

Terrestrial and freshwater ecology

1 Introduction

Dixon.Brosnan Environmental Consultants prepared this chapter as part of an Environmental Impact Assessment (EIA) for a proposed redevelopment of a composting facility at Killowen, Portlaw, Co Waterford. This chapter addresses the impacts of the development on the terrestrial and freshwater ecology of the site which is operated by Ormonde Organics Ltd. The proposed development involves the construction of an anaerobic digestion plant, with associated combined heat and power plant; and an augmentation of the existing composting capability.

This chapter describes and evaluates the habitats with their representative flora and fauna in order to describe and assess the impacts that would result from the proposed development. The chapter follows the structure and protocols detailed in *Advice notes on current practice in the preparation of Environmental Impact Statements* (EPA 2003) and *Guidelines on the information to be contained in Environmental Impact Statements* (EPA 2002). The classification scheme used in the NRA publication *Guidelines for assessment of ecological impacts of National Road Schemes* (NRA, 2006a **Appendix 1**) was also used in this report. This ecological assessment was carried out by Carl Dixon M.Sc. Applied Ecology and Vincent Murphy M.Sc Ecosystem Conservation & Landscape Management.

2 Methodology

2.1 Consultations

The local officer of the NPWS was consulted and did not note any particular concerns relating to the facility or the proposed redevelopment.

2.2 Detailed surveys

The field survey was carried out on 28th of October 2010 to identify, map and evaluate habitats. Although the survey was carried out late in the season, the habitats potentially affected within the redevelopment area of low value and the risk that species or habitats of significant value are present on the site is negligible. The survey covered the entirety of the site and surrounding environs of the proposed development area. For the purposes of this report this area is referred to as the “study area”. The area of the site owned by Ormonde Organics Ltd is 3.2 hectares in size.

Habitats were mapped according to the classification scheme outlined in the Heritage Council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and following the guidelines contained in *Draft Habitat Survey Guidelines: a Standard Methodology for Habitat Survey and Mapping in Ireland* (Heritage Council, 2002). In broad terms the habitat map is based on the methodology outlined in the British JNCC publication (1993) on Phase 1 habitat surveys. It should be noted that some of the habitats are transitional and where this occurs they were placed in the category they most resemble. A classification scheme used to define impacts is based on a classification scheme used by the National Roads Authority (NRA) *Guidelines for the assessment of ecological impacts of National Road Schemes* (NRA, 2006a). This is included in **Appendix 1**.

An NIS stage 1 (screening report) was carried out to determine whether works at the site would impact on designated sites (SAC/SPA). The screening report concluded that the redevelopment of the facility will not have a significant impact on the qualifying interests of the River Suir SAC or on its conservation objectives. Similarly no significant impact on other designated sites including pNHA's is envisaged. An NIS screening report has been submitted as part of this overall application.

3 Description of the Receiving Environment

3.1 General landscape

The proposed development site at Killowen is situated approximately 3.1km north of Portlaw on the west bank of the lower Suir River. The immediate surrounding landscape includes farmland, dominated by improved pasture and woodlands consisting of plantations of broadleaved species. Other prominent features of the surrounding landscape include the lower River Suir with its associated riparian woodland of willows and levy structures. Hedgerows, treelines, trackways and public roads were also noted. The study area contains a number of minor watercourses. The site itself is dominated by artificial surfaces which include the buildings, yards and parking areas.

3.2 Designated Conservation Areas

There are no designated conservation areas within the proposed development site. Thus the proposed development site does directly impact on nor is not located immediately adjacent to any Special Area of Conservation (SAC), Natural Heritage Area (NHA), Special Protection Area (SPA), National Park or Nature Reserve. The proposed development is located approximately 300 meters from Lower Suir River SAC (site code 002137). A list of all the protected sites within 10 km of the proposed development site is included as **Table 1**. The most relevant sites are shown on **Figs. 1 - 3**.

Table 1. Protected sites within 10km of proposed development site.

Site	Code	Distance
SAC &cSAC		
Lower River Suir	002137	230 meters N & E
pNHA		
Lough Cullin	000406	2.71km W
Lower River Suir (Coolfinn, Portlaw)	000399	1.92km S
Fiddown Island	000402	520 meters N
Portlaw Woods	000669	2.61km S
River Suir Below Carrick-On-Suir	000655	5.72km NNW
Tibberaghny Marshes	000411	2.98km N
Nature reserves		
Fiddown Island Nature Reserve		520 Meters N

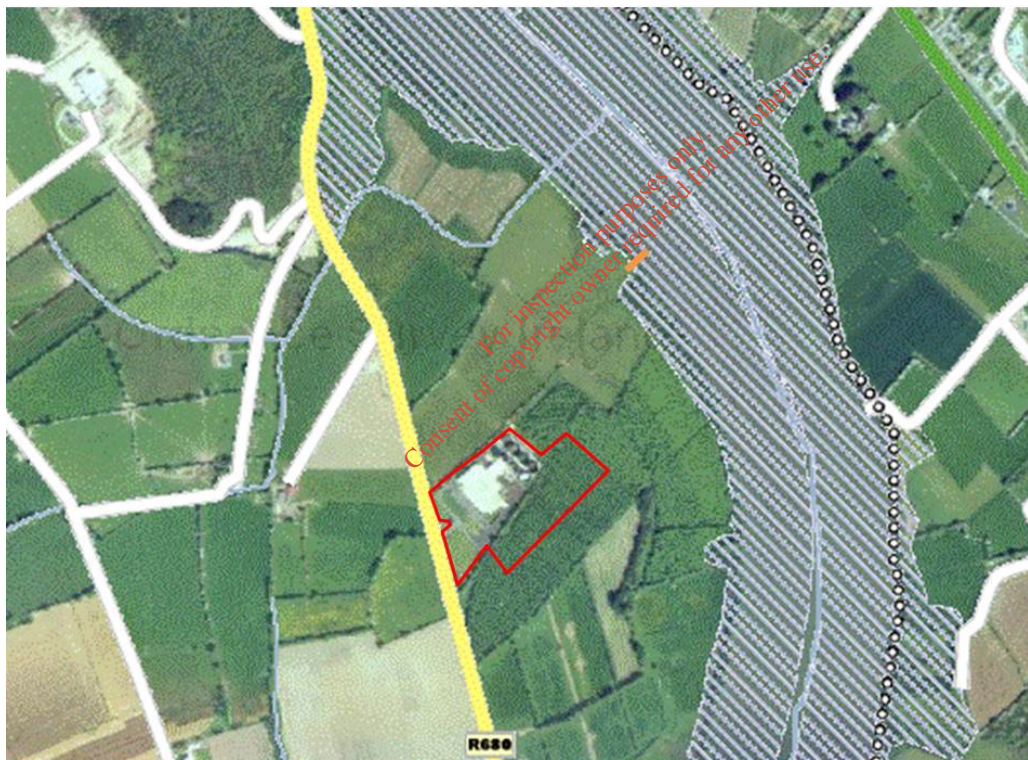


Figure1. Proposed development area (outlined in red) and the surface water discharge point (indicated in orange) in relation to the SAC in the hatched area.

