect on vegetation structure and composition.**
Vegetation structure: vegetation height (centimetres)	Maintain structural variation within sward	No, impacts to sward height is influenced by grazing. The proposed development will not result in grazing of the habitat within this SAC. There will therefore be no impact on vegetation height. There is no potential for significant adverse effects on vegetation structure.
Vegetation composition: typical species and subcommunities (% cover at a representative number of monitoring stops)	Percentage cover at a representative number of monitoring stops	**Yes,** a degradation of water quality could negatively affect the existing vegetation species within the habitat, which could impact the vegetation cover, and zonation. Impacts on the vegetation species, cover and zonation could result in a change in the zonation across the habitat. A change of the structure and zonation of the habitat **could constitute a significant adverse effect on the vegetation composition.**
Vegetation composition: cover of *Salix repens* (% cover; centimetres)	Maintain less than 40% cover of creeping willow (*Salix repens*)	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. As *Salix repens* is a terrestrial species with no intrinsic dependence on surface water interactions to support the vegetation composition or structure, any potential water quality impacts associated with the proposed development pose no risk of affecting the percentage cover of *Salix repens* in this SAC.
Vegetation composition: negative indicator species (% cover)	Negative indicator species (including non-natives) to represent less than 5% cover	No, no invasive species were recorded within the proposed development site, therefore, the proposed development will not result in the spread of invasive species. There is no potential for significant adverse effects on vegetation composition.
Vegetation composition: scrub/trees (% cover)	No more than 5% cover or under control	No, the proposed development is located outside the SAC boundary. No works will occur within the SAC boundary. As scrub/trees are terrestrial habitats with no intrinsic dependence on surface water interactions to support the vegetation composition or structure, any potential water quality

Attributes and Measures	Target	Potential for Adverse Effects
		impacts associated with the proposed development pose no risk of affecting the percentage cover of scrub/trees in this SAC.

7.5 North Bull Island SPA (004006)

The North Bull Island SPA is an excellent example of an estuarine complex and is one of the top sites in Ireland for wintering waterfowl. It is of international importance on account of both the total number of waterfowl and the individual populations of light-bellied brent goose, black-tailed godwit and bar-tailed godwit that use it. Also of significance is the regular presence of several species that are listed on Annex I of the E.U. Birds Directive, notably golden plover and bar-tailed godwit, but also ruff and short-eared owl. North Bull Island is a Ramsar Convention site, and part of the North Bull Island SPA is a Statutory Nature Reserve and a Wildfowl Sanctuary.

7.5.1 Special Conservation Interests

- Light-bellied brent goose (*Branta bernicla hrota*) [A046]
- Shelduck (*Tadorna tadorna*) [A048]
- Teal (*Anas crecca*) [A052]
- Pintail (*Anas clypeata*) [A054]
- Shoveler (*Anas clypeata*) [A056]
- Oystercatcher (*Haematopus ostralegus*) [A130]
- Golden plover (*Pluvialis apricaria*) [A140]
- Grey plover (*Pluvialis squatarola*) [A141]
- Knot (*Calidris canutus*) [A143]
- Sanderling (*Calidris alba*) [A144]
- Dunlin (*Calidris alpina*) [A149]
- Bar-tailed godwit (*Limosa lapponica*) [A157]
- Black-tailed godwit (*Limosa limosa*) [A156]
- Curlew (*Numenius arquata*) [A160]
- Redshank (*Tringa totanus*) [A162]
- Turnstone (*Arenaria interpres*) [A169]
- Black-headed gull (*Chroicocephalus ridibundus*) [A179]
- Wetlands and waterbirds [A999]

Table 7-7: Special Conservation Interests, Conservation Objectives, and Location of the Special Conservation Interests in the North Bull Island SPA

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[11]
Light-bellied brent goose (*Branta bernicla hrota*)	To maintain the favourable conservation condition of light-bellied brent goose in North Bull Island SPA.	The migratory light-bellied brent geese spend winter within Ireland and belong to the east Canadian High Arctic population. Counts of this species undertaken at the South Dublin Bay and River Tolka Estuary SPA during I-WeBS in November 2011 and February 2012, combined with the high-tide count of 622 on 10/01/12, exceeded the threshold of international importance. Brent geese were recorded in a total of 15 subsites across the survey period. Peak numbers during low tide surveys were recorded within subsite 0UL41, 0U465, 0UL48 and 0UL43 for the four low tide surveys, respectively. The subsite peak count of 1,341 Brent geese was recorded for 0U465 on 04/11/11. Brent geese are grazers and are known for their preference for foraging in intertidal areas with the Eelgrass Zostera sp. (Robinson *et al.,* 2004). Brent geese foraged intertidally across a total of 14 subsites, the maximum number recorded in any one subsite was 640 (0U465) on the 4/11/11. This species feeds by day and roost by night. Bull Island is their principal roosting site and they return to this SPA at dusk from both intertidal and inland feeding areas (Benson 2009). This species is considered to be 'favourable' in terms of population trends.
Shelduck (*Tadorna tadorna*)	To maintain the favourable conservation condition of shelduck in North Bull Island SPA.	The shelduck has five known populations which breed across temperature Eurasia. Although a breeding species in Ireland, shelducks undertake a moult migration each summer. Large moult gatherings occur along areas in north Germany and several sites in Britain. Following the moult, the ducks then migrate to wintering areas. Shelduck was recorded in just five subsites (0U465, 0U466, 0UL44, 0UL47 and 0UL48). Two of these (0U465 and 0UL47) recorded Shelduck in all five surveys undertaken. Shelducks can forage in a variety of ways from scything their bill through wet mud on exposed tidal flats, to dabbling and scything in shallow water and up-ending in deeper waters. They can

[11] Information obtained from the Conservation Objectives Supporting Document (Version 1). NPWS, October 2014. Available at: https://www.npws.ie/sites/default/files/publications/pdf/South%20Dublin%20Bay%20and%20River%20Tolka%20Estuary%20SPA%20(004024)%20Conservation%20objectives%20supporting%20document%20-%20[Version%201].pdf

