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### 3.3.1.9. Habitat Section 11

<b>Location</b>	V9578 9622 to V9569 9643	
<b>Length</b>	c. 150	
<b>Salmonid Habitat Quality</b>		<b>Description</b>
<b>Adult Habitat</b>	Fair	Mostly uniform muddy glide, with small amount of poor riffle over muddy cobble. Heavily shaded.
<b>Nursery Habitat</b>	Fair	
<b>Spawning Habitat</b>	Poor	



Uniform muddy glide



Riffle over muddy cobble

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### 3.3.1.10. Habitat Section 12

<b>Location</b>	V9569 9643 to V9567 9642	
<b>Length</b>	c. 30	
<b>Salmonid Habitat Quality</b>		<b>Description</b>
<b>Adult Habitat</b>	Fair	Fast glide with some riffle over large rocks, gravel and mud.
<b>Nursery Habitat</b>	Good	
<b>Spawning Habitat</b>	Poor - Fair	



Fast glide and riffle

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### 3.3.1.11. Overview of salmonid habitat quality in the Glanooragh River

A summary of salmonid habitat quality is tabulated below. Salmonid habitat in the 4km section of the Glanooragh River assessed for this report is generally of a modest quality due to the low diversity of flow and the generally heavily silted substrate. None of the channel assessed was classified as good or better as adult or spawning habitat. 26% of the channel assessed was classified as good salmonid nursery habitat. The most significant habitat consisted of c.900m of good nursery habitat in Sections 3, 4, 7 & 12, and c.1km of fair – good spawning habitat in Sections 4 & 9. It is notable that approximately half of the fair – good spawning habitat is in Section 4, and most good nursery habitat is in Sections 3 & 4, which are immediately downstream of the confluence with the Aghacureen Drain.

Salmonid Habitat Quality	Adult	Nursery	Spawning
None / None-Poor	0%	0%	6%
Poor / Poor-Fair	10%	15%	24%
Fair / Fair-Good	90%	62%	70%
Good	0%	23%	0%
Good - Very Good	0%	0%	0%
Excellent	0%	0%	0%

### 3.3.2. Water Quality/ Invertebrate Fauna

#### 3.3.2.1. Site 1

The invertebrate community recorded at this site and tabulated below merits a Q-rating of Q3 indicating moderately polluted conditions.

INDICATOR GROUP	POLLUTION SENSITIVITY/TOLERANCE	TAXON	NUMBER
A	Very Pollution Sensitive	<i>Ecdyonurus</i> sp.	1
B	Moderately Pollution Sensitive	<i>Leuctra</i> sp.	2
		<i>Baetis muticus</i>	2
		Goeridae	1
		<i>Ancylus fluviatilis</i>	5
C	Moderately Pollution Tolerant	<i>Potamopyrgus antipodarum</i>	1
		<i>Gammarus duebeni</i>	c.140
		<i>Baetis rhodani</i>	5
		<i>Ephemerella ignita</i>	1
		Limnephilidae	1
		<i>Rhyacophila dorsalis</i>	5
		Polycentropidae	4
		Elminthidae	c.80
		<i>Hydraena</i>	1
		Veliidae	1
		Chironomidae (excl. <i>Chironomus</i> )	10
		Tipulidae	27
D	Very Pollution Tolerant	None Recorded	
E	Most Pollution Tolerant	Tubificidae	1
-	Taxa not assigned to any Indicator Group	<i>Eiseniella tetraedra</i>	2
		<i>Stylodrilus heringianus</i>	5

### 3.3.2.2. Site 2

The invertebrate community recorded at this site and tabulated below merits a Q-rating of Q3 indicating moderately polluted conditions.