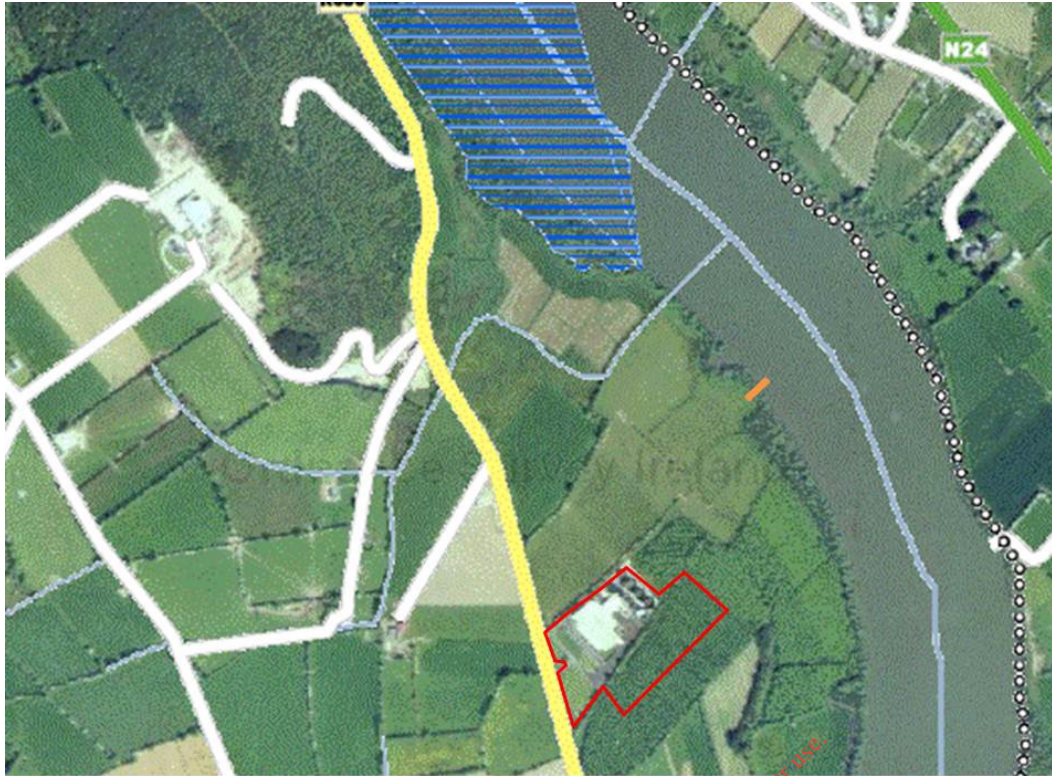
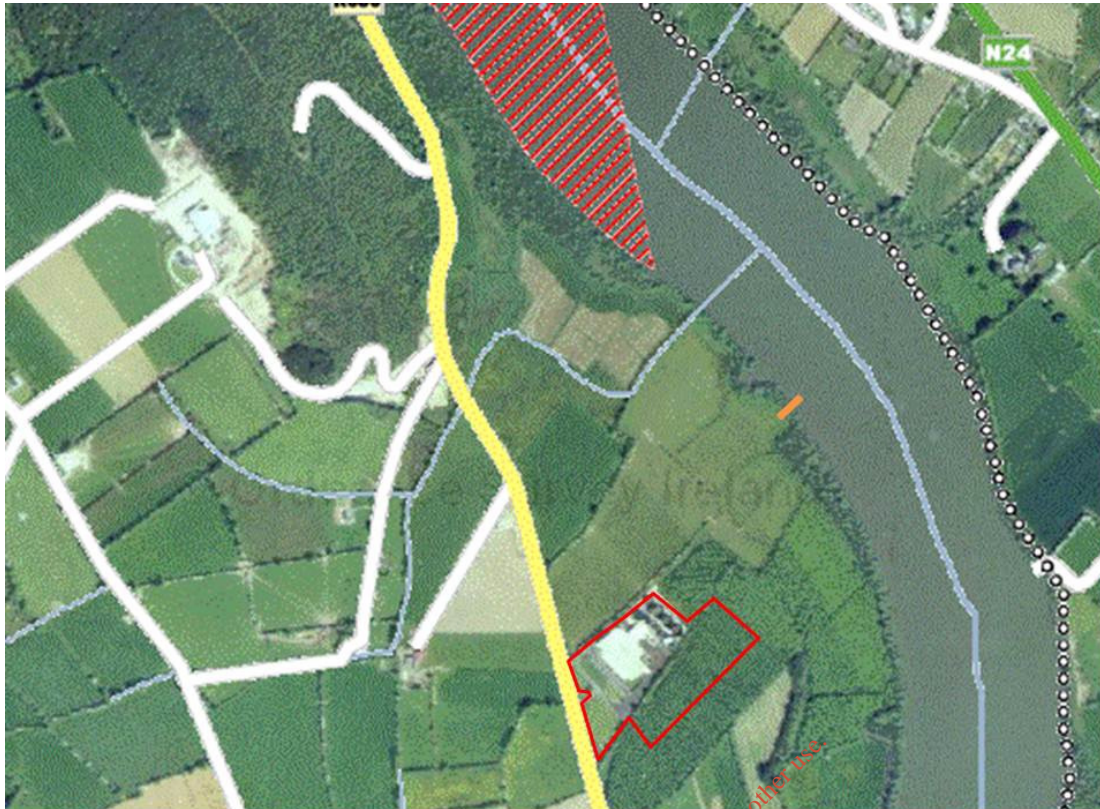


Figure 2. Proposed development area (outlined in red) and the discharge point (indicated in orange) in relation to the pNHA in the hatched area.

