APPENDIX 12.2 ECOLOGICAL REPORT ON LYRATH, SMARTCASTLE AND RATHGARVAN STREAMS

A12.2.1 INTRODUCTION

Ecological surveys were undertaken of (i) the stream running from Lyrath Estate to the confluence with the River Nore (hereafter referred to as the Lyrath stream), (ii) a first order tributary of the Smartcastle stream (from Ballynamorahan to north of Strangsmill) and (iii) a field-drain at Rathgarvan (from Ballynamona to Rathgarvan).

All three watercourses are proposed as receiving channels for drainage outfalls from the proposed road development. Attenuation ponds/infiltration-vegetative systems are proposed for the drainage outfalls from the proposed road development before waters enter the Lyrath stream and the tributary of the Smartcastle stream.

Control of Discharge to Smartcastle Tributary

An attenuation pond has been provided upstream of the outfall to the tributary of the Smartcastle stream, at Ballykeoghan (mainline Ch 4+200). This facility will take the form of an open balancing pond that will enable the outfall flow to be regulated to a rate equivalent to that generated from the original green-field catchment. The flow also passes through an oil interceptor that should be located at the detailed design stage so as to be accessible from the public lay-by (Ch 3+980 to Ch 4+120 southbound), before entering the Ballykeoghan attenuation pond. Regulated flows are released from the attenuation pond into a small tributary of the Smartcastle stream at approximately Ch 3+750.

The attenuation facilities can fulfil a dual function, as they also present opportunities for ecological wetland habitat creation. It is anticipated that with appropriate detailing and planting, reed-bed wetlands could be created that would assist with the biological remediation and treatment of the normal day-to-day low concentrations of pollutants in the highway surface water run-off. Over the course of time these ponds will develop their own beneficial ecosystems. When fitted with a penstock or other closure device, pollution control facilities are also effective in the containment of accidental spillages. Such isolating devices should be provided either integral to the pollution control unit or at the outfall immediately prior to the discharge to the receiving watercourse.

Control of Discharge to Lyrath Stream

In the case of the Lyrath stream, attenuation of the flow is not proposed, as the natural watercourse hydrograph would not be appreciably affected by a direct discharge of highway surface water run-off. Therefore, no formal attenuation flow control measures have been included in the drainage design.

In order to allow for pollutant screening at this outfall, and in response to various consultations on the scheme, the pollution control strategy at this location consists of an infiltration/sedimentation pond.

At the detailed design stage, pollution control facilities should be designed and sized appropriately to retain the first 10mm of surface water run-off from the 1:5 year storm. It is this initial run-off that contains the majority of the oils and other contaminants washed off the highway surface. When fitted with a penstock or other closure device, pollution control facilities are also effective in the containment of accidental spillages. Such isolating devices should be provided either integral to the pollution control unit or at the outfall immediately prior to the discharge to the receiving watercourse.

Proposed In-stream Works

Proposals to provide flood relief measures along these streams include the upgrading of existing culverts, where required, the removal of general debris from the river channels and the removal/trimming of vegetation and trees that are encroaching on the channel. There is no channel modification or fording proposed and in-stream works will be minimal.

The lengths of channel under survey are 2.0 km for the stream running through Lyrath Estate, 2.5km for the 1st order tributaries of the Smartcastle stream and 1.3 km at Rathgarvan, respectively.

The purpose of the survey was to identify ecologically sensitive areas along the riparian and aquatic zones, to determine the presence and/or suitability of habitat for protected species of wildlife, and to assess the suitability of the river channel for salmonid spawning.

A12.2.2 METHODOLOGY

A12.2.2.1 Field Survey

The area was surveyed in May and July 2004, by walking the stretches of the streams under study. Ecological habitats were classified using *A Guide to Habitats in Ireland* (Fossitt, 2000).

The watercourses were checked for evidence of species listed under Annex II of the Habitats Directive (92/43/EEC) and Annex I of the Birds Directive (79/409/EEC). Likely sites were checked for signs of otter (*Lutra lutra*) and otter holts. The stretches of river were checked for suitable habitat for freshwater crayfish (*Austropotamobius pallipes*) carapace remains. The suitability of the riverbanks as nesting habitat for kingfisher (*Alcedo athis*) was determined. Areas of riffle habitat along the stretch of river were assessed for their suitability as spawning habitat for salmonids and lamprey species. While a full bat survey was not carried out, the suitability of mature trees, bridges and culverts was checked as potential roost sites.

For clarity, the stretches of the streams under study are subdivided into sections referred to with letters (e.g. A-B, B-C etc. see EIS Figures 11.2 to 11.52 in Volume 2 of the EIS).

A12.2.2.2 Literature Review and Consultations

Existing records of the occurrence of protected species of fauna were checked in the following literature: Kurz & Costello (1999) for lamprey; Reynolds (1998) for white-clawed crayfish; Moorkens (1999) for freshwater pearl mussel (*Margaritifera margaritifera*); O'Reilly (2002) for fisheries. The National Parks and Wildlife Service (NPWS) were consulted for additional information on protected species of flora and fauna that may occur in the area. The Southern Regional Fisheries Board (SRFB) was consulted with regard to existing information on these watercourses.

