

Chapter 7

Ecology

7.1 Introduction

This report provides an assessment of the likely impacts of the proposed upgrade of the M7 between Naas and Newbridge, Co. Kildare, on the ecological environment (i.e. flora, fauna and habitats). The proposed upgrade entails the widening of the stretch of motorway from two lanes to three lanes within the existing motorway boundary and the construction of the proposed Newhall Interchange.

This report follows the Environmental Protection Agency's (EPA) "*Guidelines on the Information to be Contained in Environmental Impact Statements (EPA, 2002)*" as well as the National Roads Authority (NRA) "*Environmental Impact Assessment of National Road Schemes – A Practical Guide (2008)*", "*Guidelines for Assessment of Ecological Impacts on National Road Schemes (Rev 2, June 2009)*" and "*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2008)*".

7.2 Methodology

The National Parks and Wildlife Service (NPWS) website database was consulted to determine the proximity of the site to designated areas for conservation and records of the occurrence of protected species of flora and fauna in the vicinity of the site.

Aerial imagery of the study area was reviewed to identify potentially important habitats within and in the vicinity of the site. Following on from the desk study, a site survey was undertaken on 24th February 2012. An additional site survey was undertaken on the 10th June 2013 in the vicinity of the Newhall Interchange following a design revision of the interchange layout and at locations of proposed attenuation ponds at Ch. 4+600, 7+800 and 11+400. A further, additional site visit was undertaken at the Newhall Interchange location on 30th July 2013.

The vegetation along the motorway was surveyed from bridges and where by accessing from adjacent lands as access from the motorway onto the median or verge was not permitted for safety reasons. The habitats within the landtake for the existing motorway are the products of landscaping associated with the initial phase of road construction. While a complete walkover survey of the entire road corridor was not undertaken, sufficient detail of the species composition within the various habitat types was obtained to enable classification to level 3 according to the Heritage Council scheme (Fossitt, 2000). In this report, scientific and common names for plants follow Webb *et al.* (1996), and Scannell and Synnott (1987) respectively.

As the habitats present within the motorway fenceline do not constitute semi-natural habitats and are unlikely to support any significant or rare species and thus have any significant nature conservation value, the level of habitat survey and assessment undertaken was deemed appropriate in view of the highly modified nature of the habitats. Where the landtake extends beyond the existing motorway fence line, at the Newhall Interchange location and at the proposed attenuation pond locations at Ch. 4+600, 7+800 and 11+400, multi-disciplinary walkover surveys were undertaken to assess habitats and determine mammal activity (see below).

All watercourses crossed by the road and aquatic habitats in the vicinity of the motorway were assessed for the presence of and suitability for rare or protected species of fauna and flora and to ascertain their ecological value. This included

determining evidence of otter activity (by spraints, tracks, etc.) as well as potential holt or couch locations, manual searches for freshwater crayfish and lamprey ammocoetes, presence of kingfisher nesting habitat and visual assessment of water quality based on macro-invertebrate diversity, sediment loading and macrophyte presence and abundance.

Mammals and birds were assessed in the course of the main habitat surveys using a combination of direct sightings and observations of signs, tracks and droppings. A comprehensive survey of badger setts in the vicinity of the road, as recommended by the NRA's '*Ecological Surveying Techniques for Protected Flora and Fauna*', was not undertaken as the existing road has been in place for over a decade and it is assumed that badger territories in the vicinity of the scheme have realigned with the road. This however does not infer that the road does not present a threat to badger populations, though vulnerability is likely to be principally through the movement of young animals which are leaving already established territories. Such movements are randomised and not detectable by survey. During the field visits, evidence of badger activity was checked for at all survey locations.

No specific surveys were undertaken to determine the presence or potential for bats along the scheme. It is considered that the loss of habitats within the existing fenceline of the motorway will have no impact on any existing bat roost nor will it have any impact on current bat movements. Comment is provided on the presence of potential bat habitat adjacent to the motorway and in the vicinity of the Newhall Interchange.

7.3 Receiving Environment

General description of the study area

The site is located along the M7/M9 extending between Junction 9 at Johnstown to the separation of the M7 and M9 at Greatconnell. The proposed upgrade entails widening of the existing road within the existing fenceline and as a result the habitats to be impacted will consist primarily of planting associated with the original road landscaping. The scheme will extend beyond the existing road fenceline in the vicinity of the Newhall Interchange and at Ch. 4+600, 7+800 and 11+400 to accommodate attenuation ponds.

The land adjacent to the M7 is primarily in agricultural use, though in the north around Naas there is a mixture of urban including industrial and residential developments. To the south of the road in the vicinity of Ch.10500 a large attenuation pond and area of unmanaged grassland occurs between the M7/M9 and the recently developed Business Park access road. The pond is filled by a small stream which flows from the south into the pond and drains to the north in a culvert under the M7. The stream is a tributary of the River Liffey which it enters approximately 1km north of the site. Immediately west is a farm access over-bridge (Osberstown Bridge), which connects Osberstown House with land south of the M7.

Designated Areas

The Grand Canal (Naas and Corbally Branch), a proposed Natural Heritage Area (pNHA) (refer **Figure 7.1, EIS Volume 3**), runs in a general north-south direction and is crossed by the motorway at Ch.11160 on an existing clear-span bridge. The Grand Canal also runs adjacent to the motorway in the vicinity of Ch.2600 to 3600 though at a distance of approximately 100m to the southeast. A site synopsis for the pNHA is presented in **Appendix 7.1**. Under the Wildlife Amendment Act (2000),

NHAs are legally protected from damage from the date they are formally proposed for designation.

Pollardstown Fen is a Special Area of Conservation (SAC) (Site code no. 00396) situated approximately 3km north-west of Newbridge. It lies in a shallow depression, running in a north-west/south-east direction. About 40 springs provide a continuous supply of water to the fen. These rise chiefly at its margins, along distinct seepage areas of mineral ground above the fen level. The continual inflow of calcium-rich water from the surrounding Curragh, and from the limestone ground to the north, creates waterlogged conditions which lead to peat formation. There are layers of calcareous marl in this peat, reflecting inundation by calcium-rich water. This peat-marl deposit reaches 6m at its deepest point and is underlain by clay. Pollardstown fen is the largest spring-fed fen in Ireland and has a well developed flora and fauna. Owing to the rarity of this habitat and the numbers of rare organisms found there, the site is rated as of international importance and is a listed Nature Reserve. The site is vulnerable to interference via the underlying Curragh aquifer. A site synopsis for this site is presented in **Appendix 7.2**.

Mouds Bog is also a SAC (Site code no. 002331) located about 3 km north-west of Newbridge in Co. Kildare. Mouds Bog is a large raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats including hummock/hollow complexes, pools and flushes, and cutover which add to the diversity and scientific value of the site. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive. A site synopsis for this site is presented in **Appendix 7.3**.

