In Parliament – Session 2021 - 2022

HS2

High Speed Rail (Crewe – Manchester)

Background information and data

Ecology and biodiversity

BID EC-010-00001

Ecological baseline data - otter and water vole

M123

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Department for Transport

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1 Introduction

1.1.1 This report presents a summary of the baseline data relating to:

- otter (*Lutra lutra*); and
- water vole (*Arvicola amphibius*).

1.1.2 Baseline data have been collected for the Proposed Scheme in relation to the following community areas (CA):

- Hough to Walley's Green (MA01);
- Wimboldsley to Lostock Gralam (MA02);
- Pickmere to Agden and Hulseheath (MA03);
- Broomedge to Glazebrook (MA04);
- Risley to Bamfurlong (MA05);
- Hulseheath to Manchester Airport (MA06);
- Davenport Green to Ardwick (MA07); and
- Manchester Piccadilly Station (MA08).

1.1.3 This report should be read in conjunction with the Background Information and Data (BID) Ecology and Biodiversity Map Book (Map Series EC-11 and EC-12).

1.1.4 The Environmental Statement[1] should be referred to for details of the ecology impact assessment.

[1] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement*. Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement.

2 Otter

2.1 Methodology

2.1.1 Details of the standard methodology utilised for otter surveys are provided in Technical Note – Ecology and biodiversity – Ecological Field Survey Methods and Standards (FSMS) included in the Environment Impact Assessment Scope and Methodology Report (SMR) (see Environmental Statement, Volume 5, Appendix CT-001-00001)[2].

2.1.2 Desk study records relating to otters within 5km of the land required for construction of the Proposed Scheme were obtained from the following sources:

- Canal & River Trust;
- Environment Agency Otter Surveys 1977–2010;
- Greater Manchester Ecology Unit[3];
- Greater Manchester Biodiversity Action Plan[4];
- Highways England;
- rECOrd[5], Local Biological Records Centre for the Cheshire Region;
- Merseyside Biobank Local Biological Record[6]; and
- Staffordshire Biological Record[7].

2.1.3 In addition to the standard field signs stated in the FSMS, lying up sites were also recorded during surveys. These were defined as cavities in river banks which are less than 1m deep and thus cannot be recorded as holts but may be used by otter for resting or sheltering. Lying up sites have only been recorded where sprainting was also recorded in near proximity to the site.

2.1.4 Otters can use a wide variety of habitats to move through the landscape including large and small rivers and their tributaries and other water bodies, including wet ditches and ponds. Terrestrial habitat features in near proximity to water, such as woodlands, hedgerows and dry ditches may also be used. For each water body/watercourse scoped in following initial

[2] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Environmental Impact Assessment Scope and Methodology Report,* Volume 5, Appendix CT-001-00001. Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement. [3] Manchester Biological Record, *The Ecological Database for Manchester and Greater Manchester*. Available online at: https://www.gmwildlife.org.uk/.

[4] Greater Manchester Biodiversity Action Plan (2009). Available online at: https://www.gmwildlife.org.uk/projects/gm_bap/.

[5] rECOrd, *Local Biological Records Centre serving Cheshire*. Available online at: http://www.record-lrc.co.uk/. [6] Merseyside BioBank Local Biological Record Centre (2021), the environmental information service, for North Merseyside. Available online at: https://activenaturalist.org.uk/mbb/.

[7] Staffordshire Ecological Record (2015), *Staffordshire Ecology Record*. Available online at: http://www.staffs-ecology.org.uk/html2015/index.php?title=Main_Page.

Phase 1 Habitat Survey, a habitat suitability appraisal was carried out. A precautionary approach was taken for these surveys, and the majority of habitats were scoped in for detailed survey following the initial habitat suitability appraisal and detailed surveys were carried out at the same time.

2.1.5 Table 1 summarises those sites that were scoped in for a detailed transect survey. This information is cross referenced to the accompanying Ecology and Biodiversity Map Book, Map Series: EC-011. The level of access to each transect has been defined using the following categories: none, low (less than 50%), moderate (51-75%), high (>75% but less than 100%) and full.

2.1.6 Assessment of terrestrial otter breeding habitat was undertaken using the method adapted by Chanin from Liles (2003)[8]. Potential terrestrial breeding habitat must meet the following criteria:

- any single area of extensive concealing habitat such as woodland, scrub, and reedbed, which is greater than 1ha in area and within 100m of a watercourse;
- any combination of extensive concealing habitats which are within 100m of one another, total at least 1ha and are within 100m of a watercourse; and
- a range of other criteria including quality of food supply and cover were also assessed.

2.1.7 Only poor-quality habitats where there was little vegetative cover, poor food resources and/or poor connectivity were scoped out. Where watercourses or water bodies were scoped out for detailed survey, relevant information is provided to explain the rationale for this in the baseline description for each CA, see Section 2.3.

[8] Liles G. (2003), *Otter Breeding Sites. Conservation and Management. Conserving Natura 2000 Rivers Conservation Techniques* Series No. 5, English Nature, Peterborough.