A12.2.3 DESCRIPTION OF THE EXISTING ENVIRONMENT

A12.2.3.1 Designated Conservation Areas

The stream that flows through Lyrath flows into the River Nore candidate Special Area of Conservation (cSAC) (site code 2162). The proximity of the watercourses/field drains to designated areas is outlined in Table A12.2.1.

Table A12.2.1 Designated conservation areas within 3km of the respective watercourses.

Site name within 3km of first order tributary of Smartcastle stream	Site code	Status	Distance from route
Lough Cullin	406	pNHA	1.75km east
Grannyferry	833	pNHA	0.9km south
Lower River Suir	2137	cSAC	1.8km south
Site name within 3km of Lyrath stream	Site code	Status	Distance from route
River Nore	2162	cSAC	Stream joins with River Nore.
Pococke River	2162	cSAC	0.6km west
Site name within 3km of first order tributary of Rathgarvan field-drain	Site code	Status	Distance from route
River Nore	2162	cSAC	1.6km west

pNHA = proposed Natural Heritage Area

A12.2.3.2 Rare and Protected Plants

According to the recent NPWS database of rare plant sites, there are 11 rare plant species within two 10km Irish National Grid squares (S51 and S55) crossed by the route. The rare plant species recorded within these squares are: corn cockle (*Agrostemma githago*), nettle- leaved bell flower (*Campanula trachelium*), meadow saffron (*Colchicum autumnale*), blue fleabane (*Erigeron acer*), red hemp-nettle *(Galeopsis angustifolia*), opposite-leaved pondweed (*Groenlandia densa*), meadow barley (*Hordeum secalinum*), small-white orchid (*Pseudorchis albida*), green-winged orchid (*Orchis morio*), wild clary (*Salvia verbenaca*) and betony (*Stachys officinalis*). As many of these records are old (pre-1900) and the locations of the sites are given as 10km squares only, it is not known whether the proposed works impact upon these sites or not. However, no rare plants were encountered during the walk-over survey.

A12.2.3.3 General Description of the watercourses

Aquatic Habitat:

Salmonids generally spawn in areas of riffle where there is a gravel substrate and they feed in areas of glide. The following describes the in-water conditions for the three watercourses concerned. Any areas that contain riffle and glide conditions are likely to contain salmonids.

First order tributary of the Smartcastle stream:

A summary of in-stream habitat and recommendations are outlined in Table A12.2.2. The following is a general description of the in-stream habitat of each stretch of the stream within the study area.

The width of this stream varies between 1m and 4m, and the depth varies between 5cm and 50cm. Upstream of the upper half of section D-E (see EIS Figures 11.3 and 11.51 in Volume 2), the channel was completely dry during the survey.

From the lower end of section D-E, the volume of water increases steadily downstream.

In section F-G, the stream joins with the main channel of the Smartcastle for approximately 70m. This stretch is approximately 1m deep with good pools where trout were observed. There is a dam across the main channel where it turns east. At this location, the first order tributary flows south. It is choked with fool's water-cress (*Apium nodiflorum*), water hemlock *(Cicuta virosa*) and fringed by reed canary-grass (*Phalaris arundinacea*). The channel is 3-4m wide with slow flow and a silty substrate with some cobble. There are trout present in this stretch.

There is one area of riffle along section G-H, in an otherwise slow-flowing stream.

Stream through Lyrath Estate:

A summary of in-stream habitat and recommendations are outlined in Table A12.2.2. The following is a general description of the in-stream habitat of each stretch of the stream within the study area.

The width of this stream varies between 1.5m and 4m, and the depth varies between 15cm and 30cm. At the proposed outfall location, the stream is 1.5-2m wide, 20cm deep and has a silty substrate. The flow is glide dominated through section A – B and most of section B-C (see EIS Figures 11.47 and 11.52 in Volume 2).

The stream widens at the downstream end of section B-C into a ponded area choked with fool's water cress and floating sweet grass (*Glyceria fluitans*). It continues through an old stone bridge where there is some riffle with a cobble substrate.

Through section C-D, there are a good variety of flow conditions from riffle to glide to pools. The average width is 2m and depth is 20-25cm, with a very silty substrate and occasional gravel pockets.

In section D-E, the stream widens into a pond area 10m+ wide, 20-25cm deep and with high banks on either side. This ponded area has an embankment established on the downstream end with a narrow outlet to allow water to flow through. This embankment may have been man-made to restrict flow and ensure the ponded area does not go dry. The ponded area

contains much fool's water cress. Heron (*Ardea cinerea*) and mallard(*Anas platyrhynchos*) were noted along this stretch of the stream.

In section E-F, the stream narrows to 4m with an average depth of 10-15cm, with two weirs, which have a drop of approximately 1m.

