A38 Derby Junctions

TR010022

Volume 6

6.3 Environmental Statement Appendices

Appendix 8.12a: White-clawed Crayfish Survey in 2018

Regulation 5(2)(a)

Planning Act 2008

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

April 2019

Infrastructure Planning

Planning Act 2008

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

A38 Derby Junctions Development Consent Order 202[ ]

6.3 Environmental Statement Appendices
Appendix 8.12a: White-clawed Crayfish Survey in 2018

Regulation Number	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010022
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1	April 2019	DCO Application

A38 Derby Junctions

White-clawed-Crayfish Survey Report

Report Number: HE514503-ACM-EBD-A38_SW_PR_ZZ-RP-EG-0019 P02 S4
November 2018

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1 INTRODUCTION

1.1 Background and Scope

1.1.1 AECOM Infrastructure & Environment UK Limited (AECOM) has been commissioned by Highways England to provide design services with regards to the A38 Derby Junctions Scheme (referred to as the Scheme herein).

1.1.2 The Scheme concerns the grade separation of three junctions on the A38 in Derby, namely:

- A38/ A61 Little Eaton junction;
- A38/ A52 Markeaton junction; and
- A38/ A5111 Kingsway junction.

1.1.3 These three junctions are located along an approximate 5.5km length of the A38 national trunk road, to the west and north of Derby.

1.1.4 In order to assist with the assessment of the Scheme's potential environmental effects, a range of environmental surveys have been undertaken to define prevailing baseline conditions. This includes surveys of watercourses in the vicinity of the Scheme for white-clawed crayfish (*Austropotamobius pallipes*), a protected species which is under threat throughout its range in England and Wales.

1.1.5 Desk studies and field surveys were used to determine the presence and extent of white-clawed crayfish populations in the vicinity of the Scheme. Surveys were carried out in 2015 and 2017, with an additional targeted survey carried out in 2018 in part of the study area to determine the latest status of white-clawed crayfish and to take account of amendments to the Scheme boundary. The study site is described in Section 1.2 (Study Site) and in more detail in the Section 2.

1.1.6 This report presents the 2018 white-clawed crayfish survey results, but also includes the records from previous surveys to show recent trends in the status of crayfish in the vicinity of the Scheme.

1.1.7 A major threat to white-clawed crayfish is the presence of introduced crayfish from North America, in particular the signal crayfish (*Pacifastacus leniusculus*). Signal crayfish populations usually carry a pathogen, crayfish plague (*Aphanomyces astaci*), to which white-clawed crayfish have no resistance. Once white-clawed crayfish become infected, mass mortality follows rapidly in the population, leading to complete loss, or only semi-isolated fragments of the population remaining, for example in headwaters or upstream of natural or artificial barriers. Crayfish plague spores carry infection downstream rapidly, but infection spreads upstream too by contact between crayfish. In the rare cases where signal crayfish populations are not carrying crayfish plague, they out-compete white-clawed crayfish within a few years. Hence, whenever signal crayfish become established in a watercourse, they are a severe threat to white-clawed crayfish in the same and connected watercourses. White-clawed crayfish can only survive where isolated from invasive non-native crayfish and crayfish plague.

1.1.8 The combination of crayfish plague and competition means that once a population of signal crayfish has become established in an area and the white-clawed crayfish population ceases, there is no prospect for successful recolonization by white-clawed

crayfish. There are no methods available to eradicate a population of signal crayfish once it is well established in a watercourse and expanding. When presence of signal crayfish has been confirmed in a stretch of watercourse, it can reasonably be assumed that:

- Signal crayfish, once established, will persist and continue to expand upstream and downstream in the watercourse unless there is a physical barrier; and
- White-clawed crayfish will not persist in any stretch invaded by signal crayfish and especially if downstream of signal crayfish may be lost due to crayfish plague long before signal crayfish invade the reach.

1.1.9 Confirmed presence of signal crayfish at a site can be considered to be permanent and updating surveys are therefore not required there for the purpose of environmental assessment. White-clawed crayfish can be scoped out at those sites.

1.2 Study Site

1.2.1 The Scheme encompasses Kingsway and Markeaton junctions, west of the City of Derby and Little Eaton junction north of Derby. A plan showing the locations of the Markeaton, Kingsway and Little Eaton junctions is presented in Figure 1, Appendix A.