Table 1: Sites scoped in for otter survey

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
Gresty Brook	River	SJ71095367 to SJ72485376	None	AT08_S001-S003	N/A	MA01	Within
Shropshire Union Canal (Middlewich Branch)	Canal	SJ68246522 to SJ69284574 and SJ68246522 to SJ67886206	Full	AT05_S001, AT05_S003	21 June 2018 19 September 2018 16 January 2019 13 February 2019 24 April 2019 11 June 2019 16 October 2019	MA02	Within
Tributary of the River Weaver 2	River	SJ68736183 to SJ67826249, SJ67906242 to SJ68006244 and SJ68296220 to SJ68216218	None	AT05_S002, AT05_S004, AT05_S005	N/A	MA02	Within
The Dingle	River	SJ67976306 to SJ68096301	None	AT03_S001	N/A	MA02	Within
River Dane and Tributaries 3 and 4	River	SJ68606795 to SJ68116886, SJ68456821 to SJ68666814, SJ69006752 to SJ68606795 and SJ68506740 to SJ68806755	Full	AT06_S004, AT06_S005, AT06_S006, AT06_S007	19 June 2018 20 June 2018 3 October 2018 19 June 2018 20 June 2018 26 September 2018 3 October 2018 3 July 2019 5 September 2019 25 September 2019 16 October 2019	MA02	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
Trent and Mersey Canal and unnamed tributary	Canal/ Stream	SJ68596857 to SJ68026952, SJ68816893 to SJ68056935, SJ68956763 to SJ68656842 and SJ68067033 SJ68277128	Full	AT06_S001, AT06_S002, AT06_S003, AT07_S001	20 June 2018 26 September 2018 23 January 2019 16 May 2019 3 July 2019	MA02	Within
Puddinglake Brook	River	SJ68686990 to SJ68037039	Full	AT07_S002	22 June 2018 27 September 2018 22 January 2019 15 May 2019	MA02	Within
Gad Brook and Tributary 3	River	SJ68987175 to SJ68327198 and SJ69087143 to SJ68617191	Full	BT13_S001, BT13_S002	11 July 2018 2 October 2018 13 February 2019 14 February 2019 25 May 2019 4 September 2019 5 November 2019	MA02	Within
Wade Brook	River	SJ70487336 to SJ68527434	None	BT11_S001	N/A	MA02	Within
Peover Eye and unnamed tributary	River	SJ70677561 to SJ70067578 and SJ70447525 and SJ70107571	Full	BT10_S003, BT10_S004	16 October 2018 17 October 2018 18 October 2018 19 February 2019 27 February 2019 30 April 2019 14 June 2019 19 September 2019 22 October 2019	MA02	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
Wincham Brook	River	SJ70307599 to SJ69937578	Full	BT10_S006	30 April 2019 14 June 2019 7 August 2019 22 October 2019	MA02	Within
Smoker Brook and Tributaries 1 and 2	River	SJ71147638 to SJ71147638, SJ70307599 to SJ70887615 and SJ70307599 to SJ70037633	Moderate	BT10_S001, BT10_S002, BT10_S005	17 October 2018 19 February 2019 27 February 2019 30 April 2019 14 June 2019 7 August 2019 19 September 2019 22 October 2019 12 August 2020 26 November 2020	MA03	Within
Waterless/Arley Brook and Tributary 3	Stream	SJ71037825 to SJ70327914, SJ70187860 to SJ70497879, SJ70137890 to SJ70007896 and SJ70327914 to SJ69467935	Full	BT09_S001, BT09_S002, BT09_S004, BT09_S005	25 April 2019 1 August 2019 15 October 2019 4 August 2020	MA03	Within
Tabley Brook and Tributaries 2-8	Stream	SJ70367893 to SJ69987884, SJ70827861 to SJ71167906 and SJ70617979 to SJ71257973	Moderate	BT09_S003, BT09_S006 BT08_S001-S009	1 August 2018 8 August 2018 9 August 2018 3 January 2019 25 April 2019 5 June 2019 18 July 2019	MA03	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
					12 September 2019 8 October 2019 15 October 2019 20 October 2020		
Millington Clough and Tributaries 1 and 2	River	SJ71438347 to SJ72638430, SJ71878456 to SJ72308414, SJ71598389 to SJ72118423, SJ71548421 to SJ71898399, SJ71148454 to SJ71448430, SJ72338364 to SJ72188402 and SJ72258391	High	BT07_S002–S008	16 October 2018 5 February 2019 28 February 2019 24 April 2019 17 July 2019 12 September 2019 8 October 2019 20 October 2020 15 December 2020	MA03	Within
Agden Brook	River	SJ72718419 to SJ72528464	Full	BT07_S001, BT01_S002	17 July 2018 11 October 2018 5 February 2019 17 July 2019 26 July 2019 12 September 2019 18 September 2019 15 December 2020	MA03	Within
Bridgewater Canal	Canal	SJ70998712 to SJ72048660	Full	BT01_S001	25 April 2019 26 July 2019 18 September 2019 15 October 2019	MA03	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
River Bollin - north	River	SJ71678805 to SJ70398862	Full	DT11_S001	13 June 2018 27 September 2018 9 October 2018 24 April 2019	MA04	Within
Red Brook	River	SJ70609076 to SJ69979084	Moderate	DT09_S003	19 June 2018 30 August 2018 27 March 2019 21 August 2019	MA04	Within
Manchester Ship Canal	Canal	SJ70339118 to SJ69879069	Full	DT09_S001	19 June 2018 30 August 2018 4 January 2019 27 March 2019	MA05	Within
Glaze Brook	River	SJ70239111 to SJ70209157	Full	DT09_S002	27 March 2018 19 June 2018 30 August 2018 4 January 2019	MA05	Within
Holcroft Lane Brook	River	SJ66079427 to SJ670759442, SJ66599423 to SJ65829398, SJ65839398 to SJ66099396, SJ65649392 to SJ65639391, SJ65839397 to SJ65659370, SJ65879382 to SJ65689368, SJ66629453 to SJ66929337, SJ6699390 to SJ67219333, SJ66789415 to SJ66709364, SJ66879355 to SJ66709358, SJ66869355 to SJ66859339	Low	DT15_S001-S012	8 December 2020	MA05	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
		and SJ66859352 to SJ66779351					
Small Brook	River	SJ63249820 to SJ62719781	Full	DT13_S001-S004	10 December 2020	MA05	Within
Hey Brook and Tributaries 1-4	River	SJ60117990 to SJ60379996, SJ60399997 to SD60580007, SD60580007 to SD6070009, SD60670009 to SD60810008, SD60820010 to SD61190008, SJ61329891 to SJ62319942, SJ61639901 to SJ61709882, SJ61859853 to SJ61879907, SJ62349875 to SJ61949865, SJ62589934 to SJ62049841 and SJ62349857 to SJ62499837	Moderate	DT03_S001–S005, DT14_S001-S006	14 June 2018 29 August 2018 15 January 2019 23 April 2019 1 October 2020 10 December 2020	MA05	Within
Nan Holes Brook	River	SD61190012 to SD61190012	Low	DT03_S006-S011	14 June 2018 29 August 2018 15 January 2019 26 March 2019 8 September 2020	MA05	Within
Coffin Lane Brook and Tributaries 1 and 2	River	SD59830103 to SD60560093, SD60380102 to SD60330128, SD59830109 to SD601800612 and SD60170072 to SD59890079	None	DT12_S001-S004	9 December 2020	MA05	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
Leeds and Liverpool Canal Leigh Branch	Canal	SD59580225 to SD60120195	Full	DT01_S001	26 June 2018 25 September 2018 17 December 2018 26 March 2019	MA05	Within
Sugar Brook	River	SJ77778252 to SJ77778252 and SJ78258206 to SJ78638203	Moderate	BT20_S001, BT20_S003	16 July 2019 17 September 2019	MA06	Within
Mobberley Brook	River	SJ76868295 to SJ76618359	None	BT23_S001	N/A	MA06	Within
Birkin Brook and Tributaries 4-8	River	SJ77998328 to SJ76938375, SJ78268371 to SJ77338356, SJ77678367 to SJ77528378, SJ77488375 to SJ77838405, SJ76558334 to SJ76628375, SJ76628375 to SJ76008420, SJ76768404 to SJ76558389, SJ76248391 to SJ76118364, SJ76248391 to SJ76238369, SJ76368387 to SJ76378379 and SJ76378387 to SJ76548376	Moderate	BT04_S001-S010	17 October 2019	MA06	Within
River Bollin and Tributaries 2 and 3	River	SJ79778401 to SJ79098473, SJ79818462 to SJ79938473, SJ79648468 to SJ79658473, SJ79298437 to SJ79408440, SJ79408440 to SJ79558454, SJ79338422 to SJ79338424, SJ79568417 to SJ79558416, SJ79628406 to SJ79628411,	High	BT03_S001-S008, BT24_S001-S002	23-25 October 2018 12 February 2019 26 February 2019 13 May 2019 18 July 2019 18 September 2019 5 November 2019	MA06	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
		SJ79698409 to SJ80248434 and SJ80028438 to SJ80068437			21 October 2020 17 December 2020		
Blackburn's Brook	River	SJ75218399 to SJ75428470	Moderate	BT05_S001-S002, BT05_S004, BT05_S006	26 July 2019	MA06	Within
Timperley Brook	River	SJ80858578 to SJ80278614 and SJ802786134 to SJ80068625	None	BT02_S001-S002	N/A	MA06	Within
Baguley Brook	River	SJ82148880 to SJ82058920	Moderate	CT06-S001	20 June 2019 8 December 2020	MA07	Within
River Mersey	River	SJ83799053 to SJ84249028 and SJ83799019 to SJ84089025	Moderate	CT07-S001-S002	6 August 2019	MA07	Within
River Medlock	Canal	SJ84549742 to SJ85999826	Moderate	CT05_S001	9 July 2019	MA08	Within

2.2 Deviations, constraints and limitations

2.2.1 Every effort was made to establish as complete a picture as possible of otter activity and to fully record the presence of otters and their resting places. However, the following constraints and limitations were encountered:

- field surveys were limited to locations where landowner permission had been obtained. As a result, surveys were not undertaken at potentially suitable locations due to landowner access restrictions;
- surveys were carried out from both banks of the watercourse where possible. However, at some locations access or health and safety constraints prevented this;
- at some locations, topography and vegetation structure restricted surveys by reducing access and visibility, therefore there is the potential for evidence to have been under-recorded;
- in order to complete the maximum number of surveys within the available survey timeframe, some surveys were completed during periods when water levels were high and/or after periods of heavy rainfall. While signs of otter activity can still be detected under such conditions, evidence may be under recorded as field signs may have been washed away or be less visible, thus reducing the confidence in negative results obtained during these surveys;
- due to limitations regarding land access within the available survey timeframe, it was not possible to carry out four survey visits to all sites or to carry out surveys at three-monthly intervals. This resulted in fewer opportunities for encountering otter field signs in a restricted survey season. Evidence of otter activity at the sites where fewer surveys were carried out, or where the interval between surveys was shorter, may be under recorded for these sites. This reduces the confidence in any negative results obtained during surveys at these sites; and
- due to significant land access constraints, a deviation was approved whereby otter surveys were undertaken only along those watercourses and on those water bodies within 100m (instead of 300m) of the land required for the construction of the Proposed Scheme. Where watercourses were at least in part within the land required for the construction of the Proposed Scheme, watercourses were subject to surveys to a 300m (instead of 2km) extent both upstream and downstream of where they cross the land required for the construction of the Proposed Scheme.

2.2.2 Otters are highly mobile, range over large distances and activity has been recorded on the River Bollin, Puddinglake Brook, Smoker Brook, Peover Eye, Gad Brook and Agden Brook. Therefore, in drawing conclusions on the presence of otters on watercourses/water bodies within each of the CAs a precautionary approach has been adopted, taking into consideration the above deviations, constraints and limitations. For example, where access was restricted, or where fewer than four surveys were possible, if suitable habitat exists then it has been assumed that otters are present.

2.3 Baseline

2.3.1 Stretches of watercourses or water bodies were scoped out from detailed otter survey where there was a lack of suitable habitat (river, streams and large water bodies) within and up to 100m of land required for the construction of the Proposed Scheme. Scoping-out decisions took account of the presence of barriers to dispersal, availability of suitable terrestrial breeding habitats, adjoining land use, level of disturbance, depth, flow and width of watercourse, connectivity and pollution.

2.3.2 Table 2 provides a summary of the holts, potential holts and couches recorded during surveys of MA01 to MA08. Holts are highlighted on the accompanying Ecology Map Series EC-11.