A Habitats Directive Article 6(3) Assessment was completed by Moore Group Environmental Services (on behalf of Arup Consulting Engineers) in June 2011. This Screening Assessment concluded that there will be no direct or indirect impact on any Natura 2000 site and a finding of no significant effects report was presented in that regard. This Screening Report has been revised and updated by Roughan & O'Donovan Consulting Engineers to include the proposed Newhall Interchange. The screening conclusion remains the same.

Protected Species

The Grand Canal supports otter (*Lutra lutra*), listed under Annex II and Annex IV of the EU Habitats Directive, and abundant spraints were present at Mooney's Bridge south of Ch 2+600. Evidence of otter was found at a number of watercourses that are crossed by the motorway including at the Ladytown Stream (Ch 6+700), on a minor stream at Ch 7+900, on a stream at Ch 9+730 and at the Hartwell River crossing at Ch 15+500. Spraints were also present at two outflows from the attenuation pond to the south of the motorway in the vicinity of Ch 10+500. These outflows are culverted under the motorway at Ch 10+380 and 10+520, though both the outflows from the pond incorporate hydraulic brakes and are covered by grills preventing otter from using them for passage. All the streams crossed by the motorway flow into the River Liffey and regular movement of otters to the river is expected.

Freshwater crayfish (*Austropotamobius pallipes*) were recorded on the Ladytown Stream (Ch 6+700) during the field surveys and records exist from the Hartwell (Tobenavoher) River (NBDC database). No evidence of any lamprey was determined during the watercourse surveys, though brook lamprey (*Lampetra planeri*), the smallest and most widespread of the three native species, is recorded from the Ladystown Stream (IFI, pers. comm.).

Watercourses crossed by the motorway are illustrated on **Figures 4.2 – 4.10, EIS Volume 3.**

There are records of 4 species of plant protected under the Flora Protection Order from the 10km squares within which the section of upgrade occurs. These are listed in Table 7.1 below. None of these species are expected to occur within the habitats that occur within the scheme upgrade.

Table 7.1 Protected plant species within the 10km squares occupied by the scheme

Common Name	Scientific Name	Grid Square*
Opposite-leaved pondweed	<i>Groenlandia densa</i>	N9226
Red hemp nettle	<i>Galeopsis angustifolia</i>	M8313
Basil thyme	<i>Acinos granulata</i>	N8313
Meadow saxifrage	<i>Saxifraga arvensis</i>	N8010

* Source: NPWS Website <http://webgis.npws.ie/npwsviewer/>

Habitats

Immature Woodland

Stretches of the road margins along the M7 are comprised of immature woodland (WS2) consisting of a mixture of native and exotic species (see **Plate 7.1**). This woodland was planted along the road embankments as part of the original scheme landscaping. Planting was undertaken at close spacing's and there is a poorly developed understorey consisting primarily of ivy (*Hedra helix*) and briar (*Rubus fruticosus* aggr.).



Plate 7.1: Immature woodland along road embankment

A plantation of ash, sycamore and cherry occurs to the west of the M7 Motorway and on the embankment of the R445 between approximate Ch 6+650 and 7+000 (location of proposed Newhall Interchange). The woodland is of a similar age to the

planting along the motorway and is dense with a poorly developed understorey. Some natural regeneration is occurring along the edge.

A block of woodland and scrub occurs to the north west of the attenuation pond at Osberstown Cottages between Ch 11+350 and 11+500. The woodland is dominated by ash (*Fraxinus excelsior*) and hawthorn (*Crataegus monogyna*) with willow (*Salix* spp.), elder (*Sambucus niger*) and blackthorn (*Prunus spinosa*) regeneration along the southern edge. There will be no impact on this woodland.

Grasslands

The road margin and median is grassed outside of areas covered by immature woodland or hedgerows. This grassland is subject to periodic cutting along the road edge and median where it can be classified as amenity grassland (GA2). Extensive areas are however not maintained and this grassland is classified as dry meadows and grassy verges (GS2). The species composition is limited and grass species dominate including creeping bent (*Agrostis stolonifera*), Yorkshire fog (*Holcus lanatus*), cocksfoot (*Dactylis glomerata*), thistles, dock, nettle (*Urtica dioica*), vetches (*Vicia* spp.) and occasional coltsfoot (*Tussilago farfara*).

The majority of the adjacent land outside of the scheme is under a mixture of improved agricultural grassland (GA1), which is grazed by cattle or cut for silage and tilled fields (BC3). The locations for attenuation ponds at Ch.4600, 7800 and 11400 consist of improved agricultural grasslands. To the south of the M7, the fields to the west of the Osberstown Bridge are neglected and support various species typically associated with low levels of management including ragwort (*Senecio jacobea*), thistles (*Cirsium* spp.) and docks (*Rumex* spp.). They are also classified as dry meadows and grassy verges (GS2).

The Osberstown overbridge supports two narrow bands of dry calcareous - neutral grassland (GS1) that has formed on the capping of glacial sands and gravels used as surface layer. The diversity of species is moderate and includes meadow grasses (*Poa* spp.), fescues (*Festuca* spp.), blue sedge (*Carex flacca*), daisy (*Bellis perennis*), medick (*Medicago lupulina*), yarrow (*Achillea millefolium*), knapweed (*Centaurea nigra*) and *Calliargon* moss.

To the east of Osberstown overbridge on the fringes of the existing attenuation pond, a narrow fringe of wet grassland (GS4) occurs which is broadest to the south of the pond. The vegetation is dominated by rushes (*Juncus acutiflorus* and *J. effusus*), creeping bent and creeping buttercup (*Ranunculus repens*) with small amounts of willow herb (*Epilobium hirsutum*) and meadow sweet (*Filipendula ulmaria*). This grades into an irregular band of reed swamp (FS1) that fringes the existing attenuation pond. This is dominated by mono-typic stands of bulrush (*Typha latifolia*) and branched bur reed (*Sparganium erectum*).

Recolonizing Bare-ground

An area of filled ground extends in a rough triangle between the Business Park road, the farm track leading onto the Osberstown Bridge and the existing attenuation pond. The fill is comprised of heavily compacted subsoil's and till which supports a sparse suite of colonizing plants typical of recolonizing bare ground (ED3) including creeping bent, creeping buttercup, oxeye daisy (*Leucanthemum vulgare*), fat-hen (*Chenopodium album*), red bartsia (*Odonites verna*), thistle, ragwort and dock. No evidence of any invasive alien species of plant was recorded along or in the vicinity of the motorway.

Treelines and Hedgerows

Sections of the road margins where it is at grade in the vicinity of Naas have been planted with hedgerows (WL1) comprised solely of hawthorn (*Crataegus monogyna*). In some places the median has also been planted with a hawthorn hedge. These hedgerows are of recent origin and are regularly trimmed as part of highway maintenance (see **Plate 7.2**).