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[11]
		therefore forage throughout the tidal cycle. During low tide surveys shelduck foraged intertidally across five subsites (0U465, 0U466, 0UL44, 0UL47 and 0UL48). Intertidal roosting was recorded during low tide surveys (at subsite 0U466), supporting individuals in all four low tide surveys and peak numbers (286) on 02/02/12. Good numbers also roosted within 0U466, 0UL47 and 0UL48. A total of 465 shelduck roosted during the high tide survey at subsite 0U466. This species is considered to be 'intermediate unfavourable' in terms of population trends.
Teal (*Anas crecca*)	To maintain the favourable conservation condition of teal in North Bull Island SPA.	Teal has five breeding subspecies that occur across north and northwest Europe, Siberia and into Asia. This species is considered to be 'favourable' in term of population trends. Teal breeding in Britain and Ireland are supplemented during winter by birds from a range extending from Iceland, through Scandinavia to northwest Siberia (Wernham *et al.*, 2002). Teal were recorded in seven subsites overall (0U461, 0U462, 0U465, 0U466, 0UL44, 0UL47 and 0UL48). The subsite peak count was 606 teal, recorded for 0U465 on 02/02/12. Teal are omnivores and have a variety of foraging methods (e.g. dabbling and up-ending) within differing habitats and water depths. During the survey programme, a greater proportion of foraging teal foraged intertidally. Four subsites supported foraging individuals on two or more survey occasions: 0U461, 0U465, 0U466 and 0UL47. Most teal were recorded in roosting/other behaviour, the proportion ranging from 68% - 100% during low tide surveys. Intertidal roosting/other behaviour was recorded across five subsites: 0U461, 0U465, 0U466, 0UL44 and 0UL47. Subtidal roosting/other behaviour was generally observed less frequently. This species is considered to be 'favourable' in terms of population trends.
Pintail (*Anas clypeata*)	To maintain the favourable conservation condition of pintail in North Bull Island SPA.	The pintail has a Holarctic distribution breeding widely over northern temperate and arctic zones. Although there is a small population breeding within Ireland, the main numbers that winter in Ireland come from breeding grounds from Iceland eastwards through Fennoscandia to western Russia (Wernham *et al.,* 2002). Although breeding within terrestrial wetlands, wintering takes places primarily within estuaries or coastal brackish lagoons.

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[11]
		After being absent in the October 2011 low tide survey, numbers of pintail rose to a low tide peak of 176 on 02/02/12. A total of 171 were counted during the high tide survey. All counts surpassed the threshold of all-Ireland importance. Pintail were recorded in three subsites overall: 0U465, 0U466 and 0UL47, although 0U465 recorded only one individual on a single occasion. 0U466 recorded low numbers (maximum 6) foraging subtidally on two low tide survey occasions, the peak number (103) during the high tide survey, plus a further 63 individuals foraging supratidally. Pintail are omnivorous, and the winter diet is thought to be largely plant-based (BWPI, 2004) although supplemented by small invertebrates such as amphipod crustaceans and the gastropod mollusc Peringia (*Hydrobia*) ulvae (Olney 1965). Individuals were recorded roosting intertidally within three subsites: 0U465, 0U466 and 0UL47 during the survey period. This species is considered to be 'intermediate unfavourable' in terms of population trends.
Shoveler (*Anas clypeata*)	To maintain the favourable conservation condition of shoveler in North Bull Island SPA.	The shoveler has a widespread breeding distribution across north America, Canada, north and eastern Europe, Siberia to central Asia (Wetlands International, 2006). The small numbers of shoveler breeding in Ireland are largely sedentary or dispersive and are supplemented during winter by migratory birds from other locations within northwest and central Europe. The wintering population is relatively small (c.2500 individuals) (Crowe *et al.,* 2005). Shovelers were recorded in just two subsites overall: 0U465 and 0U466. Peak counts in all low tide surveys were recorded by 0U465 whereas 0U466 held peak numbers (11) during the high tide survey. Shovelers are omnivorous, taking a range of items from planktonic crustaceans and small molluscs to insects, larvae, plant material and seeds. A true dabbling duck, Shovelers feed by surface-feeding, swimming with head and neck immersed, up-ending, and less often, by shallow dives (BWPI, 2004). Crowe (2005) previously noted that dabbling ducks tend to occur 'north and south of the Bull Island causeway'.

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[11]
		Shovelers were recorded in roosting/other behaviour in 0U465 during all four low tide surveys; the maximum number of 80 recorded on 04/11/11. No other roosting/other behaviour was recorded during the main survey programme. This species is considered to be 'unfavourable' in terms of population trends.
Oystercatcher (*Haematopus ostralegus*)	To maintain the favourable conservation condition of oystercatcher in North Bull Island SPA.	This polytypic species, the nominate species of which breeds in western and northern Europe, includes those that breed within Ireland. Irish-breeding birds are partial migrants, some moving south during winter while others remain on the Irish coast. Wintering birds are supplemented by breeding birds from Iceland and the Faeroe Islands (Wernham *et al.,* 2002). Whole site numbers peaked in October 2011 when 1,997 oystercatchers were recorded, representing numbers of all-Ireland importance. A total of 2,225 individuals were recorded during a high tide survey on the 10/01/12. This species was recorded across 18 subsites, and nine subsites supported the species in all five surveys: 0U460, 0U462, 0U465,0U469, 0UL40, 0UL41, 0UL44, 0UL47 and 0UL48. Oystercatchers primarily forage on tidal flats, although they can be found foraging along non-estuarine coastlines and may be seen foraging terrestrially for earthworms. Cockles (*Cerastoderma edule*) and blue mussels (*Mytilus edulis*) are favoured prey items of the oystercatcher and are 'universally important during winter' (Zwarts *et al.,* 1996) because these bivalves live in the upper sediment of tidal flats. Oystercatchers were recorded foraging within 18 subsites overall across intertidal, supratidal and terrestrial habitats. Relatively low numbers of oystercatchers were recorded roosting/other during low tide surveys, apart from a number of exceptions. A total of 711 oystercatchers roosted supratidal during the high tide survey, the largest proportion (345) within 0UL48. During November 2011 roost survey (spring tide), oystercatchers roosted across eight sites. This species is considered to be 'favourable' in terms of population trends.
Golden plover (*Pluvialis apricaria*)	To maintain the favourable conservation condition of golden plover in North Bull Island SPA.	Of the two species of golden plover, the nominate *P. a. apricaria* breeds at more southerly latitudes including Ireland and Britain and migrates south for winter. Golden plover that winter in Ireland are thought to be mostly the Icelandic-breeding birds *P. a. altifrons*.