Table 2: Summary of holts, potential holts and couches recorded during survey

Ecology survey code	Name of watercourse	OS grid reference	Nature of record[9]	CA	Distance from Proposed Scheme (m) and orientation
AT07_S002_OT2_Visit 1_F007_220618	Puddinglake Brook	SJ68706990	Active natal holt/holts	MA02	245m south-east
AT07_S002_OT2_Visit 1_F003_220618	Puddinglake Brook	SJ68307019	Potential natal holt/holts	MA02	Within
AT07_S002_OT2_Visit 1_F004_220618	Puddinglake Brook	SJ68347014	Potential natal holt/holts	MA02	Within
AT07_S002_OT2_Visit 2_F005_270918	Puddinglake Brook	SJ68307021	Active natal holt/holts	MA02	Within
BT13_S002_OT2_Visit 3_F002_130219	Gad Brook	SJ68637185	Potential natal holt/holts	MA02	Within
BT13_S002_OT2_Visit 1_F007_110718	Gad Brook	SJ68537189	Potential natal holt/holts	MA02	55m north
BT13_S002_OT2_Visit 1_F008_110718	Gad Brook	SJ68487193	Potential natal holt/holts	MA02	77m north
BT13_S002_OT2_Visit 1_F010_110718	Gad Brook	SJ68427199	Potential natal holt/holts	MA02	109m north
BT13_S002_OT2_Visit 1_F009_110718	Gad Brook	SJ68427199	Potential natal holt/holts	MA02	109m north
BT13_S002_OT2_Visit 1_F001_110718	Gad Brook	SJ68427196	Potential natal holt/holts	MA02	89m north

[9] Potential holt identified by either a tunnel with internal diameter of at least 250mm and extending 1m into the bank or where the end is out of sight or any cavity of similar dimensions: drain-pipe; log pile; rock/boulder pile; under structures such as bridges or buildings.

Active holts were identified where features met the potential holt criteria and the following: presence of otter spraints or footprints beside or inside tunnel; evidence of an animal's body rubbing against wall or roots; presence of hairs ca 25mm long and mid brown in colour; or presence of scratch marks.

Ecology survey code	Name of watercourse	OS grid reference	Nature of record[9]	CA	Distance from Proposed Scheme (m) and orientation
BT10_S003_OT2_Visit 1_F001_171018	Peover Eye	SJ70497558	Potential holt/holts	MA02	187m east
BT10_S004_OT2_Visit 4_F001_140619	Tributary of Peover Eye	SJ70177553	Active natal holt/holts	MA02	Within
BT10_S004_OT2_Visit 4_F002_140619	Tributary of Peover Eye	SJ70177557	Potential holt/holts	MA02	Within
BT10_S002_OT2_Visit 2_F006_190219	Smoker Brook	SJ70497608	Active natal holt/holts	MA02	10m south-east
BT09_S003_OT2_Visit 2_F003_050619 and BT09_S003_OT2_Visit 1_F002_201020	Tabley Brook	SJ70907888	Potential natal holt/holts	MA03	Within
BT09_S003_OT2_Visit 1_F001_201020	Tabley Brook	SJ70937890	Two Potential natal holts	MA03	5m east
BT01_S002_OT2_Visit 1_F006_170718	Agden Brook	SJ71938630	Potential natal holt/holts	MA03	35m west
BT01_S002_OT2_Visit 1_F004_170718	Agden Brook	SJ71958641	Potential natal holt/holts	MA03	16m west
BT01_S002_OT2_Visit 1_F001_170718	Agden Brook	SJ72188654	Potential natal holt/holts	MA03	180m east
BT07_S003_OT2_Visit 1_F001_151220	Millington Clough	SJ72178422	Potential natal holt/holts	MA03, MA06	Within
BT07_S002_OT2_Visit 5_F003_151220	Tributary of Millington Clough 1	SJ72568430	Two Potential natal holts	MA03, MA06	Within
DT11_S001_OT2_Visit2_F012_270918	River Bollin	SJ71608804	Active natal holt/holts	MA04	296m east
DT11_S001_OT2_Visit3_F005_091018	River Bollin	SJ70918828	Potential natal holt/holts	MA04	38m east
DT11_S001_OT2_Visit3_F001_091018	River Bollin	SJ70348865	Two potential natal holt/holts	MA04	237m south
BT03_S001_OT2_Visit 1_F012_231018	River Bollin	SJ79648409	Potential natal holt/holts	MA06	107m south-east
BT03_S001_OT2_Visit 1_F011_231018	River Bollin	SJ79598412	Potential natal holt/holts	MA06	50m south-east
BT03_S001_OT2_Visit 1_F009_231018	River Bollin	SJ79208462	Potential natal holt/holts	MA06	61m north-west
BT03_S001_OT2_Visit 1_F007_231018	River Bollin	SJ79208460	Potential natal holt/holts	MA06	48m north-west
BT03_S001_OT2_Visit 1_F013_231018	River Bollin	SJ79208466	Potential natal holt/holts	MA06	102m north

Hough to Walley's Green (MA01)

2.3.3 Although Gresty Brook was scoped in, no visits for otter were undertaken within MA01 due to the lack of access for survey. No incidental sightings or evidence of otter activity were reported from within MA01.

2.3.4 Thirteen desk study records of otter were returned, comprising a combination of adult otter, footprints and spraint. The closest of these was 168m south of the land required for the construction of the Proposed Scheme, from Gresty Brook (SJ72065360). Three unspecified records for otter were also returned from the immediate vicinity of the Shropshire Union Canal (SJ67096025, SJ67136025 and SJ671609), the closest of which was 1.2km west of the land required for the construction of the Proposed Scheme. In addition, records of otter absence were returned from adjacent to Mere Gutter (SJ73494951), 2.1km south of the land required for the construction of the Proposed Scheme.

2.3.5 With exception of records from the Shropshire Union Canal outside the survey extent for MA01, it is considered that otter is unlikely to use the majority of other watercourses within MA01 for breeding, foraging or commuting, due to their isolation and urban setting. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter use of the canals is extensive within the Weaver/Dane catchment.

Gresty Brook

2.3.6 The desk study returned a single unspecified record of otter from Gresty Brook, at the confluence with Basford Brook (SJ72065360), 168m to the south of land required for the construction of the Proposed Scheme. For the Basford Brook, south and north of the A500, three records (two unspecified and one of footprints) were returned (SJ72305264 and SJ72285269), 266m and 280m west, respectively, of the land required for the construction of the Proposed Scheme.

2.3.7 Although no surveys of the brook have been carried out, from aerial photographs there appears to be suitable terrestrial breeding habitat close to the watercourse. This includes parcels of broadleaved woodland within and adjacent to the land required for the construction of the Proposed Scheme. Connectivity with the River Weaver is present via Wisaston Brook and Valley Brook. Although surveys have not been carried out, it is assumed that otter will make use of the watercourse for foraging and as a corridor for movement.

Wimboldsley to Lostock Gralam (MA02)

2.3.8 Fourteen holts or potential holts were recorded within MA02 during the surveys, of which four were considered active: four close to Puddinglake Brook, with two active; six at Gad

[10] Environment Agency (2010), *Fifth otter survey of England 2009 – 2010*, Environment Agency, Bristol.

Brook; three at the Peover Eye, with one active; and one active at Smoker Brook. No signs or incidental sightings of otter activity were reported from Wincham Brook.

2.3.9 Twenty desk study records of otter were returned, comprising a combination of footprints, spraints and sightings, as well as unspecified records. Three of the records were from within the land required for the construction of the Proposed Scheme.

2.3.10 Otter is considered likely to utilise all watercourses within MA02 for foraging and/or commuting. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present, at low population levels, on most of the rivers and canals in this area.

Shropshire Union Canal

2.3.11 The desk study returned three unspecified records for otter within the vicinity of the Shropshire Union Canal (SJ67116023, SJ67146070 and SJ671609), to the south of transect AT05_S003 in community area MA01. A further record was provided from 50m north of Wimboldsley Wood (SJ67816448), within the stretch of canal covered by transect AT05.

2.3.12 Surveys with full access to the canal were undertaken in 2018 and 2019. Low levels of otter activity were observed during the surveys. Field surveys were obscured by vegetation, restricting access, which may have caused some signs to be missed. All records were from within, or immediately adjacent to, the land required for the construction of the Proposed Scheme. No evidence of holts or potential holts was recorded. The presence of broadleaved plantation woodland, within and immediately adjacent to the land required for the construction of the Proposed Scheme, offers potential terrestrial breeding habitat. However, given the low level of otter signs, breeding is unlikely.

2.3.13 Connectivity with the River Weaver, The Dingle and the River Wheelock corridors is also present. It is therefore assumed that otter will make use of the canal and adjacent watercourses for foraging and as a corridor for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter use of the canals is extensive within the Weaver/Dane catchment.

Tributary of the River Weaver 2

2.3.14 The desk study returned no records for otter within the vicinity of watercourse.

2.3.15 Although no access was granted to Tributary of the River Weaver 2 (transect AT05_S002, S004 and S005), from aerial photographs there appears to be suitable terrestrial breeding habitat in proximity to the watercourse. This includes parcels of broadleaved woodland south of Wimboldsley Hall and north of Weaver Bank Cottage. The presence of suitable habitat, within and immediately adjacent to the land required for the construction of the Proposed Scheme, offers potential terrestrial breeding habitat. Connectivity with the River Weaver, Weaver Bank Wood and the Shropshire Union Canal is also present. It is therefore assumed that otter will make use of the watercourses within the River Weaver catchment for foraging and as corridors for movement. This is consistent with the results of the Fifth

National Otter Survey[10], which states that otter is widely distributed at low population densities within the Weaver/Dane catchments.

