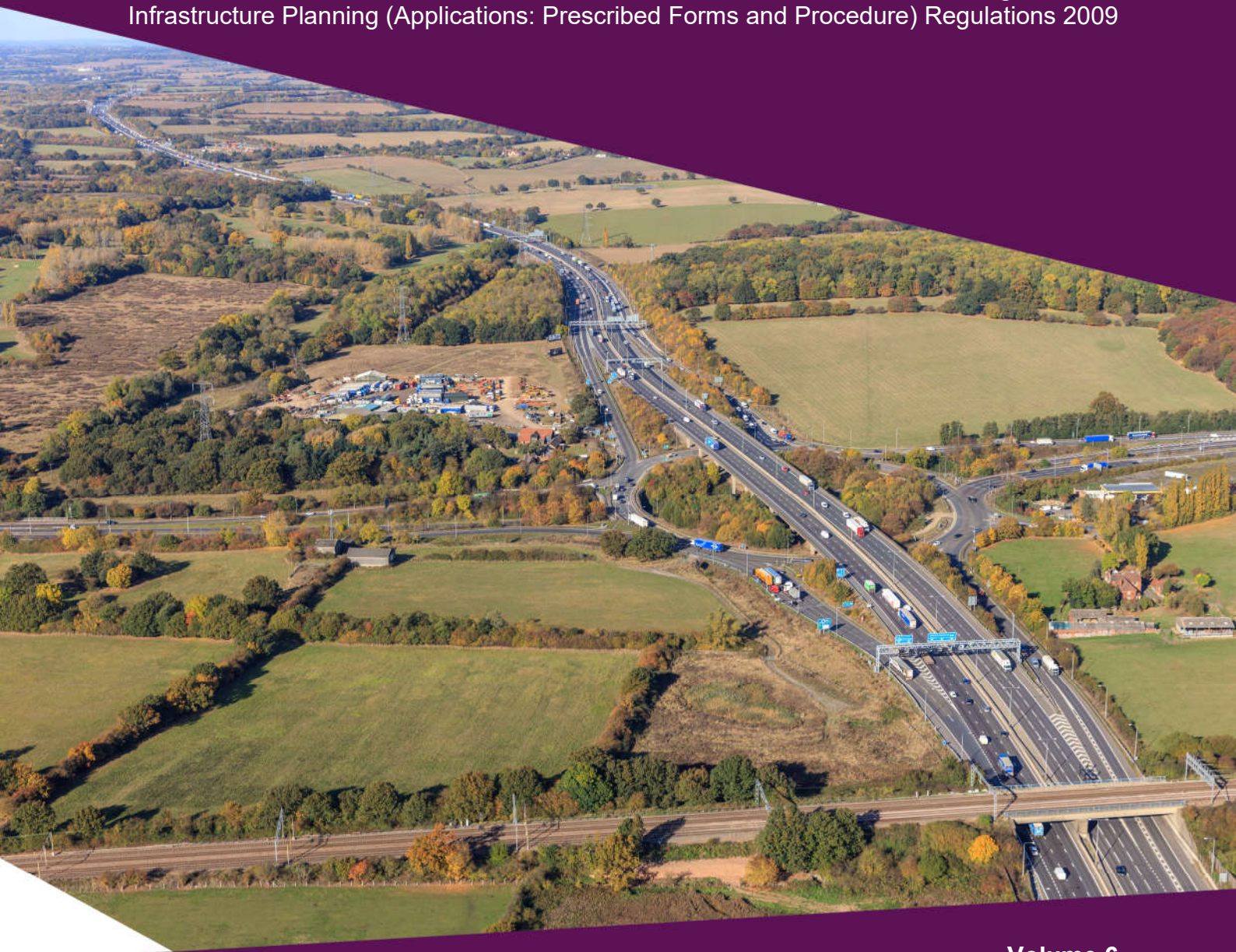
M25 junction 28 improvement scheme
TR010029
6.3 Environmental Statement
Appendix 7.6: Aquatic survey report

APFP Regulation 5(2)(a)
Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



Volume 6
May 2020

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

M25 junction 28 scheme
Development Consent Order 202[x]

6.3 ENVIRONMENTAL STATEMENT
7.6: AQUATIC SURVEY REPORT

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference:	TR010029
Application Document Reference:	TR010029/APP/6.3
Author:	M25 junction 28 improvement scheme project team, Highways England

