
Report on Otter, Water Vole and White-Clawed Crayfish Surveys

Former Mondi Site
(Site 1) Holcombe Mill
Bridge Street
Ramsbottom
BL0 0BS
Ref: P.1202.19

January 2020

Rev	Date	Details
A	28/02/2020	Addition of results of water vole and otter survey on tributary within the north west of the site

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P.1202.19

**Report on
Otter, Water Vole and White-Clawed Crayfish Surveys**

Of

**Former Mondi Site, (Site 1) Holcombe Mill
Bridge Street
Ramsbottom
BL0 0BS**

For

Eccleston Homes Ltd

January 2020

Field Work by	Tosha Allen BSc (Hons) ACIEEM, Neil Everett BSc (Hons) Grad CIEEM, Nick Carter (Natural England White-Clawed Crayfish Class Licence: 2017-27965-CLS-CLS)
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P.1202.19.06 Otter, Water Vole and White-Clawed Crayfish Survey,
P.1202.19.07 Otter and Water Vole Survey 17.02.20.

Appendix 2 Photographs

Appendix 3 Survey Proformas

EXECUTIVE SUMMARY

Ascerta has been instructed by Ecclestone Homes Ltd to carry out otter, water vole and white-clawed crayfish surveys at Former Mondi Site, (Site 1) Holcombe Mill, Bridge Street, Ramsbottom, BL0 0BS.

The site was visited on 1st July 2019 by Tosha Allen BSc (Hons) ACIEEM and Liz Kenyon BSc (Hons) Qual CIEEM where a Preliminary Ecological Appraisal was undertaken. During this site visit, habitat for otter, water vole and white-clawed crayfish was identified within the watercourse within the south of the site and within the River Irwell located to the east of the site.

The site was visited on 4th October 2019 by Tosha Allen and Neil Everett BSc (Hons) Grad CIEEM when a water vole and otter survey was undertaken on the watercourse within the south of the site.

The site was then visited on 18th October 2019 by Tosha Allen and Nick Carter (Natural England White-Clawed Crayfish Class Licence: 2017-27965-CLS-CLS) where a white-clawed crayfish survey was undertaken on the stream within the south of the site and a section of the River Irwell located to the east. The River Irwell was briefly surveyed for otter and water vole during the survey visit.

The site was visited on 17th February 2020 by Tosha Allen and Liz Kenyon when a water vole and otter survey of the tributary within the north west of the site was undertaken.

Water vole, otter and white-clawed crayfish were not identified during the surveys on both water courses and are considered to be likely absent from the survey area.

Signal crayfish were identified during the survey visit on 18th October within the River Irwell.

Recommendations:

1. If works do not commence prior to March 2021 an updated water vole, otter and white-clawed crayfish survey is recommended;
2. Avoid excessive maintenance of riparian habitat to avoid impacts on bullhead within the River Irwell and other species that may use leaf litter and fallen wood as refugia;
3. Removal of invasive species (Himalayan balsam and Japanese Knotweed) along the banks of the watercourses to avoid the spread of these species to adjacent land during the proposed works;
4. Erect fencing along the western bank of the River Irwell to avoid otters from entering the development site and reduce risk of disturbance to other species such as kingfisher and dipper;
5. Ensure measures are taken to prevent run-off from the site entering the River Irwell and the tributary during construction. These measures could be detailed within a Construction Environment Management Plan and include fuel refilling areas being within a bunded location and away from the banks of the River Irwell.
6. No works to be undertaken within 10m of the watercourse to avoid impacts on kingfisher burrows and otters that may use the River Irwell opportunistically;
7. Avoid lighting to over spill on riparian habitat and watercourses; and
8. If works are to be undertaken within 8m of the River Irwell an updated water vole and otter survey is recommended.

1.0 Introduction

Ascerta has been instructed by Ecclestone Homes Ltd to carry out an otter, water vole and white-clawed crayfish surveys at Former Mondi Site, (Site 1) Holcombe Mill, Bridge Street, Ramsbottom, BL0 0BS (hereafter referred to as the site). The site OS grid reference is SD 793 616.

Our client seeks planning consent to develop 60 residential buildings, consisting of 18 apartments, 15 town houses, 8 semi-detached and 19 detached units at the site.

The site was visited on 4th October 2019 by Tosha Allen BSc (Hons) ACIEEM and Neil Everett BSc (Hons) Grad CIEEM and on the 17th February 2020 by Tosha Allen and Liz Kenyon, when an otter and water vole survey was conducted on the watercourse within the site in accordance with Chanin P (2003). *Monitoring the Otter Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough and Strachan, R., Moorhouse, T., Gelling, M. (2011). *Water Vole Conservation Handbook*, 3rd Edition. Wildlife Conservation Research Unit: Abingdon.

The site was visited on 18th October 2019 by Tosha Allen and Nick Carter (Natural England White-Clawed Crayfish Class Licence: 2017-27965-CLS-CLS) when a white-clawed crayfish survey was conducted on the River Irwell and the water course within the site in accordance with Peay S (2003). *Monitoring the White-clawed Crayfish Austropotamobius pallipes*. Conserving Natura 2000 Rivers Monitoring Series No. 1, English Nature, Peterborough. Signs of water vole and otter were also recorded during the survey conducted on the River Irwell.

