GREYSTONES MARINA VILLAGE

146B AMENDMENT APPLICATION

APPROPRIATE ASSESSMENT

SCREENING REPORT

SEPTEMBER 2020

Prepared for

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by

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1. INTRODUCTION

1.1 Background

An Bord Pleanála approved the Greystones Harbour development under Section 226 of the Planning and Development Act 2000 in 2007 (parent approval - **ABP Ref. 27 EF2016**) for the following.

> *"An integrated harbour/marina mixed development linked to a linear coastal public park, the development will provide leisure, recreational, open space and marine facilities and mixed form residential, commercial, civic and social amenities centred around the harbour and marina at Rathdown Upper and Rathdown".*

Permission was approved by An Bord Pleanála in 2012 (**ABP Ref. 27.JA0029)** for substantial revisions to ABP Ref. 27 EF2016 (parent permission). Further planning revisions were approved as follows: WCC Planning Ref 10/2462 and 10/2808.

The client has now prepared a Section 146B application to An Bord Pleanala for revisions to the approved Block D and to two courtyards in relation to parking. The proposed revision relates solely to a redesign of Block D, with a change in usage from health/residential/commercial to residential and commercial.

The present report for Appropriate Assessment Screening is in support and the Section 146B submission. It has been prepared by Dr Brian Madden of BioSphere Environmental Services. The purpose of the report is to provide the information required to assist An Bord Pleanála, the competent authority, to undertake a Screening Assessment and, if necessary, an Appropriate Assessment (AA). This will determine the effects, if any, on European sites (also known as Natura 2000 Sites) designated for nature conservation as a result of the proposed project, both alone and in-combination with other plans and projects.

The requirements for an Appropriate Assessment are set out *under Article 6 of the EU Habitats Directive (92/34/EEC)*, transposed into Irish law through the *European Union (Birds and Natural Habitats) Regulations 2011-2015* and the *Planning and Development Act, 2000* (as amended).

Brian Madden had been consultant ecologist on the planning application for the parent permission as well as for subsequent applications and is thoroughly familiar with the layout of the Greystones Marina Project.

1.2 Regulatory Context

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna, better known as "The Habitats Directive", provides the framework for legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/EEC) (better known as "The Birds Directive").

Article 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect Natura 2000 sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment (see below).

> "*Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implication for the site and subject to the provisions of paragraph 4, the 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 has been implemented in the context of the planning code under article 177V of the Planning and Development Act, 2000, as amended.

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. First the project should aim to avoid any negative impacts on European sites by identifying possible impacts early in the planning stage, and designing the project in order to avoid such impacts. Second, mitigation measures should be applied, if necessary, during the AA process to the point, where no adverse impacts on the site(s) remain. If the project is still likely to result in adverse effects, and no further practicable mitigation is possible, then it is rejected. If no alternative solutions are identified and the project is required for imperative reasons of overriding public interest (IROPI test) under Article 6 (4) of the Habitats Directive, then compensation measures are required for any remaining adverse effect.

1.3 Stages of the Appropriate Assessment (AA)

This Appropriate Assessment Report / Natura Impact Statement has been prepared in accordance with the following guidance:

- *Appropriate Assessment of Plans and Projects in Ireland.* Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government, 2010 revision;
- *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*. European Commission Environment DG, 2002;
- *Managing Natura 2000 sites: The Provisions of Article 6 of the Habitats Directive 92/43/EEC.* Guidance issued by European Commission (21st November 2018).

There are up to four successive stages involved in the Appropriate Assessment process (European Commission 2002). The outcome at each stage determines whether the next stage in the process is required. The following describes each of the four stages:

Stage 1 – Screening

This is the first stage in the process and is carried out to determine the necessity for a more detailed Stage 2 Appropriate Assessment where potential impacts on European sites are deemed to be of significance. The following steps are involved in the Stage 1 Screening:

- Description of the project and site characteristics (existing environment);
- Identification and description of Natura sites that could potentially be affected;
- Identification and description of potential impacts;
- Assessment of potential impacts;
- Exclusion of sites where no significant effects are foreseen.

Stage 2 – Appropriate Assessment

This stage involves the consideration of the impact on the integrity of the European site of the project, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives.

Stage 3 – Assessment of Alternatives

The process which examines alternative ways of achieving the objectives of the plan or project that may avoid adverse impacts on the integrity of the European site.

Stage 4 – Assessment where no Alternative Solutions Exist and where Adverse Impacts Remain

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. First, the project should aim to avoid any impacts on European sites by identifying possible impacts early in the process. If the possibility of any adverse effects on the integrity of any European Site, arising from the proposed development, either alone or in combination with other plans or projects cannot be excluded beyond a reasonable scientific doubt, and no further mitigation is practicable, development consent must be refused. If no

alternative solutions are identified and the project is required for imperative reasons of overriding public interest (IROPI test) under article 6(4) of the Habitats Directive, then compensation measures are required for any remaining adverse effect.

2. SCREENING FOR APPROPRIATE ASSESSMENT

Screening determines whether appropriate assessment is necessary by examining:

1. Whether a plan or project can be excluded from AA requirements because it is directly connected with or necessary to the management of a Natura 2000 site;
2. Whether it is possible that the project may have a significant effect on a Natura 2000 site, either alone or in combination with other projects or plans, in view of the site's conservation objectives.

Screening involves the following:

i. Description of plan or project;
ii. Identification of relevant Natura 2000 sites, and compilation of information on their qualifying interests and conservation objectives;
iii. Assessment of likely effects – direct, indirect and cumulative – undertaken on the basis of available information as a desk study or field survey or primary research as necessary;
iv. Screening Statement with conclusions.

2.1 Description of the Project

Outline of proposed development

The proposed development is an amendment to Block D as approved. In summary, the approved primary care centre will be omitted and the ground floor (1,351 sqm) will be entirely commercial facing the marina and the entrance to the harbour. 33 no. apartments are proposed. The revised Block D will retain substantially the same footprint as approved but altered in layout introducing a single storey element on the north facing (courtyard) elevation. Alterations are also proposed to the approved courtyards between the blocks with the landscaping emphasis at the marina side and revision of car parking layout and numbers.

It is noted that the amendment application does not alter the road, drainage or watermain infrastructure granted under the parent and subsequent permissions.

Surface Water Drainage

It is proposed to connect the commercial and apartment units to the existing surface water sewer network granted permission under ABP Ref 27 EF2016 (parent permission) and 27.JA0029 and also WCC Planning Ref 10/2462 and 10/2808. All connections from commercial units and apartments will be constructed in accordance with the recommendations of the 'Greater Dublin Strategic Drainage Study (GDSDS) and Building Regulations.

The surface water and outfalls have been approved under ABP Ref 27 EF2016. The previously approved surface water drainage network has adequate capacity to cater for the alterations to Block D under this amendment application. It is noted that the footprint of the amended Block D proposal is largely the same as the current approved layout.

Foul Drainage

It is proposed to connect the commercial and apartment units to the existing foul sewer network granted permission under ABP Ref 27 EF2016 (parent EF2016 permission) and 27.JA0029 and also WCC Planning Ref 10/2462 and 10/2808. All public foul drainage will be constructed in accordance with the principles and methods as set out in the Irish Water Code of Practice and Standard Details for Wastewater Infrastructure. All private foul drainage will be constructed in accordance with the Building Regulations.

The proposed foul sewer network has adequate capacity to cater for the additional commercial and housing units proposed under this amendment application.

2.2 European Sites Identification

In accordance with the European Commission Methodological Guidance (EC, 2002), consideration is given to European sites that could potentially be affected by the proposed project.

The "Guidance for Planning Authorities" (Department of Environment, Heritage and Local Government) notes the following in section 3.2.3 "Natura 2000 Sites":

"The second stage (of the AA Screening process) is an examination of what Natura 2000 sites might be affected. These sites should be identified and listed, bearing in mind the potential for a plan or project, whether it is within or outside a Natura 2000 site, to have direct, indirect or cumulative effects, and taking a precautionary approach so that a site is included if doubt exists".