1.2.2 The A38 is an existing and busy arterial 'A' road carrying traffic around the west and north of the City of Derby. South of Kingsway junction, the road enters a cutting and is bordered by semi-improved grassland and scrub covered verges. The central reservation south of Kingsway junction and the junction island in this location support a mosaic of habitat types, including semi-improved neutral grassland and native broadleaved woodland. Bramble Brook (see Figures 2 and 3, Appendix A) flows from the west of the Scheme in this location, through culverts located under the north-bound carriageway and the central reservation before connecting with further culverts located between the junction islands. North of Kingsway junction there is an area of mixed plantation represented by semi-mature trees on the embankment.

1.2.3 Markeaton junction is bordered to the east by residential properties and to the west by parkland. The outfall from Markeaton Lake and Markeaton Brook flows through culverts beneath the existing A38 at the northern extent of Markeaton junction towards the River Derwent (see Figures 2 and 3, Appendix A).

1.2.4 The western boundary of the Scheme at Little Eaton junction borders the road bridge over the River Derwent. The existing A38 is on embankment in this location, with the embankments themselves represented by areas of scrub and immature broadleaved plantation habitats. A variety of grassland habitats exist at the base of the embankments in this location. A network of watercourses, and small tributaries of the River Derwent, are present within this junction and include Boosemoor Brook, Dam Brook and Watermeadows ditch (see Figures 3 and 4, Appendix A).

1.3 Relevant Legislation and Policy

1.3.1 The white-clawed crayfish is afforded protection under the Wildlife and Countryside Act 1981. This species is listed on Schedule 5 of the Act and is afforded partial protection under Section 9(1) making it an offence to intentionally kill, injure or take any of this species. There are additional offences in relation to buying, selling or exchanging any live or dead animal of this species or anything derived from a white-clawed crayfish, under Section 9(5).

1.3.2 White-clawed crayfish are listed on Annex II(a) of the EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora, also known as the 'Habitats Directive'. This means that the UK is required to establish Special Areas of Conservation (SACs) to protect the habitat of this species. These sites form part of the Natura 2000 network across Europe. In addition, its inclusion on Annex V of this Directive also restricts the taking, capture or killing of this species in the wild.

1.3.3 The white-clawed crayfish is listed in Section 74 of the Countryside Rights of Way (CRoW) 2000 and Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 as a species of principle importance for nature conservation in England. The Section 41 list is used to guide decision-makers such as public bodies, including Highways England, in implementing their duty under Section 40 of the NERC Act to have regard to the conservation of biodiversity in England, when carrying out their normal functions.

1.3.4 The species covered by the Section 41 list were originally identified as requiring nature conservation action under the (now withdrawn) UK Biodiversity Action Plan (BAP) and continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework.

1.3.5 The revised National Planning Policy Framework (NPPF) was published on July 2018 and sets out the governments planning policies for England and how these are expected to be applied. The NPPF outlines policies on the protection and enhancement of biodiversity including: *promoting the conservation, restoration, and enhancement of priority habitats; ecological networks and the protection and recovery of priority species; and identify opportunities for securing net gain*. National policy statements also form part of the overall framework of national planning policy, and are a material consideration in preparing plans and making decisions on planning applications. The national policy statement of relevance to the Scheme is the National Policy Statement for National Networks (NPSNN).

1.3.6 White-clawed crayfish is designated as "Endangered" on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species (2010). It is under threat in most of its range in Europe, including in England and Wales, due to reduction of habitat quality and from competition and disease from species of crayfish introduced from North America.

1.3.7 Prior to the UK Post-2010 Biodiversity Framework, local partnerships were formed to produce Local Biodiversity Action Plans (LBAP). These identified species and habitat which are important at a local level e.g. by County or Local Authority Administrative Area, for the purpose of conserving and enhancing biodiversity. The Lowland Derbyshire Biodiversity Action Plan lists white-clawed crayfish as an LBAP species (Lowland Derbyshire Biodiversity Partnership 2011).

1.3.8 Due to the many negative effects of invasive non-native species (INNS), legislation has been passed that aims to reduce ecological and economic impacts. Signal crayfish are listed under Schedule 9 Part 2 of the Wildlife and Countryside Act 1981 (as amended) (WCA). This makes it an offence under the WCA for signal crayfish to be released, or allowed to escape into the wild.

1.3.9 The EU Invasive Alien Species Regulation 1143/2014 (EU IAS Regs) imposes restrictions on signal crayfish which are listed as a 'Species of Union Concern'. These are species which pose a risk of adverse impacts across the EU, such that

targeted action across EU member states is required. Restrictions applying to these species mean they cannot be imported, kept, bred, transported, sold, used or exchanged, allowed to reproduce, grown or cultivated, or released into the environment. Under certain circumstances a Species Control Order can be served on a land owner to require the removal of a given species (see Infrastructure Act 2015).