Version	Date	Status of Version
1	May 2020	Application issue

Table of contents

Appendix 7.6
Aquatic survey report

RSK ADAS

M25 Junction 28

Aquatic Survey Report

857222

OCTOBER 2017

RSK GENERAL NOTES

Project No.: 857222

Title: M25 Aquatic Surveys

Client: ADAS

Date: October 2017

Office: Coventry

Status: REV00

Author	[redacted]	**Technical reviewer**	[redacted]
Signature	[redacted]	Signature	[redacted]
Date:	07/11/2019	Date:	07/11/2019
Project manager	[redacted]	**Quality reviewer**	[redacted]
Signature	[redacted]	Signature	[redacted]
Date:	07/11/2019	Date:	07/11/2019

CONTENTS

1 EXECUTIVE SUMMARY

1. This report presents the findings of aquatic ecology surveys carried out by RSK Environment Ltd in September 2017.

2. The survey included fish surveys and aquatic invertebrate surveys on two streams which are to be crossed by proposed improvement works at Junction 28 of the M25 Motorway. A single survey was undertaken on each of the Ingrebourne Brook and Weald Brook.

3. Based on macroinvertebrate data the Biological Water Quality in the River Ingrebourne Brook is classed as Moderate and in the Weald Brook it is classed as Poor.

4. Fish surveys show poor species-richness and abundance for fishes within both watercourses and in particular in the Weald Brook.

5. These results provide a baseline for future monitoring at the site

2 INTRODUCTION

2.1 Purpose of Report

This document reports on the findings of aquatic ecology surveys carried out in connection with proposed improvement works to Junction 28 of the M25 Motorway. The surveys focused on sections of the River Ingrebourne and the Weald Brook which are to be crossed by the motorway improvements.

The fish and aquatic macroinvertebrate surveys were requested to provide a baseline against which to judge any changes in the aquatic habitats and their species diversity that may result from the development. Furthermore, the surveys aimed to identify any fish or macroinvertebrate species of conservation interest (e.g. protected species).

2.2 Structure of this Report

The remainder of the report is set out as follows:

- *Section 3* describes the survey and assessment methods;
- *Section 4* presents the results of the surveys;
- *Section 5* provides the evaluation and conclusions;
- *Section 6* lists references; and
- *Appendix A* includes invertebrate sampling results.

Throughout the report normal convention is followed with respect to bank identification i.e. banks are designated Left Hand Bank (LHB) or Right Hand Bank (RHB) looking downstream.

3 METHODS

3.1 General

The aquatic surveys were used to assess the diversity of fish species in both brooks as well as the biological water quality (as determined from macroinvertebrate surveys) and macroinvertebrate species diversity.

3.2 Environmental Data

Data on a range of environmental variables were collected for each site. They are required to generate RIVPACS2 community predictions. The predictions have not been calculated as part of this report; however, the data were collected to allow for the calculations to be made at a later data if required.

Measurements of channel depth and width were made using a measuring pole, and observations of the substrate composition were also made. Site registration data were obtained from a 1:25000 Ordnance Survey map of the area and included: altitude, distance from source, discharge category, slope and NGR. A GPS unit was used in the field to check the map referenced National Grid Reference (NGR) of each site.

3.3 Electrofishing

Two survey sites were electrofished, one on each of the two watercourses; these were selected following a site reconnaissance undertaken on 23 August 2017. The site locations are given in *Table 1*.

Table 1. Electrofishing survey locations.

Site / watercourse name	Macroinvertebrate survey location (NGR)	Upstream limit of the electrofishing survey (NGR)	Downstream limit of the electrofishing survey (NGR)
River Ingrebourne	TQ 56500 92210	TQ 56595 92313	TQ 56509 92260
Weald Brook	TQ 56370 92290	TQ 56323 92421	TQ 56360 92331

Figure 1 illustrates the locations of the survey reaches as defined by the upstream and downstream stop net locations. The figure also shows the locations for the aquatic invertebrate samples.

Figure 1. The upstream and downstream stop net locations for the two fish survey reaches.

Stop nets were positioned at the upstream and downstream limits of each survey reach. Surveys were then undertaken using electrofishing methods. A three-catch removal method was used, in which each of the three electro-fishing 'runs' ran downstream to upstream. All fish captured on each run were transferred to water-filled buckets until the completion of surveys in that reach. Between each run, time was allowed for the water to clear following disturbance of the substrate by surveyors.