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[11]
		Golden plover were recorded in two low tide surveys only. Eight were counted during the October 2011 low tide survey and a total 97 were recorded on 02/02/12. Just three individuals were recorded during the high tide survey. All counts were below the threshold of all-Ireland importance. During winter, golden plover feed primarily within agricultural grassland and arable land. Tidal flats are used more as a roosting/resting habitat and the birds tend to favour large, open tidal flats. As a consequence, golden plover tend to be in large aggregations when observed upon tidal flats. Intertidal feeding is observed to a greater degree during cold weather periods when grassland feeding areas are frozen over. Three individuals roosted during the high tide survey, two within 0UL47) and one within 0UL48 (Sutton Strand South). Golden plover were not recorded roosting during either the November 2011 or February 2012 roost surveys. This species is considered to be 'unfavourable' in terms of population trends.
Grey plover (*Pluvialis squatarola*)	To maintain the favourable conservation condition of grey plover in North Bull Island SPA.	In Ireland, grey plovers occur as both passage and wintering birds and are though to originate from Russian breeding populations (Wernham *et al.,* 2002). Grey plovers were recorded in a total of 11 subsites throughout the entire survey programme. Whole-site counts of grey plover surpassed the threshold of all-Ireland importance in all except the November 2011 survey (51). The peak low tide count was 173 individuals but the highest overall count was made during the high tide survey (432). During winter, grey plovers mainly forage intertidally and have characteristic mode of foraging whereby they stand motionless watching the mudflat surface before snatching a prey item (often a worm) from the sediment surface. Grey plover eat a wide range of prey species. During surveys, this species was found to forage across ten subsites. During low tide surveys, relatively few grey plovers were recorded in roosting/other behaviour with the exception of 0U464, which recorded a maximum of 38 individuals during all four low tide surveys. This species is considered to be 'unfavourable' in terms of population trends

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[11]
Knot (*Calidris canutus*)	To maintain the favourable conservation condition of knot in North Bull Island SPA.	Two population of knot are recognised in Western Eurasia and Africa, *C. c. canutus* and *C. c. islandica.* The knot that winter in Ireland are almost entirely comprised of the islandica population. Knot were recorded within 12 subsites overall and in all four low tide surveys in 0U462, 0U465 and 0U466. Knots are specialist mud and sandflat foragers, pecking visible items off the surface and probing to the depth that their bill will allow. Preferred prey items are bivalve molluscs (Dekinga and Pierma, 1993). Six subsites recorded foraging knot in three or more low tide surveys. Peak numbers were held by 0U4666. A good number of knot were recorded roosting during most low tide surveys, with the largest number (1,750) being held by 0U464. This species is considered to be 'favourable' in terms of population trends.
Sanderling (*Calidris alba*)	To maintain the favourable conservation condition of sanderling in North Bull Island SPA.	It was previously thought that most sanderling wintering in Ireland and Britain were of Siberian origin, but there is now thought to be considerable overlap in the wintering range of Siberian and Greenland breeding populations (Delaney *et al.*, 2009). Sanderlings peaked early October 2011 when 357 individuals were recorded across the whole site, surpassing the threshold for all-Ireland Importance. A total of 182 were recorded during the high tide survey (10/01/12). Often foraging along the tide line where they search for prey such as sandhoppers, this species is characteristic of sandy shorelines, however, proportions are found along non-estuarine coastlines (Crowe, 2005). Sanderlings were found to be foraging intertidally across six subsites. 0U462 and 0U468 held foraging individuals at all four low tide surveys. Peak numbers were recorded for 0U462, 0UL41 and 0U460., three adjoining subsites in South Dublin Bay. Sanderlings were rarely recorded roosting during the main survey programme and just 25 individuals roosted intertidally during the high tide survey (0UL40). This species is considered to be 'favourable' in terms of population trends.

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[11]
Dunlin (*Calidris alpina*)	To maintain the favourable conservation condition of dunlin in North Bull Island SPA.	The majority of dunlin wintering in Ireland are *C. a. alpina* that originate from the western part of their breeding range and moult mainly in the Wadden Sea before starting to arrive in Ireland during October (Crowe, 2005). Ireland has a small and declining breeding population of *Calidris alpina schinzii* which are believed to winter mainly in west Africa (Delaney *et al.*, 2009). Overall dunlin were recorded within 12 subsites. Numbers of dunlin rose from 264 in October 2011 to a peak of 3,636 recorded on 05/12/11. All counts except that on 05/10/11 represented numbers of all-Ireland importance. A total of 2,487 dunlin were recorded during the high tide survey (10/01/12). The dunlin diet is relatively wide and although this species shows preference for muddier areas within sites, their distribution can often be widespread with no clear patterns. The majority of dunlin were recorded foraging during surveys. Relatively few dunlin were recorded in roosting/other behaviour during low tide surveys, with the exception of 140 individuals within 0U464 on 02/02/12. The largest roost was recorded in 0U462 where 1,100 dunlin roosted alongside bar-tailed godwit and oystercatcher on the seaward side of a sand dune to the north of the subsite. A further 850 dunlin roosted intertidally close by. This species is considered to be 'favourable' in terms of population trends.
Bar-tailed godwit (*Limosa lapponica*)	To maintain the favourable conservation condition of bar-tailed godwit in North Bull Island SPA.	The taxonomy of this species is complex, but five subspecies are generally recognised. The nominate species *L. l. lapponica b,* winters mainly in western Europe, including Ireland. Bar-tailed godwits were recorded in a total of 12 subsites throughout the survey programme. Seven subsites supported this wader in all four low tide surveys: 0U460, 0U462, 0U464, 0U465, 0U468, 0UL40 and 0UL43. Bar-tailed godwits were recorded roosting intertidally within 0U464 with relative regularity, and 427 roosted there on 02/02/12. A total of 561 bar-tailed godwits roosted intertidally during the high tide survey, the majority (362) within 0U462. This species is considered to be 'favourable' in terms of population trends