The Dingle

2.3.16 The desk study returned no records for otter within the vicinity of The Dingle.

2.3.17 Although no access was granted, from aerial photographs there appears to be suitable terrestrial breeding habitat in proximity to the watercourse. This includes parcels of broadleaved woodland within and adjacent to the land required for the construction of the Proposed Scheme. Connectivity with the River Weaver, Hop Yard Wood, Rookery Wood and the Shropshire Union Canal also appears to be present. Although surveys have not been carried out, it is assumed that otter will make use of The Dingle for foraging and as a corridor for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is widely distributed at low population densities within the Weaver/Dane catchments.

River Dane and Tributaries 3 and 4

2.3.18 The desk study returned no records for otter within the vicinity of the River Dane and its associated tributaries (3 and 4).

2.3.19 Surveys with full access to the watercourses were undertaken in 2018 and 2019, although due to access constraints, a single visit only was completed for the southern stretch of the River Dane (AT06_S006).

2.3.20 Records of otter in the form of spraints, footprints and slides were all found during the field surveys. The closest of these were footprints recorded within 6m of the land required for the construction of the Proposed Scheme (SJ68296886). Although no evidence of holts was noted, field surveys were obscured by vegetation, including stands of Himalayan balsam (*Impatiens glandulifera*) restricting access, which may have caused some signs to be missed.

2.3.21 The presence of wet and mixed deciduous woodland, within and immediately adjacent to the land required for the construction of the Proposed Scheme, offers potential terrestrial breeding habitat along the River Dane. However, given the low levels of otter signs, breeding is unlikely.

2.3.22 Connectivity between the River Dane and the Trent and Mersey Canal is also present. It is therefore assumed that otter will make use of the river and adjacent watercourses for foraging and as a corridor for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is widely distributed within the Weaver/Dane catchments, but at a low population level. Otter is, however, considered absent from the River Dane Tributaries 3 and 4.

Trent and Mersey Canal

2.3.23 The desk study returned four records for otter within the vicinity of the Trent and Mersey Canal and its associated tributaries (SJ67936965, SJ68537035, SJ68707053 and SJ682714). The closest of these was an unspecified record, from within the land required for the construction of the proposed scheme, to the north of Whatcroft Hall Lane (SJ68707053).

2.3.24 Surveys with full access were undertaken in 2018 and 2019. Records of otter in the form of spraint, footprints, lying up sites and slides were all observed during the field surveys, the closest of which was a record of spraint from immediately adjacent to the land required for the construction of the Proposed Scheme (SJ68306887). Although no evidence of holts was noted, field surveys were obscured by vegetation and steep bank sides, restricting access, which may have caused some signs to be missed.

2.3.25 Habitat, within and immediately adjacent to the land required for the construction of the Proposed Scheme, offers potential terrestrial breeding habitat. However, given the low number of otter signs reported, breeding is considered unlikely.

2.3.26 In addition to connectivity between the Trent and Mersey Canal and Puddinglake Brook, patches of deciduous woodland, including a number of veteran trees[11], are also present. It is therefore assumed that otter will make use of the canal and adjacent watercourses, for foraging and as a corridor for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter use of the canals is extensive within the Weaver/Dane catchment.

Puddinglake Brook

2.3.27 The desk study returned no records for otter within the vicinity of Puddinglake Brook. Three unspecified records were returned from the Trent and Mersey Canal (SJ67936965, SJ68537028 and SJ68707053), respectively 442m west, 270m west and 462m west of the confluence with the brook.

2.3.28 Survey visits with full access were undertaken in 2018 and 2019. Otter signs were observed during the surveys, including two active holts. The first was located 245m south-east (SJ68706990) of land required for the construction of the Proposed Scheme. The second was to the north of Bridge Farm (SJ68307021), within the land required for the construction of the Proposed Scheme. The presence of active holts has been determined from the presence of a physical structure, coupled with evidence of otter activity (footprints and fresh spraint) within the immediate vicinity. Two potential holts were also found on the western bank of the brook (SJ6830702, SJ68347014), to the south of the Trent and Mersey Canal, within the land required for the construction of the Proposed Scheme.

[11] As stated in the citation for the Trent and Mersey Canal Local Wildlife Site.

2.3.29 Evidence of otter activity was concentrated within the land required for the construction of the Proposed Scheme. Field surveys were, however, obscured by vegetation and steep bank sides restricting access, which may have caused some signs to be missed.

2.3.30 There was suitable terrestrial breeding habitat in proximity to the watercourse, within the land required for the construction of the Proposed Scheme. This includes areas of broadleaved woodland and watercourse bankside trees, such as ash (*Fraxinus excelsior*) and oak (*Quercus* sp.). It is assumed that, in addition to breeding, otter will make use of the brook, along with the nearby Trent and Mersey Canal, River Dane and adjacent water bodies, for foraging and as corridors for movement. This is consistent with the results of the Fifth National Otter Survey[10,] which states that otter is widely distributed within the Weaver/Dane catchments but at a low population level.

Gad Brook and Tributary 3

2.3.31 The desk study returned no records for otter from the Gad Brook or the associated Tributary 3. Two records were returned from Orchard Marina (SJ684721, SJ68227218) on the Trent and Mersey Canal, approximately 180m north of the confluence with the brook.

2.3.32 Surveys with full access to Gad Brook and its associated tributary were undertaken in 2018 and 2019. Otter field signs were observed during the surveys. Evidence was concentrated between SJ68737156 (east of Pear Tree Farm Cottages) and the brook's confluence with the Trent and Mersey Canal (SJ68427199), particularly within woodland at Marshall's Gorse.

2.3.33 Six potential holts were recorded within Marshall's Gorse, one of which was within land required for the construction of the Proposed Scheme (SJ68637185). The remaining five potential holts were all within 110m of the land required for the construction of the Proposed Scheme. Due to the lack of evidence, these holts were not considered active.

2.3.34 Although no active holts were confirmed, field surveys were obscured by vegetation, restricting access, which may have caused some signs to be missed. The presence of broadleaved plantation woodland, within and immediately adjacent to the land required for the construction of the Proposed Scheme, offers potential terrestrial breeding habitat. However, given the low number of otter signs reported, breeding is considered unlikely. It is assumed that otter will make use of Gad Brook, the nearby Trent and Mersey Canal and adjacent water bodies for foraging and as corridors for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is widely distributed to the south of Warrington and Manchester but at a low population level.

Wade Brook

2.3.35 The desk study returned no records for otter associated with the Wade Brook and no access was granted for survey. Suitable habitat is present in the form of woodland within the land required for the construction of the Proposed Scheme. Otter spraint and footprints were confirmed present approximately 170m east of land required for the construction of the Proposed Scheme (SJ70497336) during surveys carried out in 2018. Although field surveys

have not been carried out, it is assumed that otter will make use of the Wade Brook and the nearby Trent and Mersey Canal for foraging and commuting. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is widely distributed to the south of Warrington and Manchester but at a low population level.

Peover Eye and unnamed tributaries

2.3.36 The desk study returned no records for otter along Peover Eye or the unnamed tributaries.

2.3.37 Surveys with full access to the watercourses were undertaken, for the majority of the watercourses, in 2018 and 2019. No surveys have been carried out on the southern and western tributaries adjacent to Plumley Lime Beds due to lack of access.

2.3.38 Evidence of otter activity was concentrated within Winnington Wood and Peas Wood along the tributary of the Peover Eye. Field surveys were obscured by vegetation, restricting access, which may have caused some signs to be missed.

2.3.39 A single active holt was identified on a tributary of the Peover Eye within Winnington Wood (SJ70177553), within the land required for the construction of the Proposed Scheme. The presence of an active holt has been determined from the presence of a physical structure, coupled with evidence of otter activity (footprints) within the immediate vicinity. In addition, two potential holts were recorded during field surveys within the land required for the construction of the Proposed Scheme, 40m north of the active holt (SJ70177553). The third potential holt was located within Mill Wood, adjacent to the Peover Eye (SJ70497558), 187m east of land required for the construction of the Proposed Scheme. Due to the lack of evidence, these holts were not considered active.

2.3.40 Within and adjacent to the land required for the construction of the Proposed Scheme, there was extensive suitable terrestrial breeding habitat in the proximity of the watercourses. This includes Plumley Lime Beds Site of Special Scientific Interest (SSSI), Mill Wood, Winnington Wood, Peas Wood, Smoker Wood and Leonard's Wood. It is assumed that, in addition to breeding, otter will make use of the interconnected Smoker Brook, Peover Eye and Wincham Brook for foraging and as corridors for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is widely distributed to the south of Warrington and Manchester but at a low population level.

Wincham Brook

2.3.41 The desk study returned a single record of otter footprints from an unspecified location to the west of land required for the construction of the Proposed Scheme. From the description provided, this is considered likely to be from Wincham Brook (SJ6975). An additional record of footprints was returned from the Trent and Mersey Canal, approximately 100m south of the confluence with the brook (SJ685746) outside the land required for the construction of the Proposed Scheme.

2.3.42 Surveys with a high level of access to Wincham Brook were undertaken in 2019. Evidence of otter activity, in the form of footprints, was recorded from north of the confluence with the

Peover Eye (SJ70107581), 60m south of the land required for the construction of the Proposed Scheme. Field surveys were obscured by vegetation, including dense stands of Himalayan balsam and common ivy (*Hedera helix*) restricting access, which may have caused some signs to be missed.