Upon completion of surveys in each reach the fish were identified (to species level), measured (fork length or total length to the nearest mm depending on the species), and counted before being released back into the reach from which they were captured.

Site data (including physical river characteristics) were recorded on standard proformas in the field; they are summarised in the results section of this report.

Standard biosecurity practices ('check, clean, dry') were followed throughout surveys and all equipment was sterilised or thoroughly dried before arrival at the survey site and upon completion of the surveys.

3.4 Aquatic Invertebrate Survey

Macroinvertebrate sampling at a single survey site located in each of the brooks was carried out on 19 September 2017. Survey locations are shown in *Figure 1*.

The method used to sample invertebrates followed the standard four-minute combined kick sampling technique, adhering to EA guidelines (Environment Agency, 1999). The surveys were undertaken by two people at all times for safety reasons. Briefly, the sampling methodology comprised:

- 30 seconds of netting of any surface-active insects, such as pond skaters (*Hemiptera: Gerridae*) and whirligig beetles (*Coleoptera: Gyrinidae*);
- 3 minutes of active kicking and disturbing substrates and sediment with additional sweeping of vegetation where present; and
- 30 seconds of hand searching for invertebrates, such as those adhering to submerged logs, stones or other debris, for example leeches (*Hirudinea*) and caddisfly larvae (*Trichoptera*).

Care was taken to ensure that all habitats and micro-habitats, both typical and atypical, were proportionally represented in the sample, and that surface-active insects and species adhered to submerged logs and stones were included.

Samples were preserved in methylated spirits and stored at the RSK laboratory. After rigorous sorting of samples the recovered macroinvertebrates were identified to family level, and the relative abundance of each taxon was recorded.

3.5 Macroinvertebrate data interpretation

3.5.1 General

The interpretive tools described below were used to examine the invertebrate datasets. Collectively, these are referred to as the biotic scores of a sample as explained below.

3.5.2 Biological Monitoring Working Party Score (BMWP)

The BMWP score relates to the pollution tolerance of an invertebrate assemblage and, therefore, the biological water quality of the relevant water body. This ascribes a numerical score (from 1 to 10) to a range of invertebrate families, depending on their tolerance or intolerance of organic (and other) pollution which can be related to water quality. Pollution sensitive families score more highly than pollution tolerant ones. Therefore, the cumulative score of these assigned values gives a good indication of biological water quality, with higher values indicating better water quality (*Table 2*).

Table 2 allows general comparisons to be drawn regarding BMWP scores and actual water quality categories, as used by the Environment Agency.

Category	BMWP
Very Good	>150
Good	101 – 150
Fair	51 – 100
Poor	16 – 50
Very Poor	0 - 15

3.5.3 Average Score per Taxon (ASPT)

The ASPT is a derived index, which is obtained simply by dividing the BMWP score by the number of scoring families. The product is, therefore, somewhat independent of taxon richness. Using ASPT together with BMWP thus allows easier comparisons across samples and sites. Both measures are routinely used by the Environment Agency in assessing the biological water quality of rivers.

As a guide, a BMWP score of over 80 and an ASPT score of 5.0 or above indicates 'good to very good' biological water quality. A BMWP score of 50 to 80 and ASPT score of 4.0 to 5.0 indicates 'moderate to good' water quality. BMWP scores less than 50 and ASPT scores of less than 4.0 suggest 'reduced to poor' water quality.

3.5.4 NTAXA (Taxon Richness)

This is the number of invertebrate taxa recorded, and is the most widely used measure of biodiversity. A taxon in this case is taken to mean a group of related animals, such as a species, a genus or a family.

3.5.5 Community Conservation Index

The Community Conservation Index (CCI) is an expression of conservation value. It accounts for community richness as well as the relative rarity of species (Chadd & Extence, 2004). Each species is assigned a Conservation Score (CS) of 1 to 10 based on the parameters outlined in *Table 3.*

Table 3. Conservation Scores (CSs) for freshwater invertebrate species in Britain

CS	Definition
10	Red Data Book 1 (RDB1 – Endangered)
9	Red Data Book 2 (RDB2 – Vulnerable)
8	Red Data Book 3 (Rare)
7	Notable (not not Red Data Book status)
6	Regionally Notable
5	Local
4	Occasional (species not in categories 10-5, which occur in up to 10% of all samples from similar habitats)
3	Frequent (species not in categories 10-5, which occur in > 10-25% of all samples from similar habitats)
2	Common (species not in categories 10-5, which occur in > 25-50% of all samples from similar habitats)
1	Very Common (species not in categories 10-5, which occur in >50-100% of all samples from similar habitats)

The sum of the CSs is then calculated and divided by the number of contributing species to give a mean measure of conservation value. This is then multiplied by a Community Score (CoS) which is derived from the rarest taxon present or the BWMP score.