In section F–G, the stream narrows again to 1.5m, with a depth of 10-15cm. The flow regime varies from good stretches of riffle, to glide with a cobble substrate. Trout were observed along this stretch. Aquatic vegetation is comprised of occasional fool's water cress with yellow iris (*Iris pseudacorus*) and meadowsweet *(Filipendula ulmaria*) along the edges.

In section G – H the stream flows through a narrow open culvert, 600mm wide, adjacent to the local road that goes underneath the railway. It then crosses the road in a closed culvert. From the outfall point of this culvert, the remaining stretch of watercourse is on average 2.5-3m wide, 20-30cm deep and with a cobble and gravel substrate with two shallow weirs (average drop of 20cm). There is a good flow regime of riffle, glide and pool with gentle meanders.

Section H–I: The stream splits into two paths creating islands of vegetation. The characteristics of the stream flow and dimensions are similar to section G–H.

Section I–J: The stream joins into one again just north of the old stone bridge at the intersection with the local road. A water sample (LY1 – see Section A12.2.5 of this Appendix and EIS Figures 11.48 and 11.49 in Volume 2) was taken 10m south of stone bridge. At this location the stream is 3m wide with an average depth of 10cm and some riffle with cobble and occasional gravel substrate. The stream winds its way from here to the River Nore (cSAC) with very steep banks on either side at the confluence.

Rathgarvan Field Drain:

This outfall channel was completely dry apart from a small ponded area in section A–B, hence there was no ecologically sensitive in-stream habitat along the field-drain at Rathgarvan (see EIS Figures 11.48 and 11.49 in Volume 2).

Table A12.2.2. In-stream habitat within the first order tributary of the Smartcastle stream.

Location of stretch along river	Characteristics of aquatic habitat	Recommendations
A-D	Channel was completely dry with silt/clay bed	Works to be carried out along this stretch after a dry spell when the channel has dried up.
D-E and E-F	Low volumes of water with silty substrate	Minimal in-stream works anticipated. Any in-stream works to be agreed in advance by SRFB and NPWS. Machinery to work from bank at appropriate locations, thereby avoiding impacts to woody vegetation, where feasible.
F-G	Stream joins the main channel of the Smartcastle for approximately 70m. Approx. 1m deep and 3-4m wide with good pools where trout were observed. This stretch is choked with fool's water cress, water hemlock and fringed by reed canary-grass.	Minimal in-stream works anticipated. Any in-stream works to be agreed in advance by SRFB and NPWS. Machinery to work from east bank along previously cleared strip within scrub. Bank structure and vegetation cover to be maintained.
G-H	Approx. 3-4m wide with slow flow and silty substrate with some cobble. Deep pools (>50cm in depth) which are good holding habitat for trout.	Minimal in-stream works anticipated. Any in-stream works to be agreed in advance by SRFB and NPWS. Machinery to work from east bank. Bank structure and vegetation cover to be maintained.

Table A12.2.3: In-stream habitat within the Lyrath stream.

Location of stretch along river	Characteristics of aquatic habitat	Recommendations
A-B	The flow conditions are predominantly glide with a silty substrate.	Machinery to work from either bank.
B-C	The flow conditions are predominantly glide with a silty substrate.	Machinery to work from east bank.
C-D	Flow conditions from riffle to glide to pool conditions. Width = 2m and depth = 20-25cm with a very silty substrate and occasional gravel pockets.	Minimal in-stream works anticipated. Any in-stream works to be agreed in advance by SRFB and NPWS. If absolutely necessary, machinery to work from east bank avoiding woody vegetation (see generic recommendations in section 4). Bank structure and vegetation cover to be maintained.
D- E	Pond area of 10m+ in width with high banks on either side and a depth of 20-25cm.	Minimal in-stream works anticipated. Any in-stream works to be agreed in advance by SRFB and NPWS. Bank structure and vegetation cover to be maintained.
E-F	Stream width = 4m, depth = 10-15cm, with two weirs.	Minimal in-stream works anticipated. Any in-stream works to be agreed in advance by SRFB and NPWS. If necessary, machinery to work from east bank avoiding woody vegetation (see generic recommendations in section 4)
F–G	Stream width = 1.5m; depth = 10-15cm. Flow regime varies from good stretches of riffle to glide with a cobble substrate.	Minimal in-stream works anticipated. Any in-stream works to be agreed in advance by SRFB and NPWS. Machinery to access this stretch from eastern bank on southern side of existing N10 and on eastern bank between railway and local access road.
G-H	Stream width = 2.5-3m; depth = 20-30cm with a cobble and gravel substrate.	Minimal in-stream works anticipated. Any in-stream works to be agreed in advance by SRFB and NPWS. Machinery to access this stretch from eastern bank. Bank structure and vegetation cover to be maintained.
H- I	Stream width = 2.5-3m; depth = 20-30cm with a cobble and gravel substrate.	Minimal in-stream works anticipated. Any in-stream works to be agreed in advance by SRFB and NPWS. If necessary, machinery to work from east bank (within private garden) avoiding woody vegetation (see generic recommendations in section 4) Bank structure and vegetation cover to be maintained.
I-J	Stream width = 3m; depth = 10cm and some riffle with cobble and occasional gravel substrate.	Minimal in-stream works anticipated. Any in-stream works to be agreed in advance by SRFB and NPWS. If necessary, machinery to work from west bank, just south of stone bridge. No works further downstream. Bank structure and vegetation cover to be maintained.