2.3.43 Within and adjacent to the land required for the construction of the Proposed Scheme, there was extensive suitable terrestrial breeding habitat in the proximity of the watercourse. This includes Winnington Wood, Peas Wood, Smoker Wood and Leonard's Wood. However, given the low number of otter signs reported, breeding is considered unlikely. It is assumed that otter will make use of the interconnected Trent and Mersey Canal, Wincham Brook, Smoker Brook and Peover Eye, for foraging and as corridors for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is widely distributed to the south of Warrington and Manchester but at a low population level.

Smoker Brook and Tributaries 1 and 2

2.3.44 The desk study returned one record for an adult otter sighting along Smoker Brook (SJ703760), in 2014, from within the land required for the Proposed Scheme. Further records were returned for the Trent and Mersey Canal and Wincham Brook, to the west of the land required for the construction of the Proposed Scheme.

2.3.45 Surveys with a moderate level of access to Smoker Brook were undertaken in 2018, 2019 and 2020. Evidence of otter activity was concentrated towards Linnards Lane, to the west of the transect. No evidence of otter activity was recorded on the tributaries of Smoker Brook. Field surveys were obscured by vegetation, including dense stands of Himalayan balsam, restricting access which may have caused some signs to be missed.

2.3.46 A single active holt was identified (SJ70497608), 10m to the south-east of land required for the construction of the Proposed Scheme. The presence of active holts has been determined from the presence of a physical structure, coupled with evidence of otter activity (footprints and fresh spraint) within the immediate vicinity.

2.3.47 Within and adjacent to the land required for the construction of the Proposed Scheme, there was extensive suitable terrestrial breeding habitat in the proximity of the watercourses, including Winnington Wood, Peas Wood, Smoker Wood and Leonard's Wood. It is assumed that, in addition to breeding, otter will make use of the interconnected Trent and Mersey Canal, Wincham Brook, Smoker Brook and Peover Eye, for foraging and as a corridor for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is widely distributed to the south of Warrington and Manchester but at a low population level.

Pickmere to Agden and Hulseheath (MA03)

2.3.48 Three potential holts were recorded close to Tabley Brook within MA03. A further three potential holts and a single potential couch were recorded close to Agden Brook and three potential holts were recorded along Millington Clough/Tributary 1 of Millington Clough from

the boundary between MA03 and MA06. No signs or incidental sightings of otter activity were reported from Waterless/Arley Brook.

2.3.49 The desk study returned a single unspecified record of otter from the River Bollin, 71m west of the land required for construction of the Proposed Scheme (SJ74408600).

2.3.50 Otter is considered likely to utilise all watercourses within MA03 for foraging and/or commuting. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area.

Waterless/Arley Brook and Tributaries

2.3.51 The desk study returned no records for otter along Waterless/Arley Brook.

2.3.52 Surveys with a low level of access were undertaken in 2018, 2019 and 2020 and no evidence of otter presence recorded. Field surveys were obscured by vegetation, including dense stands of Himalayan balsam, restricting access to the watercourse banks, which may have caused some signs to be missed.

2.3.53 Outside the land required for the construction of the Proposed Scheme, Waterless/Arley Book is connected to suitable terrestrial breeding habitat in the proximity of the watercourses, including that of Rinks Wood, Round Wood, Bongs Rough, Bongs Wood and Gore Wood. Evidence of breeding otter in the wider Smoker Brook catchment was recorded during surveys. Whilst there was no evidence of breeding recorded for Waterless/Arley Brook, it is assumed that otter will make use of the watercourse for foraging and as a corridor for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is widely distributed to the south of Manchester but at a low population level.

Tabley Brook and Tributaries 2 to 8

2.3.54 The desk study returned no records for otter along Tabley Brook or its tributaries.

2.3.55 Surveys with a moderate level of access were undertaken for Tabley Brook and the associated tributaries in 2018, 2019 and 2020. Due to ongoing access constraints, fewer than four survey visits were carried out for all watercourses and signs may have been missed. Three potential holts were recorded along Tabley Brook to the south of Yew Tree Farm (one at SJ70907888 and two at SJ70937890, each immediately adjacent to the land required for the construction of the Proposed Scheme). Due to the lack of evidence these holts were not considered active. No further signs of otter were recorded during the surveys.

2.3.56 Whilst surveyed habitats within the land required for the Proposed Scheme were disturbed by cattle and are largely unsuitable for breeding, Tabley Book is connected to suitable terrestrial breeding habitat in the proximity of the watercourses. This includes that of Tableypipe Wood, Square Wood, Kennel Wood and Belt Wood. Given the lack of field signs recorded, breeding is considered unlikely. Further survey of the watercourses will, however,

be required to determine whether otter is breeding within the land required for the Proposed Scheme.

2.3.57 Evidence of otter presence in the wider Smoker Brook catchment was recorded in 2018 and 2019. Whilst there was no evidence of breeding recorded for Tabley Brook, it is assumed that otter will make use of the watercourse for foraging and as a corridor for movement. This is consistent with the Fifth National Otter Survey[10,] which states that otter is widely distributed to the south of Manchester but at a low population level. Further, evidence of otter presence in the wider River Bollin catchment has been known since at least 1995[10].

Millington Clough and Tributaries 1 and 2

2.3.58 The desk study returned no records for otter along Millington Clough or its associated tributaries.

2.3.59 Surveys with a high level of access to these watercourses were undertaken in 2018, 2019 and 2020. Due to access constraints, fewer than four survey visits were carried out for all watercourses and signs may have been missed. Limited evidence of otter activity was recorded during the surveys, in the form of footprints at Peacock Lane, High Legh (SJ72038417) and three potential holts at Chapel Lane, Millington (SJ72178422) and two at Millington Hall Lane, Millington (SJ72568430). These potential holts were all recorded from within the land required for the construction of the Proposed Scheme. Within and adjacent to the land required for the construction of the Proposed Scheme there was suitable terrestrial breeding habitat in the proximity of the watercourse. Given the lack of otter signs associated with each watercourse, breeding is considered unlikely.

2.3.60 Evidence of otter presence in the wider River Bollin catchment has been known since at least 1995[10]. It is therefore assumed that otter will make use of each of these watercourses for foraging and as a corridor for movement. This is consistent with the Fifth National Otter Survey[10], which states that otter is widely distributed to the south of Manchester but at a low population level.

Agden Brook

2.3.61 The desk study returned no records for otter along the Agden Brook.

2.3.62 Surveys with full access were undertaken in 2018 and 2019. No evidence of otter presence was recorded along the southern sections of the Brook, but three potential holts were recorded along the northern stretch. Two were recorded less than 30m to the west of land required for the construction of the Proposed Scheme (SJ71938630 and SJ71958641 approximately 100m apart). The third was located to the north of A56 Lymm road (SJ72188654), 180m to the east of the land required for the construction of the Proposed Scheme. Due to the lack of evidence these holts were not considered active. In addition, a single potential couch was recorded to the east of Agden Bridge (SJ72178654) adjacent to the possible holt north of A56 Lymm road. Whilst recent use was recorded, both badger *Meles*

meles and fox *Vulpes vulpes* hair was reported. Given the low number of otter signs reported during the field survey and from the desk study, breeding is considered unlikely.

2.3.63 Surveyed habitats within the land required for the Proposed Scheme are largely unsuitable for breeding. However, there is suitable terrestrial habitat within the southern sections of the Brook within Millington Clough. Evidence of otter presence in the wider River Bollin catchment has been known since at least 1995[10] and an active holt was recorded from the River Bollin in 2018, to the north of the confluence with Agden Brook (SJ71608804) in MA04. It is therefore assumed that otter will make use of Agden Brook and its associated tributaries for foraging and as a corridor for movement. This is consistent with the Fifth National Otter Survey[10], which states that otter is widely distributed to the south of Manchester but at a low population level.

Broomedge to Glazebrook (MA04)

2.3.64 Four holts were recorded in MA04 within the vicinity of the River Bollin, one of which is considered active. No signs or incidental sightings of otter activity were reported from Red Brook.

2.3.65 The desk study returned five records of otter. Of these, one from the River Bollin is within land required for the construction of the Proposed Scheme (SJ71008817). Further, records of otter presence within the River Bollin catchment have been known since at least 1995[10].

2.3.66 Otter is considered likely to utilise all watercourses within MA04 for foraging and/or commuting. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area.

River Bollin - North

2.3.67 The desk study returned two records for fresh otter spraint along the River Bollin (SJ71008817 and SJ70238875).

2.3.68 Surveys with full access to the River Bollin were undertaken in 2018 and 2019. Otter signs were observed within the vicinity of the watercourse during the surveys, including a single active holt located 296m to the east of land required for the construction of the Proposed Scheme, to the north of the confluence with Agden Brook (SJ71608804). The presence of an active holt has been determined from the presence of a physical structure, coupled with evidence of otter activity (footprints and fresh spraint) within the immediate vicinity.