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Figure

3. Proposed development area (outlined in red) and the discharge point (indicated in orange) in relation to the Fiddown Nature Reserve in the hatched area.

Candidate Special Areas of Conservation, Special Protection Areas and proposed Natural Heritage Areas are protected under the European Habitats and Birds Directives and the Irish Wildlife (and Amendment) Acts, 1976 and 2000 respectively. The most relevant sites are the Lower River Suir SAC and to a lesser extent the Fiddown Nature Reserve which is located upstream of the facility.

3.2 Lower river Suir (002137)

This site consists of the freshwater stretches of the River Suir immediately south of Thurles, the tidal stretches as far as the confluence with the Barrow/Nore immediately east of Cheekpoint in Co. Waterford and many tributaries including the Clodiagh in Co. Waterford, the Lingaun, Anner, Nier, Tar, Aherlow, Multeen and Clodiagh in Co. Tipperary. The Suir and its tributaries flows through the counties of Tipperary, Kilkenny and Waterford. Upstream of Waterford city, the swinging meanders of the Suir crisscross the Devonian sandstone rim of hard rocks no less than three times as they leave the limestone-floored downfold below Carrick. In the vicinity of Carrick-on-Suir the river follows the limestone floor of the Carrick Syncline. Upstream of Clonmel the river and its tributaries traverse Upper Palaeozoic Rocks, mainly the Lower Carboniferous Visean and Tournaisian. The freshwater

stretches of the Clodiagh River in Co. Waterford traverse Silurian rocks, through narrow bands of Old Red Sandstone and Lower Avonian Shales before reaching the carboniferous limestone close to its confluence with the Suir.

The Aherlow River flows through a Carboniferous limestone valley, with outcrops of Old Red Sandstone forming the Galtee Mountains to the south and the Slievenamuck range to the north. Glacial deposits of sands and gravels are common along the valley bottom, flanking the present-day river course.

The site is a candidate SAC selected for the presence of the priority habitats on Annex I of the E.U. Habitats Directive - alluvial wet woodlands and Yew Wood. The site is also selected as a candidate SAC for floating river vegetation, Atlantic salt meadows, Mediterranean salt meadows, old oak woodlands and eutrophic tall herbs, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive - Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon and Otter.

3.3 Fiddown Island Nature Reserve, Co. Kilkenny

Location: 7km east of Carrick-on-Suir. Area (ha.): 21ha

Established in 1988 and it is State owned. Features of Interest include an alluvial woodland dominated by tree willows formerly used for basket making. The vegetation is characterised by tall herbs, sedges and grasses. It is covered in willow scrub and bordered by reed swamps - the only known site of its type in Ireland.

3.4 NPWS site designation qualifying interests

The NPWS lists the following species and habitats as qualifying interests for the River Suir cSAC (**Tables 2 and 3**). A more detailed assessment of the impacts on designated sites was carried out in the form of a NIS Stage 1 screening report which has been submitted as part of the overall application.

Table 2. Qualifying species

Site code	Name	Species code	Species
002137	Lower River Suir	1095	<i>Petromyzon marinus</i>
002137	Lower River Suir	1096	<i>Lampetra planeri</i>
002137	Lower River Suir	1099	<i>Lampetra fluviatilis</i>
002137	Lower River Suir	1103	<i>Alosa fallax</i>
002137	Lower River Suir	1106	<i>Salmo salar</i>
002137	Lower River Suir	1102	<i>Alosa alosa</i>
002137	Lower River Suir	1355	<i>Lutra lutra</i>
002137	Lower River Suir	1092	<i>Austropotamobius pallipes</i>
002137	Lower River Suir	1029	<i>Margaritifera margaritifera</i>

Table 3. Qualifying habitats

Site code	Name	Habitat Code	Habitat
002137	Lower River Suir	1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>)
002137	Lower River Suir	1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)
002137	Lower River Suir	3260	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation
002137	Lower River Suir	91A0	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in British Isles
002137	Lower River Suir	91E0	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)
002137	Lower River Suir	6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
002137	Lower River Suir	91J0	<i>Taxus baccata</i> woods of the British Isles

3.5 NPWS rare plants database

The national parks and wildlife service has only one historical of a recording rare or threatened plant species for the 10km grid square S41, and this is shown in **Table 4**. This species was not recorded on or in the vicinity of the site.

Table 4. Rare plant species

Species	Common name	Ten Km square	Recorded date
<i>Cephalanthera longifolia</i>	Narrow-leaved Helleborine	S41	1894

3.5 Habitat types

The terrestrial habitats within the development area or potentially affected by the development are listed below and are shown in the habitat map (**Figure 4**). Aquatic habitats are discussed in **Section 7**.