2.0 Objectives

Our client's objectives are to ascertain the potential ecological constraints and opportunities of the site to inform potential future development of 60 residential buildings.

Our objectives are as follows:

- Undertake protected species surveys for otter, water vole and white-clawed crayfish within the watercourses, within the site and adjacent (River Irwell).
- Review protected species records within 2km of the site;
- Provide recommendations for further species-specific surveys and mitigation measures where current legislation requires;
- Provide recommendations that seek to enhance the ecological value of the site;
- Provide recommendations to assist our clients in achieving their objectives whilst satisfying current wildlife legislation.

3.0 Relevant Legislation

Water vole (*Arvicola amphibious*) are a Species of Principal Importance and also fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to:

- intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection;
- intentionally or recklessly disturb water voles whilst occupying a structure or place used for that purpose;
- intentionally kill, injure or take water voles;
- possess or control live or dead water voles or derivatives;
- sell water voles or offer or expose for sale or transport for sale; and
- publish or cause to be published any advertisement which conveys the buying or selling of water voles.

Otter (*Lutra Lutra*) are similarly protected under the Wildlife and Countryside Act, 1981 (as amended) and have additional protection as a European Species under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

White-clawed crayfish (*Austropotamobius pallipes*) are similarly protected under the Schedule 5 of the Wildlife and Countryside Act, 1981 (as amended). They are also a species of Principal Importance. A Natural England Protected Species Class Licence is required in order to survey areas where these species are suspected to be present.

4.0 Survey Methods

4.1 Desk Study

A review of the designated sites and habitats within 2km of the site has been undertaken using the Multi-Agency Geographic Information for the Countryside (MAGIC) and the Natural England websites.

A review of UK and Local priority species and habitats known to occur in the region of the site has been undertaken; using the Joint Nature Conservation Committee website and local records from Greater Manchester Ecology Unit (Appendix 3).

A full desk study has been undertaken and reported within the *P.1202.19 Ascerta Preliminary Ecological Appraisal, Former Mondi Site, Holcombe Mill, Bridge Street, Ramsbottom BLO OBS, August '19 Report*. Only records of otter, water vole and white-clawed crayfish are reviewed within this report.

4.2 Otter and Water Vole Survey Methods

The water courses within the site were assessed for use by otter and water vole following methods outlined in Chanin P (2003). *Monitoring the Otter Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough and Strachan, R., Moorhouse, T., Gelling, M. (2011). *Water Vole Conservation Handbook*, 3rd Edition. Wildlife Conservation Research Unit: Abingdon.

Signs of otter use including prints, spraints, couches or holts were searched for from the banks. Signs of water vole use, including latrines, footprints, feeding remains, runs and burrows were searched for along the banks of the watercourses.

4.3 White-clawed crayfish survey methods

The watercourses within the site were assessed for the use by white-clawed crayfish following methods outlined in Peay S (2003). *Monitoring the White-clawed Crayfish Austropotamobius pallipes*. Conserving Natura 2000 Rivers Monitoring Series No. 1, English Nature, Peterborough. The Manual Search (standard Method) was used within the River Irwell.

Five sample patches were surveyed along a 350m stretch of the River Irwell located to the east of the site. The survey area stretched from OS grid reference SD 79485 16496 to SD 79448 16809.

4.4 Evaluation

Habitats and species on the site were evaluated following the '*Guidelines for Ecological Impact Assessment in the UK and Ireland*' 2018. A geographical frame of reference is assigned to each habitat and species, with International Value being most important, then National, Regional, County, District, Local and lastly, within the immediate Zone of Influence (Zoi) of the proposals only.

Value judgements are based on characteristics that can be used to identify ecological resources or features likely to be important in terms of biodiversity. These include site designations such as SSSIs. For undesignated features, the size, conservation status (locally, nationally or internationally), and the quality of the ecological resource are considered. Ecological resource quality can refer to habitats (for instance if they are particularly diverse, or a good example of a specific habitat type), other features (such as wildlife corridors or mosaics of habitats) or species populations or assemblages.

4.5 Limitations

The white-clawed crayfish survey was undertaken in October within the sub-optimal period for this type of survey. The survey was undertaken within suitable weather conditions and flow therefore, it is not considered a limitation within the conclusions of this report.

The western bank of the River Irwell was surveyed briefly for signs of water vole and otter during the white-clawed crayfish survey undertaken on 18th October 2019. The eastern bank was not surveyed due to access restrictions and health and safety concerns due to the water level and fast flow of the water within the section of the River Irwell surveyed. However, the eastern bank lies outside the development area and will not be impacted by the proposals. This limitation in survey effort is taken into consideration within the conclusions of this report.

A section of the tributary located upstream, within the north of the site, was not surveyed in October 2020 due to a 60m health and safety buffer that was in place at the time of survey located around the unsafe chimney structure. However, this section was covered in February 2020. This is not considered a limit to the report conclusion. .