The approach to screening is likely to differ somewhat between plans and projects, depending on scale and on the likely effects, but the following should be included:

1. *Any Natura 2000 sites within or adjacent to the plan or project area*
2. *Any Natura 2000 sites within the likely zone of impact of the plan or project. A distance of 15 km is currently recommended in the case of plans, and derives from UK guidance (Scott Wilson et al. 2006). For projects, the distance could be much less than 15 km, and in some cases less than 100 m, 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.*

3. *Natura 2000 sites that are more than 15 km from the plan or project area depending on the likely impacts and the sensitivities of the ecological receptors, bearing in mind the precautionary principle. In the case of sites with water dependent habitats or species, and a plan or project that could affect water quality of quantity, for example, it may be necessary to consider the full extent of the upstream and/or downstream catchment."*

For the proposed amendment application, the important attribute in considering the Natura 2000 sites that could be affected is that the project is within a previously approved development site and that the revised Block D will retain substantially the same footprint as approved but altered merely in layout and usage. Of particular relevance form the perspective of AA is that the amendment application does not alter the road, drainage or watermain infrastructure granted under the parent and subsequent permissions

Taking a precautionary approach, potential impacts by the proposed Block D amendment development on European sites identified in a radius of up to 10 km of the project site are considered. Such sites are listed in Table 1 and shown in Figure 1.

Table 2 lists the qualifying interests for each site and examines whether a linkage exists between the project area and the relevant European site.

Table 1. European sites within 10km of Greystones Marina Project.

European site (site code)	**Location (closest straight line distance from the development site)**
Special Areas of Conservation (SAC)	
Bray Head SAC (00714)	< 500 m north of amendment application development area
Murrough Wetlands SAC (002249)	c.5 km to the south
Glen of the Downs SAC (00719)	c.3.5 km to the west
Ballyman Glen SAC (00713)	c.7 km to the northwest
Knocksink Woods SAC (00725)	c.8 km to the northwest
Carriggower Bog SAC (00716)	c.8 km to the southwest
Wicklow Mountains SAC (002122)	c.9 km to the west
Rockabill to Dalkey Island (003000)	c.10+ km to the northeast
Special Protection Areas (SPA)	
The Murrough SPA (004186)	c.6 km to the south
Wicklow Mountains SPA (004040)	c.9 km to the west

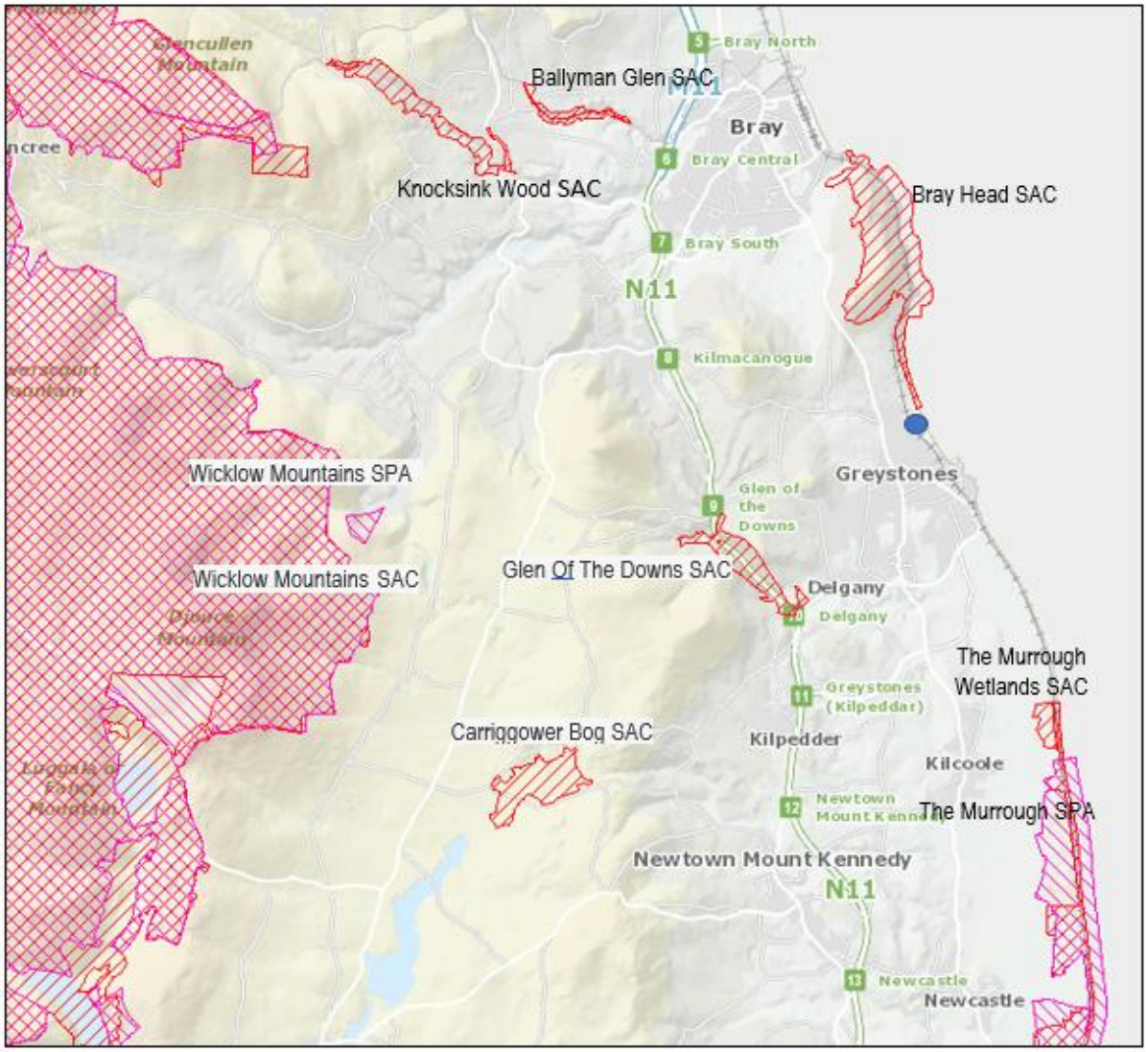

Figure 1. European sites within a 10 km radius of Block D development site

Table 2. Relevant European sites, reasons for designation, and linkages.

European Site	**Reasons for designation (information correct as of 3rd February 2020) (*denotes a priority habitat)**	**Source – Pathway – Receptor link**
Bray Head SAC (site code 000714)	[1230] Vegetated Sea Cliffs [4030] Dry Heath According to this SAC's site Conservation Objectives document (Version 1, dated 11th April 2017), for the listed QI, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitat for which the SAC has been selected.	No While the Bray Head SAC extends to the clay cliffs at Redford Bridge just north of the Greystones Marina Project area, there is no linkage, hydrological or otherwise, between the Block D location and the SAC
Murrough Wetlands SAC (site code 0002249)	1210 Annual vegetation of drift lines 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) 1410 Mediterranean salt meadows (*Juncetalia maritimi*) 1220 Perennial vegetation of stony banks 7210 Calcareous fens with Cladium mariscus and species of the Caricion davallianae* 7230 Alkaline fens According to this SAC's site Conservation Objectives document (Generic Version 7, 2020), for each of the listed QIs, the Conservation Objective is to maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	No. The Murrough Wetland SAC commences c.5 km to the south of Greystones. A pathway between the Block D Study Area and the Murrough Wetland SAC has not been identified.
Glen of the Downs SAC (site code 000719),	Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] According to this SAC's site Conservation Objectives document (Generic Version 7, dated 2020), for each of the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats for which the SAC has been selected.	No. The Glen of the Downs SAC is located c.3.5 km to the west of Greystones. A pathway between the Block D Study Area and the Glen of the Downs SAC has not been identified.
Ballyman Glen SAC (site code 000713)	Petrifying springs with tufa formation (Cratoneurion) [7220] Alkaline fens [7230]	No. The Ballyman Glen SAC is located c.7 km to the west of Greystones.