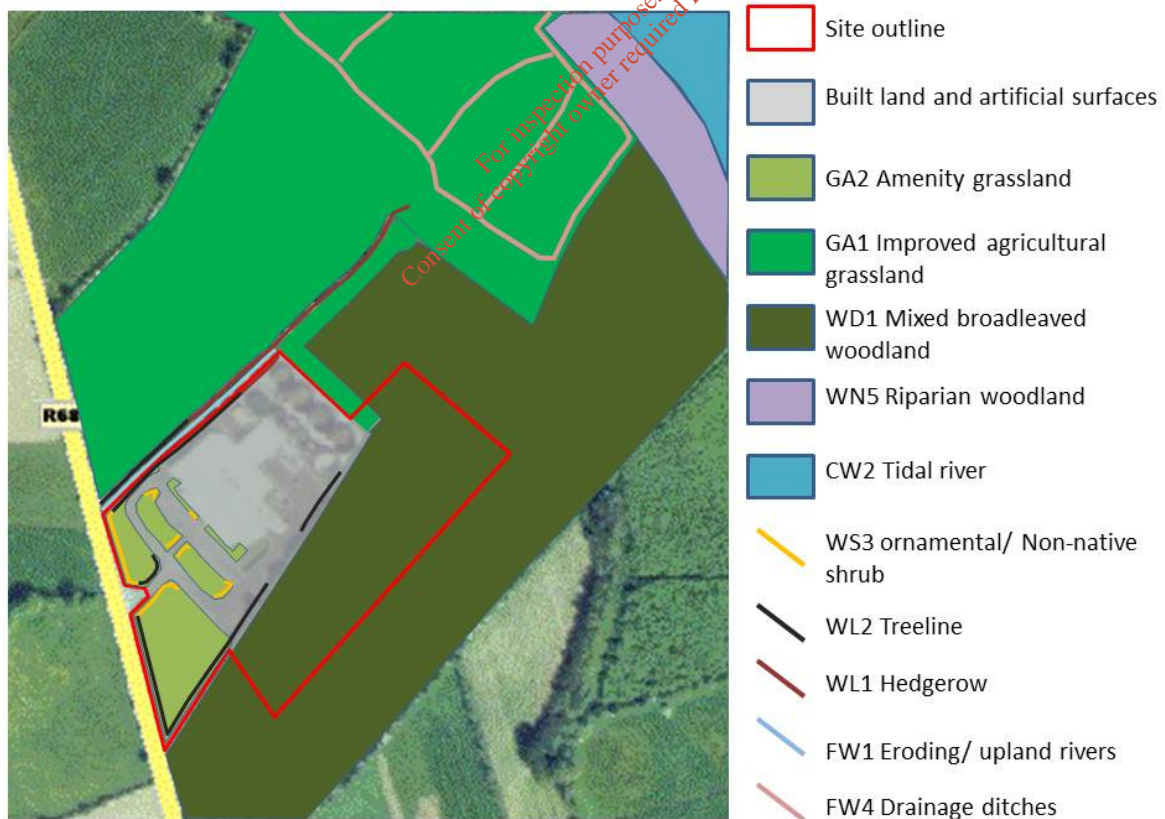


Figure 4. Habitat map

Grassland

- **GA1 Improved agricultural grassland**
- **GA2 amenity grassland**

Woodland

- **WD1 Mixed broadleaved woodland**
- **WS3 Ornamental/ non-native shrub**
- **WN5 Riparian woodland**

Linear woodland

- **WL1 Hedgerow**
- **WL2 Treelines**

Cultivated and built land

- **BL3 Built land and artificial surfaces**

Fresh water

- **FW1 Eroding/upland rivers**
- **FW2 Depositing lowland rivers**
- **FW4 Drainage ditches**

GA1 Improved agricultural grassland

This habitat includes grassland that has been reseeded and regularly fertilised. It is dominated by grass species, particularly rye-grass, with a poor complement of agricultural weed species. The adjoining land to the north and west of the site are classified as improved agricultural grassland, which is heavily grazed and/or used for silage. Poorly drained areas within this habitat have been colonised by soft rush.

WD1 Mixed broadleaved

This refers to the immediate adjoining lands to the south and east. Both consist of plantation grown ash and sycamore. The trees are closely spaced and approximately 8 m tall. This area appears to be

quite well maintained and regularly thinned. The ground flora is dominated by bramble, nettle and moss species, with broadleaved dock, ivy, male fern, holly, elder and blackthorn also recorded.

WL1 Hedgerow

The northern boundary of the site is marked by both hedgerow and treeline. The species mix is predominantly gorse with hawthorn and bramble. Downey birch and sycamore were also present in the hedgerow.

WL2 Treelines

The treeline on the northern boundary of the site is a purposefully planted treeline used as a screen to obscure the view of the treatment plant from the road and neighbouring houses. This treeline consists primarily of Leyland cypress and Scot's pine with ash, sycamore, birch and eucalyptus also included.

WN5 Riparian woodland

Adjacent to the river is a dense area of Riparian woodland dominated by white willow, with crack willow and grey willow also present. The dense under story vegetation in the field layer includes nettle, bramble, dock (*Rumex spp*) and reed canary grass.

BL3 Built land and artificial surfaces

This habitat type includes all the buildings, sheds, storage tanks and yards within the active site. Very little vegetation occurs within the working areas. The few species observed included rye grass, smooth sow thistle, broadleaved dock, daisy, broadleaved plantain and yarrow. These were all recorded in cracks in concrete or at the base of buildings.

WS3 Ornamental/ non-native shrubs

At the main entrance to the site there is a landscaped area. Shrubs such as cotoneaster are common, with Leyland cypress and eucalyptus trees also present. This species poor habitat surrounds a well maintained lawn of rye grass.

GA2 Amenity grassland

The rye grass lawns is species poor with ribwort plantain, daisy, dandelion, hop trefoil and creeping thistle as infrequent ruderals.

3.6 Habitat value

Based on the habitat surveys, the relative values of each terrestrial habitat type are detailed in **Table 4**. Aquatic habitats are discussed in **Section 7**. It should be noted that the value of a habitat is site specific, and will be partially related to the amount of that habitat in the surrounding landscape. The evaluation scheme used in **Table 4** is based on the scheme detailed in the NRA publication *Guidelines for assessment of ecological impacts of National Road Schemes* (NRA, 2006a) (**Appendix 1**).

Table 4. Habitat value

Habitat Type/Species	Relative Habitat Value	Comments
GA1 Improved agricultural grassland	Low value E	Habitat is highly modified with low species diversity.
WD1 Mixed Broadleaved woodland	Low - Moderate value E-D	Recently established plantation with low species diversity and dominated by ash and sycamore. Potential to develop into more diverse woodland.
WL1 Hedgerow	Moderate value D	Diverse with remnants of semi-natural habitat, locally important for wildlife. Valuable as corridors and refuges for wildlife amongst artificial and highly modified habitats.
WL2 Treelines	Low value E	A highly modified and largely artificial habitat maintained as a screen. Regularly trimmed to facilitate the movement of machinery through the site.
WN5 Riparian woodland	International value A	This habitat is included within the boundary of the cSAC. It is a natural woodland associated with the lowland depositing river. Diversity appears high and this habitat serves as valuable refuge for wildlife.
BL3 Built land and artificial surfaces	Low value E	Highly modified habitat artificial habitat, of minimal value to wildlife.
WS3 Ornamental/ non-native shrubs	Low value E	Highly modified and regularly maintained habitat; mainly evergreen shrubs. Limited potential for birds.
GA2 Amenity grassland	Low value E	Highly modified and regularly maintained habitat. .

4 Mammal Survey

4.1 Badgers

Badgers and their setts are protected under the provisions of the Wildlife Acts 1976 and 2000. It is an offence to intentionally kill or injure a protected species or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. The density of badgers in Ireland is approximately one social group per km² in lowland areas with a high component of pasture. In upland areas where feeding is scarce, badgers are generally found at lower densities. Overall the average density in Ireland is approximately one social group per 2 km². Badger setts are formed by a complex group of interlinked tunnels and therefore works in proximity to setts can potentially cause considerable damage.. The presence of badgers can be recognised by feeding signs, paths, latrines and setts.