5.0 Survey Results

5.1 Desk Study

No records have been returned for water vole or white-clawed crayfish within 2km of the site boundary. One record of European otter was returned within 2km of the site. The otter was recorded within the River Irwell south of the site.

5.2 River Irwell description

A 350m section of the River Irwell was surveyed for the presence / possible absence of otter, water vole and white-clawed crayfish. The section of the river surveyed is located east of the site and south of Peel Brow. The stretch of river surveyed is bound by the site (derelict mill) and cricket ground to the west and woodland to the east. A weir and road bridge is located north of the stretch surveyed. The water levels within this section of the River Irwell were high and fast flowing in the weeks prior to the survey being undertaken on 18th October 2019. The survey was undertaken when the water levels dropped following high water levels. Riffles, pools and runs were present within the stretch surveyed. The earth banks in place were undercut providing refuge for fish and other species such as crayfish. The earth banks were steep, vertical and slightly sloped in places. The depth of water varied throughout the length from <0.5m-1.5m. The width of the channel also varied along the length between 18-24m. The banks sides were dominated by broadleaved trees with Himalayan balsam and Japanese knotweed abundant. Tall herbs and grasses were also frequent along the banks. Photographs of the stretch of river surveyed are displayed in Photographs 4-8 within Appendix 2 and is displayed on plan 1202.19.06 in Appendix 1.

5.3 Tributary (southern section) description

The tributary which is located within the south of the site was surveyed for the presence / likely absence of otter, water vole and white-clawed crayfish. The section of tributary surveyed is approximately 180m in length and 1-1.5m wide. The water level within the watercourse varies along the length between 10cm-40cm. The water at the time of survey was fast flowing in places with slow flow occasionally along the length. Slack areas were present within the fast-flowing sections. The sediment is made up of sand, silt and stones. The tributary is located within a semi-natural broadleaved woodland with a shallow earth bank along the west and a steep earth bank along the east of the watercourse. Dense Himalayan balsam and Japanese knotweed was present along the banks and within the woodland. The watercourse and immediate surrounding habitat are dominated by bankside trees, submerged weeds are abundant and short grass is rare. Photographs of the tributary surveys are displayed in Photographs 9 and 10 within Appendix 2 and is displayed on plans P.1202.19.05 and P.1202.19.06 in Appendix 1.

5.4 Tributary (north section) description

The tributary which is located within the north west of the site was surveyed for the presence/likely absence of otter and water vole. The section of the tributary surveyed is approximately 60m in length and 10m wide. The water levels within this section of the water course was approximately 1m deep. The bank height is approximately 2m in height and are steep and vertical in places. The banks have been maintained in the past and have been left to vegetate in previous years. The banks are stone and earth and a small section reinforced with wood which is in poor condition. This section of the tributary lies adjacent to the former mill buildings within the site. Rubbish and pollution is evident within the water course. The disturbance of this watercourse is low as it is located within a fence area with no access to the public. Broadleaved scattered trees and willow scrub is present along the banks with tall grasses and herbs also present. Reeds were also present along the margins of the watercourse. Photographs of the tributary surveys are displayed in Photographs 11 and 12 within Appendix 2 and is displayed on plan P.1202.19.07 within Appendix 1.

5.5 Otter and Water Vole Survey

The watercourse within the south of the site was surveyed for the presence / potential absence of otter and water vole. No signs of otter or water vole was identified along the section of watercourse surveyed. A signal crayfish claw was identified on the bank of the watercourse south of the site during the water vole and otter survey. It is considered that the crayfish was likely predated by mink (*Neovison vison*), a scat of which was found along the River Irwell.

The River Irwell was briefly assessed for water vole and otter during the white-clawed crayfish survey. No evidence of otter or water vole was identified within the section of the river during the survey. The water level was high and fast flowing the week prior to the survey and therefore any water vole present would have likely moved out of the area and it is considered that water vole have not re-colonised the river in the interim.

A mink scat was observed under the bridge in the northern sector of the River Irwell (TN3). Mink are non-native species and can outcompete water vole, forcing them to disperse to areas where mink are not present.

5.6 White-clawed Crayfish Survey

No evidence of white-clawed crayfish was observed during the survey on the water course south of the site and within the section of the River Irwell along the east of the site. Signal crayfish *Pacifastacus leniusculus* were observed within Patches 1, 2, 3 and 4 of the River Irwell (Photographs 1 and 2, plan P.1202.19.06 in Appendix 1 for locations of survey Patches). Signal crayfish are non-native invasive species and negatively influence white-clawed crayfish populations. A signal crayfish claw was identified along the bank of the watercourse within the south of the site during the water vole and otter survey undertaken on 4th October 2019 (TN1). A cage which contained fish was deployed between 12:00 and 16:00 hours within the watercourse where the signal crayfish claw was identified on the previous survey visit (TN2). This did not attract crayfish and therefore, it is considered that crayfish are not present within this section of the watercourse at the time of the survey.