2.3.69 In addition, a potential holt was recorded 38m to the east (SJ70918828) of the land required for the construction of the Proposed Scheme. Two further potential holts were recorded 237m south of the land required for the construction of the Proposed Scheme, 140m south of the confluence with the Old Bollin. Due to the lack of evidence these holts were not considered active.

2.3.70 Field surveys were obscured by vegetation, including stands of giant hogweed (*Heracleum mentagazzianum*), Japanese knotweed (*Fallopia japonica*), bramble (*Rubus fruticosus* agg.) and rosebay willowherb (*Chamaenerion angustifolium*), restricting access to the bank. Some field signs of otter may have been missed.

2.3.71 Within and adjacent to the land required for the construction of the Proposed Scheme there was suitable terrestrial breeding habitat in the proximity of the watercourse. This includes broadleaved woodland within the river corridor and within Fox Covert. Evidence of otter presence in the wider River Bollin catchment has been known since at least 1995[10]. Whilst the Fifth National Otter Survey[10] did not conduct main surveys[12] of the Mersey and Bollin catchments, otter signs were reported from the River Bollin during alternate squares spot-checks[13]. It is therefore assumed that, in addition to breeding, otter will make use of the River Bollin for foraging and as a corridor for movement. This is also consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area.

Red Brook

2.3.72 The desk study returned no records for otter along Red Brook.

2.3.73 Surveys with a moderate level of access to Red Brook were undertaken in 2018 and 2019. Although no otter signs were observed within the vicinity of the watercourse during the surveys, field surveys were obscured by vegetation, including stands of Himalayan balsam and rosebay willowherb, restricting access. In addition, surveys were undertaken from the northern bank only, which may have caused some signs to be missed.

2.3.74 Within and adjacent to the land required for the construction of the Proposed Scheme there was suitable terrestrial breeding habitat in the proximity of the watercourse, including Coroners Wood. Given the lack of field and desk study data, it is assumed that breeding is highly unlikely. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area. Furthermore, evidence of otter presence in the wider River Bollin catchment has been known since at least 1995[10]. It is, therefore, considered that this species will make use of the Red Brook, adjacent Manchester Ship Canal and Glaze Brook for foraging and as a corridor for movement.

[12] The 2009/10 Fifth National Otter Survey (Environment Agency, 2010) for the first time covered the whole of England. All 3,327 sites surveyed during the fourth survey were re-surveyed and are referred to as 'main survey' locations.

[13] As distinct from the main survey locations for the Fifth National Otter Survey (Environment Agency, 2010), data were gathered for all 50km grid squares not covered in the main survey. These were not surveyed to the same level as the main survey sites. An alternative approach was taken whereby up to ten spot-checks were carried out within those 10km grid squares for which no desk study records were available. These are referred to as the 'alternate squares survey'.

Risley to Bamfurlong (MA05)

2.3.75 Surveys with a moderate level of access were carried out in MA05 and no holts or potential holts were recorded. No signs or incidental sightings of otter activity were reported from the Leeds and Liverpool Canal.

2.3.76 The desk study returned eight records of otter, comprising unspecified records, adult sightings and fresh spraint, from within 5km of the land required for the construction of the Proposed Scheme. The nearest of these was an adult otter from Millford Brook (SJ597986), approximately 1km west of the land required for the construction of the Proposed Scheme.

2.3.77 Otter is considered likely to utilise all watercourses within MA05 for foraging and/or commuting. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter colonisation to the north of Warrington has been slow. In addition, no otter signs were found during the alternate squares spot-checks within the Glaze catchment.

Manchester Ship Canal

2.3.78 The desk study returned no records for otter along the Manchester Ship Canal.

2.3.79 Surveys with full access were undertaken in 2018 and 2019 with limited signs of otter activity recorded. All signs were outside the land required for the construction of the Proposed Scheme. Field surveys were obscured by vegetation, including dense stands of rhododendron (*Rhododendron* sp.), Himalayan balsam and Japanese knotweed and steep bank profiles restricting access, which may have caused some signs to be missed.

2.3.80 Within and adjacent to the land required for the construction of the Proposed Scheme there was suitable terrestrial breeding habitat in the proximity of the watercourse. This includes broadleaved woodland within the canal corridor and associated with the Red Brook and Glaze Brook. Whilst breeding is considered highly unlikely given the limited field signs, it is assumed that otter will make use of the Manchester Ship Canal for foraging and as a corridor for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter use of canals is extensive in this area.

Glaze Brook

2.3.81 The desk study returned a single unspecified record from Glaze Brook (SJ7091).

2.3.82 Surveys with full access to Glaze Brook were undertaken in 2018 and 2019. Although no otter signs were observed within the vicinity of the watercourse, field surveys were obscured by vegetation, including dense stands of Himalayan balsam, restricting access, which may have caused some signs to be missed. The lack of evidence is consistent with the Fifth National Otter Survey[10], which reported finding no signs of otter during alternate square spot-checks within the Glaze catchment.

2.3.83 Within and adjacent to the land required for the construction of the Proposed Scheme there was suitable terrestrial breeding habitat on the western bank of the watercourse. Given the

lack of field and desk study data, it is assumed that breeding is highly unlikely. However, it is considered that otter will make use of Glaze Brook and the adjacent Red Brook and Manchester Ship Canal as a corridor for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area.

Holcroft Lane Brook

2.3.84 The desk study returned no records for otter along Holcroft Lane Brook.

2.3.85 Due to access constraints, no surveys have been carried out for the watercourse. However, within and adjacent to the land required for the construction of the Proposed Scheme, there appears to be suitable terrestrial breeding habitat adjacent to the watercourse. The brook is also connected to Pennington Flash and Hey Brook to the east providing opportunities for foraging and commuting. Although field surveys have not been carried out, it is assumed that otter will make use of Holcroft Lane Brook for foraging and commuting. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area.

Small Brook

2.3.86 The desk study returned no records for otter along Small Brook and its associated tributaries.

2.3.87 A single survey with a moderate level of access to the watercourses was undertaken in 2020. The habitat was considered unsuitable for otter foraging due to the lack of water and therefore food sources. The absence of cover is also considered to reduce the likelihood of the use of Small Brook for commuting, although the brook is connected to Pennington Flash to the east providing some opportunities for foraging and commuting through the wider landscape. Although field surveys were limited to one of the four visits, it is assumed that otter will make use of Small Brook for foraging and commuting. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area.

Hey Brook and Tributaries 1 to 4

2.3.88 The desk study returned no records for otter along Hey Brook and its associated tributaries.

2.3.89 Surveys with a moderate level of access to the watercourses were undertaken during 2018, 2019 and 2020. Limited signs of otter activity were observed within the vicinity of the watercourse during the surveys. Although no holts were recorded, field surveys were obscured by vegetation, including stands of Himalayan balsam and bramble, restricting access to the bank, which may have caused some signs to be missed. The limited evidence is consistent with the Fifth National Otter Survey[10], which reported finding no signs of otter during alternate square spot-checks within the Glaze catchment.

2.3.90 Within and adjacent to the land required for the construction of the Proposed Scheme there was some suitable terrestrial breeding habitat in the proximity of the watercourse. This includes areas of broadleaved woodland within the river corridor. Whilst breeding is highly unlikely given the limited signs of otter activity, it is assumed that otter will make use of Hey Brook and associated tributaries for foraging and as a corridor for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area.

Nan Holes Brook

2.3.91 The desk study returned no records for otter along Nan Holes Brook.

2.3.92 Surveys with full access to Nan Holes Brook were undertaken in 2018, 2019 and 2020. Access was subsequently revoked, and the fourth survey visit was not carried out. Limited signs of otter were observed within the vicinity of the watercourse during the surveys. Field surveys were obscured by vegetation, including stands of Himalayan balsam, restricting access to the bank, which may have caused some signs to be missed. The lack of evidence is consistent with the Fifth National Otter Survey[10], which reported finding no signs of otter during alternate square spot-checks within the Glaze catchment.

2.3.93 Within and adjacent to the land required for the construction of the Proposed Scheme there was suitable terrestrial breeding habitat in the proximity of the watercourse. Given the lack of field and desk study data, it is assumed that breeding is highly unlikely. However, it is considered that otter will make use of Nan Holes Brook and adjacent Hey Brook for foraging and as a corridor for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area.

Coffin Lane Brook and Tributaries 1 and 2

2.3.94 The desk study returned no records for otter along Coffin Lane Brook and its associated tributaries. The survey was significantly limited by access constraints and only one of the four required surveys has been completed.

2.3.95 There is limited suitable terrestrial breeding habitat adjacent to the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. Field surveys were obscured by vegetation, including dense stands of invasive Himalayan balsam, giant hogweed and Japanese knotweed. This restricted access to the banks and may have caused some signs to be missed. Heavy rain prior to the December survey visit for Tributary 2 may also have washed away some signs of otter presence. Given the lack of desk study data and high levels of disturbance, it is assumed that breeding is highly unlikely. The brook is, however, connected to Abram Flashes SSSI and Hey Brook to the east, and to the Leeds and Liverpool Canal, providing opportunities for foraging and commuting, although the presence of culverts is likely to restrict otter movement.

2.3.96 Although limited field surveys have been carried out, it is assumed that otter will make use of Coffin Lane Brook and its associated tributaries for foraging and commuting. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area.