Dixon.Brosnan surveyed the proposed development site in October 2010. The prevalence of pasture with hedgerows and mixed broadleaved woodland surrounding the proposed development site makes it suitable for badgers. However the site itself is of no value for this species. A survey of the site and surrounding area, to approximately 300 meters from the site boundary, did not record any signs of badger activity.

4.2 Bats

All bat species in Ireland are protected under the Wildlife Act 1976, as amended 2000 and the Habitats Directive which was transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I 94 of 1997), as amended. The Irish government is also a signatory to the Bonn convention (*Convention on the conservation of migratory species of wild animals*, Bonn 1979) and the Bern convention, 1982 (*The convention on the conservation of European wildlife and natural habitats*) and has a commitment to the "Eurobats" agreement (*Agreement on the Conservation of bats in Europe*, 1991). (NRA 2005a).

No buildings will be directly affected by the proposed development. Sections of treelines and an area of broadleaved deciduous woodland, which could potentially provide commuting routes and feeding opportunities for bat species will be affected. However the habitats affected are unlikely to provide roosting sites and the loss of habitat will not be significant in the context of the local landscape and the amount of similar feeding habitat in this general area.

4.3 Otters

Otters, along with their breeding and resting places are protected under the provisions of the Wildlife Act 1976, as amended by the Wildlife (Amendment) Act, 2000. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Directive which is transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I. 94 of 1997), as amended. Otters are also listed as requiring strict protection in Appendix II of the Berne Convention on the *Conservation of European Wildlife and Natural Habitats* and are included in the Convention on International Trade of Endangered species (CITES). (NRA 2005b).

Although rare in parts of Europe, they are widely distributed in the Irish countryside in both marine and freshwater habitats. Otters are solitary and nocturnal and as such are rarely seen. Thus surveys for otters rely on detecting signs of their presence. These include spraints (faeces), anal gland secretions, paths, slides, footprints and remains of prey items. Spraints are of particular value as they are used as territorial markers and are often found on prominent locations such as grass tussocks, stream junctions and under bridges. In addition they are relatively straightforward to identify. The IUCN Otter specialist Group has accepted these signs of Otter presence as an acceptable basis for Otter surveys (Reuther *et al.*, 2000).

Otters occasionally dig out their own burrows but generally they make use of existing cavities as resting places or for breeding sites. Suitable locations include eroded riverbanks, under trees along rivers, under fallen trees, within rock piles or in dry drainage pipes or culverts etc. If ground conditions are suitable, the holt may consist of a complex tunnel and chamber system. Otters often lie out above ground especially within reedbeds where depressions in the vegetation called "couches" are formed. (NRA, 2005b). Generally holts or resting areas can be located by detecting signs such as spraints or tracks.

In contrast natal holts which are used by breeding females can be extremely difficult to locate. They are often located a considerable distance from any aquatic habitats and Otters may also use habitats adjoining small streams with minimal or no fish populations. (Dr. P. Sleeman Pers. Comm.). In addition, natal holts are usually carefully hidden and without obvious sprainting sites. It is thought that this is to avoid killing of the cubs by adult, male Otters. Otters do not have a well defined breeding season.

Otters occur along both the freshwater and tidal section of the Suir River and are listed as a qualifying interest for the Lower River Suir SAC. No evidence of otters was found in the study area and similarly no active holts were recorded in the areas to be affected by this development. The

species may periodically utilise the thin reedbeds and riparian woodland along the riverbank adjacent to the proposed development area for resting and is expected to hunt within the Suir River. However the site itself is of no value for this species.

4.4 Protected mammals

Other mammal species protected under the Wildlife Acts 1976 and 2000, which could conceivably occur, are red squirrel, Irish hare, pine martin, hedgehog and stoat.

The species was recorded (NPWS survey 1991) from grid squares S51, near Carrick-on-Suir, and S52, at Pill town, 8km to the northwest and 4.5km to the north respectively. Given the presence of a large area of mixed broadleaved woodland, there is potential habitat for the species adjoining the proposed development site.

The Irish hare is widespread in the Irish countryside but was not observed within the proposed development area or any surrounding habitats. Hedgehog and stoat are widely distributed and may be present in proximity to the proposed development site. No deer species are recorded from grid square S41, and the nearest recorded deer population was noted 20km to the west near Kilsheelan.

4.5 Other mammals

No evidence of foxes was recorded from any habitats surrounding the site. Rabbits were observed in the dryer grasslands and field systems. Field mouse, bank vole and brown rat are almost certainly present and pygmy shrew are also likely to occur within the study area.

5. Reptiles and amphibians

The common newt and common frog are protected species under the Wildlife Act 1976 and 2000. Neither species were observed, however it is likely that common frog is present within wetter grassland areas and drainage ditches within the overall study area.

6 Birds

6.1 General bird survey

General bird surveys were carried out in conjunction with the habitat survey during October 2010. It should be noted that October is too late to carry out a breeding bird survey. Summer visitors that breed on the site are absent and some resident species remain inconspicuous until spring. However, a good general picture of the bird communities of the site can be gained from examination of the

habitat types present and general bird observations. Generally the area to be developed is of limited value for birds and no specialised bird surveys were considered necessary.

Birds of Conservation Concern in Ireland (BoCCI) are bird species suffering decline in the Irish/European and global context. Birdwatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into a red list and an amber list. Green listed species are regularly occurring bird species whose conservation status is currently considered favourable. The bird species listed in **Table 5** can be broadly associated with the main habitat types found on the site, namely a mix of intensively managed grassland, hedgerows and localised plantations. Thus these species are likely to forage and/or breed within the study site. Species are classified by their BoCCI status.

