MONKSTOWN MARINA

ENVIRONMENTAL IMPACT STATEMENT

MARINE AND TERRESTRIAL ECOLOGY

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Final Report

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MONKSTOWN MARINA EIA
MARINE AND TERRESTRIAL ECOLOGY

1. Introduction

This report details the results of a marine and terrestrial ecological assessment undertaken by EirEco Environmental Consultancy on behalf of Cunnane Stratton Reynolds for a proposed Marina development at Monkstown, Co. Cork. The site lies adjacent to Monkstown Creek, a proposed Natural Heritage Area (pNHA No1979) and part of the Cork Harbour Special Protection Area (SPA No4030). The site was formerly within the SPA but an appeal to have it removed from the SPA was successful on scientific grounds.

The proposed development will entail reclamation of a strip of land adjacent to Carlisle Place to accommodate parking and infrastructural elements of the project, along with an extensive system of floating pontoons and jetties which will accommodate 285 boat moorings. Dredging of the shallower areas within the footprint of the proposed development will be required.

2. Methodology

2.1 Desk study

Prior to undertaking the survey in the field, a review was undertaken of the National Parks and Wildlife Service website to determine the extent and boundaries of the SPA and pNHA, their qualifying interests and to obtain synopses for the sites. The NPWS website was also queried with regards to other protected or nationally rare species of plant or animal which may occur in the general vicinity. The report was prepared in conformity with the requirements of the *Guidelines on the Information to be contained in Environmental Impact Statements* (EPA, 2002).

2.2 Marine survey

A marine survey was undertaken on the 12th May 2008 during neap tides, using a combination of SCUBA and direct observation during low water within the littoral zone. A team of three divers undertook the survey fulfilling the roles of scientific diver, standby diver and dive supervisor. The survey commenced one hour before high water (HW 11.49 3.3m) and continued to approximately 1 hour after high water (to avail of slack water). A series of three transects were surveyed across the proposed marina location (see Figure 1). The transects extended from the outer limit of the proposed marina in a direct line to the shore (a distance of c200m) at three equidistant centres across the length of the site. Two divers swam each transect, one with a surface marker buoy attached maintained the compass direction while the other recorded substrate, depth, and diversity and abundance of marine life on a divers slate. The dive supervisor doubled as boat cox'n and shadowed the divers during the entire dive.

Habitats were classified according to JNCC Marine Habitat Classification for Britain and Ireland (Version 04.05) as well as Fossitt (2000). An overview of the substrate, flow regime and habitat types were also undertaken in the general vicinity around the proposed development location to determine how typical or atypical the conditions at the site were.

2.3 Terrestrial survey

The terrestrial environment in the vicinity of the proposed development was surveyed during the initial marine survey in May 2008 and again during the bird surveys undertaken in February and March 2009 (see below). Habitats were classified according to the Heritage Council Classification (Fossitt, 2000). Suitability for and signs of terrestrial mammal and bird activity were recorded.

2.4 Bird survey

Data on wintering bird activity within Monkstown Creek for the period 2001 to 2006, collected as part of the Irish Wetland Bird Survey (IWeBS), was obtained from BirdWatch Ireland. The data presented the peak counts for each species of wetland bird during the respective winter period. Peaks and means over the 5 year period are also presented.

A series of 2 winter bird counts were also undertaken in Monkstown Creek and the area adjacent to the proposed marina. Counts were undertaken in February and March 2009 during periods of spring tide, with species occurrence and utilization of the shoreline in the vicinity of the proposed marina recorded over the duration between low water to high water.

3. Results

3.1 General Site Description

The site is located immediately south of Monkstown and due west of Black Point on the southern tip of Cobh. The extensive tidal mudflats of Monkstown Creek extend marginally into the south of the site though the water deepens to the north due to the scouring of the tidal flow that runs through the channel north to Lough Mahon. The shoreline in the vicinity of the site is comprised of a vertical stone retaining sea wall (approx. 3m in height) adjoining Strand Road. The western side of Strand Road is faced with another retaining wall (approx. 3m in height) forming a boundary to a wooded section of gardens and private land occurring on steeply sloping ground. A small stream flows from this area and is culverted under the road where it enters the sea within the site.