Plate 7.2: Hawthorn hedgerow present in motorway median

Invasive Alien Species

There was no evidence of any invasive alien species of plant recorded from the motorway or in the adjacent lands that would be subject to impact or disturbance from the scheme.

Watercourses

The Grand Canal (Naas and Corbally Branch), a proposed Natural Heritage Area (site code no. 002104), runs in a general north-south direction and is crossed by the motorway at Ch 11+160 on a clear-span bridge. The Grand Canal also runs adjacent to the motorway in the vicinity of Ch 2+600 to 3+600 though at a distance of approximately 100m to the southeast. The canal supports dense submerged and floating aquatic vegetation comprised of willow moss (*Fontinalis antipyretica*), starwort (*Callitriche* sp.), mare's tail (*Hippuris vulgaris*) and pondweeds (*Potamogeton* spp.). The banks have a margin of reed canary grass (*Phalaris arundinacea*), branched bur-reed (*Sparganium erectum*) and occasion stands of common reed (*Phragmites australis*). At the time of survey, common frog (*Rana temporaria*) was frequent in the marginal vegetation. The canal supports stocks of a number of coarse fish species including perch (*Perca fluviatilis*) along with European eel (*Anguilla anguilla*) and minnow (*Phoxinus phoxinus*).

The Hartwell (Tobenavoher) River and a series of small streams flow in a generally westerly direction across the motorway to join with the River Liffey. The River Liffey is a highly significant salmonid catchment supporting significant populations of Atlantic salmon (*Salmo salar*), listed under Annex II and V of the EU Habitats directive) and sea trout (*Salmo trutta*) in addition to resident brown trout (*Salmo*

trutta). It also supports populations of Freshwater Crayfish, also listed under Annex II of the EU Habitats Directive (NBDC database).

The Hartwell (Tobenavoher) River is crossed by the M7 (Ch 15+500) on a broad and low open bottomed box culvert (see **Plate 7.3**). The culvert bed is heavily covered with coarse aggregate though the river has maintained a well defined channel allowing fish passage. This river has resident stocks of trout and has abundant suitable spawning habitat downstream of the motorway. The river may also support brook lamprey (*Lampetra planeri*) a species afforded protection under Annex II of the EU Habitats Directive. No suitable ammocoete beds occur in the vicinity of the M7 culvert though potential spawning habitat occurs downstream.



Plate 7.3: Hartwell River culvert under the M7/M9

A minor stream crosses under the motorway at Ch 7+880 in a concrete 750mm pipe culvert (See **Plate 7.4**). The stream is a tributary of the River Liffey which it joins approximately 1.7km downstream at Yeomanstown. The stream is culverted for approximately 200m upstream of the motorway before briefly emerging in a gabion-lined channel for a length of c30m before the motorway culvert. The water quality appears good and the substrate in the exposed stretch of channel is riffle habitat with suitable gravel for spawning by trout. Otter spraint was present at the culvert entrance and there is likely to be movement through the culvert and along the stream to the River Liffey.



Plate 7.4: Minor stream culvert under M7/M9 at Ch. 7+880

A second minor stream which is culverted under the M7 at Ch 9+720 also flows in a northerly direction to join the River Liffey. This stream has a very high silt load and resultant poor water quality, though fresh otter spraints were present during the survey a short distance upstream of the M7 culvert (See **Plate 7.5**). The culvert under the motorway is a 750mm diameter concrete pipe with no mammal passage facility. Otter may be using this to connect with the River Liffey downstream as the habitat upstream is considered inadequate to support a resident population.



Plate 7.5: Minor stream upstream of culvert at Ch. 8+720

There are two out flows from the existing attenuation pond at Osberstown which are culverted under the M7 in 750mm concrete pipes at Ch 10+380 and 10+530. Both outflows are screened at their exit point from the existing attenuation pond thereby preventing otter movement. The two flows converge a short distance downstream of the M7 before flowing into the River Liffey approximately 1km further downstream. Otter activity has been confirmed at the existing attenuation pond, and as well used trails lead from the pond towards the adjacent farm access overbridge at Ch 10+350, it appears that otter may use the overbridge to join with the stream downstream of the M7 and thus to the River Liffey. Downstream of the motorway the streams support some watercress (*Rorippa nasturtium-aquaticum*) and flote grass (*Glyceria fluitans*) on a mixed substrate with abundant silt. It is used by stock for drinking and has limited fisheries potential, although it is likely to support minnow and eel.

The Ladystown Stream is culverted under the Ladytown Overbridge at Cormicks Bridge (Ch 6+700) (location of proposed Newhall Interchange). This stream is fed by two channels (refer **Figures 4.5 and 4.13, EIS Volume 3**), one approaching from the south west in the vicinity of Lewistown and the other from the south east. The stream from the south east is culverted under the motorway and ties into the channel downstream of Cormick's Bridge (Ch 6+800). The stream from the south west is culverted under the R445. This culvert is 74m in length and is a bottomless arch culvert with a bed width of c2.5m. It is joined by a minor drain immediately north of the Ladytown Overbridge. A short distance downstream of the culvert a sluice gate and weir with a vertical 1m drop presents a barrier to any upstream fish movement (refer **Plate 7.6**).

The stream bed downstream of the culvert consists of coarse sediments and cobbles with a riffle-glide flow regime (see **Plate 7.7**). The banks are steep with some bare ground and dry grassland. Reed-canary grass is frequent along the stream edge. A young ash plantation occurs to the west and east of the stream.

The stream supports a population of brown trout downstream of the Ladytown Overbridge, though there is no potential for movement further upstream due to the weir. Fish were observed in a pool area at the base of the weir during the site visit which coincided with low flow conditions and movement downstream was hindered by the limited volume of water. Freshwater crayfish were also present at this location. Otter spraint was recorded at the culvert entrance. The stream also supports populations of brook lamprey, eel and minnow.

Upstream both feeder channels have heavy vegetation growth (refer **Plate 7.8**) and limited flows and appear unsuited to trout. They may however support freshwater crayfish though no evidence was found during sweep netting and dedicated searches carried out as part of this study.

The minor ditch joining the stream downstream of the Ladytown Overbridge has standing water with abundant *Chara* algae, starwort (*Callitriche* sp.), curly pondweed (*Potamogeton crispus*) and branched bur-reed (*Sparganium erectum*). The ditch supports minnow (*Phoxinus phoxinus*) and is likely to provide good spawning and nursery habitat for both common frog (*Rana temporaria*) and smooth newt (*Lissotriton vulgaris*).