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[11]
Black-tailed godwit [*Limosa limosa*]	To maintain the favourable conservation condition of black-tailed godwit in North Bull Island SPA.	Four populations of black-tailed godwits are recognised, three population of the nominate *L. l. limosa* and one L. l. *islandica* , the latter of which breeds almost exclusively in Iceland and winters in Britain, Ireland, Spain, Portugal, and Morocco (Delaney *et al.*, 1999). Recoveries and sightings confirm that the black-tailed godwits wintering in Ireland are of the *islandica* population. Black-tailed godwits were recorded across 12 subsites overall and six subsites recorded this wader in all four low tide surveys. Numbers of black-tailed godwits peaked early with 855 recorded on 05/10/11, representing numbers of international importance. A total of 808 black-tailed godwits were counted during the high tide survey. This long-billed species forage within intertidal flats for their preferred prey of bivalves, however, this species is relatively adaptable, utilising other habitats for foraging (where available), such as terrestrial grassland, coastal marshes or freshwater callows. Black-tailed godwits foraged intertidally within 12 subsites. Substantial numbers roosted intertidally within 0U466 in all surveys, a maximum number of 650 was recorded on the 05/10/11.
Curlew (*Numenius arquata*)	To maintain the favourable conservation condition of curlew in North Bull Island SPA.	The nominate subspecies of curlew breeds across Europe and winters in Europe. Ireland supports a small and declining population of breeding curlew. Irish breeding curlew are thought to make only short migrations, many resident during winter. Wintering numbers are enhanced by birds moving in from breeding grounds in Fennoscandia, the Baltic and northwest Russia (Delaney *et al.*, 2009). Curlew had a widespread distribution across the site, occurring in 14 subsites overall. A total of 11 subsites recorded this wader in all four low tide surveys. Curlews are the largest wader to spend the non-breeding season within Ireland. Within intertidal areas they seek out larger prey items such as crabs, large worms and bivalves and their de-curved bill is ideally suited to extracting deep-living worms such as lugworms (*Arenicola marina*). Curlews also feed amongst damp grasslands where they take terrestrial worms. Curlew were recorded foraging intertidally across 14 subsites overall, during surveys. Curlews were regularly observed in roosting/other behaviour in small numbers across ten subsites overall. But most records were irregular and involved small numbers only. Just three

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[11]
		individuals roosted intertidally during the high tide survey. However, 530 curlew roosted supratidally, located within 0U466. This species is considered to be 'favourable' in terms of population trends.
Redshank (*Tringa totanus*)	To maintain the favourable conservation condition of redshank in North Bull Island SPA.	The taxonomy of this species has proved complex, but five populations are recognised currently, including *T.t. Britannica,* a small and declining population that breeds in Britain and Ireland, and *T. t. robusta* which breeds in Iceland and the Faeroes and winters in Britain, Ireland and the Northern Sea area (Delaney *et al.,* 2009). Redshank were recorded within 15 subsites overall and all bar one recorded this wader in all four low tide surveys. Total numbers of redshank were variable across the survey months but all surveys recorded numbers that surpassed the threshold of all Ireland importance. Numbers peaked at 1,196 on 05/10/11, likely due to the presence of some passage birds. Numbers then dropped to just 522 during the February low tide count. A total of 954 redshank were recorded during the high tide survey. This species forage by pecking the surface or proving within intertidal mudflats, favouring the muddier sections of the sites. A particularly favoured prey is the burrowing amphipod *Corophium volutator.* Redshank foraged widely across the site and within 15 subsites overall, while a total of 14 subsites supported foraging redshank in all four low tides. Roosting behaviour was recorded within 12 subsites overall during low tide surveys. The October 2011 survey recorded the greatest number roosting/other intertidally when 383 redshank were recorded within nine subsites. This species is considered to be 'favourable' in terms of population trends.
Turnstone (*Arenaria interpres*)	To maintain the favourable conservation condition of turnstone in North Bull Island SPA.	Turnstones breed widely in both the high and low arctic zones; two subspecies of this bird are recognised. Wintering turnstone in Ireland have a widespread distribution and frequent open, non-estuarine, rocky shorelines although they also occur within estuaries. Across the entire survey period, turnstones were recorded in 13 count subsites. Nine subsites recorded turnstones in all four low tide surveys. Turnstones are generally associated with shorelines with rocky substratum, particularly those with algal wrack zones within which the birds forage for prey species such as amphipod

