

DixonBrosnan

environmental consultants

Project				
<p>An assessment of the ecological impact on the Dawn River arising from diversion of part of the river channel within the Dawn Meats Facility at Carroll's Cross, Co. Waterford.</p>				
Client Dawn Meats Ireland				
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1. Introduction

DixonBrosnan were commissioned to carry out an ecological survey to assess the value of the Dawn River for fish species and to assess the ecological impact on the river from river works and from the extension of an integrated constructed wetland within the Dawn Meats site. This information was requested by the planning authority. In particular the potential impact on spawning grounds for salmonids and lamprey was to be assessed. Following an onsite meeting with Inland Fisheries Ireland it was agreed that an electrofishing survey would be carried out on the Dawn River In 2013. As such surveys can only be carried out when there is no risk to juvenile fish in gravels, this will be carried out in the period from July to September 2013. This information will be incorporated into an overall Habitats Directive Screening Report for the overall development/operation of the site. As detailed below, any significant adverse impact on qualifying interests for designated Natura 2000 sites is considered unlikely. Notwithstanding that the electrofishing survey will be carried out subsequent to the preparation of this report, it is considered unlikely that this survey will substantially alter the conclusions of this report.

2. Methodology

A visual inspection of the Dawn River both downstream and upstream of the Dawn Meats facility was carried out on June 5th, June 12th and June 14th by Carl Dixon M.Sc. The objective was to ascertain the probable value of the Dawn River in terms of fish populations and to determine if there are any obstacles to migration which would prevent anadromous fish from utilising the main channel. Impacts on the Dawn River downstream of the proposed works were also visually assessed.

3. Works carried out within the facility

The works carried out at the facility come into two categories namely (A) extension of the existing Integrated Constructed Wetland (ICW) and (B) diversion of the Dawn River and the development of a single span clear span foot bridge. These are discussed in detail below:

3.1 (A) Extension of the existing Integrated Constructed Wetland (ICW)

The existing wetland at the facility has been expanded with the addition of three new ponds with a surface area of 5600m² bringing to the total surface area to 12,400m² (12 ponds). The new wetland will cater for increased production at the site and is an extension of an existing wetland system which has been in place for a number of years. The wetland is now in place and functioning as planned. Details about the constructed wetland, which was developed on land to the west of the

existing building are provided by the report *Proposed Integrated Constructed Wetland Carroll's Cross, Co. Waterford* (February, 2012). The wetland has the following characteristics:

- The treatment system at Carroll's Cross is an addition to the existing ICW and, as a combined system provides treatment for 80m³/day. When sizing the area of an ICW various factors including hydraulic loading, concentration of contaminants and average annual rainfall were taken into consideration to ensure that there would be sufficient residence time for effective treatment.
- The design of the ICW system is in line with the DoEHLG guidelines on ICWs (Integrated Constructed Wetlands - Guidance Document for farmyard soiled water and domestic wastewater applications, 2010).
- The effluent is treated through the existing 9-pond wetland; it is then pumped to the new 3 pond ICW. The base of each pond is lined using on site material to provide 1.0m of cohesive subsoil material beneath the wetland with the upper 0.75m having a permeability of 1×10^{-8} m/s.
- The performance of the ICW is in accordance with the Emission Limit Values of the current discharge license i.e. BOD 10 - 5 mg/l, Suspended solids 10 - 5 mg/l, Phosphates <math>< 1</math> mg/l, Nitrates <math>< 1</math> mg/l and Ammonia <math>< 1</math> mg/l.
- The possible infiltration of pollutants to ground water is an issue of major importance in the design, construction and operation of ICW's. The following ensure that there is no negative impact on groundwater: Shallow water depths, Low hydraulic pressure, the presence of organic matter in the soil and the accumulating necromass and compaction of soils to form a soil liner with a low permeability. Risk mitigation measures was employed during the construction of the integrated constructed wetland to limit the impact on adjacent surface water and groundwater environments, through proper management and supervision.
- Integrated constructed wetlands are designed to be as self-maintaining and as self-operable as possible, however there are a number of maintenance procedures required. Some of these have been listed below for the ICW at Dawn Meats:

1. Water level management and flow maintenance
2. Surface water monitoring at the inlet and outlet points
3. Vegetation monitoring – vigour and growth