1.3.10 The Great Britain Invasive Non-native Species Strategy aims to address invasive non-native species (INNS) issues in Great Britain (GB), maintaining the approach of the 2008 Strategy and the 2003 policy review (The Great Britain Non-native Species Secretariat 2015). The Strategy covers the terrestrial, freshwater and marine environments and also species native to one part of a country that become invasive in areas outside their natural range. Signal crayfish are identified within this strategy as a species which disrupt habitats and ecosystems, preying on or out-competing native species and spreading disease.

1.3.11 Highways England, through the national Road Investment Strategy, has set an aspiration that the operation, maintenance, and enhancement of the Strategic Road Network (SRN) should move to a position that delivers no net loss of biodiversity; and, in the long term, Highways England should deliver a net gain in biodiversity across its broader range of works. Highways England published a Biodiversity Action Plan in 2015 (Highways England, 2015) to show how it will work with service providers to halt overall biodiversity loss, and maintain and enhance habitats and ecological networks. The Government requires Highways England to demonstrate progress against the Biodiversity Plan, to secure an ongoing annual reduction in the loss of net biodiversity due to its activities. The 2015 Biodiversity Plan supersedes the 2002 Highways Agency (now Highways England) Biodiversity Action Plan (BAP) 2002, which still carries some relevance as it lists specific species of conservation concern including white-clawed crayfish. The main aim of the 2002 Highways BAP for the white-clawed crayfish was to ensure that new road developments avoid or adequately mitigate any potential impacts on the species.

2 METHOD

2.1 Desk Based Study

2.1.1 A desk-based study was undertaken to identify internationally, nationally and locally designated statutory sites, local designated non-statutory sites and records of crayfish species within 2km of the Scheme. The OS grid references representing the central points of the desk-based study undertaken were SK 32801 36103 and SK 36402 39990 and relate to Kingsway and Markeaton junctions and Little Eaton junction respectively.

2.1.2 Online resources reviewed included the Multi-Agency Geographic Information Centre (MAGIC), and the National Biodiversity Network (NBN) Gateway. A data search to identify any further crayfish records within 2km of the central OS grid locations detailed above was also requested from the Derbyshire Wildlife Trust (DWT) and presented in the AECOM(b) (2017) Report and used to inform this document.

2.1.3 Further to the desk based assessment presented in the previous AECOM report (AECOM(a), 2016 and AECOM(b) 2017), a more detailed desk based assessment was undertaken utilising online sources and biological records provided by DWT for crayfish up to and including 2016 and recently updated for this report in 2018. AECOM records from the 2015 and 2017 crayfish surveys were also used to help inform the scope of the field survey in 2018. Desk study findings are discussed in Section 3.1 (and Figures 2 and 3 in Appendix A), explaining why most of the watercourses in the vicinity of the Scheme were scoped out in 2018 because the status of crayfish had been established by previous surveys. The survey in 2018 focused on Dam Brook.

2.2 Field Survey Methods

2.2.1 The survey methodology was adapted from Joint Nature Conservation Committee's (2015) Common Standards Monitoring (CSM) – Protocol for Population Monitoring of White-clawed Crayfish. This protocol favours manual searching for crayfish where there is sufficient habitat for this method with 100 refugia searched (cobbles and boulders turned) initially over a 200m length of channel. If less than five crayfish are found, then the search is extended to 250 refugia.

2.2.2 The survey was undertaken in two sections of the Dam Brook channel as illustrated in Figure 4 (Appendix A). Section 1 (S1) was located upstream of the Dam Brook weir (SK3651040038) to the Boosemoor Brook confluence (SK3660239962) over a length of 120m (See Plates 1 and 2 Appendix B). Section 2 (S2) was located between a farm access culvert (SK3665939917) and Breadsall (SK3682939823) over a length of 200m (See Plates 3 Appendix B). Manual searches (hand-searching) were undertaken in suitable habitat within these sections (Visit 1). Where no crayfish were found using manual search methods, 30 crayfish refuge traps, which mimic natural refuges crayfish would utilise, were deployed within Dam Brook. Traps were deployed in pairs, with 14 traps deployed in S1 and 16 traps deployed in S2. In order to be effective refuge traps should be in place for a minimum of three weeks and checked after 12 days to ensure the traps are still in place, although where presence of crayfish is confirmed within the first 12 days the survey period can be reduced.

2.2.3 The traps were set in pairs and as unobtrusively as practicable, to minimise the risk of interference or theft.

2.2.4 Environment Agency consents were obtained for all trapping locations prior to the surveys commencing in July 2018. The white-clawed crayfish surveys of Dam Brook in 2018 were undertaken during July and August (Visit 1, 30 July 2018 and Visit 2 10 August 2018).