European Site	**Reasons for designation (information correct as of 3rd February 2020) (*denotes a priority habitat)**	**Source – Pathway – Receptor link**
	According to this SAC's site Conservation Objectives document (Version 1, 2019), for the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats for which the SAC has been selected.	A pathway between the Block D Study Area and the Ballyman Glen SAC has not been identified.
Knocksink Woods SAC (site code 00725)	Petrifying springs with tufa formation (Cratoneurion) [7220] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] According to this SAC's site Conservation Objectives document (Version 1, 2019), for the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats for which the SAC has been selected.	No. The Knocksink Woods SAC is located c.8 km to the northwest of Greystones. A pathway between the Block D Study Area and the Knocksink Woods SAC has not been identified.
Carriggower Bog SAC (site code 00716)	Transition mires and quaking bogs [7140] According to this SAC's site Conservation Objectives document (Version 1, dated 13 Dec 2019), for each of the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats for which the SAC has been selected.	No. The Carriggower Bog SAC is located c.8 km to the southwest of Greystones. A pathway between the Block D Study Area and the Carriggower Bog SAC has not been identified
Wicklow Mountains SAC (site code 001209),	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with Erica tetralix [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Calaminarian grasslands of the Violetalia calaminariae [6130] Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] Blanket bogs (* if active bog) [7130]	No. The Wicklow Mountains SAC is located c.9 km to the west of Greystones. A pathway between the Block D Study Area and the Wicklow Mountains SAC has not been identified

European Site	**Reasons for designation (information correct as of 3rd February 2020) (*denotes a priority habitat)**	**Source – Pathway – Receptor link**
	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110] Calcareous rocky slopes with chasmophytic vegetation [8210] Siliceous rocky slopes with chasmophytic vegetation [8220] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Lutra lutra (Otter) [1355] According to this SAC's site Conservation Objectives document (Version 1, 2017), for the listed QI, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats and Annex II species for which the SAC has been selected.	
Rockabill to Dalkey Island SAC (site code 003000),	1170 Reefs 1351 Harbour Porpoise (*Phocoena phocoena*) According to this SAC's site Conservation Objectives document (Version 1, dated 07th May 2013), for each of the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	No. The Rockabill to Dalkey Island SAC is located just over 10 km to the NE of Greystones. A pathway between the Block D Study Area and the Rockabill to Dalkey Island SAC has not been identified.
The Murrough Wetland SPA (site code 004186)	Red-throated Diver (Gavia stellata) [A001] Greylag Goose (Anser anser) [A043] Light-bellied Brent Goose (Branta bernicla hrota) [A046] Wigeon (Anas penelope) [A050] Teal (Anas crecca) [A052] Black-headed Gull (Chroicocephalus ridibundus) [A179] Herring Gull (Larus argentatus) [A184] Little Tern (Sterna albifrons) [A195] Wetland and Waterbirds [A999]	No The Murrough Wetland SPA is located just over 6 km to the south of Greystones. A pathway between the Block D Study Area and the Murrough Wetland SPA has not been identified. Further, the Marina Project Area does not have habitat to support the Special Conservation Interests of the SPA.

European Site	**Reasons for designation (information correct as of 3rd February 2020) (*denotes a priority habitat)**	**Source – Pathway – Receptor link**
	According to this SPA's site Conservation Objectives document (Generic Version 7, dated 2020), for each of the listed SCIs, the Conservation Objective is to maintain the favourable conservation condition of the species and wetland habitat for which the SPA has been selected.	
Wicklow Mountains SPA (site code 004140),	Merlin (Falco columbarius) [A098] Peregrine (Falco peregrinus) [A103] According to this SPA's site Generic Conservation Objectives document (Version 7, 2020), for each of the listed SCIs, the Conservation Objectives are to maintain or restore the favourable conservation condition of the species for which the SPA has been selected.	No. There are no pathways (physical or hydrological) between the Greystones Marina Project Area and the Wicklow Mountains SPA. Further, the Marina Project Area does not have habitat to support the Special Conservation Interests of the SPA.

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2.3 Assessment of Significance and Potential Impacts and Effects

Potential impacts, if any, by the proposed project on the identified European sites are discussed below.

Impacts are considered in the context of the **Source-Pathway-Receptor** (S-P-R) conceptual model for environmental management risk assessment. This provides a systematic means of determining and evaluating the nature, effect and extent of exposure a vulnerable receptor may experience in relation to a particular hazard. For a risk to exist there must be a source (or hazard or pressure), a pathway, and a receptor (or target) (Daly, 2004). An environmental hazard is an event, or continuing process, which if realised will lead to circumstances having the potential to degrade, directly or indirectly, the quality of the environment (Royal Society, 1992). A pathway is a route by which a particle of water, substance or contaminant moves through the environment and comes into contact with, or otherwise, affects a receptor (Environment Agency, 2001).

From the perspective of AA Screening, it is highlighted that the proposed project is an amendment to a permitted project (for which an Appropriate Assessment had been carried out by the competent authority). The nature of the proposed project is also highlighted, namely, changes to the design and subsequent usage of the permitted Block D building. The project does not involve any other changes from the permitted planning and importantly does not alter the road, drainage or watermain infrastructure granted under the parent and subsequent permissions. It is noted that the proposed amendment project does not require any additional mitigation to that detailed in the parent and subsequent permissions.

Special Areas of Conservation

For the eight identified SAC sites (see Tables 1 & 2), it can be demonstrated with full scientific certainty that there is no Pathway between the Source (i.e. Block D project area) and relevant Receptor (European site). These sites vary in distances between 500 m and 10+ km from the Block D location within the Greystones Marina complex. As the proposed amendment merely involves changes to design and usage of the building but no change to the footprint of building or the drainage arrangements (from parent permission), the amendment could not have any effects, direct or indirect, on the various qualifying interests (as listed in Table 2) of the SACs.

While the Bray Head SAC is located just north of the Greystones Marina Project area, it is highlighted that the qualifying interests of the SAC (vegetated sea cliffs and dry heath) could not in any way be affected by the proposed amendment to Block D.

It can be concluded with scientific certainty that the proposed project could not have impacts, direct or indirect, on the conservation objectives of any of the eight identified SAC sites and hence on the Site Integrity of the sites.

Special Protection Areas

For the two identified SPA sites (see Tables 1 & 2), it can be demonstrated with full scientific certainty that there is no Pathway between the Source (i.e. Block D project area) and relevant Receptor (European site). These sites vary in distances between 6 km and 9 km from the Block D location within the Greystones Marina complex.

The proposed Block D amendment project could not in any way impact upon the Special Conservation Interests (as listed in Table 2) of the two identified SPAs. Also, the Greystones Marina site does not have habitats to support any of the SCIs associated with the two SPAs.

It can be concluded with scientific certainty that the proposed project could not have impacts, direct or indirect, on the conservation objectives of any of the two identified SPA sites and hence on the Site Integrity of any of the sites.

2.4 Analysis of "In-combination" Effects

The Habitats Directive requires competent authorities to make an appropriate assessment of any plan or project which is likely to have a significant effect alone or in-combination with other plans and projects.

The present report has considered the possibility for impacts by the proposed Block D amendment application on all European sites within a 10 km radius of Greystones harbour, including the Bray Head SAC which occurs just north of the Greystones Marina Project area.

The principal other project that needs consideration is the Greystones Marina parent project, of which Block D is located within. The Marina project is a major infrastructural project that was assessed in detail for environmental impacts and effects, including the carrying out of Appropriate Assessment. At the time, mitigation was recommended as required to minimise environmental impacts and especially the potential for effects on European sites. At this stage, the marina element of project is operational and the landward development largely complete.

Taking into account that the proposed amendment project will not result in any additional impact or require additional mitigation to that of the parent permission, it can be concluded that there is no potential for in-combination effects as a result of the proposed amendment.

2.5 Screening Conclusion and Statement

An Appropriate Assessment screening report has been prepared for a Section 146B amendment to the permitted Block D of the Greystones marina project.

The potential effects that may arise from construction and operation of the project on the Natura 2000 network have been examined by considering the potential for significant effects, alone or in-combination with other projects, on all European sites within a 10 km radius of the Block D location.

On the basis of the findings of this screening report, it is concluded that the project:

(i) is not directly connected with or necessary to the management of a Natura 2000 site, and

(ii) significant impacts on the Natura 2000 network are not foreseen.

Based on this information, and beyond reasonable scientific doubt, we have demonstrated that the proposed Block D amendment, either individually or in combination with other plans or projects, would not be likely to have a significant effect on any Natura 2000 site. Therefore, in accordance with Article 6(3) of the Habitats Directive it is considered that a Stage 2 Appropriate Assessment is not required.

2.6 References

Daly, D. (2004), Groundwater at Risk in Ireland - Putting Geoscientific Information and Maps at the Core of Land Use and Environmental Decision-making, John Jackson Memorial Lecture, Royal Dublin Society, November 2004

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Environment Agency (2001), Guide to Good Practice for the Development of Conceptual Models and the Selection and Application of Mathematical Models of Contaminant Transport Processes in the Subsurface. Environment Agency National Groundwater and Contaminated Land Centre Report, Solihull, UK.

Royal Society (1992) Risk: Analysis, Perception and Management. The Royal Society, London (ISBN 0-85403-467-6).