4. Maintenance of access
5. Maintenance of inlet and outlet pipes
6. Maintenance of embankments - cutting/mowing the upper embankments at least once a year, to provide for easy and safe access for monitoring and maintenance.
7. Sediment/sludge management – accumulating sludge to be removed and disposed of appropriately when required.
8. Pump and tank maintenance

3.2 (B) Diversion of the Dawn River and the development of a single span clear span foot bridge

A section of the Dawn River was diverted into a new channel in August 2011 using a tracked machine. The position of the river and the changes caused by the diversion are shown in **Appendix 1**. The diversion of the river was undertaken by excavating the new section first in dry ground to minimise silt levels. Once this was completed, material from the old section (to a depth of 300mm) was excavated and carefully transported to the new section and redistributed along the stream bed. Mitigation measures were put in place including silt traps using bales of straw downstream of the works. This facilitated a reduction in the amount of sediment in the river downstream of the site. The silt traps were checked regularly during the works. Works in the river commenced upstream and continued downstream. The works carried out at the new section of watercourse aimed to provide similar hydraulic and morphological characteristics to the original channel.

During construction works some changes to the morphology of the channel, including the development of a large pool, were made upstream of the section of river which was diverted. This large pool now supports a population of adult brown trout although there is little cover available at this stage due to an absence of vegetation. Downstream of the pond there is an area of faster flowing riffle which helps to re-oxygenate water flowing from the pond.

Overall, the morphology of the new section of river channel is probably not dissimilar to that which previously existed, with a mixture of glide and riffle habitat. However following completion of the works some erosion of the newly constructed banks has occurred in places. This is particularly evident in the downstream section of the channel where there is an acute angle and in the absence of mitigation there is the potential for quite large volumes of solids to reach the watercourse. This

has the potential to impact on the ecological value of the river. Thus work is required to stabilise eroding river banks via rock armour and appropriate planting.



Photo 1 Riffle habitat during period of high flow

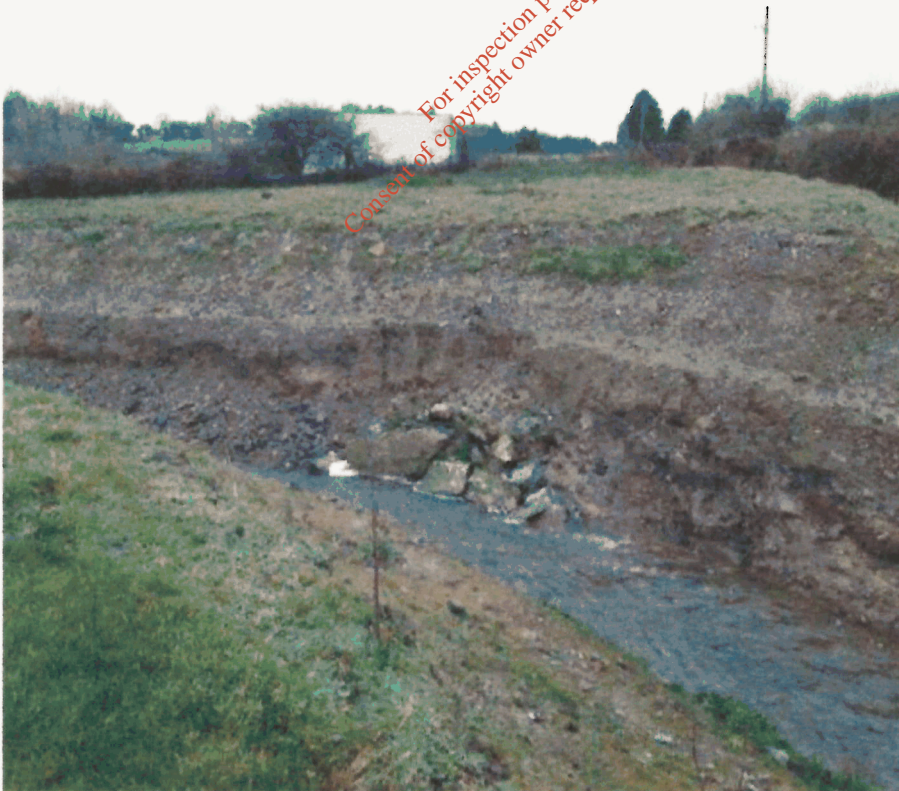


Photo 2. Eroding river bank on new channel

4. Receiving Environment

4.1 Designated sites.

There are no designated conservation areas within the development site. Thus the proposed development site is not included within, nor is it located immediately adjacent to, any Special Area of Conservation (SAC), Special Protection Area (SPA), Natural Heritage Area (NHA/pNHA), National Park or Nature Reserve. The proposed development is located approximately 9.2m from the Lower River Suir SAC (Site code 002137) as measured along the Dawn River which hydrologically connects the site with the Lower River Suir SAC (**Table 1**). This is shown below in **Figure 1**. It is noted that a Habitats Directive Screening Report will be prepared to cover the overall construction and operation of the constructed wetland and associated works.