Plate 7.6: Weir on Ladystown Stream at Ch 6+700



Figure 7.7: Ladystown Stream downstream of Weir



Plate 7.8: Ladytown Stream upstream of Cormick's Bridge

Fauna

The majority of the lands within the existing fence-line bounding the M7 are of limited value to fauna. The adjacent habitats are dominated by agricultural grassland and hedgerows with occasional watercourses, areas of recolonizing bare ground and an existing attenuation pond at Osberstown. The pond and some of the minor streams support minnow, frog and possibly also smooth newt.

Otter

The otter, an Annex II and Annex IV listed species under the EU Habitats Directive, has also been recorded from the Grand Canal and the River Liffey. Both these watercourses support good populations of fish in addition to crayfish, which are all key prey items for otter. Otter utilize holts (excavated or natural cavities amongst tree roots, boulders, etc adjacent to a water body) for breeding purposes. No evidence of a holt was noted during the survey. Evidence of otter was recorded during the site survey at a number of locations including the Grand Canal, three streams at Ch 7+880, Ch 8+720, and Ch 6+700 and around the existing attenuation pond at Osberstown. There is likely to be otter movement through the existing culverts at Ch 7+880 and Ch 8+720 and from the existing attenuation pond at Osberstown both north to the River Liffey and east to the Grand Canal. It appears that otter are using the agricultural overbridge at Osberstown to cross the M7 as the culverts leading from the ponds to the west of the road have hydraulic brakes and screens preventing otter passage. Fencing along the entire section of motorway has not been assessed but a number of gaps in the fence are present in the vicinity of the culvert locations enabling otter to access the carriageway and thus be exposed to the risk of mortality by traffic.

Freshwater Crayfish

The freshwater crayfish (*Austropotamobius pallipes*) an Annex II listed species, is found in alkaline waters and is widespread throughout the Liffey catchment. The species often occurs in very high densities where aquatic vegetation or substrate allows for good concealment and feeding opportunities. Due to the connectivity with

the Liffey it is possible they occur in the various streams crossed by the scheme and possibly the existing attenuation pond at Osberstown also. Records exist from the Hartwell Stream (NBDC website). Freshwater crayfish were recorded during the current surveys in the Ladystown Stream at Ch 6+700 downstream of the culvert under the Ladytown Overbridge. No evidence of crayfish was recorded upstream though they may occur in the dense aquatic vegetation that occurs. The lower sections of the Ladytown Stream (downstream of the Newhall Interchange) also supports spawning salmon (*Salmo salar*), also Annex II listed in freshwater (IFI pers. comm.)

Brook Lamprey

The brook lamprey (*Lampetra planeri*) is the smallest and most widespread of the three lamprey species found in Ireland. It requires riffle habitat for spawning but due to its small size is capable of utilizing quite limited areas for this purpose. The juvenile phase of the lamprey lifecycle (ammocoete) is spent buried in fine silts and thus they are able to cope with small watercourses which are heavily choked with aquatic growth. While no evidence of brook lamprey was found during the survey, the species is known from the Liffey and many of its tributaries and have been recorded in the Ladystown Stream and Hartwell River.

Badger

Evidence of badger (*Meles meles*) feeding activity was found at a number of locations on both sides of the M7. Foraging activity was recorded to the south of the road adjacent to the existing attenuation pond at Osberstown, and to the north of the road on the lower part of the Osberstown Bridge embankment. It is probable that badgers are using the overbridge to access the existing attenuation pond and surrounds for foraging with a sett located north of the road in the vicinity of Osberstown House. Badger activity was also recorded along the Grand Canal and adjacent fields to the west between Ch 2+600 and 3+600. Fencing along the entire section of motorway has not been assessed but a number of gaps in the fence have been noted at various locations enabling badger to access the carriageway and thus be exposed to the risk of mortality by traffic.

Other Mammals

Signs of fox (*Vulpes vulpes*), rabbit (*Oryctolagus cuniculus*) and brown rat (*Rattus norvegicus*) were recorded at numerous locations during the site visit. Additional species likely to occur include hedgehog (*Erinaceus europaeus*), stoat (*Mustela erminea*), Irish hare (*Lepus timidus hibernicus*) and wood mouse (*Apodemus sylvaticus*). The naturalized American Mink (*Mustela vison*) and grey squirrel (*Sciurus carolinensis*) may also be present in the area.

Bats

Bat surveys were not undertaken as part of this assessment. The existing M7 road is likely to limit bat movement to some extent and the proposed scheme will have no impact on any structures that are or may be suitable for roosting by bats. The habitats within the existing road are not considered of significant value as foraging habitat for bats though some areas of value occur adjacent to the scheme. The existing attenuation pond and adjacent wet grassland at Osberstown provide good potential foraging conditions for bats due to the abundance of winged invertebrates typically associated with these habitats. The proximity of the pond to the Grand Canal may enable Daubenton's bat (*Myotis daubentonii*), a species associated with waterbodies, to have colonized or forage there. Other typically widespread species including pipistrelle (*Pipistrellus* spp.) and Leisler's (*Nyctalus leisleri*) are also likely to

occur. Adjacent to the site, mature ivy-clad trees provide potential roosting locations for bats. Old buildings in close proximity, in particular Osberstown House and associated farm buildings, may also be used as roosts and are sufficiently close to the pond to enable regular commuting. The Osberstown Bridge may also provide a flight path for bats moving across the M7. The habitats along the Grand Canal crossing at Ch. 11+200 and further west where it runs adjacent to the motorway in the vicinity of Ch. 2+600 to 3+600 also provide good foraging habitat as well as potential roost sites in bridges, various dwellings and mature trees.

Birds

The habitats in the vicinity of the M7 support a typical assemblage of birds associated with the range of habitats present, i.e. agricultural pasture, hedgerows, and watercourses. A species of particular note recorded on the existing attenuation pond is kingfisher, an Annex I listed species under the EU Birds Directive. Kingfisher are a piscivorous species typically feeding on slow moving waters. They are known to breed on both the Grand Canal and the River Liffey. Their breeding requirements are quite specific however, preferring a steep to over-hanging bank of exposed clay or sand adjacent to water and no evidence of a suitable nest site was noted in the vicinity of the pond or on any of the other watercourses during the field surveys.

The Grand Canal and existing attenuation pond at Osberstown also support a range of other waterbirds including moorhen (*Gallinula chloropus*), little grebe (*Tachybaptus ruficolus*), mute swan (*Cygnus olor*), mallard (*Anas platyrhynchos*) and heron (*Ardea cinerea*).

The treelines and hedgerows present are also likely to support a range of passerines including various tits, finches, thrushes and corvids, though these are effectively outside of the site boundaries. The grassland and recolonizing bare ground provide feeding opportunities for seed-eating species such as goldfinch (*Carduelis carduelis*), siskin (*C. spinus*) and linnet (*C. cannabina*). Ground nesting species skylark (*Alauda arvensis*) and meadow pipit (*Anthus pratensis*) may also nest in the grassland adjacent to the M7.