The tide fills against the sea wall during high water to a depth of approximately 2m. During low water, an intertidal strip is exposed which is narrowest to the north and broadens to the south into the Monkstown Creek. The water in the vicinity of the site is full or near full salinity while the exposure rating is sheltered.

3.2 Designated Areas

The Monkstown Creek pNHA (site No1979) has been subsumed into the Cork Harbour SPA (SPA No4030) as it was originally designated on account of its importance for wintering waterfowl. The creek forms an isolated element of the SPA which comprises most of the main intertidal areas in Cork Harbour including all the North Channel, the Douglas Estuary, Lough Beg, Whitegate Bay and the Rostellan inlet. The site synopsis for Cork Harbour SPA is included in Appendix 1.

Special Protection Areas are designated under the EU Birds Directive to protect the habitat of rare and vulnerable species (listed under Annex I of the Directive) and to protect wetland habitats which attract large numbers of migratory birds on a regular basis. Such

sites are of deemed of international importance where they support 1% or more of the population of a species, or where more than 20,000 birds regularly use the site.

Cork Harbour is of international importance for wintering waterfowl as it regularly supports in excess of 20,000 birds and is one of the top five wintering sites in the country. It supports internationally important numbers of redshank (5 year mean = 1,614) along with nationally important numbers of a further 15 species. A nationally important common tern (Annex I listed) breeding colony (maximum of 102 pairs in 1995) is also present, and in addition the site hosts numerous Annex I listed species (including whooper swan, golden plover, bar-tailed godwit, ruff and little egret).

A Boundary Appeal was submitted to the NPWS on behalf of the developer requesting exclusion of the proposed site on scientific grounds in October 2008. Though formal notification has not yet been published, the appeal was successful (Dr David Tierney, NPWS, pers. comm.) and the boundaries of the proposed site now lie outside of the Monkstown Creek element of the SPA.

3.3 Marine Environment

The upper shore at the proposed site abuts the sea-wall running along Strand Road. The littoral (or inter-tidal) zone is restricted therefore to a narrow band which is widest at the southern end (c70m) and narrowest to the north (c11m). The substrate of this intertidal zone is comprised of a mixture of silt, sand and gravel with frequent cobbles and occasional small boulders. The brown seaweeds (*Fucus serratus* and *F. vesiculosus*) are dominant in the inter-tidal zone on cobble and boulders. Mussels (*Mytillus edulis*) are frequent on rocks and become more abundant towards the southern part of the shore. The shoreline conforms to being a *Mixed sediment shore* (LR4) according to Fossitt (2000). As the shore widens to the south of the site, the substrate becomes siltier and the habitat conforms to *Mud shores* (LS4) (ibid). A large mussel bed occurs approximately 100m south of the site boundary at a distance of about 30m from the shore.

The sub-tidal profile varies across the site with the north-east corner of the proposed structure extending into deeper water (11m) associated with the main channel to Lough Mahon, while the south-east corner extends towards the extensive inter-tidal flats of Monkstown Creek (2.8m). The littoral substrate over the entire site varies little with fine silts overlying coarser and compacted material. Locally, areas of gravel and small cobble occur. The seabed is typically quite uniform in slope across the site though some undulations are present along the central transect.

The dominant organism within the deeper waters of the site (>5m) is the peacock worm (*Sabella pavonina*), which forms extensive stands in the deeper waters in the north-east of the site. Cover varies but averages at approximately 30% with the remaining areas under silt. The cover provided by the peacock worm supports a range of other organisms including a variety of sponges (*Haliclona occulata* and *Halichondria panacea*) and anemones (*Sagartia elegans* and *Urticina felina*). Crustaceans are frequent to abundant including common prawn (*Palaemon serratus*), shore and velvet swimming crab (*Carcinus maenas* and *Portunus puber*), hermit crabs (*Pagurus bernhardus*) and occasional spider crab (*Macropodia* sp.). Fish species observed included frequent sand goby (*Pomatoschistus minutus*) and occasional snake pipefish (*Syngnathus acus*).