2.2.5 All surveys were undertaken by fully licensed AECOM ecologists with a Natural England C11 licence.

2.3 Survey Limitations

2.3.1 S1 had limited available refugia such as cobbles and bricks which could be searched manually, with the bed comprising of finer sediments including sand and silt. A 70m stretch between S1 and S2 of the Dam Brook channel could not be surveyed as it was significantly overgrown by bramble and hawthorn and the banks were high and steep which prevented safe access and egress.

2.3.2 S2 was intermittently overgrown with bramble, willowherb hedge bindweed and common nettle which made some areas of channel impossible to survey. Whilst Dam Brook in S2 was overgrown, there were enough refugia available for manual search and this gave a good representation of the presence/ likely absence of white-clawed crayfish. Consequently, not accessing the overgrown areas is not considered to have affected the findings of this survey. Additionally, increased survey effort (i.e. both standardised manual searches and refuge trapping) was undertaken within both survey sections providing confidence in the survey results for S1 and S2 notwithstanding the above limitations.

3 RESULTS

3.1 Desk Based Study

3.1.1 Figures 2 and 3 show all of the records from previous surveys within 500m of the Scheme. Overall, these show the trend of an increasing number of locations of signal crayfish and expansion from introduction sites and a decrease in the number of sites with white-clawed crayfish. By 2015 there was only one confirmed population of white-clawed crayfish in the study area; within the Dam Brook system. No additional populations of white-clawed crayfish were found in 2017 or 2018.

3.1.2 At Markeaton junction, Markeaton Brook was ruled out for further survey in 2017, due to signal crayfish having been recorded in a tributary of Markeaton Lake in 2012 and a well-established signal crayfish population was recorded at the inlet of Markeaton Lake in the AECOM survey in 2015, likely indicating the whole stretch had been invaded by gnal crayfish. As white-clawed crayfish were historically abundant in Markeaton Lake, but were not recorded downstream of Markeaton Park in 2012, an outbreak of crayfish plague is the most likely reason for the loss. This system includes Mill Pond, Mill Dam and the connecting Middle Brook that flows into the lower Markeaton Brook. It has been widely colonised by signal crayfish and the population is expected to continue to expand and increase in abundance.

3.1.3 At Kingsway Junction, Bramble Brook was ruled out of further survey because the survey in 2015 showed much of the channel was dry and there was a lack of suitable habitat for white-clawed crayfish.

3.1.4 At Little Eaton junction, several stretches of watercourse were identified in 2017 as potentially suitable for white-clawed crayfish populations. These were the River Derwent, Bottle Brook, and Dam Brook, with its tributaries Boosemoor Brook and Watermeadows ditch.

3.1.5 The large River Derwent closest to Little Eaton junction was surveyed in 2015 and 2017, but no crayfish were found. Nonetheless, with signal crayfish scattered in the wider catchment, early outbreaks of crayfish plague were considered to be reason for loss of historic populations of white-clawed crayfish in the main river, leaving records since the 1990s limited to some of the tributaries. Additional historic signal crayfish data on the River Derwent in Derby were provided by the Environment Agency, although locations are beyond the area shown on Figures 2 and 3.

3.1.6 Bottle Brook was surveyed in 2017 and no crayfish were found, but there was a desk study record for signal crayfish in this watercourse, which suggested the population was at low abundance in the early stage of invasion in the watercourse. Furthermore, the Scheme boundary was revised in 2018 and reduced, such that Bottle Brook would not be affected by the Scheme.

3.1.7 In Dam Brook the 2017 crayfish survey recorded the presence of signal crayfish upstream and downstream of the A61 Road culvert and in the Dam Brook sub-catchment signal crayfish were also recorded in the Watermeadows Ditch, adjacent to the agricultural concrete access culvert, which eventually connects to the River Derwent. The survey undertaken in 2017 between a weir (at SK 36499 40033) and Breadsall (where the watercourse is inaccessible in the urban area) covered an approximate 330m stretch of Dam Brook. Signal crayfish were found downstream of a weir within Dam Brook adjacent to the A61 and A38 Roundabout (at SK36510

40038), where previously white-clawed crayfish had been recorded (Figure 3 Appendix A). The weir was considered to form a potential temporary barrier to signal crayfish movement upstream of the structure. A site on the Boosemoor Brook, a tributary of Dam Brook upstream of the weir, was surveyed in 2015, but the channel had been modified. The site was considered to be poor habitat for white-clawed crayfish and none were found in the site (<100m) that could be accessed.

3.1.8 The purpose of the field survey in 2018 was to see whether white-clawed crayfish remained in Dam Brook upstream of the invading population of signal crayfish, or whether the signal crayfish had already spread upstream of the low, sloping weir.