7.4 Evaluation

The Grand Canal pNHA (site code no. 002104) is crossed by the motorway at Ch 11+160 on a clear-span bridge and runs adjacent to the motorway in the vicinity of Ch 2+600 to 3+600 though at a distance of approximately 100m to the southeast. This site is rated of national importance using the NRA evaluation criteria (NRA, 2009). Two SAC's occur approximately 3km from the motorway, namely Pollardstown Fen and Mouds Bog. Both sites are rated of international importance.

The footprint of the proposed scheme (which is primarily within the current fence line of the motorway) is comprised of habitats of no significant ecological value or of local importance (lower value) associated with landscape planting along the motorway margins and median strip. These habitats include immature woodland, hedgerows and grasslands.

The sites of the proposed attenuation ponds at Ch. 4+600, 7+800 and 11+400 are under improved agricultural grassland (GA1) with some adjacent hedgerows (WL1) and treelines (WL2). These sites are also rated of local importance (lower value). The habitats around the Ladytown Stream include steep banks with some bare ground and dry grassland and a young ash plantation to the west and east of the stream. The mosaic of habitats is rated of local importance (higher value).

There was no evidence of any invasive alien species of plant recorded from the lands within the scheme or in the vicinity. The majority of the adjacent lands outside of the scheme are under a mixture of improved agricultural grassland (GA1), which is grazed by cattle or cut for silage and tilled fields (BC3). The artificial existing attenuation pond to the east of the motorway at Osberstown provides a habitat of local importance (higher value) and supports, or may support a number of species afforded protection under the EU Habitats and Birds Directive including otter, kingfisher, freshwater crayfish and potentially brook lamprey. Two outflows from the pond are culverted under the motorway to the west. In addition, the grassland habitats around the pond are used by badger for foraging and therefore within the territory of a badger group. There is evidence that otter (and possibly other mammals including badger and fox) are utilising an agricultural overpass at Osberstown to cross the motorway to the west. Evidence of badger activity was also recorded further west along the Grand Canal.

A number of small streams and the Hartwell River are crossed by the motorway with existing culverts. All watercourses are tributaries of the River Liffey, an important salmonid catchment. There is evidence of otter activity on a number of watercourses and it appears that otter may be utilising some of the existing culverts to cross the motorway and thus link to the River Liffey. The Hartwell River supports a stock of brown trout and brook lamprey while the Ladytown Stream at Ch 6+700 also supports Atlantic salmon, brown trout, freshwater crayfish and brook lamprey. These watercourses are rated of local importance (higher value).

7.5 Impact of Proposed Development

7.5.1 Impacts on Designated Areas

There will be no direct impacts on designated areas for conservation. The nearest designated site is the Grand Canal, a proposed Natural Heritage Area which is crossed by the motorway at Ch 11+160 on a clear-span bridge. No modification to this structure is proposed. The Grand Canal also runs adjacent to the motorway in the vicinity of Ch 2+600 to 3+600 though at a distance of approximately 100m to the southeast. A number of protected species occurring within the Grand Canal however, may undergo regular or periodic movement between the pNHA and the existing attenuation pond within the study area. Impacts on these species are dealt with below. There is a risk of polluted or silt-laden run-off from the motorway during both the construction and operation phase of the scheme. Existing measures are in place to treat the current run-off and additional measures will be employed to avoid any deterioration during either construction or operational phases (refer Chapter 4, Section 4.2.3 – 4.2.6, Drainage).

Pollardstown Fen and Mouds Bog SAC's are sufficiently removed from the motorway to avoid any risk of direct or indirect impact from the proposed upgrade. A Habitats Directive Article 6(3) Screening Assessment concludes that there will be no direct or indirect impact on any Natura 2000 site and a finding of no significant effects report has been presented in that regard.

7.5.2 Impacts on Habitats

The proposed development is contained primarily within the fence line of the existing motorway. It supports a suite of habitats of recent origin associated with the landscape planting along the motorway margins and median strip. These habitats include immature woodland, hedgerows and grassland. These habitats have limited associated biodiversity and are rated of no significant ecological value or of local importance (lower value). The grassland and hedgerow habitats within the motorway

median will be lost during construction. These do not possess any significant ecological value and replanting of verges will occur following completion of works.

The site of the attenuation ponds at Osberstown (Ch 11+500) and at Ch. 4+600 and 7+800 consist of improved agricultural grasslands. No modifications are proposed to any of the receiving watercourses into which the scheme outfalls with the exception of the Ladystown Stream.

The Ladystown Stream at Ch 6+700 will require an extension to the existing culvert under the Ladytown Overbridge as part of the Newhall Interchange upgrade and a diversion downstream of the weir to facilitate the design of the new interchange.

The extended culvert will be a total of 160m in length. The specific design for the interchange has been subject to an options assessment to determine the optimal design which is presented on **Figures 4.5 and 4.13, EIS Volume 3**.

The lower stretch of this stream supports a population of Atlantic salmon, brown trout, freshwater crayfish and brook lamprey. However, the existing weir downstream of the existing culvert under the Ladytown Overbridge poses an impediment to any upstream movement of fish. The habitat upstream of the culvert is heavily overgrown with abundant silt and is considered unsuited for brown trout, though it may support crayfish (none were recorded during the survey). The culvert extension will not result in a significant habitat loss as the stretch of water upstream is ponded with slack flow and heavily silted. Increased loads of pollution during construction or operation could however, adversely affect aquatic biota in the Ladystown Stream.

There is also a risk of siltation during construction in other watercourses along the scheme with the risk dependant on proximity of earthworks, flow rates in the receiving waters and weather during operations that could give rise to high silt loads. While most of the minor streams crossed by the existing M7 motorway currently have poor water quality, as tributaries of the River Liffey they have potential to support trout, brook lamprey and a number of other fish species. Deterioration in water quality during construction is readily avoided by a suite of standard mitigation measures outlined in Section 7.6.

7.5.3 Impacts on Fauna

Otter

The main potential impact on otter relates to the increased risk of direct mortality through road-kill should otter gain access to the carriageway. Otter activity has been recorded on a number of the watercourses crossed by this stretch of the M7 and it is likely that there is movement through culverts on all of the stream crossings under the existing M7. The out-flowing stream linking the existing attenuation pond at Osberstown to the River Liffey is currently impassable to otter, and they appear to be utilising the farm over-bridge at this location to cross the motorway.

The culvert under the Ladytown Overbridge which will be extended as part of the upgrade for the Newhall Interchange will require mammal passage through its entire length to facilitate upstream and downstream movement of otter.