Closer to the shore, red and green seaweeds (including *Ulva lactuca* and *Porphyra* sp) become abundant with occasional fronds of sugar kelp (*Laminaria saccharina*), and open areas of silt and mixed substrates. Brown seaweeds (*Fucus* sp.) dominate in shallower water approaching the low tide mark. Mussels (*Mytillus edulis*) are frequent in small clumps along with anemones (*Sagartia* sp.), shrimp, occasional sponges (*Myxilla* sp.) and frequent juvenile flounder (*Pleuronectes flesus*).

The substrate, physical conditions and biota conform to *infra-littoral mixed sediment in full salinity in moderately exposed to sheltered waters* (SS.SMX.Imx.SpavSpAn) in the JNCC classification or *infralittoral mixed sediments* (SS4) according to Fossitt (2000). The community is characterised by the peacock worm, various sponges and polychaete worms on fixed substrata. The surrounding waters in the vicinity of the site support a similar community though there are marginal variations due to depth, current and substrate.

3.4 Terrestrial Environment

3.4.1 Habitats

Strand Road (*Buildings and artificial surfaces* - BL3) is separated from the shoreline by an artificial seawall (*Seawalls, piers and jetties* - CC1) of approximately 3m in height in the vicinity of the site. The wall is formed primarily of concrete with a few courses of block-work above the ground level of the road. A narrow (typically 1m or less) band of grassland (*amenity grassland* - GA2) fringes a pathway along the seawall side or eastern side of the road.

The western side of Strand Road is faced with another retaining wall (*Stone walls & other stonework* - BL1) formed of cut stone and approximately 3m in height. This wall forms a boundary to a wooded section (*Mixed broadleaved woodland* - WD1) of gardens and private land occurring on steeply sloping ground elevated roughly 2m above the road level. At the base of the wall adjacent to the road is a narrow strip of vegetated ground that is kept damp locally by drainage from the elevated land to the west. The vegetation includes watercress (*Rorippa nasturtium-aquaticum*), pendulous sedge (*Carex pendula*), wild onion (*Allium triquetrum*), figwort (*Scrophularia nodosa*), and winter heliotrope (*Petasites fragrans*). A small stream flows from through a small arched-opening in the base of the wall at one point and is culverted under the road where it enters the sea within the site. The stream does not have the potential to support any fish.

The woodland on the west of the wall is dominated by sycamore (*Acer pseudoplatanus*) and beech (*Fagus sylvatica*) with occasional pines (*Pinus* sp.) and holm oak (*Quercus ilex*). The understorey is comprised of laurel (*Prunus laurocerasus*) with abundant ivy (*Hedra helix*) and winter heliotrope. Ivy cascades down the wall in many places.

3.4.2 Fauna

The woodland has the potential to support a range of typical breeding garden birds including various thrushes (blackbird, song and mistle thrush), tits (great, coal and blue), finches (chaffinch and greenfinch), wren, dunnock, robin, wood pigeon and magpie, along with some more typical woodland species such as tree-creeper. Seasonal migrants such as willow warbler, chiffchaff and possibly spotted flycatcher could be also expected.

Evidence of otter was recorded at Carlisle Place to the north of the site. There is a minor stream emerging at this point adjacent to a boat slip and otter are likely to use it periodically for washing their pelts, a necessity for animals that utilise the marine environment. Otter are likely to forage over a wide area in the vicinity of Monkstown, including the site, with potential movement extending to the inner parts of Monkstown Creek and across the bay to Black Point. Due to the proximity to people, activity is likely to be primarily nocturnal. The otter is an Annex II listed species under the EU Habitats Directive.

No evidence of seal activity was noted during the surveys, but occasional occurrence of both common and grey seals can be expected in the surrounding waters. There are no known haulouts for seals of either species within Cork Harbour (Cronin et al, 2003; Ó Cadhla et al, 2005).

3.4.3 Utilization of shore by wintering waterfowl

As part of an ongoing Irish wetland bird survey (I-WeBS) coordinated by BirdWatch Ireland, regular counts of wintering waterfowl have been carried out at Monkstown Creek. This data is presented in summary format in Table 1 and includes the peak number of each species recorded over each winter during the five year period from 2001 to 2006. The peak count recorded over the entire period along with the mean number for each species is also presented. The numbers presented in the columns 1% national and 1% international give the number of a particular species which would represent 1% of the national or international population. Where counts for a particular species equal or exceed this number, the site is then rated as being of national or international importance for that species.