APPENDIX 1

SITE SYNOPSES

Site Name: Bray Head SAC

Site Code: 000714

This coastal site is situated in the north-east of Co. Wicklow between the towns of Bray and Greystones. The bedrock geology is Cambrian quartzites and shales (with mudstones and greywackes). Bray Head consists of a plateau of high ground, with five prominent quartzite knolls and has a maximum height of 241 m. The more exposed higher ground has a covering of shallow acidic soils, with protruding bedrock and scree. Elsewhere, deeper soils are formed by drift deposits and are calcareous in character. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1230] Vegetated Sea Cliffs

[4030] Dry Heath

Dry heath is the principal habitat over much of Bray Head. The vegetation of the upper plateau area is dominated by dwarf shrubs, mainly Heather (Calluna vulgaris), Bell Heather (Erica cinerea) and gorse (Ulex europaeus and U. gallii). Broom (Cytisus scoparius) also occurs, and associated with the gorse and broom is the Red Data Book species Greater Broomrape (Orobanche rapum-genistae). In the areas where the shrubs are less dense Tormentil (Potentilla erecta), Common Milkwort (Polygala vulgaris), Heath Bedstraw (Galium saxatile) and a variety of grasses (e.g. Aira praecox, Agrostis tenuis, Deschampsia flexuosa) are present. Where rock outcrops occur species such as English Stonecrop (Sedum anglicum) and Sheep's-bit (Jasione montana) are found. Bracken (Pteridium aquilinum) is dominant in some areas. The heath communities which occur on the dry slopes above the sea cliffs, especially those south-facing, are more open in character and dominated by grasses rather than dwarf shrubs. The annual plant communities which develop here are typical of those found only on sites in south-eastern Ireland. Common species include Wood Sage (Teucrium scorodonia), clovers (Trifolium dubium and T. campestre), Scarlet Pimpernel (Anagallis arvensis) and Field Madder (Sherardia arvensis). An uncommon annual species which can appear abundantly in the heath after a fire event is Yellow Fumitory (Corydalis claviculata). Some rare plants are found in this habitat, notably Bird's-foot (Ornithopus perpusillus) and Spring Vetch (Vicia lathyroides), both Red Data Book species.

Calcareous dry grassland, typically species-rich, occurs on deposits of glacial till. The primary grass species are Quaking-grass (Briza media), Smooth Meadow-grass (Poa pratensis) and Red Fescue (Festuca rubra). Typical calcicole herbs include Pale Flax (Linum bienne), Salad Burnet (Sangusiorba minor), Burnet-saxifrage (Pimpinella saxifraga), Carline Thistle (Carlina vulgaris) and Kidney Vetch (Anthyllis vulneraria). Orchids are a feature of this habitat, with five species known from the area - Pyramidal Orchid (Anacamptis pyramidalis), Common Spotted-orchid (Dactylorhiza fuchsii), Common Twayblade (Listera ovata), Fragrant Orchid (Gymnadenia conopsea) and Bee Orchid (Ophrys apifera). Bloody Crane's-bill (Geranium sanguineum) was refound recently in this community at Bray Head - this is a typical species of the Burren and associated areas, and is very rare in eastern Ireland.

Rocky sea cliffs, another Annex I habitat, form most of the seaward boundary at this site and extend for approximately 2 km. Steep clay cliffs extend southwards for a further 1 km, with a small area of clay cliff also at the northernmost part of site. The rocky cliffs are divided by a railway track built in the 1800s. The lower cliffs are fairly steep in places but above the track they are less steep, and often support heath or dry grassland vegetation. In parts the cliffs are up to 60 m in height. Typical species of the more exposed rock areas are Common Scurvygrass (Cochlearia officinalis), Rock Sea-spurrey (Spergularia rupicola), Thrift (Armeria maritima), Sea Campion (Silene vulgaris subsp. maritima), and Sea Samphire (Crithmum maritimum). On some sections of the cliff face, the locally scarce Tree Mallow (Lavatera arborea) is found. Species of the upper cliff flora include Kidney Vetch and Red Fescue. A widespread species found from the mid to upper zones of the cliff face is Ivy (Hedera helix), and associated with this is the scarce Wild Madder (Rubia peregrina).

The clay cliffs in the southern part of the site are steep and unstable and have little vegetation. A stand of mostly native woodland occurs in the northern part of the site. This is a fairly pure Sessile Oak (Quercus petraea) dominated woodland, with some Ash (Fraxinus excelsior) and Downy Birch (Betula pubescens). Understorey trees include Holly (Ilex aquifolium) and Hawthorn (Crataegus monogyna). The wood is on shallow drift and the ground flora often has species more associated with heath than woodland. Other habitats which are found at this site include bedrock shore, a sandy/shingle beach and an area of shallow marine water. Bray Head has an important seabird colony. A census in 1999 gave the following populations: Fulmar (55 pairs), Shag (8 pairs), Kittiwake (781+ pairs), Guillemots (286 individuals), Razorbills (191 individuals) and Black Guillemots (123 individuals). A few pairs of gulls also breed. Both the Kittiwake and Black Guillemot populations are of national importance. Peregrine Falcon, an Annex I species of the E.U. Birds Directive, breeds at the site, as do Raven and Kestrel. Characteristic bird species of the heath areas include Stonechat, Whitethroat, Linnet and Skylark.

The heath and grassland habitats at this site are threatened by reclamation for agriculture and also by frequent burning. The site is a popular recreational area and is especially used by walkers Bray Head is of high conservation importance as it has good examples of two habitats (sea cliffs and dry heath) listed on Annex I of the E.U. Habitats Directive. It also supports a number of rare plant species and has ornithological importance.

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Site Name: Rockabill to Dalkey Island SAC
Site Code: 003000

This site includes a range of dynamic inshore and coastal waters in the western Irish Sea. These include sandy and muddy seabed, reefs, sandbanks and islands. This site extends southwards, in a strip approximately 7 km wide and 40 km in length, from Rockabill, running adjacent to Howth Head, and crosses Dublin Bay to Frazer Bank in south Co. Dublin. The site encompasses Dalkey, Muglins and Rockabill islands.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1170] Reefs

[1351] Harbour Porpoise (*Phocoena phocoena*)

Reef habitat is uncommon along the eastern seaboard of Ireland due to prevailing geology and hydrographical conditions. Expansive surveys of the Irish coast have indicated that the greatest resource of this habitat within the Irish Sea is found fringing offshore islands which are concentrated along the Dublin coast. A detailed survey of selected suitable islands has shown areas with typical biodiversity for this habitat both intertidally and subtidally. Species recorded in the intertidal included *Fucus spiralis*, *Fucus serratus*, *Pelvetia canaliculata*, *Ascophyllum nodosum*, *Semibalanus balanoides* and *Necora puber*. Subtidally, a wide range of species include *Laminaria hyperborea*, *Flustra folicacea*, *Alaria esculenta*, *Halidrys siliquosa*, *Pomatocereos triqueter*, *Alcyonium digitatum*, *Metridium senile*, *Caryophyllia smithii*, *Tubularia indivisa*, *Mytilus edulis*, *Gibbula umbilcalis*, *Asterias rubens*, and *Echinus esculentus*. These reefs are subject to strong tidal currents with an abundant supply of suspended matter resulting in good representation of filter feeding fauna such as sponges, anemones and echinoderms.

The area selected for designation represents a key habitat for the Annex II species Harbour Porpoise within the Irish Sea. Population survey data show that porpoise occurrence within the site boundary meets suitable reference values for other designated sites in Ireland. The species occurs year-round within the site and comparatively high group sizes have been recorded. Porpoises with young (i.e. calves) are observed at favourable, typical reference values for the species. Casual and effort-related sighting rates from coastal observation stations are significant for the east coast of Ireland and the latter appear to be relatively stable across all seasons. The selected site contains a wide array of habitats believed to be important for Harbour Porpoise including inshore shallow sand and mudbanks

and rocky reefs scoured by strong current flow. The site also supports Common Seal and Grey Seal, for which terrestrial haul-out sites occur in immediate proximity to the site. Bottle-nosed Dolphins has also occasionally been recorded in the area. A number of other marine mammals have been recorded in this area including Minke, Fin and Killer Whales and Risso's and Common Dolphins.

The coastal environment of Co. Dublin is a very significant resource to birds with some nationally and internationally important populations. Of particular note in this site are the large number of terns (Arctic, Common and Roseate) known to use Dalkey Island as a staging area (approx. 2,000) after breeding. Other seabirds commonly seen include Kittiwake, Razorbill, Guillemot, Puffin, Fulmar, Shag, Cormorant, Manx Shearwater, Gannet and gulls. This site is of conservation importance for reefs, listed on Annex I, and Harbour Porpoise, listed on Annex II, of the E.U. Habitats Directive.