Table 1. Protected sites within 15km.

Site	Code	Distance
SAC		
Lower River Suir	002137	9.6 km (connected via Dawn River)
Lower River Suir	002137	6.4km (as the crow flies).



Figure 1. The proposed development area, under the red square, in relation the Lower River Suir SAC (shaded orange).

The primary concern from an ecological viewpoint is for potential impacts on aquatic habitats and species listed as qualifying interests for the Lower River Suir SAC. These are listed below in **Table 2** and **Table 3**.

Table 2. Qualifying species Lower River Suir SAC

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. Freshwater qualifying habitats Lower River Suir (Site Code 002137)

Habitat Code	Habitat	% cover Approx.
3260	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation	1

A large waterfall and hydro-electric scheme in the lower reaches appears to create an insurmountable obstacle to fish such as Atlantic Salmon, Sea Lamprey and River Lamprey and neither shad species is expected to occur. The status of freshwater crayfish is uncertain however the underlying bedrock is not limestone (although there is some carboniferous influence) and thus it is considered improbable that this river is of high value for this species. No records for freshwater pearl mussel were found although there is some potential habitat in the lower reaches. Otter and the *habitat Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion* vegetation both occur within the river. The brook lamprey is the most abundant and widespread of the three lamprey species and is often found in the absence of the other two species, for example above a pollution or physical barrier that prevents the anadromous species reaching that part of the river. O'Connor, W. (2007) recorded brook/river lamprey from the only site on the Dawn River which was surveyed. This site in the lower catchment had high quality habitat (moderately soft sandy substrate inter-mixed with cobble) and was considered to be ideal lamprey

nursery habitat. A high density of 8.22 lampreys per m² was recorded. It is noted that the habitat in e proximity and downstream of the Dawn Meats Facility is of less value for this species.

4.2 Conservation objectives

The conservation objective for the Lower River Suir SAC is *To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.*

5. Dawn River Background environmental information

5.1 EPA water quality 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 4**.

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 this data that is generally used to form the basis of water quality management plans for river catchments. 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 waterway adjacent to the development site is the Dawn River. Its source is in the southern end of the townland of Whitestown and it flows for 14.7km to its confluence with the River Suir. EPA biological monitoring data for sites on the Dawn River as well as relevant data from the River Suir is shown in **Table 5**.

Table 4. 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

Table 5. EPA Q values

River	Location	Approx. distance from development site	2011 Q values
Dawn River	NNW of Ballyhussa	3.1km upstream from the site	4
Dawn River	Br. SE of Ross	1.0km upstream from the site	3-4
Dawn River	Br. E of Kildermody	4.6km downstream from the site	4
Dawn River	Br SE of Cullenagh (Br at 'Factory')	7.1km downstream from the site	4
Dawn River	Br. NW Stpnehouse – tidal	10.9km downstream from the site	3-4
River Suir	Lower Suir Estuary	11.3 km downstream from the site	Eutrophic

The EPA Integrated Water Quality Report 2011 – South East Ireland notes that *“Quality has improved from 2010 when BODs were frequently elevated. o-Phosphate is also within accepted limits.”* The same report notes that *“there have been reports of siltation near Carroll’s Cross.”* The original wetland was constructed in 2002 and extended in 2012. River diversion works were carried out in 2011. The source of this siltation noted at Carroll’s Cross is therefore unclear.

Overall Q values are largely indicative of satisfactory water quality. Although lower Q values of 3-4 were recorded at locations both upstream and downstream of the site, there is no pattern which would indicate that the discharge from the site is having an impact on Q values. The EPA report notes that water quality physio-chemical values improved in 2011.