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[11]
		crustaceans, insects and small molluscs. A mixed substrata shoreline and wrack zone is found on the upper shore in several places around the site, therefore a widespread distribution is to be expected and it is difficult to link this species' distribution to any specific factors. Turnstones foraged regularly (three low tide surveys or more) in 11 subsites during the survey period. Turnstones were rarely recorded in roosting/other behaviour during low tide surveys. A total of 72 individuals roosted during the high tide survey, the largest single flock roosting supratidally on rock in 0U469. This species is considered to be 'favourable' in terms of population trends.
Black-headed gull (*Chroicocephalus ridibundus*)	To maintain the favourable conservation condition of black-headed gull in North Bull Island SPA.	The black-headed gull is the most widespread breeding seabird within Ireland, breeding both inland and along the coast. Wintering numbers are also boosted by birds arriving from northern and eastern Europe (Wernham *et al.*, 2004). More than 2,000 birds were recorded in all low tide surveys, the peak was 2,933 individuals counted on 02/02/12. Black-headed gulls were recorded within 19 subsites overall (all except 0UL52). The subsite peak of 631 individuals was recorded for 0UL43. This species was recorded foraging intertidally in 14 subsites. 0Ul40 held peak numbers during the first three low tide surveys and numbers ranked as second highest on the first survey date. A greater number of black-headed gulls were recorded as roosting/other behaviour than foraging. Intertidal roosting/other was recorded across 15 subsites overall. Merne *et al.* (2009) noted the importance of Dublin Bay for five species of gull throughout the year, as both a daytime feeding and loafing site, and a night-time roost site. Additionally, survey data suggests that Dublin Bay is a major staging area for black-headed gulls prior to spring migration, a maximum of 39,535 black-headed gulls were recorded in February. The dusk roost undertaken as part of the 2011/12 Waterbird Survey Programme recorded a total of 40,585 black-headed gulls. This species is considered to be 'unfavourable' in terms of population trends.

Special Conservation Interest	Conservation Objectives	Population and Distribution of the Species Within the Site[11]
Wetlands and waterbirds	To maintain the favourable conservation condition of the wetland habitat in North Bull Island SPA as a resource for the regularly occurring migratory waterbirds that utilise it.	Wetlands are distributed throughout the entirety of the SPA boundary, with the exception of the solid causeway running through the centre of the site. Waterbirds have been recorded throughout the SPA.

7.5.2 Potential for Direct and Indirect Effects on the SPA

The potential for direct and indirect effects on the qualifying interests of South Dublin Bay River Tolka and Estuary SPA associated with the proposed development are discussed hereunder.

7.5.2.1 Construction Phase

7.5.2.1.1 Direct Effects

Loss of Habitat

The proposed works will not occur within this European site. Therefore, there will be no direct habitat loss to the North Bull Island SPA as a result of the proposed development.

7.5.2.1.2 Indirect Effects

Water Impacts

Discharges of pollutants or silt-laden waters (of sufficient magnitude) into the Newtownmoyaghy Stream holds the potential to travel downstream to this SPA. Instream works, site clearance, excavation activities and the stockpiling of material could result in sediment laden runoff being dispersed into the Newtownmoyaghy Stream and eventually to the North Bull Island SPA, if not appropriately managed.

Increased silt loading in watercourses can stunt aquatic plant growth, limit dissolved oxygen capacity and overall reduce the ecological quality of watercourses, with the most critical period associated with low flow conditions.

If surface water runoff was to become contaminated with fuels or oils from construction vehicle/machinery leaks and spills, this could also pose a significant risk to plant life in the SPA.

Water impacts could pose a risk to the special conservation interests of the SPA via their food sources such as fish and macroinvertebrate populations.

Dust Impacts

The proposed construction works will include excavation activities which have the potential to result in the generation of dust within the immediate area. Movement of HGVs associated with the construction works are likely to be 'Small' trackout movements, which equates to dust occurring up to 50m from the site (Section 5.1.5). At the closest point, the North Bull Island SPA is located approximately 29km east (straight line distance) from the proposed development site, thus there is no potential for the generation of dust to impact this SPA.

Noise Impacts

As mentioned above, the proposed development site is located 29km from this SPA; therefore, due to this considerable distance, there is no risk of noise disturbance of the special conservation interests.

7.5.2.2 Operation Phase

7.5.2.2.1 Direct Effects

No operational activities will occur outside of the proposed development boundary. Therefore, there will be no direct effects on the North Bull Island SPA.

7.5.2.2.2 Indirect Effects

Surface water runoff will be filtered through a standard filter drain, installed along the road's edge, as discussed in Section 5.2.1. This water will be filtered back to the Newtownmoyaghy Stream which greatly reduce the potential risk of traffic and vehicle pollution entering the stream and subsequently travelling to the North Bull Island SPA.

Attributes and Measures	Target	Potential for Adverse Effects
Light-bellied brent goose, shelduck, teal, pintail, shoveler, oystercatcher, golden plover, grey plover, knot, sanderling, dunlin, bar-tailed godwit, black-tailed godwit, curlew, redshank turnstone and black-headed gull.		
Population trend (% change)	Long term population trend stable or increasing.	**Yes,** a degradation of water quality due to the potential release of hydrocarbons or sediment into the Newtownmoyaghy Stream could impact special conservation interests and/or their prey in the downstream intertidal and subtidal habitats in which these species forage. A decrease of prey could result in a decrease of the carrying capacity of the foraging habitats for the designated special conservation interest species. This could potentially affect the long-term population trend for these special conservation interest species and change their distribution range. A change in population trend and distribution would **constitute a significant adverse effect.**
Distribution (range, timing and intensity of use of areas)	No significant decrease in the range, timing or intensity of use of areas by the special conservation interest, other than that occurring from natural patterns of variation.	
Wetlands		
Habitat area (hectares)	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,713 hectares, other than that occurring from natural patterns of variation.	No, the proposed development is located outside the SPA boundary. No works will occur within the SPA boundary. There will be no loss of habitat area. There is no potential for significant adverse effects on habitat area.

8. MITIGATION MEASURES

For the purpose of Article 6(3) of the Habitats Directive, the mitigation measures prescribed hereunder will avoid and/or reduce the significance of the potential impacts from the proposed development and prevent the occurrence of any significant adverse effects on European sites. The mitigation measures are described with respect to:

- How the measures will avoid/reduce adverse effects on the site;
- The degree of confidence in their likely success;
- The timescale, relative to the project, when they will be implemented and secured; and
- How and when the measures will be monitored.