Stickleback *Gasterosteidae*, minnow *Phoxinus phoxinus* and bullhead *Cottus gobio* (Photograph 3) were also caught in the net during the survey. These species were present within Patches 1, 2, 3 and 5 within the River Irwell.

The survey proforma for the white-clawed crayfish survey is displayed within Appendix 3.

6.0 Evaluation & Recommendations

6.1 Otter and Water Vole

Evidence of water vole and otter were not recorded during the surveys on the watercourse south of the site and the River Irwell to the east. The high-water level and fast flow within the weeks leading up to the survey may have caused any water vole that may have been present, to move on to habitats upstream or downstream. The water level had dropped at the time of survey however, due to the high-water level and fast flow in the weeks leading up to the survey, water voles are unlikely to have re-colonised the section of water course surveyed. In addition, a mink scat was observed under the bridge in the northern sector of the River Irwell and mink can displace water voles.

Mammal paths within the surrounding woodland, slides into the tributary along the eastern and western banks were identified. Scats, footprints or burrows were not identified during the water vole and otter survey undertaken on 4th October 2019.

The tributary within the north west of the site that was previously located within the 60m buffer zone was surveyed once the water levels had dropped following high water levels in previous weeks. The flow within this section of the tributary was still. No evidence of water vole or otter were identified within this section of the tributary.

6.2 Crayfish

No evidence of white-clawed crayfish was recorded during the survey within the tributary south of the site and within the River Irwell. A signal crayfish claw was identified along the bank of the tributary. Signal crayfish were also observed within the River Irwell. The section of River Irwell watercourse surveyed for crayfish was not suitable for white-clawed crayfish due to the abundance of signal crayfish within the watercourse.

Due to the presence of signal crayfish in the area, and as no white-clawed crayfish were caught in the trap deployed within the Tributary, it is highly unlikely that white-clawed crayfish are present in the short section of Tributary that lay upstream of the Trap (TN2) where access was not possible at the time of survey.

6.3 Other species

A mink scat was identified on a boulder under the bridge north of the section along the River Irwell.

Stickleback, minnow and bullhead were also identified within the River Irwell during the survey undertaken on 18th October 2019. Signal crayfish affect the densities of bullhead populations within a catchment due to competition for food and shelter. Excessive management of riparian habitats is likely to be detrimental to bullhead abundance as they use encroaching roots, leaf litter and fallen wood debris as refugia within the watercourse (M., Tomlinson & M., Perrow 2003). The current proposals of the site will not drain into the River Irwell and works are not proposed within 10m of the watercourse. Run off from the site during works could cause an increase in pollutants within the watercourse and therefore is likely to negatively influence the watercourse and fish species present. Measures would need to be taken during construction to ensure run-off from the site does not enter the River Irwell.

Kingfisher and dipper were identified along the River Irwell during the survey undertaken on 18th October 2019. As works will not occur within 10m of the watercourse and the banks will not be affected it is likely that kingfish burrows will not be impacted by the proposals and therefore, require no further consideration within this planning application.

6.4 Enhancements

In order to meet requirements for biodiversity protection and enhancement outlined within the NPPF, it is recommended that ecological enhancements are included. These could include:

1. Suitable landscaping incorporating species that provide a food or shelter resource to wildlife to include hawthorn, honeysuckle and holly as hedgerow species and silver birch, crab apple, rowan and bird cherry as tree species.

7.0 Conclusions

It is considered that white clawed crayfish are not present in the sections of flowing water surveyed and that otter and water vole are not currently using habitats on the site. As such, there would be very limited impact on the local ecology as a result of the proposals, provided the recommendations detailed above are followed. In summary these include:

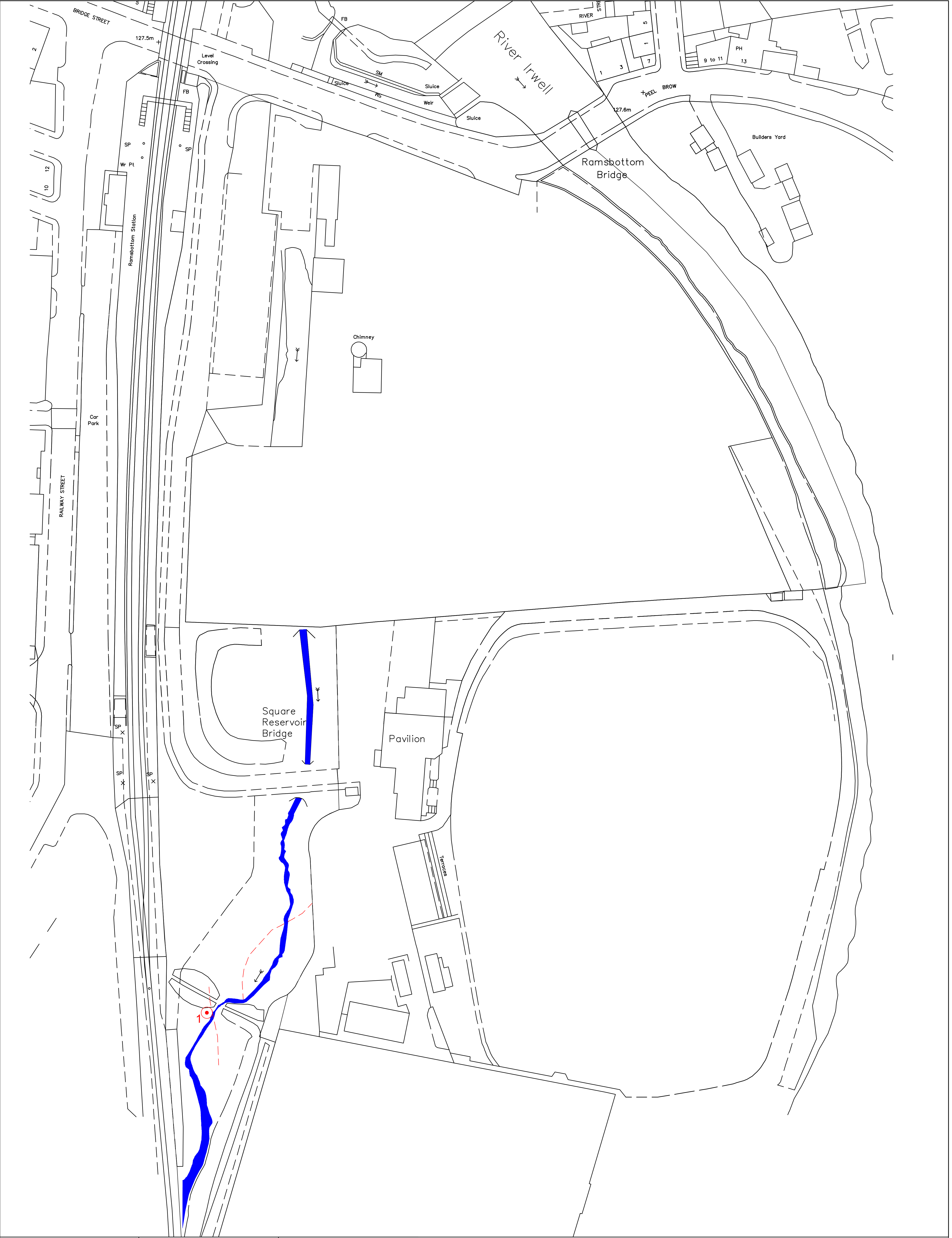
1. If works do not commence prior to March 2021 an updated water vole, otter and white-clawed crayfish survey is recommended;
2. Avoid excessive maintenance of riparian habitat to avoid impacts on bullhead within the River Irwell and other species that may use leaf litter and fallen wood as refugia;
3. Removal of invasive species (Himalayan balsam and Japanese Knotweed) along the banks of the watercourses to avoid the spread of these species to adjacent land during the proposed works;
4. Erect fencing along the western bank of the River Irwell to avoid otters from entering the development site and reduce risk of disturbance to other species such as kingfisher and dipper;
5. Ensure measures are taken to prevent run-off from the site entering the River Irwell and the tributary during construction. These measures could be detailed within a Construction Environment Management Plan and include fuel refilling areas being within a bunded location and away from the banks of the River Irwell.
6. No works to be undertaken within 10m of the watercourse to avoid impacts on kingfisher burrows and otters that may use the River Irwell opportunistically;
7. Avoid lighting to over spill on riparian habitat and watercourses; and
8. If works are to be undertaken within 8m of the River Irwell an updated water vole and otter survey is recommended.

The above recommendations, if fully implemented, will enable the proposals to meet the requirements of national and local guidance and legislation including the NPPF and Policy EN6 of the Bury Council Unitary Development Plan (UDP).

8.0 References

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- Tomlinson ML & Perrow MR (2003). *Ecology of the Bullhead*. *Conserving Natura 2000 Rivers Ecology Series No. 4*. English Nature, Peterborough.

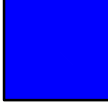
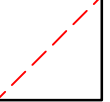
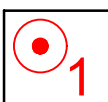
Appendix 1