Table 5. Bird species recorded and associated habitat types within the study area

Species	Latin name	Habitat	Conservation Status*
Blackbird	<i>Turdus merula</i>	Grassland habitats and hedgerows	Green
Blue tit	<i>Cyanistes caeruleus</i>	Woodland	Green
Chaffinch	<i>Fringilla coelebs</i>	Woodland, hedgerow, grassland	Green
Great tit	<i>Parus major</i>	Woodland	Green
Grey heron	<i>Ardea cinerea</i>	Drainage ditches and rivers	Green
Hooded crow	<i>Corvus cornix</i>	Grassland habitats	Green
Jackdaw	<i>Corvus monedula</i>	Grassland habitats and trees	Green
Mallard	<i>Anas platyrhynchos</i>	Drainage ditches and river	Green
Robin	<i>Erithacus rubecula</i>	Grassland habitats and hedgerows	Green
Rook	<i>Corvus frugilegus</i>	Grassland habitats, trees	Green
Song thrush	<i>Turdus philomelos</i>	Woodland , hedgerows and grassland	Green
Woodpigeon	<i>Columba palumbus</i>	Grassland and woodland habitats	Green

*- BirdWatch Ireland Birds of Conservation Concern in Ireland (BoCCI)

The list of species in **Table 5** reflects the broad range of habitat types found within the proposed development site. No species listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BoCCI), were recorded at the study site. A number of other common species are also likely to occur in the vicinity of the development site including blackcap, bullfinch, chiffchaff, dunnoek, goldfinch, greenfinch, grey wagtail, magpie, mistle thrush, pheasant, reed bunting, starling, stonechat, swallow, swift, willow warbler and wren, however none of these were recorded during the site visit.

7. Aquatic habitats

FW1 Eroding upland rivers

This habitat type is represented by the seasonal stream which flows along the northern boundary of the site and is associated with the hedgerow and treeline habitats. As it leaves the site and hedgerow, it enters a system of drainage ditches in the field system between the proposed development site and the River Suir. At the time of the site visit, this was a dry stream bed which was overshadowed by the surrounding treeline and hedgerow. It is of low ecological value.

Tidal rivers CW2

A tidal section of the River Suir is situated approximately 300 meters to the east of the proposed development area. This section of the river is approximately 280 meters wide and is characterised by deep slow water. The western bank, adjacent to this site, has a levee approximately 5 meters high. The riverside bank of this levy is dominated by willows including white willow, cracked willow and osier. Reed canary-grass and common reed were also present along the water's edge and along the levy.

FW4 Drainage ditches

A system of drains and ditches occurs in the field system between the facility and the River Suir. Soft rush and jointed rush were recorded throughout this habitat with reed canary-grass and common reed recorded in lower areas closer to the River Suir.

7.2. Aquatic habitat value

Based on the habitat surveys, the relative values of each Aquatic habitat type are detailed in **Table 6**. The evaluation scheme used in **Table 6** is based on the scheme detailed in the NRA publication *Guidelines for assessment of ecological impacts of National Road Schemes* (NRA, 2006a) (**Appendix 1**).

Table 6. Habitat value

Habitat Type/Species	Relative Habitat Value	Comments
FW2 Depositing lowland river	International value A	This habitat is outside of the proposed development area and will not be directly affected by this development. As part of the Lower River Suir SAC it is considered a high value habitat.
FW4 Drainage ditches	Low value E	The system of drainage ditches supports a moderate diversity of flora and will not be directly affected by the proposed development.
FW1 Eroding upland rivers	Low value E	Of low ecological value.

7.3. EPA monitoring

The Environmental Protection Agency carries out a biological assessment of most river channels in the country on a regular basis. The assessments are used to derive Q values, indicators of the biological quality of the water. The biological health of a watercourse provides an indication of long term water quality. The EPA Q value scheme is summarised in **Table 7**.

The intermediate ratings Q1-2, Q2-3, Q3-4 and Q4-5 are used to denote transitional conditions, while ratings within parenthesis indicate borderline values. Great importance is attached to the EPA biotic indices, and consequently it is these data that are generally used to form the basis of water quality management plans for river catchments.

Table 7. EPA biotic index scheme.

Q value	Water quality	Pollution	Condition
5	Good	Unpolluted	Satisfactory
4	Fair	Unpolluted	Satisfactory
3	Doubtful	Moderately polluted	Unsatisfactory
2	Poor	Seriously polluted	Unsatisfactory
1	Bad	Seriously polluted	Unsatisfactory

Source: EPA

In estuarine waterways the EPA rates water quality as Unpolluted, Intermediate, Potentially eutrophic and eutrophic. The former two are considered to be acceptable estuarine water quality, while the latter two water quality ratings are considered as unsatisfactory.

The 2011 Q values for and water quality measurements for the River Suir are shown in Table 8. The nearest upstream and down stream values, where monitoring points exist are named. Please note that this section of the River Suir is classified as the Middle Suir estuary. This designation begins 1.6 km upstream at Fiddown Bridge and continues downstream to the east of Waterford city.

Table 8. EPA Q values for the waterways in relation to the proposed pipeline route

River / waterway	Location	Approx. distance from development site	2011 Q values
Suir	Kilsheelan bridge	20.8 km upstream	3-4
Suir	Churchtown, Carrick-on-Suir	15.1 km upstream	4
Suir	Carrick-on-Suir	9.8 km upstream	3
Suir	2km upstream of Carrick-on-Suir to Fiddown bridge	9.8 km upstream to 1.6km upstream	Estuarine & coastal water quality – Potentially eutrophic
Suir	Fiddown bridge (and adjacent to this site)	1.6km upstream to 23.3km downstream	Estuarine & coastal water quality – Eutrophic

The objective under the Water Framework Directive is to “Restore by 2021”. Further information on water quality is given in the NIS stage 1 screening report which is included as part of the overall application.

8.4 Aquatic fauna

The River Suir rises in Tipperary and joins the Nore and Barrow in Waterford Harbour. It is 115 miles in length and drains a total catchment of 1,394 square miles. It runs over limestone for most of its length and is considered a highly productive trout fishery. It also gets a substantial run of salmon. (O, Reilly, 1998).

A number of species listed in Annex II and V of the EU Habitats Directive occur within the river Suir cSAC. Six of the nine fish species protected in Ireland under European legislation or listed in the Irish Red Data Book (Whilde, 1993) as having endangered, vulnerable or internationally important status, occur within the River Suir and/or its estuary. Important fish species recorded from the River Suir include river lamprey, sea lamprey, brook lamprey, Atlantic salmon, Twaite, shad and Allis shad; all of which are qualifying interests for the Lower River Suir SAC. Sea lamprey, river lamprey and salmon migrate through the tidal sections of the Suir where it runs in proximity to the site and both shad species occur in estuarine condition. Two invertebrate species, freshwater pearl mussel and white clawed crayfish are listed as qualifying interests for the Lower River Suir SAC. Neither species is likely to occur within the tidal section of the Suir in proximity to the site.