8.1 CONSTRUCTION PHASE MITIGATION MEASURES

Mitigation measures which will be implemented during the Construction Phase are detailed hereunder.

8.1.1 Ecological Clerk of Works

A suitably qualified Ecological Clerk of Works (ECoW) will be appointed by the Contractor. The ECoW will be available for the duration of the Construction Phase and will ensure that all mitigation measures outlined within this report are implemented during the proposed construction works. The ECoW will monitor the sediment / turbidity levels (e.g. by using a turbidity tube) downstream of the works. The ECoW will take baseline samples before works commence, take daily samples during instream works, and after works have finalised as appropriate and in liaison with the Contractor.

8.1.2 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) will be prepared and will be implemented during the Construction Phase of the development. All mitigation measures outlined within this NIS will be incorporated within the CEMP.

8.1.3 Management of Invasive Species

In order to comply with Regulations 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations (2011), the appointed Contractor will ensure biosecurity measures are implemented throughout the construction phase to ensure the introduction and translocation of Invasive Alien Plant Species (IAPS) is prevented.

The following mitigation measures are prescribed to control the translocation or spread of IAPS and / or pathogens:

- Biosecurity measures will comply with the IFI Biosecurity Protocols including: 'IFI Biosecurity Protocol for Field Survey Work' (IFI, 2010);
- All plant and machinery used during the works should be thoroughly cleaned and washed before delivery to the site to prevent the spread of hazardous invasive species and pathogens.
- No construction works will occur outside the proposed development site boundary; and

- No invasive plant species were recorded within the proposed development site. However, in the event that proposed construction works are delayed more than 12 months, a pre-construction invasive species survey will be undertaken. In the event that an invasive plant species, listed in Part 1 of the Third Schedule of S.I No. 477/2011 – European Communities (Birds and Natural Habitats) Regulations 2011 is recorded, a site-specific Invasive Species Management Plan (ISMP) will be prepared.

8.1.4 Management of Material Disposal

All material, except topsoil, from the excavation of the new channel, will be removed off-site and disposed of at an appropriate permitted or licensed facility in compliance with the Waste Management Act (1996) as amended.

8.1.5 Mitigation Measures for Water Quality Effects

Due to the proposed plan for instream works in the Newtownmoyaghy Stream and hydrological connectivity to two SACs and two SPAs, the implementation of mitigation measures for sediment and pollution control is necessary.

A precautionary approach has been taken with regards potential impacts on aquatic habitats and species, and mitigation measures have been proposed to avoid or reduce any potential for significant effects.

8.1.5.1 Management of Sediment

The following measures will be carried out by the appointed Contractor to minimise and avoid the effects of sedimentation during the proposed Construction Phase.

- All construction works will be confined to the proposed development site boundary. No works will be undertaken outside of this area.
- Works within and adjacent to watercourses will be suspended during periods of heavy rainfall (i.e. greater than 10mm/hour or greater than 25mm in a 24-hour period);
- Prior to any excavation works commencing, silt fences will be erected by hand along the banks of the stream i.e. at the point where the new channel will join back with the Newtownmoyaghy Stream, to ensure sediment is prevented from travelling outside of the planning application boundary. Silt fences will also be installed between the interface of stockpiled material and the newly excavated channel to prevent silt from travelling from the stockpile into the new channel. Silt fencing locations are presented in Figure 3-2. A permeable fabric (Hy-Tex Terraston Premium silt fence, or similar) will be used instead of mesh. The silt fences will be positioned to allow an appropriate working area but will not occur within areas prone to flood. The silt fencing will be erected as per the manufacturer's guidelines, under the ECoW supervision and will be maintained until all ground disturbance has ceased and vegetation re-established. Once installed, the silt fence will be inspected daily during construction and more frequently during heavy rainfall events. The ECoW will also supervise the removal of the silt fences following the completion of the works.
- No direct discharge to the stream will be permitted at any time during the works. Any sediment collected by settlement tanks/silt fencing will be transported off site by a licensed waste operator for appropriate disposal.

- Once the silt fences are installed sand bags, wrapped in heavy gauge polythene will be positioned along both ends of the stream connection point, creating a barrier around the construction works. The sandbags will be lifted into place using a mechanical excavator.
- Instream works (on the new channel section. will be carried out during low flow, outside of the 1 in 10 -year flood event extents.
- Sedi-mats will be placed within the newly excavated channel, prior to the diversion of the stream. Sedi-mats will also be placed immediately downstream of the proposed development, to further prevent any sediment from travelling to any hydrologically connected designated sites, via the Newtownmoyaghy Stream. Sedi-mats will be removed after construction works have been completed.
- Excavations less than 10m from a watercourse should be covered with tarp or similar during high rainfall to avoid the creation of surface water with high concentrations of suspended solids that would require dewatering.
- Excavated materials temporarily stockpiled will be stored at least 10m away from watercourses and drainage paths during the divergence works to minimise generating sediment laden runoff during the works.
- Prior to the diversion, the newly excavated channel will act as a temporary silt pond. Once the silt has been cleared from the channel and new gravel has been installed, this will also reduce the likelihood of suspended solids being released in the new channel, once the diversion is complete.

8.1.5.2 Management of Construction Pollution

The following measures will be carried out by the appointed Contractor to minimise and avoid the effects of water pollution during the Construction Phase.

- An emergency plan to deal with accidental spillages will be drawn up, which all site personnel must adhere to and receive training in.
- Spill-kits and hydrocarbon absorbent packs will be stored in the cabin of all construction vehicles. All machine operators and site staff will be fully trained in the use of this equipment.
- All machinery will be regularly maintained and checked for leaks. Services will not be undertaken within 50m of a surface water conduit. Servicing must be undertaken on level, hard surfaced designated areas.
- Re-fuelling of construction equipment and the addition of hydraulic oil or lubricants to vehicles / equipment will take place in a designated hard surface, bunded area, on-site, more than 50m away from the Newtownmoyaghy Stream. If it is not possible to bring machinery to the refuelling point, fuel will be delivered in a double-skinned mobile fuel bowser. A drip tray will be used beneath the fill point during refuelling operations in order to contain any spillages that may occur.
- All waste will be removed from the site and disposed of by an approved waste contractor in accordance with prevailing waste management regulations.
- On completion of the works, all apparatus, plant, tools, offices, sheds, surplus materials, rubbish and temporary erections or works of any kind will be removed from the site.
- Water runoff from constructed roads and hardstanding areas will be intercepted by the silt curtains, to prevent increased sediment loading to the channel.