An increased risk of mortality could result in a reduction in the local population of this Annex II and IV listed species. As otter can currently gain access to the motorway at a number of locations due to gaps in the existing fencing, the entire fencing network along the scheme will be upgraded to prevent animals gaining access to the carriageway and thus reduce the risk of traffic related mortality.

A decline in water quality through pollution or siltation arising during the construction phase of the proposed development could result in indirect impacts on otter through a reduction in prey availability. Increased levels of human activity associated with the construction phase may also affect otter through disturbance.

Freshwater Crayfish, Brook Lamprey and Trout

The principle risk of impacting on freshwater crayfish, brook lamprey and brown trout relates to deterioration in water quality during the construction phase. Such impacts are likely to be temporary in nature and are readily avoided by a suite of standard mitigation measures and thus are not considered significant. While there was no evidence of freshwater crayfish recorded on the stretch of the stream upstream of the Ladytown Overbridge (Ch. 6+700) there is a potential for them to occur. Crayfish and Trout were recorded in the downstream stretch of this stream which is to be diverted. The stretch of stream to be culverted will require preconstruction salvage of Freshwater Crayfish under licence from the Department of Arts, Heritage and the Gaeltacht; and the downstream stretch to be diverted will require the salvage and downstream release of Freshwater Crayfish (under licence) and also Brook Lamprey and Brown Trout (electrofishing by Inland Fisheries Ireland).

Method statements for these construction works must also be agreed with Inland Fisheries Ireland prior to construction.

Other Mammals

The proposed development will not result in any reduction in the foraging area for badger but would increase the risk of mortality by animals attempting to cross the M7 should they gain access to the carriageway. As with otter, badger can also currently gain access to the motorway at a number of locations due to gaps in the existing fencing, and the upgrading of the fencing associated with the widening of the motorway will reduce the risk of traffic related mortality. The risk of exposure to traffic is also the main potential impact for other mammals including Irish hare, stoat, hedgehog and fox. Given the availability of alternative habitat for these species, the loss of habitat is not considered significant.

Birds

The proposed development may result in a reduction in water quality within the various watercourses which could result in indirect impacts on kingfisher through a reduction in prey. The main conduit for kingfisher movement across the existing motorway is likely to be through the Grand Canal bridge and the Hartwell River culvert. As kingfishers typically fly in a low direct pattern, they are more vulnerable to traffic collision than other bird species, though the widening of the motorway will not result in an increased risk of collision above the existing situation.

There are unlikely to be impacts associated with the proposed development on other bird species, as the habitats lost do not support any species of conservation concern and are common and widespread.

7.6 Mitigation Measures

7.6.1 Designated Areas

The existing bridge over the Grand Canal pNHA will not be modified and there will be no direct impacts on this or any other designated conservation areas associated with the proposed development. Indirect impacts on the pNHA via a reduction in water quality are dealt with below.

Pollardstown Fen and Mouds Bog SAC's are sufficiently removed from the motorway to avoid any risk of direct or indirect impact from the proposed upgrade and a Habitats Directive Article 6(3) Screening Assessment concludes that there will be no direct or indirect impact on any Natura 2000 site.

7.6.2 Habitats

The main direct impact on habitats arising from the proposed development relates to the minor loss of habitats of low ecological value associated with landscape planting along the motorway margins and median strip. A number of minor streams are also crossed by the existing M7 motorway though there will be no requirement to modify existing culverts and thus no potential direct impacts. These streams have currently poor water quality and are thus susceptible to further deterioration in water quality. While fish stocks may not be significant, they are nonetheless tributaries of the River Liffey and have potential for trout, brook lamprey, freshwater crayfish and a number of other species. The potential impact of a reduction in water quality during construction is dealt with by appropriate mitigation as detailed below.

While no invasive alien species have been recorded along the line of the scheme, to avoid the risk of introduction of invasive alien species of plant, earthworks and landscaping along the scheme will adhere to the National Roads Authority *Guidelines for the treatment of Invasive Alien Species on National Road Schemes* (2010). The appointed Contractor will also be obliged to be familiar with the European Communities (Birds and Natural Habitat) Regulations 2011 which makes it an offence to spread certain species of invasive plant.

7.6.3 Water Quality

To avoid impacts on water quality and associated biota within the Grand Canal and all other watercourses crossed by the motorway during the construction phase all detailed design, construction and operation will be carried out in accordance with *Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes* (NRA, 2006), *Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites* (Murphy, 2007) and *Control of water pollution from construction sites; Guidance for Consultants and Contractors* (SP156) (CIRIA, 2002) in addition to the specified requirements below and elsewhere within the EIS.

Throughout the construction phase Best Practice will be adhered to in relation to all activities that may impact on aquatic or riparian habitats. Any discharge to surface waters from either the construction or operation stage must not impact negatively on the salmonid status of the River Liffey catchment. Specific mitigation measures will include the following:

- Measures will be taken to minimise the entry of suspended solids to all surface waters during the construction phase by use of sediment traps or settlement ponds. This will entail a mechanism for containment of runoff in the event of accidental spillage to enable clean-up and appropriate disposal through licensed facilities. The contractor will monitor discharges from the site for total suspended solids, pH and other parameters as required by Inland Fisheries Ireland (IFI), to ensure all discharges are in compliance with levels to be agreed with IFI.
- As grout/cementous materials are highly toxic to aquatic life all such works must be maintained in complete isolation of all waters and the storm water system. Wash down from delivery and concrete pumping areas will be contained and removed off site for appropriate disposal.

- The short-term storage and removal/disposal of excavated material will be planned and managed such that the risk of pollution and suspended solid laden run-off from these activities is minimised. This will include storage locations being a minimum of 50m from any watercourse, and such facilities to be bunded with drainage directed through appropriately sized settlement ponds and sediment traps.
- Temporary storage of oil and diesel for plant machinery will be required during the duration of the construction period. All fuels will be stored in a bunded facility with filling and take-off points within the bunded area. The bunds will protect against accidental tank rupture and will ensure any spilled oil can be retained for subsequent disposal to an appropriate facility.
- During construction, temporary, contained chemical toilet facilities will be used, which will be taken off site for emptying at a suitably licensed disposal location. Consequently, there will be no discharge of sewage to surface waters.
- Adequate security measures will be put in place to prevent any acts of vandalism that may result in spillage or discharge of pollutants.
- To avoid impacts on water quality and associated biota within all waterbodies during the operation phase surface water run-off will be directed through hydrocarbon interceptors before discharge to surface waters.
- In order to limit the peak flow from the road drainage runoff and reduce it to the existing run off rates, flow restricting devices will be provided upstream of the inlet to a receiving waterbody. This will necessitate provision of temporary storage of the surface water runoff. This storage or attenuation will be provided upstream of the flow restriction by the provision of a number of lined attenuation ponds and online attenuation. A penstock/shut-off valve will be installed in the last downstream manhole before discharge to facilitate the isolation of spillage events within the online attenuation storage.
- Where attenuation ponds are proposed these will include appropriate planting to facilitate further treatment of road runoff in a treatment forebay (as shown on **Plate 4.11**) or a depressed treatment basin, planted with a suite of native wetland plant species.
- Landscape management on the scheme upgrade will minimize the usage of fertilizer, herbicides and pesticides to avoid direct and indirect contamination of surface waters. No application of herbicides and pesticides will be undertaken within 2m of any waterbody.
- Within the Ladystown Stream at Ch.6+700, hydraulic continuity within the channel downstream of the existing culvert to be replaced under the previously realigned road will be maintained at all times during construction. Monitoring of water quality in the stream downstream of the existing culvert will be undertaken continuously during construction to ensure silt levels do not exceed levels as agreed with Inland Fisheries Ireland.