Leeds and Liverpool Canal (Leigh Branch)

2.3.97 The desk study returned no records for otter along the Leeds and Liverpool Canal. Surveys with a high level of access were undertaken in 2019. No signs of otter were found within the vicinity of the canal. The lack of evidence is consistent with the Fifth National Otter Survey[10], which reported finding no signs of otter during alternate square spot-checks within the Glaze catchment.

2.3.98 Within and adjacent to the land required for the construction of the Proposed Scheme there was limited suitable terrestrial breeding habitat in the proximity of the watercourse. However, the canal runs adjacent to both Abram Flashes and Bryn Marsh and Ince Moss SSSI. Whilst breeding is considered highly unlikely, it is assumed that otter will make use of the canal for foraging and as a corridor for movement.

Hulseheath to Manchester Airport (MA06)

2.3.99 Five potential holts were recorded within MA06, each associated with the River Bollin. In addition, three potential holts were recorded along Millington Clough/Tributary 1 of Millington Clough from the boundary between MA03 and MA06 (as reported in MA03 above). No signs or incidental sightings of otter activity were reported from Sugar Brook, Birkin Brook and its associated tributaries, and Blackburn's Brook.

2.3.100 The desk study returned five records of otter from within 2km of the land required for the construction of the Proposed Scheme (SJ748839, SJ79198453, SJ75428470, SJ74978552 and SJ77058568). These comprised fresh and old spraint, footprints and unspecified records. Two of the five records were from within the land required for the construction of the Proposed Scheme from Blackburn's Brook.

2.3.101 Otter is considered likely to utilise all watercourses within MA06 for foraging and/or commuting. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area and that records of otter presence within the River Bollin catchment have been known since at least 1995[10].

Sugar Brook

2.3.102 The desk study returned no records for otter along Sugar Brook.

2.3.103 Due to ongoing access constraints, two survey visits with a low level of access were undertaken in 2019 and no evidence of otter presence was recorded. In addition, field

surveys were obscured by vegetation, restricting access to the watercourse banks, which may have caused some signs to be missed.

2.3.104 Within and adjacent to the land required for the construction of the Proposed Scheme there was suitable terrestrial breeding habitat in the proximity of the watercourses. The Brook is connected to suitable terrestrial breeding habitat including Rostherne Mere SSSI and Ramsar site to the south. Evidence of otter presence in the wider River Bollin catchment has been known since at least 1995[10]. It is therefore assumed that otter will make use of the river and adjacent water bodies for foraging and as a corridor for movement. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area.

Mobberley Brook

2.3.105 The desk study returned no records for otter along Mobberley Brook. Due to access constraints, no surveys have been carried out.

2.3.106 From aerial photography there appeared to be suitable habitat in the proximity of the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. In addition, Mobberley Brook is connected to suitable terrestrial breeding habitat including Ward's Plantation, Birkinheath Covert and Ecclesfield Wood. Evidence of otter presence in the wider River Bollin catchment has been known since at least 1995[10]. It is therefore assumed that otter will make use of the river for foraging and as a corridor for movement.

Birkin Brook and Tributaries 4 to 8

2.3.107 The desk study returned no records for otter along Birkin Brook or its associated tributaries, although a single record was returned from the confluence with Blackburn's Brook (SJ75428470).

2.3.108 Due to access constraints, a single survey with a moderate level of access was undertaken in 2019 and no evidence of otter presence was recorded. Field surveys were obscured by vegetation, including dense stands of Himalayan balsam, restricting access, which may have caused some signs to be missed.

2.3.109 Whilst surveyed habitats within the land required for the Proposed Scheme are largely unsuitable for breeding, the brook is connected to suitable terrestrial breeding habitat including Ecclesfield Wood and Birkinheath Covert. Evidence of otter presence in the wider River Bollin catchment has been known since at least 1995[10]. Whilst survey effort was restricted to one of the four visits, it is assumed that otter will make use of the river for foraging and as a corridor for movement.

Blackburn's Brook

2.3.110 The desk study returned two unspecified records for otter along Blackburn's Brook; from the western perimeter of Rostherne Mere (SJ748839) and from the confluence with Birkin Brook adjacent to Hancock's Bank Wood (SJ75428470).

2.3.111 Due to access constraints, a single survey visit with full access was undertaken in 2019 and no evidence of otter presence was recorded. In addition, field surveys were obscured by vegetation, including dense stands of Himalayan balsam, restricting access, which may have caused some signs to be missed.

2.3.112 Within and adjacent to the land required for the construction of the Proposed Scheme there was extensive suitable terrestrial breeding habitat in the proximity of the watercourse. This includes Hancock's Bank Wood to the south and north of the M56. In addition, the brook is connected to suitable terrestrial breeding habitat including within Rostherne Mere to the south. Evidence of otter presence in the wider River Bollin catchment has been known since at least 1995[10]. Coupled with the desk study record, it is assumed that otter will make use of Blackburn's Brook for foraging and as a corridor for movement.

Timperley Brook

2.3.113 The desk study returned no records for otter within the vicinity of Timperley Brook and no access was granted for survey. From aerial photographs, suitable habitat appears to be present in the form of woodland within and adjacent to the land required for the construction of the Proposed Scheme. The brook is, however, disconnected from other watercourses within the wider landscape. In the absence of field survey data, it has been assumed that otter will make use of Timperley Brook for foraging. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is present at low population levels on most of the rivers and canals in this area.

River Bollin and Tributaries 2 and 3

2.3.114 The desk study returned no records of otter from the River Bollin or its associated tributaries within MA06.

2.3.115 Surveys with a high level of access to the River Bollin and its associated tributaries were undertaken in 2019 and 2020, with low levels of otter activity recorded. Field surveys were obscured by vegetation, including dense stands of Himalayan balsam, restricting access, which may have caused some signs to be missed. Evidence was reported from adjacent to Sunbank Lane, Hale Bank Farm (SJ79808418 and SJ80028434), respectively 60m and 90m south of the land required for the construction of the Proposed Scheme. No active holts were recorded. Five potential holts were reported (SJ79648409, SJ79598412, SJ79208462, SJ79208460 and SJ79208466), of which the closest was 48m north-west of the land required for the construction of the Proposed Scheme at Sunbank Wood. Due to the lack of evidence these holts were not considered active.

2.3.116 Within and adjacent to the land required for the construction of the Proposed Scheme there was extensive suitable terrestrial breeding habitat in the proximity of the watercourses. This includes broadleaved woodland located at Cotterill Clough SSSI, Mill Wood (including Mill Wood and Castle Mill Local Wildlife Site) and Sunbank Wood. However, given the limited field signs, breeding is considered unlikely. Evidence of otter presence in the wider River Bollin catchment has been known since at least 1995[10]. It is therefore assumed that otter will make use of the river for foraging and as a corridor for movement.

Davenport Green to Ardwick (MA07)

2.3.117 Due to a lack of access, limited surveys for otter were undertaken within MA07. No signs or incidental sightings of otter activity were reported from Baguley Brook or the River Mersey.

2.3.118 Three desk study records of otter were returned (SJ85748991, SJ83209036 and SJ81989166), all associated with the River Mersey. Records comprised spraint and a single adult otter sighting. The closest of the three was located 172m west of the land required for the construction of the Proposed Scheme.

2.3.119 Otter is considered highly unlikely to utilise Baguley Brook or the River Mersey within land required for the construction of the proposed Scheme for breeding. In addition, high levels of disturbance and pollution are likely to limit the use of the watercourses for foraging and commuting. This is consistent with the results of the Fifth National Otter Survey[10], which states that otter is widely distributed to the south of Manchester but at a low population level.

Baguley Brook

2.3.120 The desk study returned no records for otter along Baguley Brook.

2.3.121 Surveys with a high level of access were undertaken in 2019 and 2020 and no evidence of otter presence was recorded. There was some suitable breeding habitat within and adjacent to the land required for the construction of the Proposed Scheme, including Blackcarr Wood. Connectivity was, however, limited. Otter is, therefore, considered absent from the watercourse within the land required for the construction of the Proposed Scheme due to the heavily urbanised context, high levels of pollution and regular disturbance.

River Mersey

2.3.122 The desk study returned three records for otter along the River Mersey. The closest of these was an adult sighted 176m to the east of the land required for the construction of the Proposed Scheme (SJ83209036). The other two records are from Cheadle Bridge and south of Chorlton Water Park SBI, respectively 1.7km east and 1.6km west of the land required for the construction of the Proposed Scheme.

2.3.123 Surveys with full access were undertaken in 2019 and no evidence of otter presence was recorded. There was no suitable breeding habitat within or adjacent to the land required for

the construction of the Proposed Scheme. In addition, high levels of disturbance and pollution are likely to limit the use of the watercourses for foraging and commuting. Otter is considered absent from the River Mersey within the land required for the construction of the Proposed Scheme.

Manchester Piccadilly Station (MA08)

2.3.124 Surveys with a moderate level of access were carried out in MA08 and no holts or potential holts were recorded. In addition, no field signs of otter were observed during the surveys conducted within MA08.