INDICATOR GROUP	POLLUTION SENSITIVITY/TOLERANCE	TAXON	NUMBER
A	Very Pollution Sensitive	None Recorded	
B	Moderately Pollution Sensitive	<i>Leuctra sp.</i>	3
		Goeridae	1
		Sericostomatidae	3
C	Moderately Pollution Tolerant	<i>Ancylus fluviatilis</i>	7
		<i>Potamopyrgus antipodarum</i>	10
		<i>Gammarus duebeni</i>	c.140
		Hydracarina	1
		<i>Baetis rhodani</i>	4
		<i>Ephemerella ignita</i>	1
		<i>Rhyacophila dorsalis</i>	3
		Elminthidae	45
		Dytiscidae (larva)	1
		<i>Hydraena</i>	1
		Veliidae	1
		Gerridae	1
		Chironomidae (excl. <i>Chironomus</i> )	36
		Simuliidae	1
		Tipulidae	24
D	Very Pollution Tolerant	Sphaeriidae	1
E	Most Pollution Tolerant	None Recorded	
-	Taxa not assigned to any Indicator Group	Nematoda	1
		<i>Eiseniella tetraedra</i>	3
		<i>Lumbriculus variegatus</i>	2
		<i>Stylobrillius heringianus</i>	3
		Nematomorpha	1
		Ceratopogonidae	1

### 3.3.2.3. SITE 3

The invertebrate community recorded at this site and tabulated below merits a Q-rating of Q2-3 indicating moderately polluted conditions.

INDICATOR GROUP	POLLUTION SENSITIVITY/TOLERANCE	TAXON	NUMBER
A	Very Pollution Sensitive	None Recorded	
B	Moderately Pollution Sensitive	Sericostomatidae	1
C	Moderately Pollution Tolerant	<i>Ancylus</i> sp.	8
		<i>Gammarus duebeni</i>	c.38
		<i>Baetis rhodani</i>	2
		Polycentropidae	2
		<i>Helophorus</i>	1
		Chironomidae (excl. <i>Chironomus</i> )	c.150
		Tipulidae	c.80
		Simuliidae	c.130
D	Very Pollution Tolerant	<i>Eprobdelta</i>	3
		<i>Glossiphonia</i>	3
		<i>Helobdella stagnalis</i>	17
E	Most Pollution Tolerant	None Recorded	
-	Taxa not assigned to any Indicator Group	<i>Lumbriculus variegatus</i>	1000s
		Muscidae	1



### 3.3.2.4. SITE 4

The invertebrate community recorded at this site and tabulated below merits a Q-rating of Q3 indicating moderately polluted conditions.

INDICATOR GROUP	POLLUTION SENSITIVITY/TOLERANCE	TAXON	NUMBER
A	Very Pollution Sensitive	None Recorded	
B	Moderately Pollution Sensitive	<i>Leuctra sp.</i>	4
		Sericostomatidae	4
C	Moderately Pollution Tolerant	<i>Ancylus fluviatilis</i>	1
		Planorbidae	1
		<i>Potamopyrgus antipodarum</i>	c.500
		<i>Gammarus duebeni</i>	c.70
		<i>Baetis rhodani</i>	8
		<i>Ephemerella ignita</i>	75
		Limnephilidae	3
		<i>Hydropsyche</i>	2
		<i>Rhyacophila dorsalis</i>	1
		Elminthidae	10
		Halplidae	2
		Chironomidae (excl. <i>Chironomus</i> )	18
		Simuliidae	1
		Tipulidae	5
D	Very Pollution Tolerant	<i>Lymnaea peregra</i>	1
		<i>Glossiphonia complanata</i>	1
		<i>Erpobdella</i>	1
		Sphaeriidae	1
E	Most Pollution Tolerant	None Recorded	
-	Taxa not assigned to any Indicator Group	<i>Eiseniella tetraedra</i>	1
		<i>Stylodrilus heringianus</i>	4
		Nematomorpha	1
		Ceratopogonidae	3

### 3.3.2.5. Overview of Water Quality in Glanooragh River

The Glanooragh is moderately polluted (Q3) immediately upstream and downstream of the confluence with the Aghacureen Drain. The biological assessment data give no indication of a negative impact from the Aghacureen drain in the months preceding the survey.