Additional mitigation measures pertaining to the maintenance of water quality are detailed in Chapter 9 'Hydrology'.

7.6.4 Fauna

Otter

With the exception of the Ladytown Stream as there will be no modification to any of the other watercourse culverts along the stretch of motorway to be widened, there will be no alteration to the existing potential for movement of otter. However, as existing fencing is in poor repair with numerous gaps and broken sections, fencing

within 100m either side of all watercourse crossings will be upgraded in accordance with the UK Highways Authority specification *Nature Conservation advice in relation to otters* (DMRB, 2001).

Mammal passage will be provided within the modified Ladytown Stream culvert, either alongside or within the extended culvert, with associated fencing as per the DMRB (2001) specification.

To provide required cover for otter and other fauna utilizing the watercourses, where appropriate landscape design will aim to re-establish natural riparian zones.

Freshwater Crayfish, Brook Lamprey and Trout

The stretch of the Ladytown Stream to be culverted upstream of the Overbridge at Ch. 6+700 will require preconstruction salvage of Freshwater Crayfish under licence from the Department of Arts, Heritage and the Gaeltacht.

The stretch of watercourse to be diverted downstream of Ch 6+700 will require the preconstruction salvage of Freshwater Crayfish, Brook Lamprey and Brown Trout. This will be undertaken under licence from DAHG and Inland Fisheries Ireland, as appropriate.

A fish pass arrangement will be provided to overcome the weir downstream of the existing culvert which will entail a series of interconnected pools from the upstream side of the proposed culvert to a new 1.5m x 1.5m box culvert to be provided under the existing R445. The pools will provide a permanent water depth of 500mm in order to facilitate fish passage. The proposed fish pass culvert under the R445 will be constructed with a depressed culvert invert in order to ensure that it also remains permanently backwatered in order to facilitate the movement of fish.

During construction, the diversion channel shall be formed in the dry and arrangements made for the salvage and relocation of crayfish, lamprey and trout to be completed before the flow is diverted.

Any modified section of stream channel will allow for the unimpeded movement of salmonids, lamprey and freshwater crayfish up and downstream.

Construction Method statements for all works impacting the watercourse at the Newhall Interchange shall be agreed with Inland Fisheries Ireland prior to construction.

Badger

The existing fencing along the motorway has numerous gaps where animals can access the carriageway. The entire fencing network (apart from those stretches referred to under Otter above) will be repaired or replaced as required in accordance with the NRA'S *Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes*.

Bats

As no impacts are expected on any bat species as a result of the proposed scheme, there are no specific mitigation requirements identified.

Other mammals

Measures detailed for otter and badger above will serve to mitigate against impacts for other mammal species also.

Birds

Measures as detailed above for otter and the maintenance of water quality above serve to mitigate against impacts on kingfisher.

Where practicable, tree and hedgerow clearance will be avoided between 1st March and 31st August during the bird nesting and breeding season.

To compensate for the loss of habitat for other bird species, landscaping proposals entail the use of native trees and shrubs. In addition, the use of pesticides and herbicides will be minimized to avoid reductions in insect populations and potential impacts on bird fertility.

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Appendix 7.1

SITE SYNOPSIS SITE NAME: GRAND CANAL SITE CODE: 002104

The Grand Canal is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. The Grand Canal proposed Natural Heritage Area (pNHA) comprises the canal channel and the banks on either side of it. The canal system is made up of a number of branches - the Main Line from Dublin to the Shannon, the Barrow Line from Lowtown to Athy, the Edenderry Branch, the Naas and Corbally Branch and the Milltown Feeder. The Kilbeggan Branch is dry at present, but it is hoped to restore it in the near future. Water is fed into the summit level of the canal at Lowtown from Pollardstown Fen, itself a pNHA.

A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The hedgerow, although diverse, is dominated by Hawthorn (*Crataegus monogyna*). On the limestone soils of the midlands Spindle (*Euonymus europaeus*) and Guelder rose (*Viburnum opulus*) are present.

The vegetation of the towpath is usually dominated by grass species. Where the canal was built through a bog, soil (usually calcareous) was brought in to make the banks. The contrast between the calcicolous species of the towpath and the calcifuge species of the bog is very striking.

The diversity of the water channel is particularly high in the eastern section of the Main Line - between the Summit level at Lowtown and Inchicore. Arrowhead (*Sagittaria sagittifolia*) and Water-cress (*Rorippa nasturtium-aquaticum*) are more common in this stretch than on the rest of the system. All sites for Hemlock Waterdropwort (*Oenanthe crocata*) on the Grand Canal system are within this stretch.

The aquatic flora of the Corbally Extension of the Naas Branch of the canal is also very diverse, with a similar range of species to the eastern Main Line. Otter spraints are found along the towpath, particularly where the canal passes over a river or stream.

The Smooth Newt (*Lissotriton vulgaris*) breeds in the ponds on the bank at Gollierstown in Co. Dublin. The rare and legally protected Opposite-leaved Pondweed (*Groenlandia densa*) (Flora Protection Order 1987) is present at a number of sites in the eastern section of the Main Line, between Lowtown and Ringsend Basin in Dublin.

The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.

9.12.2009

Appendix 7.2

SITE SYNOPSIS SITE NAME: POLLARDSTOWN FEN SITE CODE: 000396

Pollardstown Fen is situated on the northern margin of the Curragh of Kildare, approximately 3km west-north-west of Newbridge. It lies in a shallow depression, running in a north-west/south-east direction. About 40 springs provide a continuous supply of water to the fen. These rise chiefly at its margins, along distinct seepage areas of mineral ground above the fen level. The continual inflow of calcium-rich water from the Curragh, and from the limestone ground to the north, creates waterlogged conditions which lead to peat formation. There are layers of calcareous marl in this peat, reflecting inundation by calcium-rich water. This peat-marl deposit reaches some 6 m at its deepest point and is underlain by clay.