3.1.9 No further desk study records of white-clawed crayfish were identified beyond those reported in the previous reports (AECOM 2016, AECOM, 2017).

3.1.10 The 2015 and 2017 survey results discussed above are shown in Tables C1 and C2 in Appendix C.

3.2 Field Results

3.2.1 The results of the field surveys carried out in 2018 are shown in Table 1 and Figure 4 Appendix A. Site photos are also provided in Appendix B and referenced in Table 1.

Table 1: White-Clawed Crayfish 2018 Survey Results

	Little Eaton Junction					
Site Name	**Method**	**Visit 1 / Dates**	**Habitat Description**	**Survey 1 Findings**	**Visit 2 Date(s)**	**Survey 2 Findings**
Dam Brook (S1) From – SK36510 40038 To – SK36602 39962	Refuge trap deployment (x14) and manual search (hand searching).	30 July	Straight (modified) section of brook located upstream of the A61 weir at SK 36499 40033. Banks trapezoidal with bed and bank reinforcement present immediately upstream of the weir. Fine bed sediments including sands and silt were dominant with limited in-channel and bank-toe refugia; however building materials such as bricks were rarely available. Overhanging scrub hawthorn and bramble was also present shading the channel with no marginal or bankside vegetation present.	No crayfish found during manual search.	10 August 2018	One **signal crayfish** male was recorded upstream of the Dam Brook weir (see Plates 4 and 5, Appendix B) at SK36534 40025. The animal was mature with carapace lengths being 35mm. The 3rd right pereopod (leg) was missing, otherwise there was no sign of damage and the animal appeared healthy.
Dam Brook (S2) From – SK36659 39917 To – SK36829 39823	Refuge Trap deployment (x16) and manual search (hand searching).	30 July	Straight section of brook with earth banks. Channel banks overgrown with common nettle, willow herb and bramble with individual stands of semi-mature alder and willow. Channel bed was dominated by large cobbles and boulders with finer gravels and sand beneath. Large refugia were often embedded by bed sediments and couldn't be searched. Building materials such as bricks also offered a range of in channel and bank toe refugia	No crayfish recorded during manual search	10 August 2018	No crayfish recorded during refuge trap collection.

4 DISCUSSION

4.1.1 Signal crayfish were recorded during the 2018 survey, with one adult captured on Dam Brook upstream of the A61 weir in S1. This section is hydraulically linked to S2, with no known barriers to crayfish movement. The A61 weir (Plate 1 Appendix B) is not therefore considered to be a barrier to signal crayfish movement and signal crayfish are likely to be established throughout Dam Brook in areas of suitable habitat.

4.1.2 It is highly likely that there is a strong correlation between the increasing numbers of signal crayfish (carriers of the well documented crayfish plague *Aphanomyces astaci*) and the apparent absence of white-clawed crayfish in Dam Brook from Breadsall into the connecting Watermeadows Ditch.

4.1.3 Considering the above findings, white-clawed crayfish are considered absent from this stretch and from the watercourses in the vicinity of Little Eaton junction.

4.1.4 As white-clawed crayfish are also considered to be absent from the vicinity of Kingsway and Markeaton junctions, with other populations of signal crayfish in watercourses there, there are no surviving populations of white-clawed crayfish that could be affected by the Scheme.

5 SUMMARY AND RECOMMENDATIONS

5.1.1 On the basis of the surveys and other records, there are no white-clawed crayfish populations in the vicinity of the Scheme. White-clawed crayfish can therefore be scoped out of the ecological assessment.

5.1.2 The previously recorded white-clawed crayfish population in Dam Brook was not re-found in 2018. Signal crayfish were identified within S1 in Dam Brook, upstream of the A61 weir. No crayfish were identified in S2, however, this section is hydraulically linked to S1 and there are no barriers to signal crayfish movement into this section. White-clawed crayfish are likely to be absent from both S1 and S2 in Dam Brook.

5.1.3 All the other watercourses within the study area have been previously found to be lacking in suitable habitat for white-clawed crayfish or they are in the process of being invaded by signal crayfish. This process is expected to continue until the signal crayfish have colonised all the accessible areas of the relevant sub-catchments of the River Derwent.

5.1.4 No further white-clawed crayfish surveys are recommended for the Scheme.

5.1.5 The current or likely future presence of signal crayfish in watercourses affected by works for the Scheme means there is some risk that signal crayfish could be moved to other areas during works. Biosecurity measures to avoid further introductions of signal crayfish or crayfish plague will be considered and reported in the Environmental Statement.