Table 1. Summary wintering waterfowl counts from Monkstown Creek
(*Source: BirdWatch Ireland, Irish Wetland Bird Survey*)

I-WeBS

Monkstown Creek

Species	1% National	1% International	2001/02	2002/03	2003/04	2004/05	2005/06	Peak	Mean
Little Grebe	25	4,000			1			1	0
Great Crested Grebe	55	3,600			1		1	1	0
Cormorant	140	1,200	81	61	58	64	101	101	73
Grey Heron	30	2,700	8	20	19	36	31	36	23
Little Egret		1,300			1	1	1	1	1
Mute Swan	110	110	2	6		1	1	6	2
Shelduck	150	3,000	44	77	102	73	122	122	84
Wigeon	820	15,000			3			3	1
Teal	450	5,000	65	26	46	34	65	65	47
Mallard	380	20,000	16	30	15	24	12	30	19
Red-breasted Merganser	35	1,700	2					2	0
Oystercatcher	680	10,200	66	74	59	73	112	112	77
Lapwing	2,100	20,000	45	70	12	423	57	423	121
Dunlin	880	13,300	142					142	28
Black-tailed Godwit	140	470	19	185	75	5	416	416	140
Bar-tailed Godwit	160	1,200			5	1		5	1
Curlew	550	8,500	82	65	8	55	27	82	47
Redshank	310	3,900	159	31	23	82	41	159	67
Greenshank	20	2,300	5	1	3	2		5	2
Common Sandpiper							1	1	0
Turnstone	120	1,500	14	5	14	8		14	8
Unidentified gull			1,623					1,623	325
Black-headed Gull		20,000				91	149	149	48
Common Gull		16,000				49	12	49	12
Lesser Black-backed Gull		4,500					2	2	0
Herring Gull		13,000				1	4	4	1
Great Black-backed Gull		4,800				4	26	26	6
Sandwich Tern							72	72	14
Common Tern							1	1	0

The I-WeBS data shows that the Monkstown Creek approaches national importance for grey heron with a mean count of 23 birds recorded and a peak count of 36. The black-tailed godwit has a mean count of 140 birds rendering the Creek of national importance for this species, while the maximum count of 416 during 2005/2006 approached the figure of 470 (international importance for the species). Of the other species recorded, both shelduck and cormorant occur regularly in numbers of regional importance (mean counts of 84 and 73 respectively). The other species recorded occur in small numbers of local importance. Black-tailed godwit feed on invertebrates within estuarine mud's by probing with their long bills, while shelduck sift off the surface with their flattened bills. Both heron and cormorant are piscivorous, the former hunting in shallows while the latter pursues prey underwater. The limited intertidal area within the footprint of the proposed marina, would be of little foraging value to any of these species on account of the coarseness of the substrate and the proximity of the road to the shore.

Overall, Monkstown Creek supports a reasonable diversity of wintering waterfowl during the winter period and is of national importance for black-tailed godwit and heron, as well as being of regional importance for shelduck and cormorant.

A series of 2 wetland bird counts were undertaken in February and March 2009 in Monkstown Creek and the area adjacent to the proposed marina as part of this study.

Counts were undertaken during periods of spring tide, with species occurrence and utilization of the shoreline in the vicinity of the proposed marina recorded over the duration between low water and high water. The counts aimed to compare utilization of the shoreline in the vicinity of the site as the tide filled with the rest of Monkstown Creek. As the site has a limited area of intertidal habitat and offers no potential for high tide roosting by waterbirds, counts are of the peak number of birds over the period mid to low tide. The results of these surveys are presented in Table 2.

Table 2. Results of Wetland Bird Counts in the vicinity of the site and in Monkstown Creek, February and March 2009.