CCI calculation can be applied to specific taxa in a sample rather than mandatory identification of all taxa present in a sample. However, it should be noted that the greater the size of the species dataset obtained, the better the resolution of the final score index.

CCs can range from 0 to >40, an interpretation guide of scores is provided below:

- 0.0 to 5.0 – sites supporting at least one uncommon species and / or a community of low taxon richness – low conservation value.
- 5.0 to 10.0 – sites supporting at least one species of restricted distribution and / or a community of moderate taxon richness – moderate conservation value.
- 10.0 to 15.0 – sites supporting at least one uncommon species or several species of restricted range and / or a community of high taxon richness – fairly high conservation value.
- 15.0 to 20.0 – sites supporting several uncommon species, at least one of which may be nationally rare and / or a community of high taxon richness – high conservation value.

- >20.0 – sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and / or a community of very high taxon richness – very high conservation value.

3.5.6 LIFE

LIFE (Lotic-invertebrate Index for Flow Evaluation) was used to assess the flow regime to which the invertebrate communities at the sites were adapted, ranging from fast to slow flows. This provides a base-line against which any potential future changes that might arise from the planned road scheme could be assessed.

The invertebrate species and families present are assigned to a particular flow group with flow-sensitivity scores based on the relevant flow group and abundance categories (Extence *et al*, 1999). The LIFE score is then calculated as the average flow score for the invertebrates within the sample.

As a guide, LIFE scores less than 6.00 generally indicate sluggish or still water conditions. As current velocity increases, so do LIFE scores. LIFE values greater than 7.5 indicate very fast flows. LIFE scores will change throughout the seasons depending on flow conditions and care must be taken when comparing scores from samples collected in different seasons.

3.5.7 PSI

The PSI (Proportion of Sediment-sensitive Invertebrates) index was used to assess the preferred silt regime that the current, base-line fauna in the streams was adapted to. The amount of siltation within a watercourse is often determined by the flow regime and PSI scores can be linked to LIFE scores, with decreasing flow - reduction in the LIFE score - often leading to increased siltation and reduction in the PSI. Heavy rainfall and increased run-off from hard standing during and post construction could increase silt-loading to the nearby watercourses, a factor that would be picked up by significant decreases in the PSI scores from the established baseline.

The PSI scores are calculated based on published sediment sensitivities and abundance categories (Extence *et al*, 2013). Each species or family of invertebrates is assigned a sensitivity to fine sediment score. The PSI score is then calculated as follows:

$$PSI = \left[\frac{\sum \text{Scores for Sediment Sensitivity Groups A \& B}}{\sum \text{Scores for all Sediment Sensitivity Groups A; B; C \& D}} \right] \times 100$$

The condition of the river bed is then classified according to the criteria shown in *Table 4.*

Table 4. Interpretation of PSI Scores

PSI	River Bed Condition
81–100	Minimally sedimented / unsedimented
61–80	Slightly sedimented
41–60	Moderately sedimented
21–40	Sedimented
0–20	Heavily sedimented

4 RESULTS

The following sections of this report provide site details, fish and macroinvertebrate survey results for each of the two survey reaches identified in *Table 1* and *Figure 1*.

4.1 River Ingrebourne Site Description

The survey reach was *c.*100 m long with an average wetted width of 1.5 m (width range = 1.3 m to 2.0 m) and an average depth of 0.2 m (depth range = 0.05 m to 0.4 m). Water levels were considered to be low with little or no rainfall during the days preceding the survey and water clarity at the start of the survey was very good with the substrate clearly visible throughout the survey reach.

The substrate throughout the survey reach was comprised predominantly of gravel or coarse sand and fine sand or silt. The dominant flow types included shallow glide, shallow run and some areas of riffle.

Throughout the reach there were various in-channel features which may provide refuge areas for fish and other aquatic life and these included tree root systems, large and coarse woody debris, undercut banks and overhangs.