5.2 . Water frameworks Directive – Dawn River status (IE)

The Water Framework Directive (WFD) is a key initiative aimed at improving water quality throughout the EU. It applies to rivers, lakes, groundwater, and coastal waters. The Directive requires an integrated approach to managing water quality on a river basin basis; with the aim of maintaining and improving water quality. The Directive requires that management plans be prepared on a river basin basis and specifies a structured approach to developing those plans. It requires that a programme of measures for improving water quality be brought into effect by 2012 at the latest.

Specifically the WFD aims to:

- protect/enhance all waters (surface, ground and coastal waters)

- achieve "good status" for all waters by December 2015
- manage water bodies based on river basins (or catchments)
- involve the public
- streamline legislation

The Water Frameworks Directive assesses the water quality of rivers and ranks their status as follows: High, Good, Moderate, Poor, Bad and Yet to be determined.

The Dawn River (Suir Estuary Water Management Unit) status in this area was determined to be *Good*

B) The water frameworks directive also determined the "Risk" level of the river between as follows: 1a – At risk of not achieving Good Status, 1b – Probably at risk of not archiving Good Status, 2a – Expected to achieve Good Status, 2b – Strongly expected to achieve Good Status.

The Dawn River in this area is considered *1a – At risk of not achieving Good Status*

C) The water frameworks directive also sets out the future plans for the protection and restoration of rivers as follows:

- Protect
- Restore – 2015
- Restore – 2021
- Restore - 2027

The objective for the Dawn River is to *Restore 2015*.

6. Dawn River Survey

6.1 Upper catchment

The Dawn River is a small river which rises approximately 2.7km south west of the Dawn Meats facility. The facility is therefore located in the upper reaches of the catchment. Land in the upper reaches is consists of low to moderate quality pasture with planted blocks of coniferous forestry. An overview of the upper catchment is shown in **Figures 2 and 3** below.



Figure 2. Upper catchment Dawn River south of N25. Location of facility marked in red.



Figure 3. Upper catchment Dawn River north of N25. Location of facility marked in red.

Upstream of the Dawn facility there is a large Roadstone Quarry which has not been used for several years. The Dawn River crosses under a minor road and is then culverted into the quarry. It is possible that the pipe which passes under the minor road is blocked which may prevent connectivity with the upper catchment. The river emerges from the quarry directly onto the Dawn Meats site. A visual inspection of the Dawn River as it enters the Dawn Meats site shows that it has a reactively small flow and the levels of silt and algal are indicative of some nutrient enrichment.

Within the Dawn Meats site there are two discharges to the river. The wetland system consists of 14 cells which discharge to the river. The system is designed to treat 80m³/day and provides a high quality effluent. Within the Dawn Meats site there is also an open channel which takes surface water run-off from the N25 road. A visual inspection of this channel indicates high levels of iron and the dense growth of algae and macrophytes which is indicative of nutrient enrichment (**Photo 3**).

Downstream of the new section of channel and downstream of the Dawn Meats site, there is high levels of silt on the bed of the river (**Photo 4**). Silt levels begin to drop approximately 450m downstream of the site. This section of the river is relatively uniform with some smaller areas of faster flowing water. The silt impacts on small areas of gravel that could function as spawning/nursery habitat for trout and is probably suppressing macro-invertebrate populations.

The degree to which the impacts on the river are related to the recent diversion of the river and construction of additional wetland cells, is difficult to ascertain at this stage. There was a fish kill previously in this part of the Dawn River (Frank O'Donaghue Inland Fisheries pers. Comm.) and there were incidents of high levels of siltation associated with the working quarry immediately upstream of the facility when it was in operation (Ger Murphy Dawn Meats pers. Comm.). It is also noted that surface water run-off from the busy N25 road may also be introducing silt and nutrients.

Elsewhere in the upper reaches the northern part of the catchment drains into Ballyshonock Reservoir and the stream from this reservoir meets the Dawn River approximately 640km downstream of the Dawn Meats facility.



Photo 3. Showing discharge from N25 with high iron and nutrient levels



Photo 4. Silt on riverbed downstream of the Dawn Meats Facility.

6.2 Middle catchment

The middle section of the river is characterized by better quality farmland; however the average field size remains relatively small and pasture remains the dominant agricultural activity. There are large amounts of mature trees in the landscape and the banks of the river is wooded where for long sections where it runs through a steep valley adjoining the N25. There are some small areas of conifers. An overview of the middle catchment is shown in **Figure 4** below.