Site 3, which is c. 1 km downstream of the Aghacureen Drain, is moderately polluted (Q2-3). The deterioration in water quality between Site 2 and Site 3 is at least in part due to a significant inflow of what appears to be slurry contaminated water from a drain entering the river from the north side at Grid Ref. V9463 9425. At Site 4, which is c. 4km downstream of the Aghacureen Drain, the river is moderately polluted with a Q-rating of Q3.

### 3.3.3. Fish

The results of the electrofishing at the four sampling sites on the Glanooragh River are tabulated as follows, and illustrated in Fig. 3:

	Site 1	Site 2	Site 3	Site 4
<b>Fishing Time (minutes)</b>	14	15	15	12
<b>C.P.U.E. Juvenile Brown Trout*</b>	73	100	4	60
<b>CPUE Adult Brown Trout*</b>	0	4	0	0
<b>Total Brown Trout C.P.U.E.</b>	73	104	4	60
<b>CPUE Juvenile Salmon*</b>	0	0	4	5
<b>Three Spined Stickleback</b>		Present	Present	
<b>Eel</b>		Present		
<b>Stone Loach</b>			Present	

\*Number of fish per hour equivalent of fishing

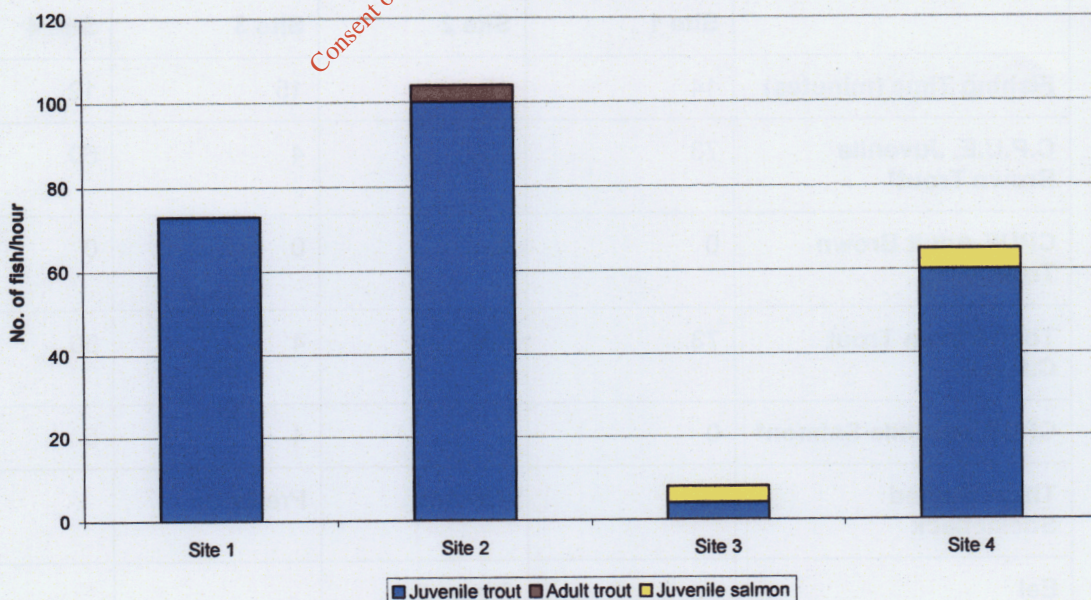


The survey results indicate good densities of juvenile trout both upstream and downstream of the confluence with the Aghacureen Drain (Sites 1 & 2). Whereas no salmon were recorded at these sites, their presence in this section of river at low densities cannot be ruled out, given that salmonid nursery habitat at these sites is good, and given that salmon were recorded 1km downstream at Site 3.

At Site 3 a single juvenile trout and a single juvenile salmon were recorded in 15 minutes of electrofishing, indicating a very poor density (CPUE of 4) for each of these species. Given the good potential salmonid nursery habitat at the site, these low densities are likely to be due to the poor water quality (Q2-3) and heavy siltation at the site.