	Total counts			
	February 26th		March 26th	
Species	**Site**	**Creek**	**Site**	**Creek**
Cormorant	1	30	2	27
Grey heron		4	2	3
Mute swan		2		2
Brent goose		12		
Shelduck		54		93
Teal		34		42
Mallard		12		4
Oystercatchers	9	9	2	19
Black-tailed godwit		59		80
Curlew	3	41		15
Redshank	3	35	1	61
Greenshank		2		3
Turnstone	4	16	18	22
Black-headed gull	27	79		52
Lesser black-backed gull		8	7	16
Herring gull	7	4	10	3
Great black-backed gull	5		1	

Utilization of the shoreline in the vicinity of the proposed development was primarily by small numbers of oystercatcher, turnstone, curlew and redshank. These species are adept at foraging in the coarse substrate and in the case of oystercatcher availing of the presence of mussels. Gulls also were found to forage along the shore probing amongst the wrack opportunistically. The limited area of inter-tidal along this stretch of shore limits the duration during which birds can feed. The mud specialists for which Monkstown Creek holds Nationally or near-nationally important numbers, namely black-tailed godwit and shelduck, do not feed along the intertidal zone within or in the vicinity of the proposed site as the substrates are too coarse.

4. Evaluation of the Existing Environment

The proposed marina site is located in a narrow section of Cork Harbour immediately south of Monkstown. The site is entirely within the existing inter-tidal zone and the shoreline in the vicinity of the site is comprised of a vertical stone retaining sea wall adjoining Strand Road. Monkstown Creek is part of the Cork Harbour SPA and is also a pNHA on account of its importance of wintering waterfowl. While the site was previously within the SPA and pNHA, it has been excluded following the submission of an appeal. There are

locally strong currents within the central channel of Cork Harbour at this point, but the flow slackens in the vicinity of Monkstown Creek with associated sediment deposition. Overall, the sub-tidal substrate is comprised of fine silts, with sand, shingle and cobble frequent along the shoreline. The deeper sub-tidal community conforms to the JNCC classification infra-littoral mixed sediment in full salinity in moderately exposed to sheltered waters (SS.SMX.Imx.SpavSpAn). This community is frequent in such environments.

The intertidal shoreline in the vicinity of the proposed marina is limited in extent as it abuts a sea wall running along the adjacent road. The intertidal substrate is comprised of a mixture of sediments with a high percentage of coarse material and is utilised during the winter period by a small number of species as curlew, oystercatcher and turnstone that feed amongst coarse substrates and weed Overall numbers are limited and represent a small percentage of those utilising Monkstown Creek. Otter, an Annex II listed species under the EU Habitats Directive occur in the vicinity of the site and could be expected to forage over it occasionally.

To the south, the intertidal zone widens into mudflats within Monkstown Creek, which support significant numbers of wintering birds. While the SPA/ pNHA boundary extends marginally into the proposed marina site (corresponding with the low water mark), the intertidal zone within the site does not provide good foraging for waterfowl other than.

5. Impacts

5.1 Designated Areas

The site of the proposed marina has been excluded from the Cork Harbour SPA and Monkstown Creek pNHA, as the habitat does not provide significant feeding grounds for wintering waterfowl. Nonetheless, impacts on the SPA/pNHA could result from the proposed development through altered flow regimes influencing sedimentation patterns, through disturbance to wintering bird populations, or through the effects of pollution arising from the marina. These potential impacts are dealt with below.

5.2 Loss of habitat

The proposed marina will result in the permanent loss of a strip of intertidal habitat associated with the land-based element of the development (car-parking, retail, office and landscaping). The strip is limited in extent and as the habitat is widespread within Cork Harbour, its loss will constitute a minor impact. The adjacent land is comprised of an artificial seawall, road and associated footpath. Impacts on these man-made elements will not be ecologically significant.

There will be a requirement to dredge part of the seabed in the shallower parts of the marina (see Drawing. No C285/PII/3 – Dredging Plan). Dredging will be necessary in the southern half of the marina and in a band paralleling the shore to enable safe access by craft during all states of the tide. The dredging will result in the localized loss of the marine biota which within the shallower areas proposed for dredging, is comprised of small amounts of peacock worm, sponges, seaweeds, mussels etc. These communities are widespread in the area and the loss of a limited area associated with the proposed development will constitute a minor impact. Colonization in the marine environment is rapid

and the proposed development will provide a variety of new niches which overtime can be expected to enhance the marine biodiversity locally.

5.3 Impacts on tidal regime and sedimentation

The potential impacts of the proposed development on the tidal regime, sediment transport and
coastal processes in the area surrounding the development were investigated by Cronin Millar Consulting Engineers using the DYNLET 1 Dimensional numerical hydrodynamic model. The location of the proposed development is an area where the river velocity decreases substantially due to the plan form of the river/estuary and the topography of the area. Monkstown Creek is a natural deposition area for the river sediments due to this velocity decrease. The footprint of the proposed development is at the upstream edge of this depositional area.