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Site Name: The Murrough Wetlands SAC

Site Code: 002249

The Murrough is a coastal wetland complex which stretches for 15 km from Ballygannon to north of Wicklow town, and in parts, extends inland for up to 1 km. A shingle ridge stretches the length of the site and carries the mainline Dublin-Wexford railway.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1210] Annual Vegetation of Drift Lines

[1220] Perennial Vegetation of Stony Banks

[1330] Atlantic Salt Meadows

[1410] Mediterranean Salt Meadows

[7210] Cladium Fens*

[7230] Alkaline Fens

On the seaward side of the shingle bank which runs along The Murrough Wetlands SAC site drift line vegetation includes species such as Sea Rocket (Cakile maritima), Sea Sandwort (Honkenya peploides), Sea-holly (Eryngium maritimum) and Yellow Horned-poppy (Glaucium flavum). The rare and legally protected Oysterplant (Mertensia maritima) (Flora (Protection) Order, 1999) has been recorded on the gravelly shore in the past but is now considered to be extinct from this locality. Low sand hills occur at Kilcoole, with Marram (Ammophila arenaria) and Lyme-grass (Leymus arenarius). In other areas and further inland a rich grassy sward, which is most extensive at the south of the site, has developed. Typical species include Sweet Vernal-grass (Anthoxanthum odoratum), Crested Dog's-tail (Cynosurus cristatus), Common Bird's-foot-trefoil (Lotus corniculatus), Burnet Rose (Rosa pimpinellifolia) and Pyramidal Orchid (Anacamptis pyramidalis). A community dominated by Silverweed (Potentilla anserina) and Strawberry Clover (Trifolium fragiferum) occurs in some of the wetter, grassy areas. In some places, particularly at the south of the site, a gorse (Ulex sp.) heath has developed on the stony ridge.

Saltmarsh is present within the site in two distinct areas. At the southern end of the site is found Broad Lough. This is a brackish, partly tidal lake, and has a well developed saltmarsh community which includes Saltmarsh Rush (Juncus gerardi), Common Saltmarsh-grass (Puccinellia maritima), Sea Aster (Aster tripolium), Sea Purslane (Halimione portulacoides) and Common Scurvygrass (Cochlearia officinalis). Common Reed (Phragmites australis) is abundant along the western shore, along with some Sea Club-rush (Scirpus maritimus). Saltmarsh is also present in the northern end of the site in the vicinity of The Breaches. Though this has been greatly affected by drainage in the late 1980s and early 1990s, localised Sea Couch (Elymus pycnanthus) still occurs. The grassland which was created and improved as a result of the drainage is now influenced by seepage and flooding of saline waters.

Fen vegetation is well developed in the Murrough wetlands, with both alkaline and calcareous fen with Great Fen-sedge (Cladium mariscus) represented. The fens occur mostly between Five Mile Point and Six Mile Point, especially in the townland of Blackditch and also in the Leamore and Grange areas. The alkaline fen is dominated by Black Bog-rush (Schoenus nigricans), with Marsh Pennywort (Hydrocotyle vulgaris), Purple Moor-grass (Molinia caerulea), Devil's-bit Scabious (Succisa pratensis), Heather (Calluna vulgaris), Cross-leaved heath (Erica tetralix), and a wide variety of orchids also present. The rare, Narrow-leaved Marsh-orchid (Dactylorhiza traunsteineri) has also been recorded here. Great Fen-sedge occurs in mosaic with several vegetational elements but chiefly with alkaline fen. Its many forms can range from pure stands of Great Fen-sedge, through to occurring as a dominant with Greater Tussock-sedge (Carex paniculata) and Blunt-flowered Rush (Juncus subnodulosus). Cladium fen also occurs at Blackditch within stretches of swamp woodland or fen carr dominated by Rusty Willow (Salix cinerea subsp. oleifolia) and Downy Birch (Betula pubescens).

A fine wet woodland occurs at Blackditch. Downy Birch is the dominant species, with some Alder (Alnus glutinosa), willows (Salix spp.) and Ash (Fraxinus excelsior) also present. The ground flora of this wooded area is often quite dense. This wood also contains a rich invertebrate community with at least eight rare or notable species of fly (Order Diptera) occurring, including Syntormon setosus, a species unknown elsewhere in Britain or Ireland. A wide range of freshwater and brackish marsh habitats occur within the site. These vary from reed-marsh dominated by reeds and rushes (Juncus spp.), to those of sedges (Carex spp.), with other areas supporting a mixture of sedges and Yellow Iris (Iris pseudacorus). A wide variety of grasses and herbs are also found. These include Meadowsweet (Filipendula ulmaria), Silverweed and Common Spike-rush (Eleocharis palustris).

The scarce Red Data Book species Marsh Pea (Lathyrus palustris) occurs in one area. The marshes merge into wet grassland in many areas. Where grazing pressure is low, a herb-rich sward occurs with species such as Ragged-Robin (Lychnis flos-cuculi), Cuckooflower (Cardamine pratensis), Meadowsweet and Heath Spottedorchid (Dactylorhiza maculata) occurring. Sedges are abundant in the wetter areas. Where drains have been cut, there are many other species such as Greater Spearwort (Ranunculus lingua), Bogbean (Menyanthes trifoliata) and the scarce Reed Sweet-grass (Glyceria maxima).

The Murrough is an important site for wintering waterfowl and breeding birds. Species listed on Annex I of the E.U. Birds Directive include Little Egret, Whooper Swan, Greenland White-fronted Goose, Golden Plover, Kingfisher and Little Tern. Average peak winter counts from 1994/95 - 1997/98 showed the site to have an Version date: 4.01.2014 3 of 3 002249_Rev13.Doc internationally important population of Brent Goose (1,318, higher than in the early 1990s), nationally important populations of Wigeon (1,518), Teal (772) and Lapwing (3,140), and regionally or locally important populations of Whooper Swan (80), Little Grebe (22), Shelduck (95), Gadwall (9), Mallard (391), Shoveler (22), Golden Plover (615), Curlew (605) and Redshank (181). Greylag Goose numbers were nationally important in the early 1990s but these numbers have dropped off. The average peak is now 213.

Little Tern breed on the shingle beach near The Breaches and this is the largest colony on the east coast (approx. 50 pairs in 1993, an average of 37 pairs over the ten year period 1988-1998). Redshank, Oystercatcher, Ringed Plover and Water Rail also breed. The reedbeds at Broad Lough provide habitat for Reed Warbler and the rare Bearded Tit has bred here.

Otter has been reported regularly from the Murrough. This is a Red Data Book Species, and is also listed on Annex II of the Habitats Directive.

Recent farming and drainage practices and afforestation have greatly reduced the area and quality of the wetlands habitats - the area between Kilcoole and Newcastle is particularly affected. In 1997 there was some levelling of the sand hills below Killoughter station. Pollution, reclamation and further drainage would adversely affect this site. A section of the wetlands at Blackditch, which includes alkaline and Cladium fen, has been acquired by BirdWatch Ireland and is being managed for nature conservation.

This site is of importance as it is the largest coastal wetland complex on the east coast of Ireland. Although much affected by drainage, it still contains a wide range of coastal and freshwater habitats, including six listed on Annex I of the E.U. Habitats Directive, some of which contain threatened plants. Areas on the site contain a rich invertebrate fauna, including several rarities. It is an important site for both wintering and breeding birds and supports a variety of species listed on Annex I of the E.U. Birds Directive.

Site Name: Ballyman Glen SAC

Site Code: 000713

Ballyman Glen is situated approximately 3 km north of Enniskerry and straddles the County boundary between Dublin and Wicklow. It is orientated in an east-west direction with a stream running through the centre. The glen is bounded mostly by steeply sloping pasture with Gorse (Ulex europaeus) and areas of wood and scrub. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[7220] Petrifying Springs*

[7230] Alkaline Fens

Ballyman Glen contains a small strip of alkaline fen which is associated with petrifying spring/seepage areas that have given rise to thick deposits of marl. The vegetation of the main part of the fen is dominated by Greater Tussock-sedge (Carex paniculata), Tall Fescue (Festuca arundinacea), butterworts (Pinguicula vulgaris and P. lusitanica), Black Bog-rush (Schoenus nigricans) and Broad-leaved Cottongrass (Eriophorum latifolium). The site is particularly notable for its orchids, with species including Early Marsh-orchid (Dactylorhiza incarnata), Narrow-leaved Marsh-orchid (D. traunsteineri) and Marsh Helleborine (Epipactis palustris) occurring. In addition, twenty species of sedge have been recorded in the area, including the scarce Longstalked Yellow-sedge (Carex lepidocarpa). The fen area is being invaded by Downy Birch (Betula pubescens).