At Site 4, juvenile trout were recorded at moderate density and juvenile salmon at low density. The densities probably reflect the relatively mediocre habitat quality at the site.

Fig. 3 Salmonid catch per unit effort





#### **3.3.4. Protected Status and Protected Species**

No protected species were recorded in the present survey. All three lamprey species (listed in Annex II of EU Habitats directive 92/43/EEC) are known to occur in the River Flesk catchment (Kurz and Costello, 1999). Lampreys could therefore occur in the Glanooragh river and tributaries. Salmon (listed in Annex II of EU Habitats directive 92/43/EEC) were recorded in the Glanooragh River during this survey, and have been recorded by Central Fisheries Board in the wider Gweestin system (W. Roche pers comm.)

#### **3.3.5. Importance of Potentially Affected Freshwater Habitats.**

The section of the Glanooragh River surveyed is classified as being of C Rating (High value, locally important).

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#### **4. POTENTIAL SIGNIFICANT IMPACTS OF THE DEVELOPMENT ON FRESHWATER AQUATIC FLORA, FAUNA AND HABITATS IN THE ABSENCE OF MITIGATION**

The potential significant impacts of the proposed development will be:

1. Pollution of the stream with suspended solids due to runoff of soil from construction areas
2. Pollution of the stream, during construction phase, with other substances such as fuels, lubricants, waste concrete, waste water from site toilet and wash facilities, etc.
3. Pollution by effluent from the waste processing area and ancillary structures and facilities
4. Pollution by surface water draining from non process area of the site e.g. car parking roofs, access roads, paths etc.
5. Pollution by effluent from toilet, wash facilities, canteen etc.

Potential impacts are described under two headings:

- i. An assessment of the potential environmental impact on the ecology of the stream of the proposed development during the period of construction.
- ii. An assessment of potential significant long-term effects of the existence of the proposed development on freshwater invertebrate fauna, flora, fish and habitats.

## **4.1. AN ASSESSMENT OF THE POTENTIAL AQUATIC ENVIRONMENTAL IMPACT OF THE PROPOSED DEVELOPMENT DURING THE PERIOD OF CONSTRUCTION**

### **4.1.1. Pollution of streams/rivers with suspended solids**

Research in North America indicates that the equivalent of many decades of natural or even agricultural erosion may take place during a single year from areas cleared for construction (Wolman and Schick 1967). Suspended sediment due to runoff of soil from construction areas, or due to disturbance of fine sub-surface sediments in the course of instream construction and excavation, can have severe negative impacts on invertebrate and plant life and on all life stages of salmonid fish.

- Suspended sediment can settle on spawning areas, infill the intragravel voids and smother the eggs and alevins (newly hatched fish) in the gravel.
- Bed Load (coarse material transported along the bottom of the stream) and settled sediments can infill pools and riffles, reducing the availability and quality of rearing habitat for fish.
- Suspended sediment can reduce water clarity and visibility in the stream, impairing the ability of fish to find food items.
- Settled sediments can smother and displace aquatic organisms such as macroinvertebrates, reducing the amount of food items available to fish.
- Increased levels of sediment can displace fish out of prime habitat into less suitable areas. (Chilibeck *et al* 1992)
- Suspended solids can abrade or clog the gills of salmonid fish. It takes a high concentration of solid wastes to clog a fish gill and cause asphyxiation,

but only a little to cause abrasions and thus permit the possibility of infections. (Solbe 1988)

#### **4.1.2. Pollution of streams/ivers with other substances associated with the construction process**

The potential exists for a range of serious pollutants to enter watercourses during construction. For example any of the following will have deleterious effects on fish, plants and invertebrates if allowed to enter watercourses.

- Raw or uncured concrete and grouts
- Wash down water from exposed aggregate surfaces, cast-in-place concrete and from concrete trucks
- Fuels, lubricants and hydraulic fluids for equipment used on the development site
- Waste from on site toilet and wash facilities

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