The proposed development involves the reclamation of foreshore for the purposes of providing a platform for the landside element of the project. The results of the hydrodynamic modeling showed that the construction of the reclaimed platform would have a very minimal impact on the current velocities in the area, with a potential maximum increase in flow velocity of 0.04m/s. This impact is negligible given that the existing maximum flow in the area, as predicted by the model is less than 0.3m/s. Based on the composition of the seabed, it is unlikely that any significant accretion or erosion will occur as a result of the development.

The proposed marina will require the capital dredging of a basin to accommodate the floating marina infrastructure. The depth of dredging will vary throughout the site depending on the size/depth of vessel throughout the marina, in an attempt to minimize the amount of dredging required. The dredging will be carried out to between -3.73 CD to -5.93 CD. It is proposed to over dredge the basin by approximately 0.5m, to increase the period between maintenance dredging operations.

The modeling results showed that the construction of the dredged basin will have only a minimal impact on the flow velocity and therefore on erosion/accretion processes, with an expected increase of less than 5%. Based on the composition of the seabed it is unlikely that any erosion will occur as a result of the construction of the dredged basin. Re-siltation of the dredged basin would be expected to occur over a period of time and maintenance dredging will be required approximately every ten years.

5.4 Impacts on Water Quality

The development poses threats to water quality through waste water and sewage, fuel and oil spillage, anti-fouling and paints associated with boat maintenance, etc. While these substance can give rise to potentially significant impacts on water quality, marine life and birds or marine mammals in the vicinity, a suite of mitigation measures are proposed below to avoid such impacts. The dredging operations will result in the suspension of sediments into the water column.

6. Mitigation

6.1 Designated Areas

Potential indirect impacts on the Monkstown Creek SPA/pNHA will be mitigated for by a variety of means as detailed in the various sections below. Marina activities will be primarily confined to the summer period while wintering waterfowl feeding on the adjacent SPA/pNHA are confined primarily to the period November through to April thus avoiding the issues of disturbance. Birds within Monkstown Creek are however unlikely to be affected by activity in the Marina as such activities are confined and predictable and habituation would be expected to occur quite rapidly.

6.2 Loss of Habitat

The loss of intertidal and sub-tidal habitat at the site will be partially compensated for by the creation of a suite of new habitats including rock armoury and landscaped features on the land-based element of the site. These new habitats will provide a range of new niches and the sub-tidal habitats in particular will be rapidly colonised. Landscaping and design shall focus on the establishment of naturally occurring habitat types using predominantly native species. All soil imported for landscaping purposes will be screened and verified as free of noxious weeds and invasive non-native species such as Japanese Knotweed and giant hogweed.

6.3 Impacts on tidal regime and sedimentation

Due to the limited predicted impact on tidal regime and sedimentation arising from the construction of the proposed marina, no mitigation is required for this element.

6.4 Impacts on Water Quality

Potential impacts on water quality will be mitigated for by a suite of measures covering both the construction and operation phases as follows:

Construction Phase:

1. The marina will be designed and operated in accordance with the Blue Flag for Marinas Programme.

2. Throughout all stages of the construction phase of the project the contractor shall ensure that good housekeeping is maintained at all times and that all site personnel are made aware of the importance of the associated marine environment and in particular Monkstown Creek SPA/pNHA and the requirement to avoid pollution of all types.

3. An emergency-operating plan shall be established to deal with incidents or accidents during construction that may give rise to pollution within Cork Harbour. This will include means of containment in the event of accidental spillage of hydrocarbons or other pollutants (including oil booms and soakage pads).

4. The storage of oils, hydraulic fluids, etc will be undertaken in accordance with current best practice for oil storage (Enterprise Ireland, BPGCS005).

5. The pouring of concrete, sealing of joints, application of water-proofing paint or protective systems, curing agents, etc will be completed in the dry to avoid pollution of the marine environment.