6 REFERENCES

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Appendix A Figures

Figure 1 – Site Location

Figure 2 – Kingsway and Markeaton Junctions Desk Study

Figure 3 – Little Eaton Junction Desk Study

Figure 4 – 2018 Survey Results

N

M1 JUNCTION 28

A38/A61 LITTLE EATON JUNCTION

A38/A6 PALM COURT JUNCTION

A38/A52 MARKEATON JUNCTION

A38/A5111 KINGSWAY JUNCTION

A50/A38 JUNCTION

2 0 2 4 6 8 Kilometres

Project Title/Drawing Title

A38 DERBY JUNCTIONS SCHEME LOCATION PLAN

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GB	SR	DD
Date	Scale @ A3	Purpose of issue
01/10/2018	1:100,000	FINAL
Drawing Number		Rev
Figure 1		1F

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File Name:\\ch-wip-001\CH_Roads\A38 Derby Jcns - PO1339\2 CAD\2.1 WIP\FIGURE 1.1 - LOCATION PLAN F1.mxd

N

Markeaton Park Survey Site (2012)

Markeaton Park (2008)

2002 A

1996 B

Markeaton Brook

2012 A

1986 A

2008 A

1986 B

Markeaton Lake

2012 B

2000

1996 A

Middle Brook

1993 C

1993 A

1993 B

Mill Pond 1

Sturgess Field Survey Site (2012)

2002 B

Mill Pond 2

1992 C

1998

1997

St Johns Terrace (2008)

Bramble Brook

200 0 200 400 600 800 1000 Metres

Legend

- Scheme boundary (20180502)
- 50m buffer
- 250m buffer
- 500m buffer
- Watercourse
- Direction of flow

AECOM 2015 survey

- Americal Signal crayfish

Records from David Rogers Associates, 2008

- White-clawed crayfish

Crayfish survey results provided by DCC. Peter Cowley, 2012

- White-clawed crayfish
- White-clawed crayfish + Signal crayfish
- No crayfish

Records provided by Derbyshire Wildlife Trust

- White-clawed crayfish (with date and reference)

File Name:X:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2018\project_files\WCC\A38_WCC_KM_deskStudy_2018.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS KINGSWAY MARKEATON WHITE-CLAWED CRAYFISH DESK STUDY 2018

Project Number 60533462		
Drawn GSB	Checked DW	Approved SP
Date 09/10/2018	Scale @ A3 1:10,000	Purpose of issue FINAL
Drawing Number Figure 2		Rev .

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N

Bottle Brook

1991 B

1991 A

1992

River Derwent

Boosemoor Brook

2014

Dam Brook

Watermeadows Ditch

Legend

- Scheme boundary (20180502)
- 50m buffer
- 250m buffer
- 500m buffer
- Water body
- Direction of flow
- Weir - Potential Signal Crayfish barrier

Derbyshire Wildlife Trust

- White-clawed crayfish record (with date and reference)

NBN search - 2017

- 2 American Signal

AECOM survey 2015

- 1 ♂ White-clawed crayfish

AECOM survey 2017

- American Signal crayfish

200 0 200 400 600 800 1000 Metres

1983 1989

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Project Title/Drawing Title

A38 DERBY JUNCTIONS
LITTLE EATON
WHITE-CLAWED CRAYFISH
DESK STUDY 2018

Project Number
60533462

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GSB	DW	SP
Date	**Scale @ A3**	**Purpose of issue**
14/11/2018	1:9,000	FINAL
Drawing Number		**Rev**
Figure 3		.

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N

Boosemoor Brook

S1

S2

Dam Brook

Watermeadows Ditch

100 0 100 200 300 400 500 Metres

Legend

- Scheme boundary (20180502)
- 50 m buffer
- 250 m buffer 500
- m buffer
- Watercourse Weir
- Direction of flow

Survey results 2018

- American Signal crayfish
- White-clawed crayfish survey area 2018

File Name:X:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2018\project_files\WCC\A38_WCC_LE_2018 survey.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
LITTLE EATON
WHITE-CLAWED CRAYFISH SURVEY RESULTS 2018

Project Number 60533462		
Drawn GSB	Checked DW	Approved .
Date 20/10/2018	Scale @ A3 1:5,000	Purpose of issue FINAL
Drawing Number Figure 4		Rev .