This section of river generally has a natural flow pattern with spawning/nursery habitat interspersed with pools suitable for salmonids. Nutrient levels appear moderate to high with dense growths of water crowfoot (*Ranunculus sp.*) where shade levels are lower (**Photo 5**). There are some localised areas of obvious enrichment and/erosion associated with cattle feeding points.



Figure 4. Middle catchment Dawn River.



Photo 5 Moderate quality habitat with dense growth of water crowfoot.

6.3 Lower catchment Dawn River.

Generally the surface area of the catchment is restricted by topography and although several small tributaries join the main channel they are generally short and do not contribute high volumes of additional flow. An overview of the lower catchment is shown in **Figure 5** below.

From Pouldrew Bridge downstream to the River Suir the channel appears tidal with high silt levels along either bank. Upstream of the bridge there is good quality salmonid habitat with riffle and pools (**Photo 6**). The dominant feature in the lower catchment however is the large lake associated with Pouldrew House into which the Dawn River flows. This is an artificial lake once associated with a historical mill which is reputed to hold pike and brown trout and the outflow from this lake falls vertically approximately 20 feet over a man-made, stone-wall dam (**Photo 7**). Alternatively, water exits the lake via a channel with a screen and sluice gate (**Photo 8**) and then is piped as part of a

small hydroelectric scheme. The outflows from the lake would appear to create an insurmountable barrier for migratory fish such as salmon, sea trout and sea lamprey. Eels however should still be able to migrate upstream.

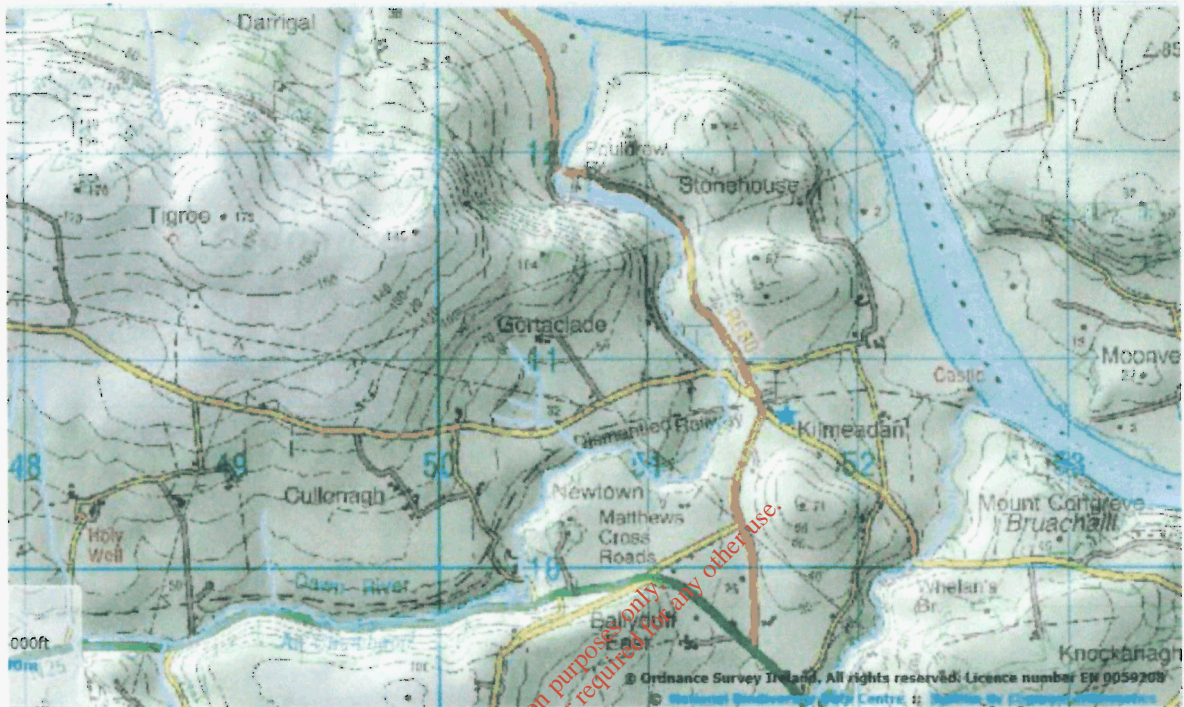


Figure 5. Lower catchment Dawn River.