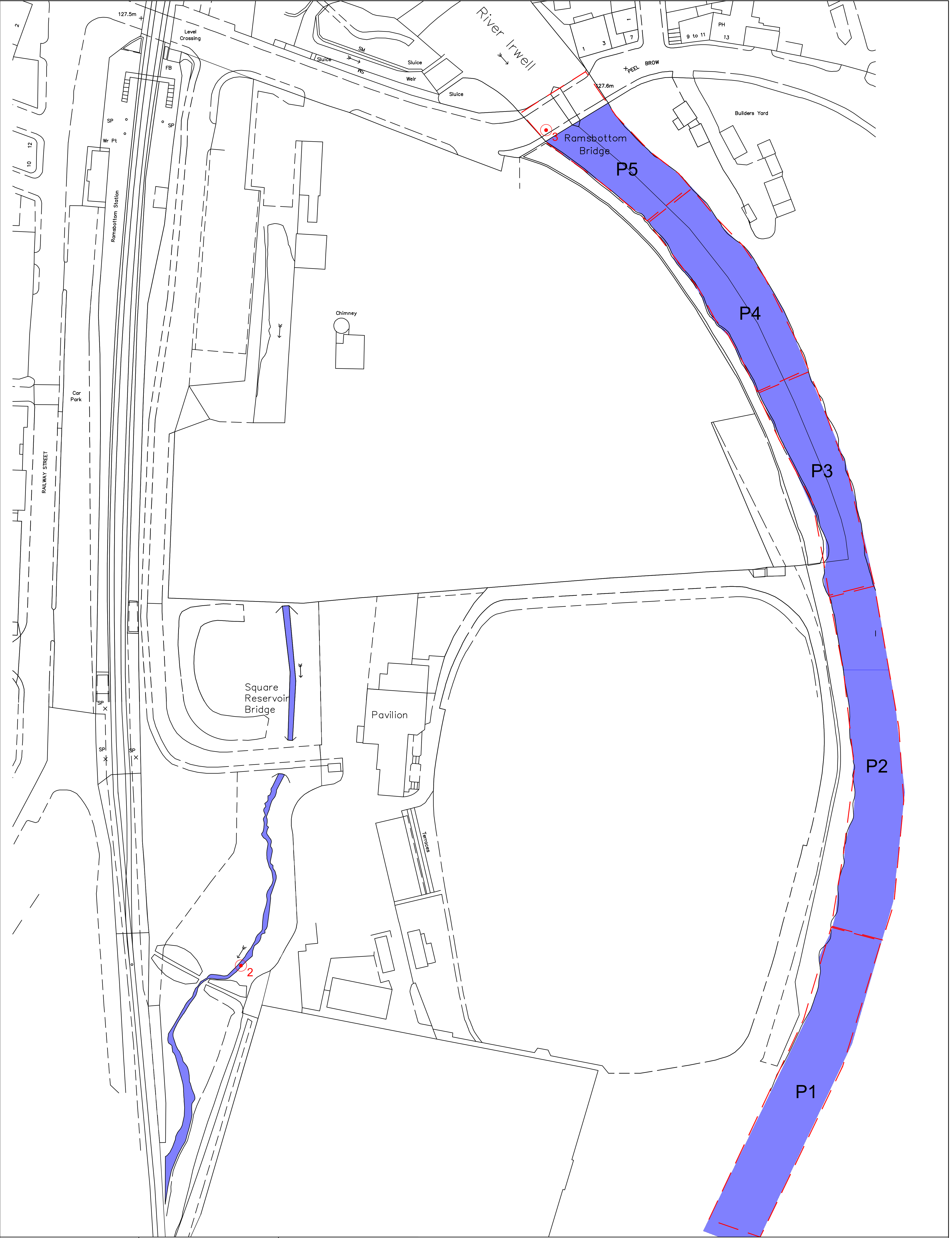
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CLIENT: Eccleston Homes Ltd			
PROJECT: Former Mondri Site, (Site 1) Holcombe Mill, Bridge Street, Ramsbottom			
DRAWING TITLE: Otter and Watervole Survey			
SCALE: 1:500 @A1	DRAWN BY: CP	DRAWING No: P.1202.19.05	REV: -
DATE: 04/10/2019	CHKD BY: TA		

KEY	
	Section of watercourse surveyed
	Mammal path
	Signal crayfish claw

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CLIENT: Eccleston Homes Ltd			
PROJECT: Former Mondri Site, (Site 1) Holcombe Mill, Bridge Street, Ramsbottom			
DRAWING TITLE: Otter, Watervole and White-clawed Crayfish Survey			
SCALE: 1:500 @A1	DRAWN BY: CP	DRAWING NO: P.1202.19.06	REV: -
DATE: 18/10/2019	CHKD BY: TA		