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Appendix B Site Photographs

Little Eaton Junction Plates

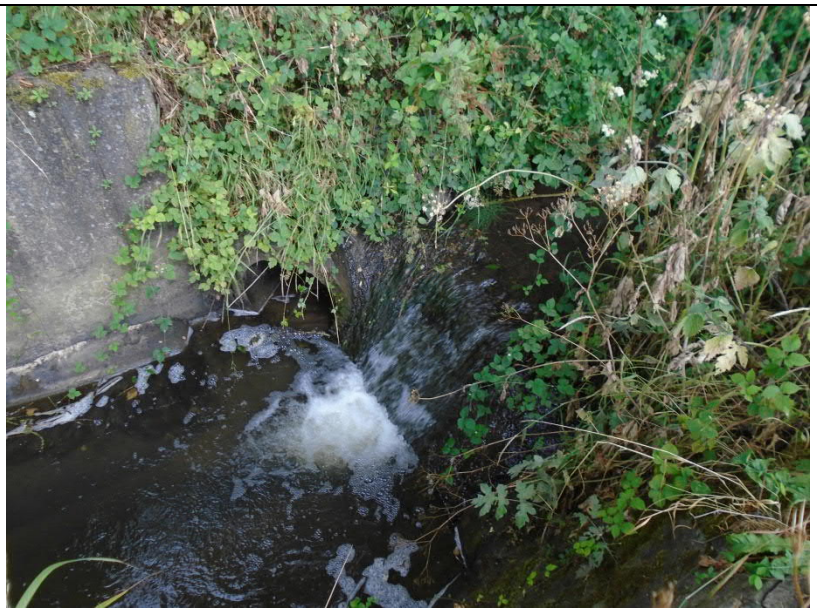
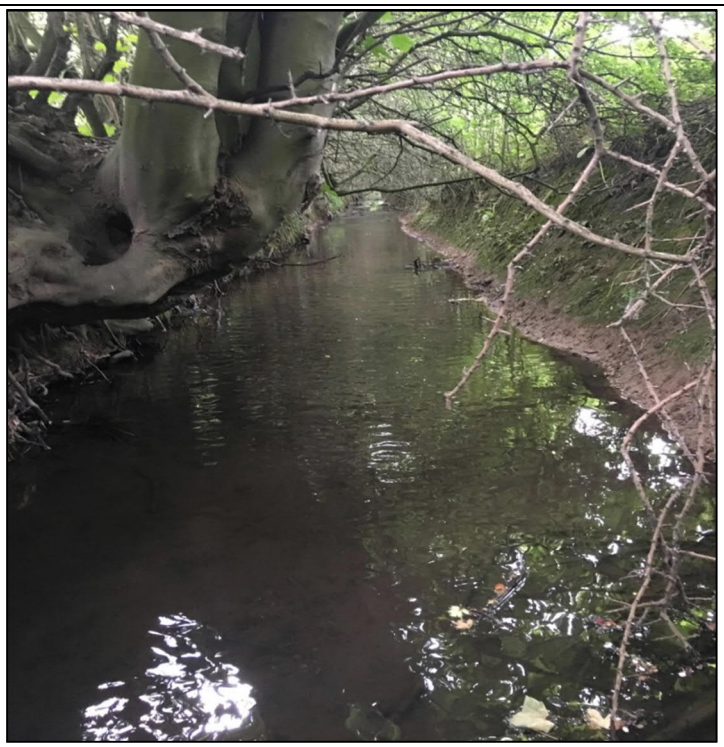
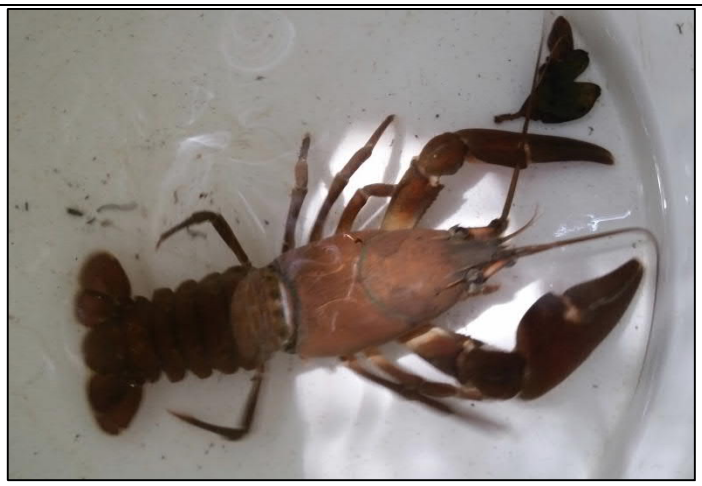
Plate number	Notes	Plates
1	Dam Brook Weir	
2	Dam Brook Survey Section 1	

Plate number	Notes	Plates
3	Dam Brook Survey Section 2	
4 & 5	Dam Brook Signal Crayfish Male	