The land adjacent to the LHB was predominantly rough pasture with some trees and shrubs along the riparian margin. The land adjacent to the RHB comprised a steep bank with trees and shrubs at the top of which was a road.

4.2 Weald Brook Site Description

The survey reach was *c.*50 m long with an average wetted width of 2 m (width range = 0.9 m to 3.0 m) and an average depth of 0.3 m (depth range = 0.05 m to 0.4 m). Water levels were considered to be low with little or no rainfall during the days preceding the survey and water clarity at the start of the survey was moderate to poor with the substrate visible throughout some but not all of the survey reach (i.e. not in deeper areas – visible depth estimated at 0.15 m).

The substrate throughout the survey reach was comprised almost ubiquitously of fine sand or silt with occasional small patches of gravel overlain with fine silt. The dominant flow types included glide, shallow run and some areas of deep slack water.

Throughout the surveyed reach there were various in-channel features which may provide refuge areas for fish and other aquatic life and these included tree root systems, large and coarse woody debris, undercut banks and overhangs.

The land adjacent to both banks was predominantly rough pasture with some trees and shrubs occurring along the riparian margins.

4.3 Macroinvertebrate Environmental Data

Environmental data recorded during the macroinvertebrate surveys is recorded in Table 5.

Table 5 – Environmental data for the two macroinvertebrate sample locations

Site	1	2
Season	Autumn	Autumn
Watercourse	River Ingrebourne	Weald Brook
NGR	TQ 56500 92250	TQ 56370 92290
Width (m)	2	2.5
Average Depth (cm)	20	30
Substrate (% cover)		
Peat	0	0
Clay	0	0
Silt	6	95
Sand	4	5
Gravel	90	0
Pebbles	0	0
Cobbles	0	0
Boulders	0	0
Distance From Source (km)	3	8
Altitude (m)	35	35
Slope (m/km)	5	2.5
Discharge Category	2	1
Flow	Moderate	Slow
Shading	90	100
Macrophyte Cover (%)	0	0

The River Ingrebourne had a relatively shallow average depth with a predominantly gravel substrate and high amount of shading. The Weald Brook was also relatively shallow but with a predominantly silt substrate and slower flows than those observed in the River Ingrebourne. The entire survey reach of the Weald Brook was shaded.

4.4 Aquatic Invertebrates

A full list of the macroinvertebrates recorded in the samples is presented in *Appendix A*. *Table 6* provides the biotic scores calculated for each site.

Table 6. Summary of Biotic Scores

Site	NTAXA	BMWP	ASPT	CCI	LIFE	PSI
River Ingrebourne	17	69	4.31	4.92	6.8	40
Weald Brook	13	41	3.73	1.00	6.1	24

4.4.1 Constraints

The results presented in this report are based on surveys in early autumn on a single visit. Although autumn is a suitable time of year for surveying aquatic macroinvertebrates, it is likely that the invertebrate assemblages are more diverse than the results suggest. Repeating surveys throughout the year (i.e. in spring, summer and autumn) and at more than one location in each brook would produce a more comprehensive list of invertebrate species, and reduce the impact of seasonality on the results. Furthermore, seasonal fluctuations in river flow and corresponding sedimentation, PSI and LIFE scores are also likely. Any comparisons between post-construction and baseline results should take account the timing of the baseline surveys for more accurate conclusions to be drawn.

4.5 River Ingrebourne Electrofishing Results

A total of 243 individual fishes comprising five different species were caught or seen during the surveys. With the exception of three chub (*Squalius cephalus*) ranging from 66 mm to 135 mm fork length all other species captured during surveys in the River Ingrebourne were those that are classed by the Environment Agency as being minor species. The species numbers, estimated density, average length and length range are all detailed in *Table 7*.

Table 7. A summary of the fish survey results from the River Ingrebourne.

Species	Total number caught	Estimated density (number of individuals per m^2)*	Mean length (mm)	Length range (mm)
Bullhead (*Cottus gobio*)	53	0.35	35.9	22 - 65
Chub (*Squalius cephalus*)	3	0.02	92	66 - 135
Gudgeon (*Gobio gobio*)	3	0.02	105	95 - 125
Minnow (*Phoxinus phoxinus*)	183	1.22	50.8	22 - 85
Stone Loach (*Barbatula barbatula*)	1	0.007	46	N/A

*Estimated density is calculated based on the total number of individual fish caught over three consecutive electrofishing runs divided by the total estimated area fished (i.e. 100m [survey reach length] x 1.5 m [survey reach average wetted width]).