Water Quality

Biological samples were taken for the first order tributary of the Smartcastle stream and the stream through Lyrath Estate at the downstream end of the surveyed section. The Q values for both streams are 3-4, which indicates slightly polluted water quality status (see Section A12.2.5 of this Appendix: SM1 = first order tributary of the Smartcastle stream and LY1 = Lyrath stream). The Lyrath stream was also sampled upstream at the crossing of the proposed Kilkenny link road at chainage 3+200 and resulted in a Q value of 3, which indicates moderately polluted water quality.

Riparian Habitat

The riparian zone along the two streams and the field drain surveyed are diverse and include the following habitats (codes are after Fossitt, 2000): hedgerows (WL1) and treelines (WL2), scrub (WS1), arable crop (BC1), improved agricultural grassland (GA1), wet grassland (GS4), conifer plantation (WD4) and buildings.

Ecologically sensitive habitats within the riparian zone along the first order tributary of the Smartcastle include treelines, hedgerows, scattered trees, scrub and conifer woodland (see Table A12.2.4). Areas of particular ecological value occur along the stretches E-F, F-G and G-H.

Ecologically sensitive habitats within the riparian zone along the Lyrath stream include treelines, scattered trees, scrub and broadleaf woodland (see Table A12.2.5). Areas of particular ecological value occur along the stretches C-D, D-E, E-F, F-G, G-H and H-I.

Ecologically sensitive habitats within the riparian zone along the field drain at Rathgarvan include treelines, scattered trees and broadleaf woodland (see Table A12.2.6). Areas of particular ecological value occur along the stretches A-B and C-D.

Table A12.2.4. Ecologically sensitive areas in the riparian habitat of the first order tributary of the Smartcastle stream.

Location of survey stretch along river	Bankside	Characteristics of riparian habitat	Potential bat roosts	Specific recommendations
A-B	Western	Sitka spruce trees (*Picea sitchenis*) and hedgerow comprised predominately of hazel *(Corylus avellana)* with occasional semi-mature ash (*Fraxinus excelsior)* and hawthorn (*Crataegus monogyna*) on north side of local road.		Machinery works on this section of watercourse via eastern bank. Avoid impacting on hedgerow.
	Eastern	Old stone bridge under local road. Conifer woodland comprised of sitka spruce. Semi-mature beech *(Fagus sylvatica*) and 2 horse-chestnut trees (*Aesculus hippocastanum)* (one of the trees is on the western side) at southern end of conifer wood.	Old stone bridge under local road.	Machinery works on this section of watercourse via western bank, but avoid semi-mature tree at end of conifer woodland.
	Western/Northern	At the end of the woodland, a treeline of young and semi-mature ash and beech with one mature ash. Hedgerow of hazel and hawthorn (with one semi-mature oak *Quercus* sp. continues south and turns due west.	Some of the trees are covered in ivy (*Hedera helix*)	Machinery works on this section of watercourse via eastern bank and southern bank (as hedgerow turns due west).

Table A12.2.4. (Cont'd) Ecologically sensitive areas in the riparian habitat of the first order tributary of the Smartcastle stream.

Location of survey stretch along river	Bankside	Characteristics of riparian habitat	Potential bat roosts	Specific recommendations
B-C	Western and Eastern	Hedgerow of willow *(Salix* sp.*),* hawthorn and young ash on both sides. Short treeline of semi-mature ash on both sides at two locations.	Forked ash – potential for bats	Avoidance of works is preferable. However, if works are necessary, machinery works on this section of watercourse via eastern bank but avoid impacting on trees.
	Eastern	As watercourse turns, area of scrub comprised of hazel, elder, hawthorn with young ash and sycamore (*Acer pseudoplatanus)*. Some clearance of scrub has already taken place on the eastern bank.		Machinery works on this section of watercourse via eastern bank.
	Western and Eastern	2 semi-mature ash on western side and 3 on eastern side at end of this section.		Avoid impacting on trees.
C-D	Western	Hedgerow with occasional semi-mature ash.	Some of the trees are covered in ivy.	Machinery works on this section of watercourse via eastern bank.
	Western	Treeline of semi-mature Scot's pine (*Pinus sylvestris*) with young beech and horse-chestnut along western bank in garden of dwelling house.		Machinery works on this section of watercourse via eastern bank.
	Eastern	Earth bank with occasional young ash trees.		Machinery works on this section of watercourse via western bank from drive-way.
	Western	Last stretch of this section is comprised of semi-mature ash and sycamore with a hawthorn and bramble (*Rubus fruticosus* agg.) hedgerow and as short section of cypress (*Cupressus* sp.) hedging.		Machinery works on this section of watercourse via eastern bank.