Plate number	Notes	Plates
		

Appendix C 2015 and 2017 Survey Results

Table C1: White-Clawed Crayfish 2015 Survey Results

Site Name	Method	Visit 1 Date/s	Survey 1 Findings	Visit 2 Date/s*	Survey 2 Findings*
Kingsway and Markeaton Junction Section of the Scheme					
Markeaton Lake (a1) western end inlet SK 33351 37695	Trapping (10 traps)	Jul. 21-22	23 American signal crayfish (all adults), recorded from Site a1.		
Markeaton Lake (a2) (eastern end) (Plate. 2) including outflow) SK 33752 37319	Trapping (10 traps)	Jul. 21-22	No crayfish recorded.	Aug. 10-11 2015	No crayfish recorded.
Mill Pond 1 (a3) (Plate. 3) SK 33811 37152	Trapping (10 traps)	Jul. 21-22	No crayfish recorded.	Aug. 10 – 11 2015	No crayfish recorded.
Mill Pond 2 (a4) (Plate. 4) SK 33872 37078	Trapping (15 traps)	Jul. 21-22	No crayfish recorded.	Aug. 10 – 11 2015	No crayfish recorded.
Middle Brook (a5) From – SK 33663 37681 To – SK 34075 37276 (Plate. 5 showing freshwater sponges**)	Standard Methodologies (hand-searching)	Jul. 23	No crayfish recorded.	Aug. 13 2015	No crayfish recorded.

Table C2: White-Clawed Crayfish 2017 Survey Results

	Little Eaton Junction					
Site Name	**Method**	**Visit 1 / Dates**	**Habitat Description**	**Survey 1 Findings**	**Visit 2 Date(s)**	**Survey 2 Findings**
River Derwent (b1) From – SK 35894 40001 To – SK 35930 39830	Trapping (x15) and Standard Methodologies (hand-searching)	25 - 26 July 2017	A short section of the River Derwent that lies beneath the A38 Abbey Hill Road Bridge	No crayfish recorded	No survey undertaken, site now negative on 3 occasions two in 2015 and one in 2017.	Not Applicable
R Watermeadows Ditch (b2) From – SK 36365 39688 To – SK 36231 39644	Trapping (x25)	24 – 25 July 2017	Two sections of trapezoidal ditch channel located upstream and downstream of railway line. Limited refugia on bed of watercourse (fine sediments) but in-channel vegetation and burrowing opportunities present.	A single female **signal crayfish** was recorded from a trap upstream of an agricultural concrete access culvert located at SK 35898 39122. The animal was mature, carapace length 53mm (Plate 1). There was no sign of damage and the animal appeared healthy.	No further surveys undertaken due to signal presence. White-clawed crayfish are likely to be absent from this stretch.	Not Applicable
Dam Brook (b3) From – SK 36805 39837 To – SK 36232 39645	Trapping (x15) and standard methodologies (hand searching)	24 – 25 July 2017	Two sections of straightened brook located upstream of the A61 Road Bridge divided by a weir located at SK 36499 40033. Banks trapezoidal with bankside reinforcement present in places in sections of channel adjacent to the A61. Fine bed sediments with deep silt and overhanging bankside vegetation also present.	Four male **signal crayfish** were recorded upstream and downstream of the A61 culvert (see Plate 2). All animals were mature with carapace lengths being 48mm, 52mm, 55mm and 59mm respectively. There was no sign of damage and all animals appeared healthy.	No further surveys were undertaken downstream of the A38 road culvert and weir.	Landowner permission was not granted to significant sections of channel upstream of the A38 road culvert therefore a second survey could not be undertaken to determine white-clawed crayfish presence/absence.

	Little Eaton Junction					
Site Name	**Method**	**Visit 1 / Dates**	**Habitat Description**	**Survey 1 Findings**	**Visit 2 Date(s)**	**Survey 2 Findings**
Boosemoor Brook (b4) From – SK 36861 39972 To – SK 36600 39966	No access permitted for survey due to dense stands of Hawthorn. Habitat is unsuitable for white-clawed crayfish and they were not found in 2015.	24 – 25 July 2017	Straightened heavily shaded and vegetated brook channel located upstream of the Dam Brook confluence	Not available	Not Available	Not Available
Bottle Brook (b5) From - SK 35946 40697 To - SK 36148 41194	Trapping (x10) and standard methodologies (hand searching and torching) downstream of railway line. Standard methodologies (hand searching) used upstream of railway line.	24 – 25 July 2017	Two sections of straightened reinforced channel located upstream and downstream of the railway line. Large boulders cobbles and building materials such as pipes bricks offering a range of in channel and bank toe refugia	No crayfish recorded	Sept. 12	No crayfish recorded.