6. Dredging operations will be limited to the ebb cycle of the tide to ensure that any suspended sediment will be carried out into the main river channel. The dredge arisings will be disposed of via two routes. Suitable material will be used as fill for the reclaimed platform, while the unsuitable silts will be dumped at sea at the licensed dredge site outside Cork Harbour subject to the granting of a foreshore license and dumping at sea license by the Department of Agriculture, Fisheries & Food.

Operation Phase:

7. Due to the ecological sensitivities of Cork Harbour and the proximity of the proposed marina to the SPA/pNHA, users of the marina will be informed by appropriate signage, as well as part of their membership package, of ways to avoid disturbance or damage to habitats and species. This will include notification of speed zones, sensitive areas, and best practice with regard to safe-guarding the environment.

8. The risk of accidental transfer of the non-native invasive species will require adherence to current best practice protocol for avoiding their spread or transfer (example listed below for zebra mussels: http://www.galway.ie/en/Services/Environment/alienspecies). These measures will be enforced during construction to ensure accidental spread does not occur on machinery or materials from the site. The Marina will also adopt any modified or updated approaches to invasive alien species control.

9. Wastewater from the Marina will be discharged to the Monkstown wastewater treatment facility. All foul waste, including that from boats, will be discharged to the treatment facility. A storage capacity of 24 hours will be developed to cover periods of power failure.

10. Grease traps will be installed as appropriate to ensure that grease, fats or other lipids are contained for appropriate licensed disposal and do not enter the municipal foul sewer system.

11. All surface water generated by the land-based element of the development will be collected in a sealed system via gullies and down-pipes from the hard-standing and roofed areas respectively. Given the location of the development particular detail has been given to how to treat the storm-water accordingly prior to discharge to Cork Harbour. The following approach is proposed to minimise the impact on the marine environment:
    - Roofed areas will discharge via trapped gullies with debris sumps directly to Cork Harbour, as they contain no contaminants.
    - Road areas will discharge to trapped gullies with debris sumps prior to discharge to Cork Harbour.
    - Car parking will discharge via By-Pass Petrol Interceptors (Class I) to Cork Harbour.

7. Conclusion

The site for the proposed marina at Monkstown is located outside of the Cork Harbour SPA and Monkstown Creek pNHA. The loss of inter-tidal habitat associated with the reclamation of part of the foreshore for the land-based element of the development is considered a minor impact as it is limited in extent and is a widespread habitat type within Cork Harbour. While otter do occur in the vicinity, the loss of this limited area of habitat will not negatively impact on the species. Small number of a limited range of waterbirds utilise the intertidal zone within the footprint and vicinity of the proposed site.

The risks of indirect impacts on the SPA/pNHA will be mitigated for by the implementation of the measures detailed above. The proposed marina will have no significant adverse impact on the existing environment and in particular on the SPA/pNHA.

8. References

Cronin, M., Duck, C., Ó Cadhla, O., Nairn, R., Strong, D. & O' Keeffe, C. (2004). *Harbour seal population assessment in the Republic of Ireland: August 2003. Irish Wildlife Manuals*, No. 11. National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Environmental Protection Agency (2002). *Guidelines on the Information to be contained in Environmental Impact Statements.* Environmental Protection Agency, Wexford.

Enterprise Ireland. *Best Practice Guide (BPGCS005) Oil Storage Guidelines* (www.envirocentre.ie).

Fossitt, J.A. (2000). *A Guide to Habitats in Ireland.* Heritage Council, Kilkenny.

National Parks and Wildlife Service. National Parks and Wildlife Service Public Mapviewer.aspx

Ó Cadhla, O., Strong, D., O'Keeffe, C., Coleman, M., Cronin, M., Duck, C., Murray, T., Dower, P., Nairn, R., Murphy, P., Smiddy, P., Saich, C., Lyons, D. & Hiby, A.R. (2007). *An assessment of the breeding population of grey seals in the Republic of Ireland, 2005.* Irish Wildlife Manuals No. 34. National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Philips, R. (1980). *Grasses, ferns, mosses and lichens of Great Britain and Ireland.* Pan Books.

Scannell, M. J. P. and Synnott, D. M. (1987). *Census catalogue of the flora of Ireland (2nd edn).* Stationery Office, Dublin.

Webb, D.A., Parnell, J. and Doogue, D. (1996). *An Irish flora (7th edn).* Dundalgan Press, Dundalk.