KEY

Section of watercourse surveyed

P1

Survey patches

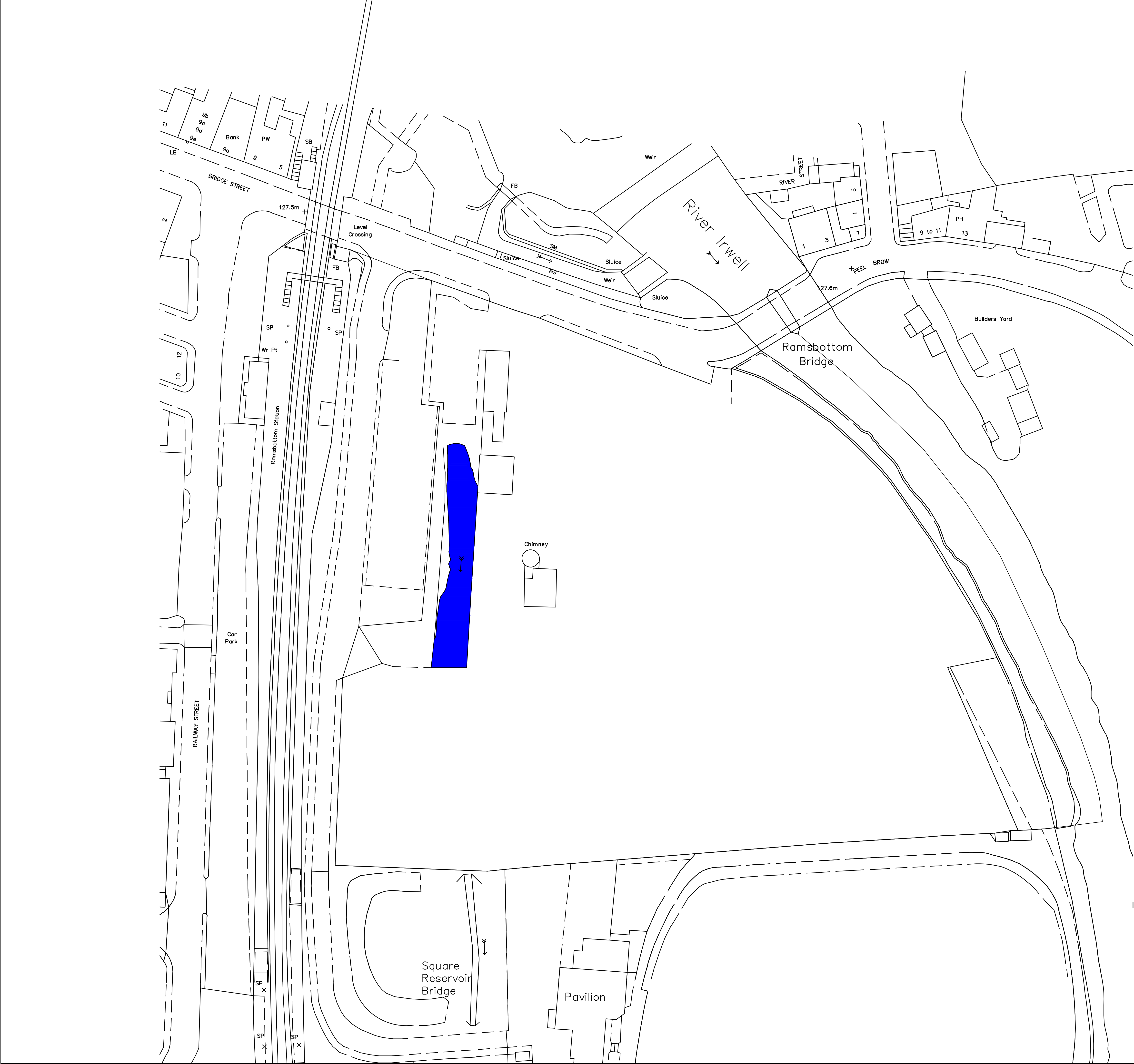
2 - Bait deployed

3 - Mink scat

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S:\All Jobs\1202.19 Former Mondri Site, (Site 1) Holcombe Mill, Bridge Street, Ramsbottom, BL0 OBS\Drawings\1202.19.05-06-07 Otter, white-clawed crayfish and watervole survey

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KEY

Section of watercourse surveyed

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CLIENT:
Eccleston Homes Ltd

PROJECT:
Former Mondri Site, (Site 1) Holcombe Mill,
Bridge Street, Ramsbottom

DRAWING TITLE:
Otter and Watervole Survey

SCALE: 1:500 @A1	DRAWN BY: CP	DRAWING No:	REV:
DATE: 17/02/2020	CHKD BY: TA	P.1202.19.07	-

Appendix 2

Photographs



Photograph 1: Adult signal crayfish identified within the River Irwell, October 2019.



Photograph 2: Juvenile signal crayfish identified within the River Irwell, October 2019.



Photograph 3: Bullhead identified within the River Irwell, October 2019.



Photograph 4: Survey Patch 1 of the River Irwell, October 2019.



Photograph 5: Survey Patch 5 of the River Irwell, October 2019.



Photograph 6: Survey Patch 4 of the River Irwell (eastern bank), October 2019.



Photograph 7: Under the bridge north of survey Patch 5 of the River Irwell, October 2019.



Photograph 8: Weir north of survey Patch 5 of the River Irwell, October 2019.



Photograph 9: The River Irwell Tributary within the south of the site, October 2019.



Photograph 10: The River Irwell Tributary within the south of the site, October 2019.