Associated with the fen, and also with the woodland elsewhere in the site, are petrifying springs. These lime-encrusted seepage areas are rich in bryophytes including such diagnostic species as Cratoneuron commutatum and C. filicinum.

Wet woodland and scrub occur along the margins of the stream for most of the length of the glen, extending outwards in areas to create inaccessible and species-rich patches of woodland. The canopy is dominated by Alder (Alnus glutinosa), willow (Salix spp.) and Ash (Fraxinus excelsior). The woodland has a dense shrub layer which includes Hawthorn (Crataegus monogyna) and Spindle (Euonymus europaeus), and a diverse ground flora with Marsh Hawk's-beard (Crepis paludosa), Sanicle (Sanicula europaea), Herb-Robert (Geranium robertianum), Bugle (Ajuga reptans), horsetails (Equisetum spp.), Meadowsweet (Filipendula ulmaria) and some sedges (Carex spp.). Areas of marsh are found in the wetter areas by the stream, particularly at the western end of the site.

There is an area of broadleaved woodland on the steeper southern slopes of the glen. Common species occurring here are Ash and Sycamore (Acer pseudoplatanus), with Bramble (Rubus fruticosus agg.) colonizing the more open areas.

An area of land that slopes towards the fen has been used as a landfill site for domestic refuse. The site is also used for a clay pigeon shoot and shattered clay pigeons are scattered throughout the area.

The fen vegetation at this site is well developed, with an unusually large number of sedge species present. The presence of alkaline fen and of petrifying spring/seepage areas is also particularly notable, as these habitats are listed, the latter with priority status, on Annex I of the E.U. Habitats Directive. Fens are rare in Wicklow and Dublin, and this is one of only two sites in Wicklow for the Narrow-leaved Marshorchid.

Site Name: Glen of the Downs SAC

Site Code: 000719

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[91A0] Old Oak Woodlands

Glen of the Downs is a semi-natural oak wood situated within an impressive glacial overflow channel. It is located on the Dublin-Wexford road, about 7 km south of Bray, Co. Wicklow. The underlying rock

is mostly quartzite and it outcrops in a few places. The soil is a sandy loam, brown earth to brown podzolic, and is very dry over much of the site. Most of the site has been a Nature Reserve since 1980.

Much of the site comprises Sessile Oak (*Quercus petraea*) woodland referable to the Blechno-Quercetum petraeae association. Sessile Oak is especially dominant on the mid to upper slopes. The quality of the Oak-dominated areas is variable - the association is well developed and especially pure on the western side, while in some places it occurs as coppice scrub. The shrub layer is sparse, but Holly (*Ilex aquifolium*) is locally common. On the ground, Great Wood-rush (*Luzula sylvatica*) forms a dense carpet over much of the area, with other species such as Bilberry (*Vaccinium myrtillus*), Heather (*Calluna vulgaris*) and Wood Sage (*Teucrium scorodonia*) occurring occasionally. Bramble (*Rubus fruticosus* agg.) and ferns such as Soft Shield-fern (*Polystichum setiferum*) are abundant in places, especially on the south-western slopes.

The site includes some areas of mixed woodland, in which Beech (*Fagus sylvatica*), Sycamore (*Acer pseudoplatanus*), Scots Pine (*Pinus sylvestris*) and other non-native species occur. Bryophytes are notably scarce within the valley and may reflect the dryness of the site. However, some rare species have been recorded. The site is notable for the presence of the rare bryophytes *Cephaloziella turneri*, *Pterigynandrum filiforme* and *Plagiothecium curvifolium*, the last named in its only Irish site. There are also several rare or scarce Myxomycete fungi, namely *Echinostelium colliculosum*, *Licea marginata, L. perexigua*, *Perichaena vermicularis*, *Comatricha ellae* (only known Irish site), *Diderma chondrioderma* and *Didymium crustaceum*.

A narrow band of alluvium associated with a small stream occurs on the valley floor. Here, the woodland is dominated by Ash (*Fraxinus excelsior*) and Hazel (*Corylus avellana*), with a species-rich herb layer that includes Ramsons (*Allium ursinum*), Dog Violet (*Viola riviniana*) and Bluebells (*Hyacinthoides non-scripta*).

Glen of the Downs is notable for some rare invertebrates, including *Mycetobia obscura* (Order Diptera) which is found in only one other locality in Britain and Ireland.

A breeding bird census carried out in 1990 recorded a total of 21 species holding territory. Wren, Robin, Blue Tit, Chaffinch and Great Tit were the most abundant species. Blackcap and Jay also breed, and the rare Wood Warbler has been recorded. Grey Wagtail breeds along the stream.

Although exploited heavily in the past, this woodland is well developed, rich in species and is of high conservation significance. The site supports oak woodland of a type that is listed on Annex II of the E.U. Habitats Directive. The glacial overflow channel is the largest example of such a feature in the country.

Site Name: Knocksink Wood SAC

Site Code: 000725

Knocksink Wood is situated in the valley of the Glencullen River, just north-west of Enniskerry in Co. Wicklow. The fast flowing Glencullen River winds its way over granite boulders along the valley floor. The steep sides of the valley are mostly covered with calcareous drift, and support extensive areas of woodland. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[7220] Petrifying Springs*

[91E0] Alluvial Forests*

Some of the slopes of Knocksink Wood are dominated by Sessile Oak (Quercus petraea), with a sparse shrub layer of Holly (Ilex aquifolium) and Hazel (Corylus avellana). In many areas the ground layer consists of a carpet of Great Wood-rush (Luzula sylvatica). Other areas are characterised by mixed woodland, with oak, Ash (Fraxinus excelsior), Beech (Fagus sylvatica), Sycamore (Acer pseudoplatanus) and occasional conifers. The ground flora includes Ivy (Hedera helix) and Bramble (Rubus fruticosus agg.), and often luxuriant ferns, including species such as Hart's-tongue (Phyllitis scolopendrium), Soft Shield-fern (Polystichium setiferum), and mosses. Lichens occur abundantly on some trees. A notable feature of the wooded slopes are the frequent and extensive springs and seepage areas, and there is tufa formation in several places. Bryophytes are abundant in some areas,

and species include Cratoneuron filiciinum, Palustriella commutata, P. falcata and Leiocolea turbinata. Associated vascular plant species include Goldensaxifrage (Chrysosplenium oppositifolium), Water-cress (Nasturtium officinale) and Great Horsetail (Equisetum telmateia).

Associated with the springs and the river are stands of wet alluvial forest. These areas are dominated by Ash and Alder (Alnus spp.), and are assigned to the group Carici remotae-Fraxinetum. Other species which occur include willows (Salix spp.), Downy Birch (Betula pubescens) and Hazel. Islands in the river and open gravelly areas provide further habitat diversity in this site.

A number of scarce or rare plants occur within the site including Blue Fleabane (Erigeron acer), Ivy-leaved Bellflower (Wahlenbergia hederacea) and Yellow Archangel (Lamiastrum galeobdolon).

This site has one of the most diverse woodland invertebrate faunas in Ireland, including some wet woodland organisms which are threatened at an international level.

Vertebrates noted in the vicinity, either by tracks, sett or sight, include Red Squirrel, Badger, Rabbit and Deer.

The woodland supports large populations of birds, including many common passerines (Robin, Blackbird, Song Thrush, Wren, Chaffinch) and crows, such as Rook, Hooded Crow, Magpie, Jackdaw and Raven. Buzzard have been recorded in the area and Dipper are occasionally seen on the river.

The importance of this site lies in the diversity of woodland habitats which occur. Two habitats listed in Annex I of the E.U. Habitats Directive, both with priority status, occur at this site (petrifying springs and alluvial woodland). The presence of rare or threatened plants and invertebrates adds to the interest. Much of this site has been designated a Statutory Nature Reserve and there is an educational centre within the site.