According to the survey results Minnow was the most abundant fish species comprising 75% of the total catch (Figure 1). Stone Loach was the least abundant fish species comprising < 1% of the total catch (Figure 1).

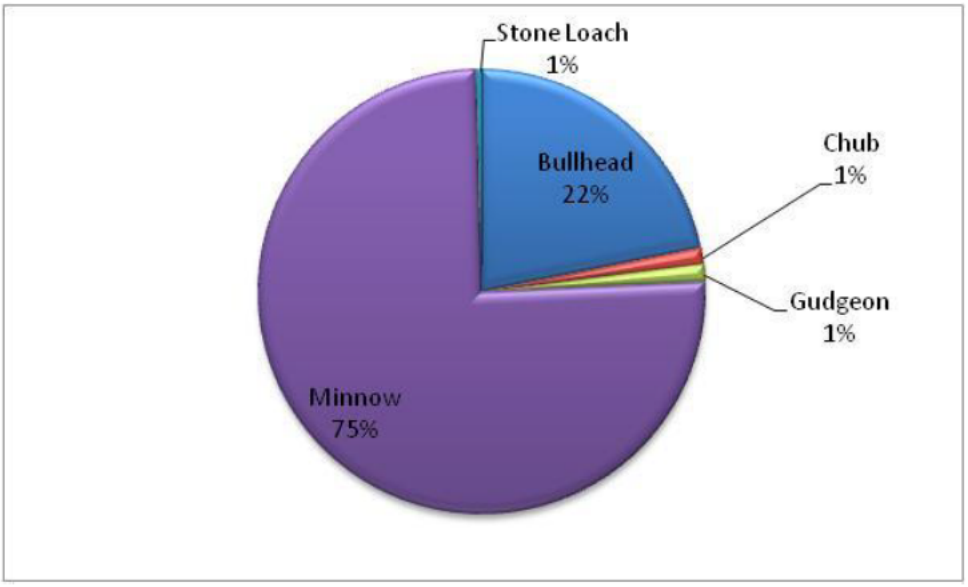


Figure 1. Pie chart illustrating the fish community species composition for River Ingrebourne based on electrofishing catches using a three-run depletion method.

One Signal Crayfish (*Pacifastacus leniusculus*) was also observed during the electrofishing surveys.

4.6 Weald Brook Electrofishing Results

A total of only six individual fishes comprising just two different species were caught during the surveys. Both species are classed as minor species by the Environment Agency. The species numbers, estimated density, average length and length range are all detailed in *Table 8*.

Table 8. A summary of the fish survey results from the Weald Brook.

Species	Total number caught	Estimated density (number of individuals per m^2)*	Mean length (mm)	Length range (mm)
Bullhead (*Cottus gobio*)	5	0.05	35.2	32 - 39
Three-Spined Stickleback (*Gasterosteus aculeatus*)	1	0.01	42	N/A

* Estimated density is calculated based on the total number of individual fish caught over three consecutive electrofishing runs divided by the total estimated area fished (i.e. 100m [survey reach length] x 1.5 m [survey reach average wetted width]).

According to the survey results Bullhead was the most abundant species comprising 83% of the total catch with Three-Spined Stickleback making up the remainder (Figure 2).