Table A12.2.4. (Cont'd) Ecologically sensitive areas in the riparian habitat of the first order tributary of the Smartcastle stream.

Location of survey stretch along river	Bankside	Characteristics of riparian habitat	Potential bat roosts	Specific recommendations
D-E	Eastern	A small area of wet grassland comprised of soft rush (*Juncus effusus*) predominantly with occasional buttercup (*Ranunculus* sp.), lady's smock (*Cardamine pratensis*), fool's water-cress and brooklime (*Veronica beccabunga).* A hedgerow borders the wet grassland and continues as far as a semi-mature oak.		Machinery works on this section of watercourse via western bank.
	Eastern/Western	From this point the stream turns south–west through a field of improved grassland.	Two old stone arched culverts allow passage of stream under local road.	Machinery works on to this section of watercourse from either side.
E-F	Western	Double hedgerow of hawthorn with semi-mature ash on raised earth bank. This grades into willow and hazel scrub on steep bank with gorse (*Ulex europaeus*) at the top of the slope.		Machinery works on to this section of watercourse from east side (in private garden).
F-G	Both banks	Area of wet grassland at confluence of first order tributary with main channel. Wet grassland on both banks with a treeline of alder (*Alnus glutinosa*) willow and occasional elm (*Ulmus* sp.) on western bank along stretch where tributary and main channel merge.		Avoidance of works along this section of watercourse.
	Both banks	From the location of the dam, where the tributary branches off from main channel to end of this section, treeline on western side comprised of ash, alder Scot's pine, sycamore and oak with hawthorn, blackthorn (*Prunus spinosa*) and hazel understorey. On eastern bank, scrub dominated – comprised of willow and hawthorn with some clearance along river bank for fencing.		Avoidance of works is preferable. However, if works are necessary, machinery works on this section of watercourse via eastern bank along cleared section of scrub but avoid impacting on remaining scrub.
G-H	Eastern	High banks with hedgerow of hawthorn and willow.		Avoidance of works is preferable. However, if works are necessary, machinery works on this section of watercourse via eastern bank, but avoid impacting on occasional hawthorn and alder on earth bank.

Table A12.2.5. Ecologically sensitive areas in the riparian habitat of the stream running through Lyrath Estate.

Location of survey stretch along river	Bankside	Characteristics of riparian habitat	Potential bat roosts	Specific recommendations
A-B	Western	Hedgerow of hawthorn. Treeline perpendicular to watercourse.		Machinery works on this section of watercourse via either bank. Sensitive works required to avoid trees if work required at point where treeline crosses watercourse.
B-C	Western	Area of willow scrub with bramble, which joins a narrow strip of broadleaf woodland comprised of young and semi-mature ash. This grades into a treeline of semi-mature ash.	Semi-mature ash with ivy cover.	Machinery works on this section of watercourse via eastern bank.
	Eastern	Two semi-mature willow to north of old stone bridge.	Old stone bridge.	Machinery works on this section of watercourse via eastern bank but avoid impacting on willow trees.
	Eastern	Hawthorn and semi-mature ash to south of stone bridge.		Machinery works on this section of watercourse via eastern bank but avoid impacting on ash trees.
C-D	Eastern	Hedgerow of hawthorn and occasional semi-mature ash. Treeline of semi-mature ash at southern end of this section.	Semi-mature ash with ivy cover.	Avoidance would be preferable, but if works required, machinery works on this section of watercourse via eastern bank but avoid impacting on ash trees.
	Western	Broadleaf woodland of beech, ash and poplar (*Populus)* with understorey of hazel, holly (*Ilex aquifolium*) and yew (*Taxus baccata*). Ground flora of yellow iris, cleavers *(G. aparine*), docks *(Rumex*), nettles (*Urtica dioica*), meadowsweet, hogweed (*Heracleum sphondylium)*, herb Robert (*Geranium robertianum*) and cow parsley (*Anthriscus sylvestris*). Field drain running parallel to watercourse. Badger activity noted to west of woodland.		Avoidance of works along the western bank of this section of watercourse.

Table A12.2.5. (Cont'd) Ecologically sensitive areas in the riparian habitat of the stream running through Lyrath Estate.