- All works will comply with the guidance set out in the guidance document entitled: '*Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532)*' (CIRIA, 2001).

8.1.5.3 Protection of Aquatic Life

- All works will adhere to IFI 'Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters' (IFI, 2016).
- Instream works will only occur outside of the Annual Close Season during the permitted summer period of July-September inclusive, outside the 1 in 10-year flood event extents.
- The addition of the imported certified clean gravel to the new channel will not only stabilize the stream bed and reduce levels of suspended solids during the stream diversion, but it will also add habitat value for aquatic life within the new stream. The addition of pools and boulders to the new stream design will also enhance the stream for aquatic life by creating a richer diversity of resting places.
- During the bunding of the existing Newtownmoyaghy Stream via sandbagging, fish salvage will be undertaken along the old channel (under licence using electrofishing techniques by certified personnel) and translocation of any fish present will take place to the watercourse directly downstream of the proposed development. The licence is issued under Section 14 of the Fisheries (Consolidation) Act, 1959 as substituted by Section 4 of the Fisheries (Amendment) Act, 1962. Records of all translocated fish must be obtained.
- The diversion of the flow from the old channel to the new channel will be managed in a gradual fashion, over the course of two days. This will ensure the continued flow of the stream.
- Any silt contaminated water from the works area must be treated prior to discharge.
- The channel will be graded, and topsoil placed and reseeded in early June and stabilized as necessary with a geocore/geojut material. This will prevent erosion of the banks and siltation of the watercourse.
- Direct access to the Newtownmoyaghy Stream by Construction Phase vehicles should not occur, and any crossing of the stream should be done so via the installation of a temporary clear span structure.

The abovementioned mitigation measures for water quality effects will ensure protection of aquatic life.

8.1.6 Dust Control

- During periods of extended dry weather, dust suppression may be necessary along haul roads and at work areas. When rainfall levels are <0.2mm per day dust suppression is unlikely to occur naturally (Holman *et al.,* 2014; BRE, 2003). In such cases, water which will be brought to site in tankers, will be pumped into a bowser or water spreader to dampen down haul roads and work areas to prevent the generation of dust where required. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff.
- Water for dust suppression will not be obtained from the Newtownmoyaghy Stream.

- A designated vehicle wheel wash area will be created adjacent to the main site entrance where all HGVs will be cleaned prior to leaving the site.
- All stockpiled material will be covered with tarp or similar material, and if necessary, during periods of dry weather will be watered to increase stability and suppress dust.

8.2 Operational Phase Water Pollution Control

Surface water runoff from the Newtownmoyaghy Road will be filtered through a standard filter drain, which consists of gravel filled trenches with a porous pipe at the base, will be installed along the new roadside edge (Newtownmoyaghy Road). The water flowing to this drain (i.e. surface water runoff such as rainwater) will be filtered back to the Newtownmoyaghy Stream from an outlet head wall. The standard filtered drain will prevent the risk of traces of hydrocarbons directly entering the watercourse, thus reducing downstream pollution. Roadside maintenance will be carried out by the County Council to ensure there is no blockage of the filter drains and that the drains are effectively functioning for their specified purpose.

8.3 Mitigation Effectiveness

The appointed Contractor will be responsible for ensuring all mitigation measures listed above, including any additional planning conditions, are fully implemented during the Construction Phase.

The above outlined mitigation measures are best practice and are proven technologies/methods. The mitigation measures, once correctly applied, will avoid, or reduce the magnitude of potential impacts on the receiving environment, therefore ensuring avoidance of significant adverse effects on the integrity of the South Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA, North Dublin Bay SAC, and North Bull Island SPA.

9. ANALYSIS OF POTENTIAL IN-COMBINATION EFFECTS

Article 6(3) of the Habitats Directive requires that, *'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.'* It is therefore required that potential impacts, as a result of the proposed development, are considered in-combination with any other relevant plans or projects.

A search of the Meath County Council planning portal[12] was therefore undertaken. The planning portal search indicated that the majority of nearby developments include small-scale residential and rural developments (e.g. residential one-off housing and agriculturally based developments) in rural areas. The planning authority considered that the nature and minor scale of these applications would preclude any potential for likely significant effects on European sites and, therefore, ecological reports (e.g. AA screening, NIS) were not considered necessary for these planning applications. Thus, due to the small-scale and temporary nature of these developments, it is considered there is no potential for any in-combination effects with the proposed development on any European site(s).

One application for a large scale housing development on the lands adjacent to the eastern boundary of the proposed development site was submitted in 2022. 530 residential units with amenity spaces were proposed. However, both the application and appeal were refused. Therefore, this development will not result in any in-combination effects with the proposed development site.

The proposed development is located within the County Meath administrative area. A review of the current Meath County Development Plan 2021 – 2027 (Meath County Council, 2021) was undertaken. It sets out the policies, objectives, and the overall strategy for the development of the county over the plan period 2021 to 2027. The Plan outlines policies and objectives which are proactive in promoting the protection of European sites, including policies HER POL 32 to HER POL 35 and objective HER OBJ 33 which states:

'*To ensure an Appropriate Assessment in accordance with Article 6(3) and Article 6(4) of the Habitats Directives (92/43/EEC)…is carried out in respect of any plan or project not directly connected with or necessary for the management of the site but likely to have a significant effect on a Natura 2000 site(s), either individually or in-combination with other plans or projects, in view of the site's conservation objectives'.*

No specific plans or projects were identified within the Plan (Meath County Council, 2021) which have the potential for likely significant in-combination effects with the proposed development. Furthermore, as stated above, following objective HER OBJ 33, any new plan/project within the local administrative area (i.e. Meath County Council) will be subject to the Appropriate Assessment process as per the EU Habitats Directive, to assess the likelihood of significant effects on European Sites, either alone or in-combination with other plans and projects.