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Site Name: Carriggower Bog SAC

Site Code: 000716

Carriggower Bog is situated on Calary plateau at the eastern edge of the Wicklow Mountains. The site is an area of wet bog and poor fen, flanked by the Vartry River on the south-western side.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[7140] Transition Mires

The bog was exploited for peat extraction until 100 years ago and the peat cuttings are now flooded. The remaining bog vegetation is characterised by bog moss (*Sphagnum* spp.) hummocks. Several species of *Sphagnum* are found including *S. recurvum*. On top of the hummocks Heather (*Calluna vulgaris*) and Cross-leaved Heath (*Erica tetralix*) are dominant. Between the hummocks, in the wet areas, Bog Asphodel (*Narthecium ossifragum*), Bogbean (*Menyanthes trifoliata*) and Common Cottongrass (*Eriophorum angustifolium*) are common, while Purple Moor-grass (*Molinia caerulea*) is locally abundant.

Downy Birch (*Betula pubescens*) and willow (*Salix* spp.) dominate an area of scrub at the centre of the site.

Very wet areas of transition mire occur on the south-western side of the site. The whole area is quaking and is characterised by a mosaic of sedges, grasses and rushes. Bottle Sedge (*Carex rostrata*) is the most abundant sedge, but others include White Sedge (*Carex curta*), Star Sedge (*Carex echinata*) and Carnation Sedge (*Carex panicea*). Purple Moor-grass and Sharp-flowered Rush (*Juncus acutiflorus*) are also present.

Towards the northern side of the site there are rock outcrops of quartzite which form low knolls. This area is partly covered by heath vegetation, dominated by Gorse (*Ulex europaeus*), Bell Heather (*Erica cinerea*) and Heather, all of which are growing over a grassy sward grazed by sheep. The main

grasses are Sweet Vernal-grass (*Anthoxanthum odoratum*), Yorkshire-fog (*Holcus lanatus*), Creeping Soft-grass (*Holcus mollis*) and bent grasses (*Agrostis* spp.)

The mosaic of transition bog habitats supports a wide range of poor fen/bogland invertebrates, including a suite of wetland species of international importance (most within the Order Diptera).

Carriggower Bog is a notable site for wintering Snipe (117 – mean winter count 1996/97 to 2000/01) and Jack Snipe (16 – mean winter count 1996/97 to 2000/01). These numbers are probably of national importance and the site has consistently held the highest national count for Jack Snipe in recent years. The very wet bog is prime habitat for both of these species.

This site is of conservation importance because it shows a good transition between fen and bog vegetation (with the fen being colonised by characteristic bog species). Transition mire, which is present at the site, is listed in Annex I of the E.U. Habitats Directive. The area holds a rich and varied flora, and it provides a habitat for some rare invertebrates. Carriggower Bog is the last remaining site in Wicklow from which some of these invertebrates are recorded. It also has ornithological interest, being an important site for Jack Snipe.

Site Name: Wicklow Mountains SAC

Site Code: 002122

Wicklow Mountains SAC is a complex of upland areas in Counties Wicklow and Dublin, flanked by the Blessington reservoir to the west and Vartry reservoir in the east, Cruagh Mountain in the north and Lybagh Mountain in the south. Most of the site is over 300 m, with much ground over 600 m. The highest peak is 925 m at Lugnaquilla. The Wicklow uplands comprise a core of granites flanked by Ordovician schists, mudstones and volcanics. The form of the Wicklow Glens is due to glacial erosion. The topography is typical of a mountain chain, showing the effects of more than one cycle of erosion. The massive granite has weathered characteristically into broad domes. Most of the western part of the site consists of an elevated moorland, covered by peat. The surrounding schists have assumed more diverse outlines, forming prominent peaks and rocky foothills with deep glens. The dominant topographical features are the products of glaciation. High corrie lakes, deep valleys and moraines are common features of this area. The substrate over much of the area is peat, usually less than 2 m deep. Poor mineral soil covers the slopes, and rock outcrops are frequent. The Wicklow Mountains are drained by several major rivers including the Dargle, Liffey, Dodder, Slaney and Avonmore. The river water in the mountain areas is often peaty, especially during floods.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority;

numbers in brackets are Natura 2000 codes):

[3110] Oligotrophic Waters containing very few minerals

[3160] Dystrophic Lakes

[4010] Wet Heath

[4030] Dry Heath

[4060] Alpine and Subalpine Heaths

[6130] Calaminarian Grassland

[6230] Species-rich *Nardus* Grassland*

[7130] Blanket Bogs (Active)*

[8110] Siliceous Scree

[8210] Calcareous Rocky Slopes

[8220] Siliceous Rocky Slopes

[91A0] Old Oak Woodlands

[1355] Otter (*Lutra lutra*) Version date: 31.05.2017 2 of 4 002122_rev17.docx

The vegetation over most of Wicklow Mountains SAC is a mosaic of heath, blanket bog and upland grassland (mostly on peaty soil, though some on mineral soil), stands of dense Bracken (*Pteridium aquilinum*), and small woodlands mainly along the rivers. Mountain loughs and corrie lakes are scattered throughout the site.

The two dominant vegetation communities in the area are heath and blanket bog. Heath vegetation, with both wet and dry heath well represented, occurs in association with blanket bog, upland acid grassland and rocky habitats. The wet heath is characterised by species such as Heather (*Calluna vulgaris*), Cross-leaved Heath (*Erica tetralix*), cottongrasses (*Eriophorum* spp.), Tormentil (*Potentilla erecta*), Mat-grass (*Nardus stricta*), bent grasses (*Agrostis* spp.) and bog mosses (*Sphagnum* spp.). In places the wet heath occurs in conjunction with flush communities and streamside vegetation, and here species such as Heath Rush (*Juncus squarrosus*) and sedges (*Carex* spp.) are found. Dry heath at this site is confined to shallow peaty soils on steep slopes where drainage is better and particularly in sheltered conditions. It is characterised by species such as Heather, gorse (*Ulex* spp.), Bell Heather (*Erica cinerea*), Bilberry (*Vaccinium myrtillus*), Purple Moor-grass (*Molinia caerulea*) and lichens (*Cladonia* spp.). In places the heath grades into upland grassland on mineral soil.

Blanket bog is usually dominated by cottongrasses, Heather and bog mosses. On steeper slopes there is some flushing and here Purple Moor-grass, Heath Rush and certain *Sphagnum* species become more common. The Liffey Head blanket bog is among the best of its kind in eastern Ireland, with deep peat formations and an extensive system of dystrophic pools developed among the hummocks and hollows on the bog surface. The vegetation is largely dominated by Heather and Cross-leaved Heath, with cottongrasses (*Eriophorum vaginatum* and *E. angustifolium*), Deergrass (*Scirpus cespitosus*) and Bog Asphodel (*Narthecium ossifragum*). In drier areas, Bilberry and Cowberry (*Vaccinium vitis-idaea*) are common, while the scarce Bog-rosemary (*Andromeda polifolia*) is also found. Blanket bog occurs over extensive areas of deeper peat on the plateau and also on gentle slopes at high altitudes.

Due to the underlying rock strata, the water of the rivers and streams is acid rather than alkaline. The water is generally oligotrophic and free from enrichment. The lakes within the area range from the high altitude lakes of Lough Firrib and Three Lakes, to the lower pater-noster lakes of Glendalough, Lough Tay and Lough Dan. Spectacular corrie lakes, such as Loughs Bray (Upper and Lower), Ouler, Cleevaun, Arts, Kellys and Nahanagan, exhibit fine sequences of moraine stages. The deep lakes are characteristically species-poor, but hold some interesting plants including an unusual form of Quillwort (*Isoetes lacustris* var. *morei*), a stonewort (*Nitella* sp.) and Floating Bur-reed (*Sparganium angustifolium*).

Alpine vegetation occurs on some of the mountain tops, notably in the Lugnaquilla area, and also on exposed cliffs and scree slopes elsewhere in the site. Here alpine heath vegetation is represented with heath species such as Crowberry (*Empetrum nigrum*) and Cowberry, and others such as Dwarf Willow (*Salix herbacea*), the grey-green moss *Racomitrium lanuginosum,* and scarce species such as Mountain Clubmoss (*Diphasiastrum alpinum*), Firmoss (*Huperzia selago*), and Starry Saxifrage (*Saxifraga stellaris*). Some rare arctic-alpine species have been recorded, including Alpine Lady's-mantle (*Alchemilla alpina*) and Alpine Saw-wort (*Saussurea alpina*).

The site supports a range of rare plant species. Parsley Fern (*Cryptogramma crispa*), Marsh Clubmoss (*Lycopodiella inundata*), Lanceolate Spleenwort (*Asplenium billotii*), Small-white Orchid (*Pseudorchis albida*) and Bog Orchid (*Hammarbya paludosa*) are all legally protected under the Flora (Protection) Order, 2015. Greater Broomrape (*Orobanche rapum-genistae*), Alpine Saw-wort and Alpine Lady's-mantle are listed in the Irish Red Data Book. The rare Myxomycete fungus *Echinostelium colliculosum* has been recorded from the Military Road.