Location of survey stretch along river	Bankside	Characteristics of riparian habitat	Potential bat roosts	Specific recommendations
D-E	Western	Area of willow and bramble scrub with occasional young and semi-mature ash and two very mature oaks. Area of bramble grades into a narrow strip of broadleaf woodland of semi mature and mature beech with occasional lime (*Tilia* sp.) and sycamore.	Several mature trees have good potential for bats.	Avoid any works along western bank
	Eastern	Area of willow scrub on steep embankment that grades into a narrow strip of broadleaf woodland of lime, sycamore and beech with bramble understorey and young saplings.	Several mature trees have good potential for bats.	Avoid any works in vicinity of woodland.
E-F	Western	Broadleaf woodland of semi-mature and mature beech with occasional poplar, horse chestnut and sycamore. Understorey of laurel (*Prunus laurocerasus*). Inactive badger sett with eight entrances.		Avoid any works to western bank along this section.
	Eastern	Amenity grassland on eastern bank on western side of driveway leading to Lyrath House from gateway with two mature beech and bamboo grass, meadowsweet and reed canary-grass.		Machinery works on this section of watercourse via eastern bank from amenity grassland area. Avoid any impacts on trees or bamboo grass tussocks.
F-G	Both banks	Between N10 and local road, both banks are comprised of young and semi-mature sycamore and poplar with snowberry (*Symphoricarpos albus*) and laurel understorey.		Machinery works on this section of watercourse via eastern bank but avoid impacting on semi-mature trees.

Table A12.2.5. (Cont'd) Ecologically sensitive areas in the riparian habitat of the stream running through Lyrath Estate.

Location of survey stretch along river	Bankside	Characteristics of riparian habitat	Potential bat roosts	Specific recommendations
	Southern	Between local road and railway, broadleaf woodland (WD1) on north side of railway on steep bank. It is comprised of ash, occasional young and semi-mature oak and beech with understorey of hawthorn and blackthorn and dense ground flora of bramble.		Machinery works on this section of watercourse via north-eastern bank.
	Northern	Abandoned grassland (GS2) on southern bank.		Machinery works on this section of watercourse via north-eastern bank.
G-H	Eastern	Watercourse goes through open culvert under railway adjacent to local access road and then under closed culvert across access road and runs adjacent to a private property. This property is bordered by a treeline of semi-mature oak, with young ash, sycamore and alder on the eastern side of stream. This grades into scrub (WS1) of hawthorn with occasional young and semi-mature beech, alder, ash and oak.	Several mature trees have good potential for bats.	Avoid any works along eastern bank.
	Western	Wet grassland (GS4) comprised of yellow iris, willowherb (*Epilobium* sp.), lady's smock, meadowsweet, nettles, cleavers and reed canary-grass.		Machinery works on this section of watercourse via western bank.
H-I	Western	Broadleaf woodland (WD1) on steep slope to watercourse comprised predominantly of beech, occasional horse-chestnut with a sparse understorey of young hawthorn and willow.		Avoid any works along western bank.
	Eastern	Semi-mature ash and horse-chestnut trees.		Machinery works on this section of watercourse via eastern bank in between semi-mature trees.
I-J	Eastern	As watercourse crosses local road, hedgerow of hawthorn on eastern bank.		Machinery works on this section of watercourse via western bank.
	Western	Further downstream, hedgerow of hawthorn occurs on western bank.		Avoid any works

Table A12.2.5. (Cont'd) Ecologically sensitive areas in the riparian habitat of the stream running through Lyrath Estate.

Location of survey stretch along river	Bankside	Characteristics of riparian habitat	Potential bat roosts	Specific recommendations
	Northern	As watercourse turns east, hedgerow that grades into a treeline of semi-mature and one mature ash on the northern bank.	Mature ash tree has good potential for bats.	Avoid any works
	Both banks	As watercourse turns south-east and joins the River Nore, both banks are comprised of hawthorn and beech trees.		Avoid any works

Table A12.2.6. Ecologically sensitive areas in the riparian habitat of the field drain at Rathgarvan.

Location of survey stretch along river	Bankside	Characteristics of riparian habitat	Potential bat roosts	Specific recommendations
A-B	Both banks	Narrow strip of broadleaf woodland (WD1) of sycamore and ash with occasional Scot's pine and willow. Saplings of ash and sycamore in understorey on southern bank and hawthorn on northern bank.	Old arch culvert. Mature trees.	Avoidance of works is preferable, however if work required at this location, sensitive works required to avoid trees.
		East of woodland is a treeline of poplar on both banks with mature ash and sycamore at corner of private garden.		Avoidance of works is preferable, however if work required at this location, sensitive works required to avoid trees.
		This treeline of poplar grades into a treeline of old willow on the north side of field drain.		Access this section of watercourse via southern bank, but sensitive works in proximity to willow trunks as these overhang the field drain.
B-C	Both banks	Field drain goes through area of improved grassland (GA1) with occasional willow along banks of drain.		Access this section of field drain via either bank.
C-D	Northern	Broadleaf woodland (WD1) of young and mature willow (whose trunks cross the field drain), elm, beech, ash, sycamore and oak.	Mature trees with cracks.	Avoidance of works along the northern bank of this section of watercourse.
	Southern	Improved grassland (GA1) adjacent to field drain.		Access this section via southern bank but avoid impacting on willow tree trunks.
D-E	Both banks	Steep banks (1.5m high) with improved grassland on both banks. Edges sprayed for noxious weeds only.		Access this section via either bank.
E-F	Western	Hedgerow of hawthorn and gorse with several gaps and one semi-mature ash and cherry (*Prunus* sp.).		Access this section via eastern bank.