9 Characteristics of the Development

It is proposed to expand recovery activities to include anaerobic digestion plant in a new purpose built unit that will complement existing composting operations. The gas generated from the plant will be used to generate electricity in an on-site generator. The existing buildings and structures will be retained. The new elements include:

- Two above ground Anaerobic Digester Tanks and one above ground Digestate Storage Tank in a bunded area to the south east of the disused waste water treatment tanks,
- Maturation and Pasteurisation Building (Buildings 1 and 2) to the east of the existing Compost Building,
- New Biofilter to the west of the Maturation and Pasteurisation Building,
- Waste Reception/Combined Heat and Power Plant (Building No 3) and adjacent Drier Building to the south east of the new Anaerobic Digester Tanks,

- Silage storage area to the south of Building No 3,
- Air locks on the northern and southern entrances to the Compost Building,
- Paved concrete yard surrounding Buildings 1, 2 and 3, and
- Roofing the disused wastewater treatment tanks.

Surface Water

The proposed changes to the site layout will not give rise to any new surface water emission points or changes in the quality of the surface water discharge. Rainwater run-off from the roofs of the new buildings and paved areas will be collected and directed via a new oil interceptor to a new attenuation tank, located in the at the north eastern site . The outlet from the tank will connect to the existing surface water drainage system. A flow control system, ('hydrobrake')will be installed on the outlet from the tank that will limit the flow to 10.9/lsec, which is equivalent to overland flow from unpaved areas. In a 50mm one hour storm event, the additional total flow from the impermeable areas of the entire site will be 196 l/sec, which equates to a 5% increase in the flow from the existing site. There will be no change to the location of the outfall to the river.

Wastewater

Wastewater generated at the site comprises sanitary wastewater from the offices which is treated in the on-site septic tank. This tank is within the footprint of the proposed AD tanks. A new sanitary wastewater treatment system will be installed.

Process water

The leachate produced in the composting process is recirculated and surplus leachate that requires treatment is typically not generated. Any surplus leachate that may arise in the future will be treated in the AD plant. Depending on the type of biomass, there is the potential for effluent to be generated during the storage of this material. All liquid generated in the storage area will be collected in a concrete underground storage tank and fed into the AD process. The AD process will not generate a wastewater that requires treatment on-site. The liquid digestate produced in the process will be stored in the converted wastewater treatment tanks, which will provide a minimum three months storage, and then sent from the site and applied to agricultural lands. Any run-off from the silage storage area will be collected and treated in the AD plant.

10. Potential impacts

10.1 Potential impact on terrestrial habitats and terrestrial fauna

Potential impacts include direct habitat loss and disturbance or displacement of fauna due to increased noise and disturbance during the construction and/or operation phase.

10.2 Potential impacts on aquatic habitats and aquatic fauna during construction phase

The main impacts from the construction works on the watercourse relate to increased suspended solids levels in surface water runoff. Sources of suspended solids may include surface runoff into storm drains and accidental spills and dewatering of excavations. In situations where bulk liquid cement is used, spillage of liquid into the watercourse or drainage systems may occur. This would lead to an increase in pH and could cause fish kills. Spillage of fuel, lubrication or hydraulic oils either from bulk storage or from construction vehicles or plant and equipment operating close to watercourses or drainage ditches may cause damage to aquatic flora and fauna communities.

10.3 Potential impacts on aquatic habitats and aquatic fauna during operational phase

Increased suspended solids, nutrients or hydrocarbons in surface water run-off could impact on water quality in the Suir River.

11. Mitigation Measures

11.1 General Mitigation Measures

It is essential that every effort should be made to minimise impacts where they may occur. The proposed development is to take place within an existing industrial site, which should facilitate the reduction of impacts.

All staff on site during construction and operation will be informed of the importance of protected the River Suir SAC.

Noise levels will be kept to a minimum during construction to minimise disturbance.

11.2 Aquatic flora and fauna

In order to minimise the potential impacts of the development on aquatic flora and fauna including fisheries, macro-invertebrates and aquatic plants, particularly those associated with the release of suspended solids, the following mitigation measures should be implemented.

A detailed method statement will be produced to minimise the production and escape of suspended solids and other contaminants to the watercourses. This will include a contingency plan to deal with any significant pollution incidents with the potential to impact on the SAC. Site engineers and construction workers, including sub-contractors, will be briefed on the environmental issues and pollution control methods before going on-site.

The only discharge to the Suir River will be of surface water from the existing facility which discharges through appropriately sized and maintained silt traps and oil interceptors. Waste is processed indoors and is only moved within the site in sealed containers; therefore no nutrient enrichment of surface water is expected to occur.

The proposed changes to the site layout will involve alterations to the surface water drainage system within the site, but will not give rise to any new surface water emission points or changes in the quality of the surface water discharge quality.

11. Predicted Impact of the Proposed Development

11.1 Predicted impact of terrestrial habitats

Predicted impacts on terrestrial and aquatic habitats are listed in **Table 9 and 10**. It should be noted that the value of a habitat is site specific, and will be partially related to the amount of that habitat in the surrounding landscape. The classification scheme, used to assess the value of habitats and the impacts on them, is detailed in the NRA publication *Guidelines for assessment of ecological impacts of National Road Schemes* (NRA, 2006a) (**Appendix 1**). Predicted impacts on fauna are detailed in **Table 11**.

Table 9 Impacts on terrestrial habitats

Habitat Type/Species	Relative Habitat Value	Impacts
GA1 Improved agricultural grassland	Low value E	Neutral. Already highly modified and easily replaced.
WD1 Mixed	Low -Moderate	Minor to Moderate negative. A moderate portion

Broadleaved woodland	value E-D	area of this habitat will be affected. None of these plantation trees are mature.
WL1 Hedgerow	Moderate value D	Neutral. This habitat is on the periphery of the proposed development area, and no alterations to this habitat are planned.
WL2 Treelines	Low value E	Minor Negative. The treelines to be removed are heavily associated with the WD1 woodland. There are extensive sections of treeline on site and in the surrounding landscape.
WN5 Riparian Woodland	International value A	Neutral. No impact on this habitat will occur.
BL3 Built land and artificial surfaces	Low value E	Minor Negative to Neutral. Already highly modified and easily replaced. The area to be developed is entirely within this habitat.
WS3 Ornamental/ non-native shrubs	Low value E	Neutral. Already highly modified and easily replaced.
GA2 Amenity grassland	Low value E	Neutral. Already highly modified and easily replaced.