Photo 6. High quality habitat with clean gravels.



Photo 7. Waterfall outflow from the lake associated with Poulgrew House which appears to create an impassable barrier for migratory fish.



Photo 8. Screen and sluice on the lake outflow channel.

7. Potential impacts

The primary cause for concern is that the diversion of the river impacted on the ecology of the river via the following mechanisms:

- Direct loss of habitat. The new channel is artificially constructed and as such does not necessarily have a natural channel morphology. A natural channel morphology with riffle-pool sequences, natural gravel substrate and native tree cover is considered of highest value for fish populations.
- As fish salvage operations were not carried out, there is a strong possibility that fish and macro-invertebrate mortality occurred when the old channel was removed.
- Silt will have been mobilised during earthworks and, notwithstanding the implementation of silt control measures, silt levels will have increased in the watercourse. High levels of silt can have a direct impact on adult fish i.e. abrading gills, can consolidate on spawning habitat for brown trout and possibly brook lamprey and smother invertebrate populations.
- Increased turbidity can reduce light levels thus impacting on plant growth including the Annex 1 habitat *Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation*
- Leaks of hydrocarbons i.e. fuel, hydraulic fluid etc. from inadequately maintained vehicles could impact on water quality.
- Inadequate stabilisation of river banks can result in a wide shallow channel of low value for fish and substantial slippage will continually increase levels of suspended solids downstream of the site.
- Noise and disturbance during site works could impact on otter which is listed on Annex 2 of the Habitats Directive.
- The use of a culvert at the lower end of the new channel could prevent migration of fish species.

8. Mitigation measures

The new section of river channel and ICW are already complete. However additional works will be required to stabilise river banks which are eroding. A brief outline of the proposed works, which will be carried out in consultation with Inland Fisheries Ireland, in the period from July to September 2013 is included as **Appendix 2** of this report. Works will have the following characteristics:

1. Where possible works shall be undertaken above the river channel
2. The machinery used to undertake the works shall work from the top of the bank and not in the watercourse
3. The works shall be undertaken to reduce any blockages in the river channel
4. The works shall be undertaken to prevent solids and sediment from entering the channel
5. There will be no removal of the in-stream material.
6. Machinery used in the works shall be refueled away from the river and appropriate bunds built where required to contain fuels and oils.
7. Silt traps shall be installed at the lower end of the works site and shall be maintained and cleaned regularly.

Additional measures to be implemented include the following:

- Tree species should be native; suitable species include willow and alder.
- For rock armor the rock type should match underlying geology
- Control of silt levels is required during site works e.g. instream control measures.
- Active monitoring of the works to assess their success particularly during winter spate conditions will be implemented
- The culvert will be replaced by a single span bridge.
- Any additional works in the future which have the potential to directly impact on the river or which have the potential to indirectly or cumulatively impact on the river, will require consultation with Inland Fisheries Ireland prior to implementation.

9. Impacts resulting from the works on site.

9.1 Impacts resulting from diversion of the river

It is possible that a small number of fish did not survive the removal of the old channel. However it is unlikely, based on the level of silt and algae immediately upstream of the site, that the old channel provided very high quality habitat for fish such as eel and brown trout even though both fish were almost certainly present. Based on a visual inspection, it is considered probable that the habitat created within the new channel will not be significantly inferior to the habitat which was present in the original channel in terms of hydrology and morphology. Over time, as vegetation develops, the value of the new channel for fish and invertebrates will increase.

9.2 Impacts in the section stretching 500m downstream of the river diversion

Silt levels are high in the section of river within the site boundary and for approximately 450m downstream of the site boundary. This siltation is likely to have impacted on fish populations and macro-invertebrate populations. As noted previously it cannot be definitively ascertained to what degree the diversion of the river channel affected the river further downstream. It is probable that some of the silt on the riverbed downstream of the site is derived from this work. However it is possible that high levels of silt were already present due to historical impacts from the Roadstone quarry, other activity within the overall Dawn Meats site and surface water run-off from the N25. It is noted that due to the closure of the quarry, the high level of treatment provided by the wetland and provided that silt running off from the site is effectively managed in the future, this section of streambed is expected to recover over time.

9.3. Impacts on the wider catchment

The best quality habitat within the overall catchment occurs in the lower middle and lower reaches of the catchment. It is considered improbable that the works have had a significant impact on the overall river outside of localised impacts in proximity to the site. As it appears that migratory species, with the exception of eel, are unlikely to be present there would have been no significant impact on migratory species due to high silt levels or silt plumes.