A12.2.3.3 Protected Aquatic Fauna

Introduction

Seven aquatic species occurring in Ireland are protected under Annex II of the EU Habitats Directive (EEC/92/43). These are otter, the three species of lamprey; sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*) and brook lamprey (*Lampetra planeri*), the white-clawed freshwater crayfish, the freshwater pearl mussel and the Atlantic salmon (*Salmo salar*). The kingfisher, a species occurring in close association with watercourses, is listed as an Annex I of the EU Birds Directive (79/409/EEC). The Rathgarvan field-drain has no fisheries habitat, as this channel was completely dry and hence will not support any protected aquatic species.

Otter

The otter is found throughout Ireland (Hayden and Harrington, 2000). Otters tend to occupy linear territories along watercourses and are rarely found far from water.

No otter spraint were found along the watercourses surveyed but they are likely to occur along the lower reaches of the first order tributary of the Smartcastle stream and the Lyrath stream, which support fish populations.

Freshwater crayfish

Crayfish appears to be widespread in lowland lakes and rivers that are underlain by Carboniferous limestone, or its derivative as glacial drift. The species is generally associated with a firm substrate, moderate productivity levels and hard water with a pH of 7 or above.

No evidence of crayfish was found along the watercourses. According to Reynolds (1998), there is no record of the species from the area under study.

Lamprey

Sea and brook lamprey are known to be common in the River Nore catchment, however the sea lamprey is usually confined to the lower reaches of the Nore south of Thomastown (Kurz & Costello 1999). There are records of unspecified species of lamprey from the River Suir catchment. The sea and river lamprey are typically confined to the lower reaches, hence some lamprey may occur in the lower reaches of the first order tributary of the Smartcastle stream. The brook lamprey however, is common and widespread in Ireland and is likely to occur in the lower reaches of these two streams.

Kingfisher

The kingfisher is relatively widespread and common in Ireland. The species requires steep to overhanging banks, which are at least 1m tall in which to nest. Habitat conditions do not appear to be suitable for nesting along the stretches of river under study, though the species can be expected to feed along the stretches where salmonids are present – the lower reaches of the first order tributary of the Smartcastle stream and the Lyrath stream.

Salmonids

Riffle habitat, which is required for spawning by salmonids, is present at a number of locations along the downstream sections of the Lyrath stream. There is only one riffle area along the first order tributary of the Smartcastle stream. This is located at the sample location on the downstream end of the surveyed section. The Rathgarvan field drain has no fisheries habitat, as this channel was completely dry.

Freshwater pearl mussels

No evidence of freshwater pearl mussels was found on the watercourses surveyed. There are records of the species from the 10km square in which the Lyrath stream and the first order tributary of the Smartcastle stream is located (Moorkens, 1999). The substrate of the upper reaches of the Lyrath stream (section A-B to E-F inclusive) and the majority of the first order tributary of the Smartcastle (apart from sections F-G and G-H) does not lend itself to a healthy population of pearl mussel.

Bats

Although this survey did not involve a full bat survey, a number of trees were noted which may provide suitable roosting sites for bats and bats will feed along these watercourses. These are listed in Tables A12.2.4, A12.2.5 and A12.2.6.

A12.2.4 CONCLUSIONS AND RECOMMENDATIONS

General Conclusions

It is likely that the wayleave will be proposed as 10m along each bank for access, if required to gain access for in-stream works. The likely impact along the wayleave will be access for possible re-grading works at the time of the road construction. Following this, it is anticipated that both stretches of watercourses and the Rathgarvan field drain will be visually inspected once a year, with estimated maintenance once every five years. Where possible the bank with the least vegetation will be used to undertake any in-stream works, to further minimise impacts. It is anticipated that there will be minimal in-stream works. Any in-stream works are to be agreed in advance by SRFB and NPWS. All works with machinery will be from the bankside where it is least likely to disturb bankside vegetation.

It is envisaged that the stream at Lyrath will only require minor works to culvert structures. The Smartcastle stream is likely to require some in-stream vegetation clearance and possible deepening to enable it to be more free-flowing and improve the capacity of the stream at this location. The culverts may require de-silting. This practice should be carried out manually where practicable.

Other than essential in-stream clearance there is no other vegetation removal anticipated. It is intended that the impacts of these works would be kept to a minimum.

The lower reaches of the first order tributary of the Smartcastle stream offers good holding habitat for salmonids in some areas where deep pools occur. Riffle habitat is common along the lower reaches of the Lyrath stream, so that spawning may occur. Otter, lamprey, crayfish and kingfisher may occur in the lower reaches of the Lyrath stream and the first order tributary of the Smartcastle stream.

The habitats occurring in the riparian zone of the two streams and the field drain at Rathgarvan are varied. Ecologically sensitive habitats include treelines, hedgerows, scattered trees, scrub and woodland.