Figure 1. Location of proposed Marina development at Monkstown, Co. Cork.

APPENDIX 1

SITE SYNOPSIS
CORK HARBOUR SPECIAL PROTECTION AREA

SITE CODE: 004030

Cork Harbour is a large, sheltered bay system, with several river estuaries – principally those of the Rivers Lee, Douglas and Owenacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas Estuary, inner Lough Mahon, Lough Beg, Whitegate Bay and the Rostellan inlet.

Owing to the sheltered conditions, the intertidal flats are often muddy in character. These muds support a range of macro-invertebrates, notably *Macoma balthica*, *Scrobicularia plana*, *Hydrobia ulvae*, *Nepthys hombergi*, *Nereis diversicolor* and *Corophium volutator*. Green algae species occur on the flats, especially *Ulva lactua* and *Enteromorpha* spp. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially where good shelter exists, such as at Rossleague and Belvelly in the North Channel. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Salt marsh species present include Sea Purslane (*Halimione portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Lax-flowered Sea-lavender (*Limonium humile*) and Sea Arrowgrass (*Triglochin maritima*).

Some shallow bay water is included in the site. Cork Harbour is adjacent to a major urban centre and a major industrial centre. Rostellan lake is a small brackish lake that is used by swans throughout the winter. The site also includes some marginal wet grassland areas used by feeding and roosting birds. Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl, for which it is amongst the top five sites in
the country. The five-year average annual core count for the entire harbour complex was 34,661 for the period 1996/97-2000/01. Of particular note is that the site supports an internationally important population of Redshank (1,614) – all figures given are average winter means for the 5 winters 1995/96-1999/00. A further 15 species have populations of national importance, as follows: Great Crested Grebe (218), Cormorant (620), Shelduck (1,426), Wigeon (1,750), Gadwall (15), Teal (807), Pintail (84), Shoveler (135), Red-breasted Merganser (90), Oystercatcher (791), Lapwing (3,614), Dunlin (4,936), Black-tailed Godwit (412), Curlew (1,345) and Greenshank (36). The Shelduck population is the largest in the country (9.6% of national total), while those of Shoveler (4.5% of total) and Pintail (4.2% of total) are also very substantial. The site has regionally or locally important populations of a range of other species, including Whooper Swan (10), Pochard (145), Golden Plover (805), Grey Plover (66) and Turnstone (99). Other species using the site include Bat-tailed Godwit (45), Mallard (456), Tufted Duck (97), Goldeneye (15), Coot (77), Mute Swan (39), Ringed Plover (51), Knot (31), Little Grebe (68) and Grey Heron (47). Cork Harbour is an important site for gulls in winter and autumn, especially Common Gull (2,630) and Lesser Black-backed Gull (261); Black-headed Gull (948) also occurs.

A range of passage waders occur regularly in autumn, including Ruff (5-10), Spotted Redshank (1-5) and Green Sandpiper (1-5). Numbers vary between years and usually a few of each of these species over-winter. The wintering birds in Cork Harbour have been monitored since the 1970s and are counted annually as part of the I-WeBS scheme. Cork Harbour has a nationally important breeding colony of Common Tern (3-year mean of 69 pairs for the period 1998-2000, with a maximum of 102 pairs in 1995). The birds have nested in Cork Harbour since about 1970, and since 1983 on various artificial structures, notably derelict steel barges and the roof of a Martello Tower. The birds are monitored annually and the chicks are ringed.

Extensive areas of estuarine habitat have been reclaimed since about the 1950s for industrial, port-related and road projects, and further reclamation remains a threat. As Cork Harbour is adjacent to a major urban centre and a major industrial centre, water quality is variable, with the estuary of the River Lee and parts of the Inner Harbour being somewhat eutrophic. However, the polluted conditions may not be having significant impacts on the bird populations. Oil pollution from shipping in Cork Harbour is a general threat. Recreational activities are high in some areas of the harbour, including jet skiing which causes disturbance to roosting birds.

Cork Harbour has is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its population of Redshank. In addition, there are at least 15 wintering species that have populations of national importance, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover, Bar-tailed Godwit, Ruff and Common Tern. The site provides both feeding and roosting sites for the various bird species that use it.