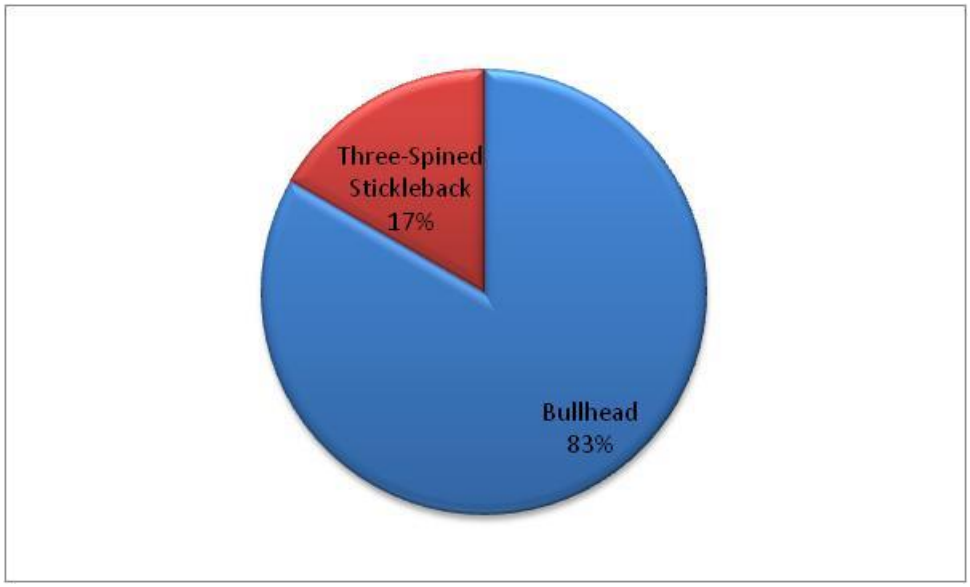


Figure 2. Pie chart illustrating the fish community species composition for Weald Brook based on electrofishing catches using a three-run depletion method.

5 DISCUSSION

5.1 Aquatic Invertebrate Assemblages

The biotic scores for water quality are ‘moderate’ at the River Ingrebourne and ‘poor’ at the Weald Brook. While there are some pollution sensitive species present, it is clear that the invertebrate assemblage is likely to be suppressed by the shading at both sites, resulting in a lack of aquatic macrophytes, and by the slow flow rate and high sediment content in the Weald Brook.

The baseline results for the Community Conservation Index assessment shows both sites have low conservation value, but the site at the River Ingrebourne scores higher that the Weald Brook and is close to having moderate conservation value.

The LIFE scores indicated that the Weald Brook has an invertebrate assemblage more typical of slower flowing streams with the River Ingrebourne having a faster flow.

The baseline results for PSI scores show both sites to be classed as sedimented, with the Weald Brook showing a higher degree of sedimentation than the River Ingrebourne.

Comparisons between the two sites are not required for the purposes of this assessment. Instead, these results should be used as a baseline against which changes in flow and sedimentation as a result of the proposed works, can be assessed.

5.2 Fish communities

Although there were relatively large numbers of fish recorded from the River Ingrebourne the species diversity was moderate to poor with just five species being recorded. The low species diversity is likely to reflect the limited range of habitats available in the reach. The majority of the channel was relatively straight with very few deeper areas or large refuges which might benefit those fish species which grow larger than the predominantly minor species observed.

The size ranges observed for some of the species indicates that they are likely to be recruiting within the reach. This is particularly true for Bullhead and Minnow for which relatively large sample sizes were obtained. Bullhead is a Species of Principle Importance and is cited under Annex II of the EU Habitats Directive.

The fish community in the Weald Brook was considerably poorer than that observed in the River Ingrebourne with just two species and six individuals in total being caught. There was evidence of siltation throughout the reach and this is likely to be a

combination of diffuse runoff and poaching of the banks by livestock or the large heard of Fallow Deer (Dama dama) which were observed during surveys.

In summary, the fish community in both surveyed reaches was considered to be relatively poor (more so in the Weald Brook) with regard to species richness and overall densities of fish (with the exception of Minnow in the River Ingrebourne). This is likely to be due, at least in part, to the generally poor habitat quality.

It should be noted that a formal habitat survey and assessment was not requested as part of this survey and the comments relating to habitat are based on brief observations made by surveyors during the macroinvertebrate and electrofishing surveys. A formal habitat assessment and water quality survey would provide more accurate information regarding the quality of the river habitat with respect to fish and macroinvertebrates.

6 REFERENCES

Environment Agency (1999). *Procedures for collecting and analysing macro-invertebrate samples.*

Chadd, R and Extence, C. (2004). *The conservation of freshwater macro-invertebrate populations: a community-based classification scheme. Aquatic Conservation: Marine and Freshwater Ecosystems. 14: 597-624*

Extence, C.A., Balbi, D. M. And Chadd, R.P. (1999). *River flow indexing using benthic macroinvertebrates: a framework for setting hydro-ecological objectives. Regulated Rivers: Research & Management. 15: 543-574.*

Extence, C.A., Chadd, R.P., England, J., Dunbar, M., Wood, P.J. and Taylor, E.D. (2013). *The assessment of fine sediment accumulation in rivers using macro-invertebrate community response. River Research and Applications.*