9.4. Impacts on Annex 2 species and Annex 1 habitats.

Brook lamprey is known to occur in the lower reaches of the river close to Kilmeadan. It is considered very unlikely that silt generated at the facility would impact on aquatic habitats this far downstream. The habitat in the zone 500m downstream of the facility does not provide high value habitat for this species; although the presence of this species in the section of river downstream of

the site cannot be completely precluded. Any significant impact on this species is considered unlikely. The best examples of the Annex 1 habitat *Water courses of plain to montane levels with the Ranunculus fluitantis and Callitriche-Batrachion vegetation* occurs in the lower reaches of the river and no impact on this habitat is likely to have occurred. Any increase in noise and disturbance was unlikely to have impacted on otter which is nocturnal and can habituate to sporadic disturbance. There is evidence that otter still use the site.

10. Conclusions

The works probably caused silt levels in the receiving watercourse to increase although how significant this impact was is now difficult to ascertain. It is probable that silt levels were already elevated due to historical impacts. Nonetheless it is probable that the works had a localised, moderate negative impact on aquatic ecology and fish populations.

The habitat provided by the new channel is probably sufficient to maintain a similar fish population as that occurring in the original channel. Thus any impact on the populations dynamics of species such as brown trout and eel is likely to have been localised, moderate negative in the short term and minor negative in the long term provided the river banks are effectively stabilised.

Due to the presence of a seemingly impassable barrier in the lower catchment, it is improbable that the fish listed as qualifying interests for the River Suit occur regularly within the Dawn River and thus no impact on these species is expected. The exception is Brook lamprey which is not migratory and which occurs within the Dawn River. However the high value habitat for this species in the middle and lower reaches is very unlikely to have been significantly affected by silt associated with site works. Overall no significant impact on this species is likely to have occurred.

No significant impact on the Annex 2 species otter or the Annex 1 habitat *Water courses of plain to montane levels with the Ranunculus fluitantis and Callitriche-Batrachion vegetation* is likely to have occurred.

Overall therefore it is considered probable that the works had a localised, moderate negative impact and that the long-term impact will be minor negative at a local level and imperceptible in the middle and lower reaches of the Dawn River.

11. References

O'Connor, W. (2007) A Survey of Juvenile Lamprey Populations in the Corrib and Suir Catchments.
Irish Wildlife Manuals No. 26. National Parks and Wildlife Service

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Appendix 1.

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Appendix No.2

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Appendix 2. Proposed works on bank slopes along a section of the Dawn River at Dawn Meats, Carrolls Cross, Co. Waterford



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February 2013

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**Proposed works on bank slopes along a section of the Dawn River at Dawn Meats, Carrolls Cross,
Co. Waterford**

Date: 15 February 2013

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1. Introduction

The Dawn River flows north east to the rear of the Dawn Meats facility at Carroll's Cross. Sections of the River have experienced some subsidence on the eastern bank slope of the Dawn River. Remediation works are proposed to stabilise the banks slopes and to minimize any further movement of the bank down into the river channel. The section of the river that has been identified as requiring some remediation works is between the bridge (244987,108153) and to the point at which the river exists the Dawn Meats site (245126,108329). These works will primarily include the placement of rock armour along the affected bank slopes, as well as vegetation establishment. These works are being proposed in a manner that will have minimum impact upon the Dawn River channel, water quality and habitat.



Dawn River proposed works along eastern bank (left)

2. Issues of concern

The following issues have been identified as possible issues of concern when undertaking the works along the river, including;

1. Pollution of waters, which could arise from discharges containing solids (sediment) arising from the earthworks proposed on the river banks, as well as any oils, greases and fuel that could (if not managed) discharge to the river.

2. Danger to aquatic and riparian habitats, including;
 - loss of in-stream spawning gravels
 - loss or damage of bank side vegetation cover
 - physical alteration of river channel
 - Interference with upstream and downstream movement of fish and macroinvertebrate

In order to eliminate or minimise any of the issues above mitigation measures will be undertaken during the proposed works, see section for further details.

3. Proposed works

The proposed works along a section of the Dawn River is to include the placement of rock armour along affected areas on the eastern bank slope. The movement and collapse of material has been assessed and indications are that the movement of water at various levels out through the bank is causing the bank to move and collapse, together with the nature and variation of the subsoil material within the bank.