[12] Local Government Ireland Planning System

10. CONCLUSION

This NIS has been prepared in accordance with the guidance '*Appropriate Assessment of Plans and Projects in Ireland; Guidance for Planning Authorities*' (DEHLG, 2010). The function of this report is to assist the competent authority with undertaking an Appropriate Assessment in accordance with the Habitats Directive, Part XAB of the Planning and Development Act 2000, and case law.

The assessment considers whether the proposed development, alone or in-combination with other projects or plans, will result in adverse effects on the integrity of South Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA, North Dublin Bay SAC and North Bull Island SPA and includes any mitigation measures necessary to avoid or reduce the risk of negative effects.

In the absence of mitigation, the potential risk to the South Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA, North Dublin Bay SAC and North Bull Island SPA is a reduction in water quality from the potential release of suspended solids and/or pollutants. However, following the application of the detailed mitigation measures included above, potential significant adverse effects will be avoided or reduced. Consequently, it is determined there is no risk of adverse effects on the qualifying interests or special conservation interests, or on overall site integrity, nor in the attainment of their specific conservation objectives for the South Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA, North Dublin Bay SAC and North Bull Island SPA.

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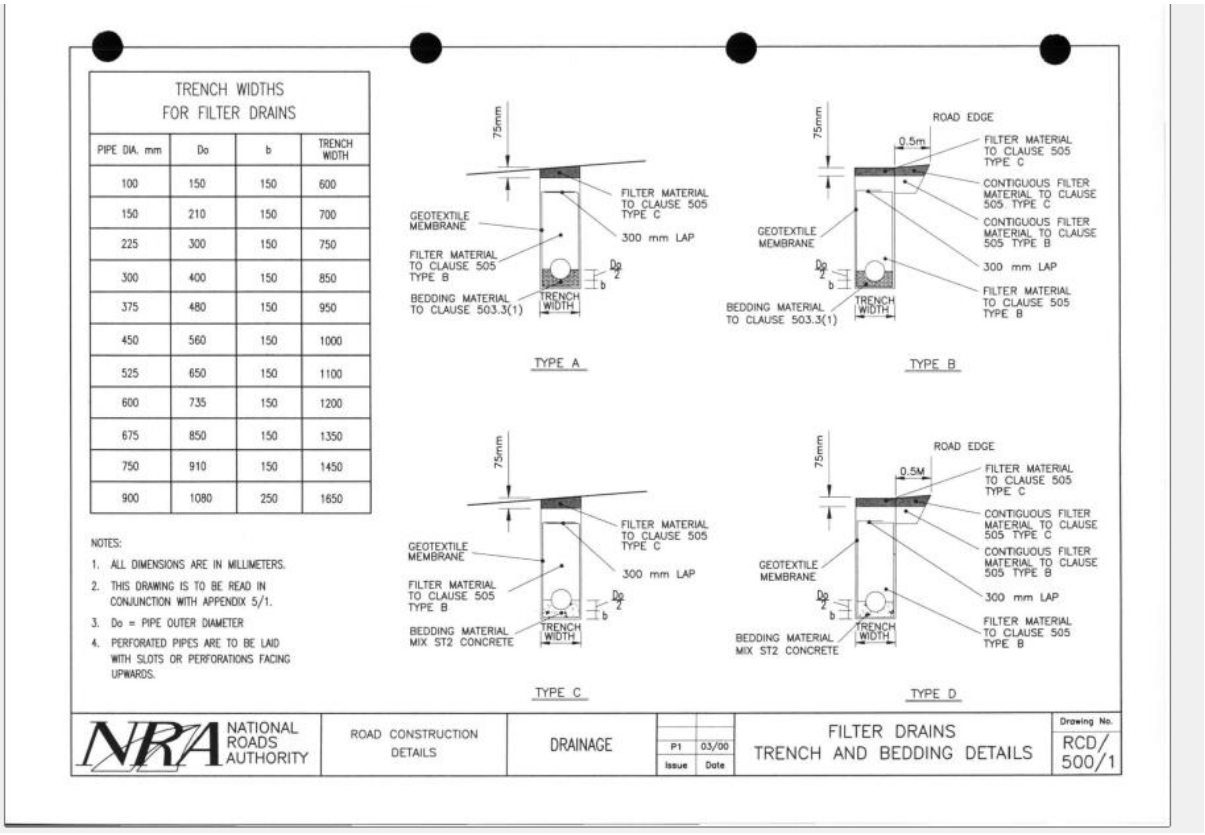
Appendix A APPROPRIATE ASSESSMENT SCREENING REPORT

Appendix A-I NRA Filter Drain and Trench Bedding Details



TRENCH WIDTHS FOR FILTER DRAINS

PIPE DIA. mm	Do	b	TRENCH WIDTH
100	150	150	600
150	210	150	700
225	300	150	750
300	400	150	850
375	480	150	950
450	560	150	1000
525	650	150	1100
600	735	150	1200
675	850	150	1350
750	910	150	1450
900	1080	250	1650

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH APPENDIX 5/1.
3. Do = PIPE OUTER DIAMETER
4. PERFORATED PIPES ARE TO BE LAID WITH SLOTS OR PERFORATIONS FACING UPWARDS.

NATIONAL ROADS AUTHORITY | ROAD CONSTRUCTION DETAILS | DRAINAGE | P1 03/00 Issue Date | FILTER DRAINS TRENCH AND BEDDING DETAILS | Drawing No. RCD/500/1

Appendix A-II NEW CHANNEL EXCAVATION DEPTHS