APPENDIX A – INVERTEBRATE SURVEY RESULTS

Species	Description	BMWP Score	Conservation Status/CS Score	PSI Group	Flow Group	Sample Site							
						River Ingrebourne				Weald Brook			
						Abundance	Abundance Category	Sediment Sensitivity Score	LIFE Flow Score (fs)	Abundance	Abundance Category	Sediment Sensitivity Score	LIFE Flow Score (fs)
HEMIPTERA													
Notonectidae		5											
Notonecta glauca	Greater Water Boatman		Very Common (1)	**D**	**4**	1	A	2	6				
EPHEMEROPTERA													
Baetidae		4											
Baetis scambus	Swimming Mayfly		Occasional (4)	**A**	**2**	1	A	2	8				
Baetis rhodani	Swimming Mayfly		Very Common (1)	**A**	**2**	25	B	3	9	1	A	2	8
TRICHOPTERA													
Leptoceridae		10											
Mystacides longicornis	Cased Caddisfly		Very Common (1)	**D**	**4**	1	A	2	6				
Sericostomatidae		10											
Sericostoma cf *personatum*	Cased Caddisfly		Very Common (1)	**B**	**2**					10	B	2	9
CRUSTACEA													
Astacidae		8											
Pacifastacus leinusculus	Signal Crayfish		Very Common (1)	**-**	**2**	5	A	-	8				
Gammaridae		6											
Gammarus pulex	Freshwater Shrimp		Very Common (1)	**B**	**2**	100	C	3	10				
Asellidae		3											
Asellus aquaticus	Hoglouse		Very Common (1)	**D**	**4**	5	A	2	6	25	B	3	5
NEUROPTERA													
Sialidae		4											
Sialis lutaria	Alderfly		Very Common (1)	**D**	**4**					50	B	3	5
DIPTERA													
Chironomidae	Non-biting Midge	**2**	-	**-**	**-**	20	B	-	-	25	B	-	-
Tipulidae	Cranefly	**5**	-	**B**	**4**	10	B	2	5				
Simuliidae	Blackfly	**5**	-	**A**	**2**	10	B	3	9				
HIRUNDINEA													
Erpobdellidae		3											
Erpobdella testacea	Leech		Very Common (1)	**C**	**5**	10	B	2	4				
Glossiphonidae		3											
Glossiphonia complanata	Leech		Very Common (1)	**C**	**4**	10	B	2	5	10	B	2	5
MOLLUSCA													
Ancylidae		5											
Ancylus fluviatilis	River Limpet		Very Common (1)	**A**	**2**	1	A	2	8	1	A	2	8
Sphaeriidae		3											

Species	Description	BMWP Score	Conservation Status/CS Score	PSI Group	Flow Group	Sample Site							
						River Ingrebourne				Weald Brook			
						Abundance	Abundance Category	Sediment Sensitivity Score	LIFE Flow Score (fs)	Abundance	Abundance Category	Sediment Sensitivity Score	LIFE Flow Score (fs)
Sphaerium corneum	Orb Mussel		Very Common (1)	**D**	**4**					5	A	2	6
Pisidium sp	Pea Mussel		-	**D**	**4**					5	A	2	6
Planorbiidae		**3**											
Anisus leucostoma	White-lipped Ramshorn		Very Common (1)	**D**	**6**					10	B	3	3
Anisus vortex	Whirlpool Ramshorn		Very Common (1)	**D**	**4**					5	A	2	6
Gyraulus albus	White Ramshorn		Very Common (1)	**C**	**4**	5	A	1	5				
Hydrobiidae		**3**											
Potamopyrgus antipodarum	Jenkins Spire Shell		Very Common (1)	**C**	**3**	25	B	2	7				
Lymnaeidae		**3**											
Radix balthica	Wandering Pond Snail		Very Common (1)	**D**	**4**	5	A	2	6	5	A	2	6
OLIGOCHAETE													
Oligochaete	Worm	**1**	-	**-**	**-**	10	B	-	-	20	B	-	-
Taxon Richness						17				13			
BMWP Score						69				41			
Number of Scoring Families						16				11			
ASPT						4.31				3.73			
CS Sum						16				10			
CCI						4.92				1.00			
PSI Score						40.00				24.00			
LIFE Score						6.8				6.1			

Printed on paper from well-managed forests and other controlled sources.

Registered office Bridge House, 1 Walnut Tree Close, Guildford GU1 4LZ
Highways England Company Limited registered in England and Wales number 09346363