Several trees along the route are characterised by a thick ivy cover and offer roosting potential for bats. A bat survey will have to be undertaken prior to the removal of any old culverts or mature trees.

As the works will avoid impacting on trees and, where feasible, avoid woody vegetation and will not radically alter the profile of the watercourses, this will constitute a temporary negative residual impact.

Recommendations relating to Proposed Works

Specific measures can only be prescribed on the basis of specific proposals for flood alleviation. The development of specific recommendations and mitigation measures at the detailed design stage should be carried out in consultation with the SRFB and NPWS . Once specific proposals are in place, an assessment of the impacts on protected species and their habitat should take place. However, the following generic recommendations apply.

No channel modification or fording to take place along these watercourses.

Where there is a requirement for machinery to work on the riverbank edge, this should be confined to the non-sensitive side as indicated in A12.2.4, A12.2.5 and A12.2.6. Avoid altering any sections of channel, which have a natural profile.

Reprofiling of banks should not be undertaken, where de-silting and vegetation clearance takes place. No gravel substrate to be removed from streambeds.

Clearing of the vegetation should be confined to scrub, herbaceous vegetation and to limbs of trees. All trees should be retained and trimming of the branches should be carried out by a qualified arboriculturalist and kept to a minimum.

March 1st to August 31st inclusive are particularly important for breeding birds and clearance of vegetation and trimming of branches should take place outside of this period. The Wildlife (Amendment) Act, 2000 affords protection to breeding birds by prohibiting the clearance of vegetation during this period.

At all locations where trees are present and are due to be retained, there should be no impact on the trees either temporary or permanent, and ground disturbance in the vicinity of this tree should be avoided to prevent damage to the root zone of the tree.

It is imperative that the proposed works will not alter the existing line or characteristics of the in-stream habitat.

The closed season for in-stream works (October to June inclusive) must be observed.

Mitigation measures will be put in place to control the release of suspended solids, or any other deleterious matter to watercourses during the proposed works, consistent with the measures proposed at the other watercourses within the proposed road development. Detailed mitigation measures for all watercourses are outlined in Chapter 12 of this EIS.

A12.2.5 WATERQUALITY SAMPLING

SM1

The kick sample from site SM1 contained 79 individual macroinvertebrates, representing 16 species/higher taxa. Group C species were most common, accounting for approximately 43% of the total sample. Overall, the Group C freshwater shrimp (*Gammarus* sp.) was the most common organism found in the sample. Group A species were well represented (15%) comprising 10 specimens of the flattened mayfly *Ecdyonurus venosus* and one specimen of the stonefly *Leuctra hippopus.* Group B was represented by 10 specimens of the mayfly *Ephemerella ignita* and 10 specimens from the cased caddis family Limnephilidae. Specimens (other than *Gammarus* sp.) recorded from Group C included the mayfly *Baetis rhodani*, members of the Tipulidae, blackfly larvae (Simulidae), Chironomidae, water bugs (Velidae) and several riffle beetle specimens (*Elmis aenea*). *Baetis rhodani* is considered one of the most tolerant of the Ephemeroptera and is the only species of this family not to be categorised in Group B (less tolerant to organic pollution) according to EPA guidelines (McGarrigle *et al*, 2002). Species very tolerant to organic pollution (Group D) were recorded as present at the site, represented by one specimen of leech and several specimens of water louse (*Asellus aquaticus*). The richness and abundance of species considered sensitive to organic pollution were moderate at this site. Groups A and B were common in the community while Group C was ranked as numerous. Macroinvertebrate community characteristics were consistent with a slightly polluted status. As a result a Q3-4 value was assigned, indicating Class B water.

LY1

The sample from site L41 contained 128 macroinvertebrate specimens representing 12 species/higher taxa. The most abundant species recorded was the Group C freshwater shrimp, *Gammarus* sp. (75% of total sample) which is known to be tolerant of organic pollution. Group A species were present in small numbers, comprising four specimens of the flattened mayfly species *Ecdyonurus venosus* and one specimen of the seasonal mayfly *Ephemera danica*. Group B was represented by a small number of the seasonal mayfly *Ephemerella ignita* and a second mayfly species *Baetis muticus,* in addition to eight specimens from the cased caddis family Limnephilidae. Specimens recorded from Group C (other than freshwater shrimp) included the mayfly *Baetis rhodani*, the uncased caddis family Hydropsyche, Tipulidae, the riffle beetle *Elmis aenea* and the water bug *Velia* sp. Species very tolerant to organic pollution (Group D) were recorded in small numbers at the site. The richness and abundance of species considered sensitive to organic pollution were moderate at this site. Group A was present in small numbers while Group B was ranked as common in the community. Group C was ranked as between dominant and excessive. Macroinvertebrate community characteristics were consistent with a slightly polluted status. As a result a Q3-4 value was assigned, indicating Class B water.

A12.2.6 REFERENCES

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