Photograph 11: The River Irwell Tributary within the north west of the site, February 2020



Photograph 12: The River Irwell Tributary within the north west of the site, February 2020

Appendix 3

Catchment	River			River		River Irwell			
Surveyor(s)	Nick Carter and Tosha Allen			Date		18/10/2019			
Weather Conditions (Description)	Overcast	Wind (Beaufort Scale)	2	Air Temperature (°C)	12	Rain	Dry- Light	Cloud Cover (8/8)	8/8
Easting (X) at start of survey	379485			Northing (Y) at start of survey		416496			
Easting (X) at end of survey	379448			Northing (Y) at end of survey		416809			
Weather	1. Good								
Flow	3. Falling								
Water Temperature (°C)	12								
Clarity	2. Moderate								
Start Time (24 Hours)	12:45			Finish Time (24 Hours)			15:15		
Site Length (m)	350			Width (m)			18-24		
Description (Channel features, land use)	Disused mill site to the west and woodland to the east. Riffles, pools and rapid flow were present. The river has a silt bed with cobbles, boulders and urban debris present.								
Sample	Patch 1 - F001	Patch 2 - F002	Patch 3 - F003			Patch 4 - F004	Patch 5 - F005		
Sample Easting (X)	379485	379517	379513			379492	379448		
Sample Northing (Y)	416496	416575	416686			416760	416809		
Survey Method (1 = Std; 2 = quadrat; 3 = net/kick; 4 = trap; 5 = view; 6 = other)	1	1	1			1	1		
Details (if not standard)									
Extent (length x width patch)									
Channel (1 = margins; 2 = mid; 3 = both; other - state)	3	3	2			3	3		
Depth (m)	0.5-1	0.5-1	<0.5			<0.5	<0.5		
Feature(1 = marg. D'water; 2 = pool; 3 = glide; 4 = run; 5 = riffle; 6 = rapid)	4	2, 4	4			5	5		
Refuges in channel (tick all present in patch)									
Cobble (6.5cm - 15cm)	X	X	X			X	X		
Cobble (15 - 25.6cm)									
Boulder (25.6-40cm)	X	X	X			X	X		
Boulder (>40cm)	X	X	X			X	X		
Rubble (give size)									
Woody debris									
Other urban debris	X	X	X			X	X		
Tree roots, fine									
Moss									
Filamentous algae									
Other submerged vegetation									
Emergents									
Main Substrate Beneath									
Bedrock									
Cobble (6.5 -15cm)									
Pebble (>6.5cm)									
Gravel (<1.6cm)	X	X	X						
Sand (>2mm)									
Clay									
Silt	X	X	X			X	X		
Siltation									
None									
Low									
Moderate	X	X	X			X	X		
High									
Refuges in bank	X		X						
Cobble/Boulder	X	X	X			X			

Tree roots, large					
Vertical or undercut bank		X	X		
Dry stone wall					
Other reinforced					
Crayfish burrows					
Shading Above (% patch)					
Crayfish No. and species from 10 refuges	2 Signal	5 Signal	1 Signal	1 Signal	0
Search time (mins)	30	30	30	30	30
Bullhead present ? (Yes, No, Unknown)	Yes	Yes	Yes	Yes	Yes
	Score	Notes (survey conditions, patches etc)			
Evaluation of alien crayfish habitat for whole site (0-= None; 1 = present but localised or sparse; 2 = Frequent (more than a third of site or frequent but in small patches; 3 = Abundant)	3 = Abundant	Suitable habitat and refugia for alien crayfish were present within patches 1-4. There was lack of refugia within the northern section of the section surveyed (patch 5) due to silt bed.			
Evaluation of white-clawed crayfish habitat for whole site (0-= None; 1 = present but localised or sparse; 2 = Frequent (more than a third of site or frequent but in small patches; 3 = Abundant)	1 = Present but localised or sparse				
Survey ability (0 = Can't access for manual survey or fewer than 10 searchable refuges; 1 = Difficult finding sufficient patches, 2 or more considered only moderate or poor potential; or searched more than 2/3rds of accessible; 2 = Likely 1 to 5 more patches worth surveying, could extend beyond surveyed patches; 3 = Could survey at least 5 or more patches similar/equivalent.	3				
Problems (pollution = 1; erosion = 2 E if >33% affected), aliens = 3)	3	Signal crayfish were present within patches 1-4.			
Total Crayfish (by 1 method, note totals by other methods in notes if applicable)	0	White-clawed crayfish were not identified during the survey.			

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Wind (Beaufort Scale)	F1	Air Temperature (°C)	12	Rain	Dry-Light	Cloud Cover	8/8		Weather Conditions (Description)	Overcast	
Species	Sex	CL (mm)	Damage	Disease	Breeding	Moulting	Catch Method	Easting (X)	Northing (Y)	Patch Number	
Signal crayfish	N/A		No	No	Juvenile	No	Hand-netting	379485	416496	Patch 1	
Signal crayfish	Female	25	No	No	Juvenile	No	Hand-netting	379485	416496	Patch 1	
Signal crayfish	N/A		No	No	Juvenile	No	Hand-netting	379517	416575	Patch 2	
Signal crayfish	N/A		No	No	Juvenile	No	Hand-netting	379517	416575	Patch 2	
Signal crayfish	N/A		No	No	Juvenile	No	Hand-netting	379517	416575	Patch 2	
Signal crayfish	N/A		No	No	Juvenile	No	Hand-netting	379517	416575	Patch 2	
Signal crayfish	Female	27	No	No	Adult	No	Hand-netting	379517	416575	Patch 2	
Signal crayfish	Male	32	No	No	Adult	No	Hand-netting	379513	416686	Patch 3	
Signal crayfish	Male	27	No	No	Adult	No	Hand-netting	379492	416760	Patch 4	