Table 10 Impacts on aquatic habitats

Habitat Type	Relative Habitat Value	Impacts
Tidal River CW2	International value A	This habitat is outside the proposed development area. The proposed changes to the site layout will involve alterations to the surface water drainage system, but will not give rise to any new surface water emission points or changes in the quality of the surface water discharge quality. There will be a minor (5%) increase in surface water runoff during 50mm one hour storm event which will not have a significant impact. A Natura 2000 screening report concluded that there would be no significant impact on the Lower River Suir SAC. Under the NRA scheme any impact on a designated site which is considered of international value is considered major. In practical terms however the impact

		is considered minor negative.
FW4 Drainage ditches	Low value E	No significant impact on this habitat is envisaged. The impact will be minor negative
FW1 Eroding upland rivers	Low value E	Neutral. This seasonal habitat is on the periphery of the proposed development area.

Table 11. Predicted Impacts on fauna

Species	Relative Species Value	Impacts
Badgers	Protected under the Wildlife Acts 1976 and 2000	The pasture lands surrounding the study area is suitable for foraging badgers. No signs of badgers were recorded on site, or in any of the surrounding habitats. No impact on this species is expected to occur.
Otter	Protected under the Wildlife Acts 1976 and 2000. Included in Annex II of the Habitats Directive	Otters have extensive territories. It is unlikely that the proposed localised construction work, approximately 300 meters from the river, would seriously disrupt their activities. They depend on salmonids and other fish species as a food source however the proposed development will not compromise water quality and the fishery. Any long term impact is likely to be negligible.
Birds	Protected under the Wildlife Acts 1976 and 2000.	The most significant impact arising from a species conservation viewpoint would be the loss of individuals of rare species. No nesting habitat is located within the proposed development site. No Annex I species were recorded or are predicted to occur in the immediate surrounding habitat. The proposed development is likely to cause short term disturbance to birds during the construction phase mainly as a result of noise, and site development works. However, these impacts are likely to be minor in the short-term and negligible in the long-term.
Bats	Protected under the Wildlife Acts 1976 and 2000.	There will be no impacts on potential roosting habitat. There will be a minor loss of potential foraging area.

13. Conclusions

The works will result mainly in the alteration of built lands and artificial surfaces within the existing site. A section of plantation mixed broadleaved woodland will be felled and small sections of associated treelines will also be removed. Both are low diversity habitats. Other surrounding terrestrial habitats will not be directly affected. Any impact on fauna is likely to be temporary in nature and no significant long term impact is envisaged. No increase in surface water discharge to the Suir is planned in the construction or post construction phases of this development. Stresses on the aquatic environment will be largely unchanged and the Natura 2000 screening report concluded that no significant impact on the River Suir SAC or other designated sites is expected to occur. Therefore overall the impact is expected to be localised and short-term with a longer term minor negative impact on the River Suir.

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Appendix 1.

NRA GUIDELINES FOR ASSESSMENT OF HABITAT VALUES

Rating	Qualifying criteria
A	<p style="text-align: center;">Internationally important</p> <p>Sites designated (or qualifying for designation) as SAC* or SPA* under the EU Habitats or Birds Directives.</p> <p>Undesignated sites containing good examples of Annex I <u>priority</u> habitats under the EU</p>
	<p style="text-align: center;">Nationally important</p> <p>Sites or waters designated or proposed as an NHA* or statutory Nature Reserves.</p> <p>Undesignated sites containing good examples of Annex I habitats (under EU Habitats Directive).</p> <p>Undesignated sites containing <u>significant numbers</u> of resident or regularly occurring populations of Annex II species under the EU Habitats Directive or Annex I species under</p>
C	<p style="text-align: center;">High value, locally important</p> <p>Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or significant populations of locally rare species.</p> <p>Small water bodies with known salmonid populations or with good potential salmonid habitat.</p>
D	<p style="text-align: center;">Moderate value, locally important</p> <p>Sites containing some semi-natural habitat or locally important for wildlife.</p> <p>Small water bodies with some coarse fisheries value or some potential salmonid habitat.</p>
E	<p style="text-align: center;">Low value, locally important</p> <p>Artificial or highly modified habitats with low species diversity and low wildlife value.</p>

*SAC = Special Area of Conservation

SPA= Special Protection Area

NHA= Natural Heritage Area

Criteria for assessing impact significance

(a) Terrestrial habitats

Impact level	Site category*				
	A sites Internationally important	B sites Nationally important	C Sites High value, locally important	D sites Moderate value, locally important	E sites Low value, locally important
Severe negative	Any permanent impacts	Permanent impacts on a large part of a site			
Major negative	Temporary impacts on a large part of a ..	Permanent impacts on a small part of a ..	Permanent impacts on a large part of a site		
Moderate negative	Temporary impacts on a small part of a ..	Temporary impacts on a large part of a ..	Permanent impacts on a small part of a site	Permanent impacts on a large part of a site	
Minor negative		Temporary impacts on a small part of a ..	Temporary impacts on a large part of a site	Permanent impacts on a small part of a site	Permanent impacts on a large part of a site
Neutral	No impacts	No impacts	No impacts	No impacts	Permanent impacts on a small part of a site
Minor positive				Permanent beneficial impacts on a small part of a site	Permanent beneficial impacts on a large part of a site
Moderate positive			Permanent beneficial impacts on a small part of a site	Permanent beneficial impacts on a large part of a site	
Major positive		Permanent beneficial impacts on a small part of a ..	Permanent beneficial impacts on a large part of a site		

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**Criteria for assessing impact significance
(b) Aquatic habitats**

A Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	Major	Severe	Severe	Severe
Localised	Major	Major	Severe	Severe

B Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	Major	Major	Severe	Severe
Localised	Moderate	Moderate	Major	Major

C Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	Moderate	Moderate	Major	Major
Localised	Minor	Moderate	Moderate	Moderate

D Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	Minor	Minor	Moderate	Moderate
Localised	Not significant	Minor	Minor	Minor

E Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	Not significant	Not significant	Minor	Minor
Localised	Not significant	Not significant	Not significant	Not significant

In line with the EPA Guidelines (EPA 2002), the following terms are defined when quantifying duration:

- Temporary: up to 1 year,
- Short-term: from 1-7 years,
- Medium-term: 7-15 years,
- Long-term: 15-60 years,
- Permanent: over 60 years.

Localised impacts on rivers are loosely defined as impacts measurable no more than 250m from the impact source. Extensive impacts on rivers are defined as impacts measurable more than 250m from the impact source. Any impact on salmonid spawning habitat, or nursery habitat where it is in short supply, would be regarded as an extensive impact as it is likely to have an impact on the salmonid population beyond the immediate vicinity of the impact source.