The areas of work will include the areas where the bank slope has collapsed, as seen in the image below. These sections are to be placed with large stone (500-1200mm) sourced from the Roadstone Quarry in Kilmacow. The type of stone used, where possible, will be similar to that found locally.



Figure 1. Collapse of bank slope

The large stone will be strategically positioned to ensure that they are not undercut or that they do not collapse down into the river channel. This will be achieved by submerging the lower boulders (up to one third of their depth) below the bed level and battering them into final position.

Where possible soil shall be deposited over and between the stone to provide material for the establishment of vegetation. The establishment of vegetation such as grasses on the rock and bank slope will further assist in the stabilization of the bank area, as well as providing vegetation cover, food and facilitating a 'natural' appearance of the bank.

The proposed works aim to stabilise the bank and to maintain its integrity. These works will be undertaken primarily outside of the river channel, with works within the river channel only where necessary.

The figure below illustrates the proposed works along the river.

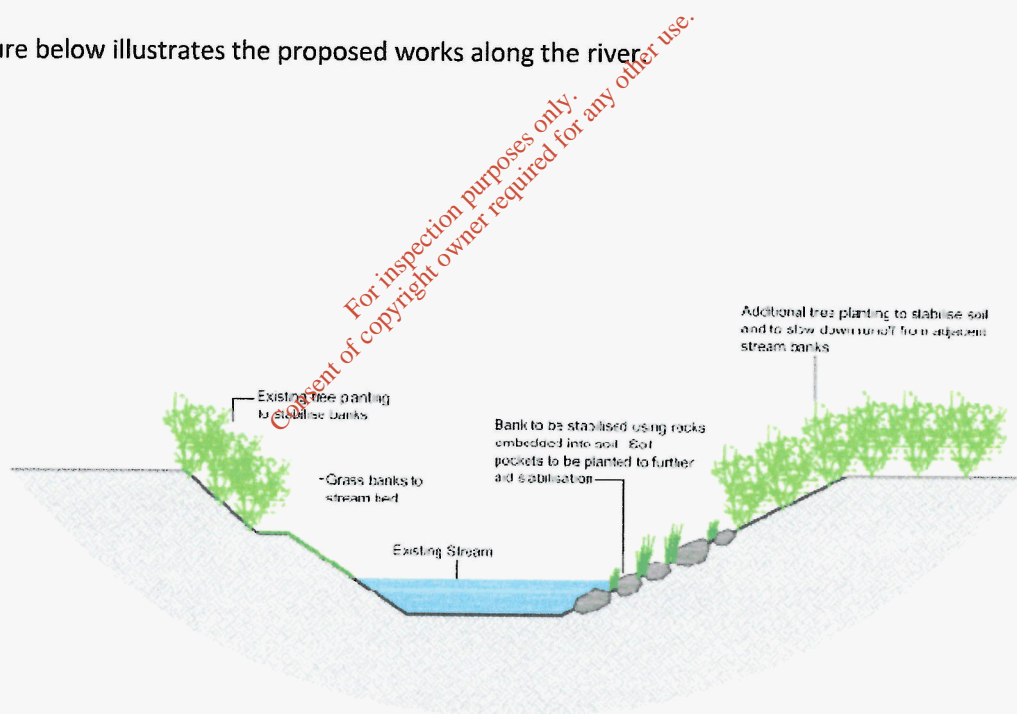


Figure 2. Proposed works

4. Measures to minimise impacts on river habitat and hydraulics

A number of measure will be undertaken to minimise any impacts on the river during the proposed works, these include;

1. Where possible works shall be undertaken above the river channel
2. The machinery used to undertake the works shall work from the top of the bank and not in the watercourse
3. The works shall be undertaken to reduce any blockages in the river channel
4. The works shall be undertaken to prevent solids and sediment from entering the channel
5. There will be no removal of the in-stream material.
6. Machinery used in the works shall be refueled away from the river and appropriate bunds built where required to contain and fuels and oils.
7. Silt traps shall be installed at the lower end of the works site and shall be maintained and cleaned regularly.

5. Timescale

The proposed works are expected to take 2-3 days to complete depending on weather conditions.

The proposed works shall be undertaken during a period specified and agreed with the Inland Fisheries.

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