The Red Data Book fish species Arctic Char has been recorded from Lough Dan, but this population may now have died out.

Mammals and birds which occur are typical of the uplands. Deer are abundant, mainly hybrids between Red and Sika Deer. Other mammals include Hare, Badger and Otter, the latter being a species listed on Annex II of the E.U. Habitats Directive. Pine Marten has recently been confirmed as occurring within the site. Among the birds, Meadow Pipit, Skylark, Raven and Red Grouse are resident throughout the site. Wheatear, Whinchat and the scarce Ring Ouzel are summer visitors. Wood Warbler and Redstarts are rare breeding species of the woodlands. Dipper and Grey Wagtail are typical riparian species. Merlin and Peregrine, both Annex I species of the E.U. Birds Directive, breed within the site. Recently, Goosander has become established as a breeding species.

Large areas of the site are owned by the National Parks and Wildlife Service (NPWS) and are managed for nature conservation based on traditional land uses of upland areas. The most common land use is traditional sheep grazing, but others include turf cutting, mostly hand-cutting but some machine-cutting also occurs. These activities are largely confined to the Military Road, where there is easy access. Large areas which had been previously hand-cut and are now abandoned are regenerating. In the last 40 years, forestry has become an important land use in the uplands, and has affected both the wildlife and the hydrology of the area. Amenity use is very high, with Dublin city close to the site. Peat erosion is frequent on the peaks. This may be a natural process, but is likely to be accelerated by activities such as grazing.

Wicklow Mountains is important as a complex, extensive upland site. It shows great diversity from a geomorphological and a topographical point of view. The vegetation provides examples of the typical upland habitats with heath, blanket bog and upland grassland covering large, relatively undisturbed areas. In all, twelve habitats listed on Annex I of the E.U. Habitats Directive are found within the site. Several rare or protected plant and animal species occur, adding further to its value.

SITE NAME: THE MURROUGH SPA

SITE CODE: 004186

The Murrough SPA comprises a coastal wetland complex that stretches for 13 km from Kilcoole Station, east of Kilcoole village in the north to Wicklow town in the south, and extends inland for up to 1 km in places. The site includes an area of marine water to a distance of 200m from the low water mark. A shingle ridge runs along the length of the site and carries the Dublin-Wexford railway line. Beside the shingle shore is a stony ridge supporting perennial vegetation. Driftline vegetation on the seaward side includes species such as Sea Rocket (Cakile maritima), Sea Sandwort (Honkenya peploides), Sea Holly (Eryngium maritimum) and Yellowhorned Poppy (Glaucium flavum). Low sand hills occur at Kilcoole, with Marram (Ammophila arenaria) and Lyme-grass (Leymus arenarius). In other areas and further inland a rich grassy sward, which is most extensive in the south end of the site, has developed. A community dominated by Silverweed (Potentilla anserina) and Strawberry Clover (Trifolium fragiferum) occurs in some of the wetter, grassy areas. In some places, particularly at the south of the site, a Gorse (Ulex) heath has developed on the stony ridge.

At the southern end of the site, Broad Lough, a brackish, partly tidal lake, has a welldeveloped saltmarsh community. Common Reed (Phragmites australis) is abundant along the western shore, along with some Sea Club-rush (Scirpus maritimus). Saltmarsh is also present in the northern end of the site in the vicinity of the Breaches. An area of fen occurs at Five Mile Point. Here, Black Bog-rush (Schoenus nigricans) is dominant. Fen Sedge (Cladium mariscus) is present where the ground is wetter. This merges into areas dominated by Common Reed. A wide range of freshwater and brackish marsh habitats occur within the site. These vary from reed-marsh dominated by reeds and rushes (Juncus spp.), to those of sedges (Carex spp.) with other areas supporting a mixture of sedges and Yellow Iris (Iris pseudacorus) also occurring. The marshes merge into wet grassland in many areas and where grazing pressure is low, a herb-rich sward occurs. Sedges are abundant in the wetter areas. Where drains have been cut, there are many other species such as Greater Spearwort (Ranunculus lingua), Bogbean (Menyanthes trifoliata) and Reed Sweet-grass (Glyceria maxima).

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Red-throated Diver, Greylag Goose, Light-bellied Brent Goose, Wigeon, Teal, Black-headed Gull, Herring Gull and Little Tern. The E.U. Birds Directive pays particular attention to wetlands, and as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The shingle ridge at Kilcoole is a traditional nesting area for Little Tern, and the site now supports one of the largest colonies in the country. Numbers vary between years, with 36 pairs recorded in 1995 and 106 pairs in 2006. A tern protection scheme and research programme, co-ordinated by BirdWatch Ireland and the National Parks and Wildlife Service, has been in operation since 1985.

Breeding success varies from year to year, largely due to predation by foxes, crows and other species.

During the winter this site is important for a number of waterbirds - all population sizes are the mean of peak counts for the 5 years, 1995/96 – 1999/2000. Light-bellied Brent Goose occurs here in internationally important numbers (859). Other species that visit here in nationally important numbers are Red-throated Diver (32), Greylag Goose (300), Wigeon (1,209), Teal (644), Black-headed Gull (997) and Herring Gull (506). Other species that are known to occur here are Little Grebe, Grey Heron, Cormorant, Mute Swan, Whooper Swan, Greenland White-fronted Goose, Shelduck, Gadwall, Shoveler, Mallard, Golden Plover, Ringed Plover, Lapwing, Dunlin, Curlew, Greenshank and Redshank. Short-eared Owl is recorded here during the winter. Little Egret has bred locally in recent years and this site is a main feeding area, with several birds present regularly. While formerly a rare bird in Ireland, Little Egret is now well-established with most birds occurring in the south-east and south (Counties Wexford, Waterford and Cork). The Murrough is presently at the edge of the species' range. This site is one of the few sites in Ireland where Reed Warbler breeds regularly. It is considered that 1-4 pairs bred each year during the 1980s and early 1990s, with a minimum of 6 birds in song in 1993. An absence of records since 1996 may be due to under-recording. Kingfisher regularly uses the site. Sandwich Tern are recorded from the site during the autumn.

The Murrough SPA is an important site for wintering waterbirds, being internationally important for Light-bellied Brent Goose and nationally important for Red-throated Diver, Greylag Goose, Wigeon, Teal, Black-headed Gull and Herring Gull. It is probably the most important site in the country for nesting Little Tern. The regular occurrence of Red-throated Diver, Little Egret, Whooper Swan, Greenland White-fronted Goose, Golden Plover, Little Tern, Sandwich Tern, Short-eared Owl and Kingfisher is of note as these species are listed on Annex I of the E.U. Birds Directive. Part of the Murrough SPA is a Wildfowl Sanctuary.

SITE NAME: WICKLOW MOUNTAINS SPA

SITE CODE: 004040

This is an extensive upland site, comprising a substantial part of the Wicklow Mountains. Most of the site is in Co. Wicklow, but a small area lies in Co. Dublin. The underlying geology of the site is mainly of Leinster granites, flanked by Ordovician schists, mudstones and volcanics. The area was subject to glaciation and features fine examples of glacial lakes, deep valleys and moraines. Most of site is over 300 m, with much ground being over 600 m; the highest peak is Lugnaquillia (925 m). The substrate over much of site is peat, with poor mineral soil occurring on the slopes and lower ground. Exposed rock and scree are features of the site. The predominant habitats present are blanket bog, heaths and upland grassland.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Merlin and Peregrine.

A series of surveys of the Wicklow Mountains SPA indicates that up to 9 pairs of Merlin breed within the site in any one year. Traditionally a ground-nesting species, Merlin in the Wicklow Mountains are usually found nesting in old crows nests in conifer plantations. The open peatlands provide excellent foraging habitat for Merlin with small birds such as Meadow Pipit being their main prey. The cliffs and crags within the site also provide ideal breeding locations for Peregrine (20 pairs in 2002). Other birds of the open peatlands and scree slopes that have been recorded within the site include Ring Ouzel and Red Grouse.

The Wicklow Mountains SPA is of high ornithological importance as it supports nationally important populations of Merlin and Peregrine, both species that are listed on Annex I of the E.U. Birds Directive. Part of Wicklow Mountains SPA is a Statutory Nature Reserve.

7.7.2014