Pollardstown Fen is unusual in Ireland as it is an extensive area of primary and secondary fen peat, lacking scrub vegetation on its surface. The fen vegetation is generally from 0.5 - 1.5m high and consists mainly of Saw Sedge (*Cladium mariscus*), Reed (*Phragmites australis*), Blunt-flowered Rush (*Juncus subnodulosus*) and a variety of Sedges (*Carex* spp.). The vegetation is quite varied and species-rich with numerous well-defined plant communities and several rare or scarce species, including Narrow-leaved Marsh Orchid (*Dactylorhiza traunsteineri*), Fly Orchid (*Ophrys insectifera*) and Broad-leaved Bog Cotton (*Eriophorum latifolium*). Of particular interest is the occurrence of the moss, *Homalothecium nitens* - a boreal relict species which is rare in Ireland. Species and communities characteristic of more nutrient-rich conditions occur on the fen margins where the water first emerges from the ground, while the central fen area is dominated by more uniform and less nutrient demanding vegetation types. Damp pastures occur on wet mineral soils and partly-drained peats on the fen margins. These are reasonably species-rich, with particularly good displays of orchids in some areas.

The fen has ornithological importance for both breeding and wintering birds. Little Grebe, Coot, Moorhen, Teal, Mallard, Mute Swan, Water Rail, Snipe, Sedge Warbler and Reed Bunting all breed annually within the fen vegetation. Reed Warbler and Garganey, both rare breeding species in Ireland, have been recorded at Pollardstown and may have bred. In recent years two very specialised bird species associated with fens, Marsh Harrier and Savi's Warbler, have been seen at Pollardstown.

An area of reclaimed land was reflooded in 1983 and has now reverted to open water, swamp and regenerating fen. Since the reflooding of the fen and the development of the shallow lake, wintering waterfowl have been attracted in increased numbers. Maximum counts during winter 1984/85 were as follows: Little Grebe 24; Teal 161; Mallard 220; Coot 81; Snipe 68.

Otter and Brook Lamprey (*Lampetra planeri*), two species listed in Annex II of the EU Habitats Directive, occur at Pollardstown. Various groups of the invertebrate fauna have been studied and the system has been shown to support a true fen fauna. The species complexes represented are often rare in Ireland, with the sub-aquatic organisms particularly well represented. A number of internationally important invertebrates (mostly Order Diptera, i.e. two-winged flies) have been recorded from the site. Of particular conservation importance, however, is the occurrence of all three of the Whorl Snails (*Vertigo* spp.) that are listed on Annex II of the EU Habitats Directive. Pollardstown is the only known site in Ireland (or Europe) to support all three species (*Vertigo geyeri*, *V. angustior*, *V. moulinsiana*) and

thus provides a unique opportunity to study their different habitat and hydrological requirements.

Much of the fen vegetation is now owned by the Office of Public Works and is a Statutory Nature Reserve. Pollardstown fen is the largest spring-fed fen in Ireland and has a well developed flora and fauna. Owing to the rarity of this habitat and the numbers of rare organisms found there, the site is rated as of international importance.

Appendix 7.3

SITE SYNOPSIS SITE NAME: MOUDS BOG SITE CODE: 002331

Mouds Bog is located about 3 km north-west of Newbridge in Co. Kildare, close to the Hill of Allen, and includes amongst others, the townlands of Grangehiggin, Barretstown and Hawkfield. The site comprises a raised bog that includes both areas of high bog and cutover. Much of the margins of the site are bounded by trackways.

The site is a candidate Special Area of Conservation selected for active raised bog, degraded raised bog and Rhynchosporion, habitats that are listed on Annex I of the E.U. Habitats Directive. Active raised bog comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (*Rhynchospora alba*) and/or Brown Beak-sedge (*R. fusca*), and at least some of the following associated species, Bog Asphodel (*Narthecium ossifragum*), Sundews (*Drosera* spp.), Deergrass (*Scirpus cespitosus*), Carnation Sedge (*Carex panicea*).

The site consists of two basins of high bog separated by a central ridge. Otherwise the bog is flat with slopes at its margins. An area of wet quaking bog with well developed pools occurs either side of the central ridge. The western high bog supports a number of small flush areas along with a wet quaking soak with scattered Downy Birch (*Betula pubescens*). The margins have extensive areas of cutover, especially to the west. This is an example of a Midland Raised Bog at the eastern extremity of its current range with typical species including Ling Heather (*Calluna vulgaris*) along with Bog rosemary (*Andromeda polifolia*) and Cranberry (*Vaccinium oxycoccos*). The central high bog supports wet flat quaking areas on both sides of the mineral ridge with frequent small pools supporting bog mosses (*Sphagnum cuspidatum*, *S. magellanicum*, *S. capillifolium*) and Greater Sundew (*Drosera anglica*). Abundant Ling Heather dominates the drier central ridge. The three flush areas along the southern perimeter of the east and west dome support a hummock/hollow system with Ling Heather, Bog-myrtle (*Myrica gale*) and in places Crowberry (*Empetrum nigrum*) - the wet hollows support a variety of bog mosses which include *S. tenellum*. A wet quaking soak to the south supports abundant bog moss (*S. cuspidatum*) and tall Common Cottongrass (*Eriophorum angustifolium*). Cutover areas to the north-east support Purple Moor-grass (*Molinia caerulea*), Soft Rush (*Juncus effusus*) with encroaching Downy Birch and Gorse (*Ulex europaeus*) in places.

Red Grouse, a Red listed species and one that is becoming increasingly rare in Ireland, has been recorded on this site. Other birds noted on the site include Skylark, Meadow Pipit, Curlew and Kestrel.

Current landuse on the site consists of peat-cutting, with extensive active industrial peat moss production in the western section of the remaining high bog. Domestic turf cutting is widely practised along the southern margin of the bog, in the south-west corner and in the centre of the northern edge. Apart from the western cutover margin, the high bog is not being actively drained. Some small areas of the cutover have been reclaimed for agriculture in recent years. Burning has taken place in the recent past, and there is extensive damage in the west of the site due to industrial peat production. These are all activities that have

resulted in loss of habitat and damage to the hydrological status of the site, and pose a continuing threat to its viability. Despite the damaging effects the high bog has retained some wet areas largely due to the topography of the site.

Mouds Bog is significant in terms of its high bog area and geographical location as it is at the eastern extreme of the range of raised bogs in Ireland. It is a site of considerable conservation significance comprising a large raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland.

This site supports a good diversity of raised bog microhabitats including hummock/hollow complexes, pools and flushes, and cutover which add to the diversity and scientific value of the site. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive. Priority status is given to habitats and species that are threatened throughout the E.U. Ireland has a high proportion of the total E.U. resource of this habitat type (over 60%) and so has a special responsibility for its conservation at an international level.