2.3.125 Two desk study record were returned from the River Irwell, the closest of which was 3.6km west of the land required for the construction of the Proposed Scheme. A further record was provided from the Manchester Ship Canal at Salford Quays, 3.7km to the west of the land required for the construction of the Proposed Scheme.

2.3.126 There was no suitable breeding habitat within or adjacent to the land required for the construction of the Proposed Scheme. In addition, high levels of disturbance and pollution are likely to limit the use of the watercourses for foraging and commuting. Otter is considered absent from within the land required for the construction of the Proposed Scheme within MA08.

River Medlock

2.3.127 No desk study records were returned for the River Medlock and no evidence of otter was recorded during the field surveys.

2.3.128 Although full access was granted to this transect in 2019, surveys were abandoned following health and safety concerns. Of the length surveyed (approximately 300m from the northern end of the transect), sub-optimal otter habitats were recorded within the land required for the construction of the Proposed Scheme. Surveys were obscured by dense vegetation, including stands of Himalayan balsam and bramble, restricting access, which means some signs may have been missed. Otter is considered absent due to the lack of desk study records, coupled with high levels of disturbance, water pollution and a large amount of litter present on the watercourse banks. Otter is considered absent from the River Medlock within the land required for the construction of the Proposed Scheme.

3 Water vole

3.1 Methodology

3.1.1 Details of the standard methodology utilised for water vole surveys are provided in the FSMS.

3.1.2 Desk study records relating to water vole within 5km of the land required for construction of the Proposed Scheme were obtained from the following sources:

- Canal & River Trust;
- Environment Agency Otter Surveys 1977-2010;
- Greater Manchester Ecology Unit[14];
- Highways England;
- rECOrd[15], Local Biological Records Centre for the Cheshire Region;
- Merseyside Biobank Local Biological Record[16]; and
- Staffordshire Biological Record[17].

3.1.3 Table 3 provides a summary of watercourses and water bodies subject to survey for water vole. The level of access to each transect has been defined using the following categories: none, low (less than 50%), moderate (51-75%), high (>75% but less than 100%) and full. This information is cross-referenced to the accompanying Ecology and Biodiversity Map Book, Map Series EC-12. For each water body/watercourse scoped into the assessment following initial Phase 1 habitat survey, a habitat suitability appraisal was carried out and, where suitable habitat was identified, more detailed field surveys were undertaken to establish presence/likely absence. For all survey sites where the habitat suitability appraisal was undertaken between June and October 2018, 2019 and 2020, detailed surveys were carried out at the same time.

3.1.4 During the initial habitat suitability appraisal, poor quality habitats considered unsuitable to support water vole were scoped out. Factors that would result in a watercourse being scoped out included high levels of shading, poor food availability, poor connectivity and/or lack of suitable watercourse banks for burrowing. Examples of these include:

[14] Manchester Biological Record, *The Ecological Database for Manchester and Greater Manchester*. Available online at: https://www.gmwildlife.org.uk/.

[15] rECOrd, *Local Biological Records Centre serving Cheshire*. Available online at: http://www.record-lrc.co.uk/.

[16] Merseyside BioBank Local Biological Record Centre, the environmental information service, for North Merseyside. Available online at: https://activenaturalist.org.uk/mbb/.

[17] Staffordshire Ecological Record. Available online at: http://www.staffs-ecology.org.uk/html2015/index.php?title=Main_Page.

- watercourses/water bodies being tree-lined, resulting in a lack of water margin vegetation;
- heavily managed watercourses/water bodies with limited vegetation cover;
- high levels of disturbance; watercourses drying out, resulting in poor food availability; and
- canalised watercourses resulting in lack of burrowing substrate.

3.1.5 Best practice survey guidance[18] states that water vole presence can only be confirmed if several field signs of this species are recorded in association with one another. During field surveys, mammal burrows, mammal feeding remains and other field signs were only regarded as evidence of water vole if found in association with water vole droppings.

3.1.6 In addition, where access for field survey was not possible, given the relative scarcity of this species within the wider landscape, water vole presence has only been assumed where there are contemporary desk study records and/or confirmed populations from field surveys on directly connected watercourses. Further, reference has been made to published sources of information from national and regional surveys for water vole to inform the decision making. Water vole are assumed absent where desk study data indicate the presence of invasive plants or mink. This approach is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19]. The report suggests that water vole is largely absent in the north-west due to the presence of mink (*Neovision vision*) coupled with encroachment by invasive plants, including Himalayan balsam and Japanese knotweed, and a lack of suitable burrowing sites due to engineered watercourse banks.

[18] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016), *The Water Vole Mitigation Handbook* (Mammal Society Mitigation Guidance Series), Eds. Fiona Mathews and Paul Chanin. The Mammal Society, London.

[19] Powell, A. and Milburn, K. (2011), *Northwest Lowlands Water Vole Project. Final Report, June 2011.*

Table 3: Summary of features subject to water vole survey

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
Tributary of Fowle Brook	Drain	SJ68046231 to SJ67736338	Low	AT01_S005-S017	27 June 2018 28 June 2018 18 September 2018	MA01	Within
Shropshire Union Canal (Middlewich Branch)	Canal	SJ67946214 to SJ68016487 and SJ68246522 to SJ69146574	Full	AT02_S001-S032, AT05_S001-S011	28 June 2018 24 April 2019 4 July 2019 11 September 2019	MA01, MA02	Within
Tributary 2 of River Weaver	Stream	SJ68396204 to SJ68216218	Full	AT04_S006-S008	23 July 2019	MA02	Within
The Dingle	Stream	SJ68286307 to SJ67416325	Moderate	AT03_S001-S008	28 June 2018	MA02	Within
River Wheelock and Tributaries of River Wheelock 4 and 5	River	SJ69196511 to SJ693865156 and SJ68716607 to SJ68876586	Moderate	AT13_S001-S002, AT10_S001-S003	27 June 2018 19 September 2018 24 April 2019	MA02, MA03	Within
River Dane and Tributary of River Dane 3	River	SJ68156880 to SJ68836784, SJ68506740 to SJ68786750 and SJ68906753 to SJ68896769870	Full	AT09_S001-S023, AT11_S001-S008	3 October 2018 24 May 2019 23 July 2019 5 September 2019	MA02	Within
Trent and Mersey Canal and 1st and 3rd crossings	Canal/ Drain	SJ68666832 to SJ68966773, SJ68046943 to SJ68596857, SJ68056935 to SJ68816893 and SJ68237099 to SJ67967031	Moderate	AT12_S001-S008, AT08_S001-S022, AT06_S001-S018	19 June 2018 20 June 2018 26 June 2018 26 September 2018 4 October 2018 16 May 2019	MA02	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
					24 May 2019 6 June 2019 3 July 2019 14 August 2019 28 August 2019		
Puddinglake Brook	Stream	SJ68766983 to SJ68067036	Full	AT07_S003-S012	22 June 2018 27 September 2018 16 May 2019	MA02	Within
Gad Brook and Tributary of Gad Brook 3	River	SJ68307201 to SJ69087177 and SJ68617191 to SJ69017144	Full	BT13_S001-S017	26 June 2018 10 July 2018 11 July 2018 12 July 2018 29 May 2019 29 August 2019	MA02	Within
Peover Eye and unnamed tributaries	River	SJ70067578 to SJ70487563, SJ70087566 to SJ70547516, SJ70767529 to SJ70087477 and SJ70457503 to SJ70507478	Full	BT10_S029-S059	30 April 2019 19 September 2019 13 September 2020	MA02	Within
Wincham Brook	River	SJ69937578 to SJ70107581	Full	BT10_S020-S021	30 April 2019	MA02	Within
Smoker Brook and Tributary of Smoker Brook 1 and 2	River	SJ70997663 to SJ70107581, SJ70037633 to SJ70307599, SJ70117714 to SJ70097673 and SJ70207719 to SJ70234701	Full	BT10_S001-S019, BT10_S022-S028, BT11_S001-S008	30 April 2019 7 August 2019 19 September 2019 13 September 2020	MA02	Within
Waterless Brook/Arley Brook	River	SJ70447886 to SJ71037825,	Full	BT09_S001-S024	25 April 2019	MA03	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
		SJ70497877 to SJ70187859 and SJ71157905 to SJ70837869			5 June 2019 1 August 2019 26 September 2019		
Tabley Brook and Tributary of Tabley Brook 1-9	River	SJ71398182 to SJ70958134, SJ70938170 to SJ71068161, SJ71188164 to SJ71248049, SJ71358064 to SJ 71368048, SJ71168077 to SJ71108052, SJ71518049 to SJ71018053, SJ71218038 to SJ71257973, SJ71387972 to SJ70617979 and SJ70987999, SJ71838045 to SJ71838003, SJ71608212 to SJ71788171, SJ71568248 to SJ71858226, SJ71858226 to SJ71958081 and SJ71808154 to SJ71718096	High	BT08_S001-S057, BT23_S001-S005, BT18_S001-S007, BT17_S001-S004, BT27-S001-S035	1 August 2018 2 August 2018 3 August 2018 8 August 2018 9 August 2018 10 August 2018 08 September 2018 25 April 2019 15 May 2019 18 July 2019 31 July 2019 12 September 2019 3 September 2020	MA03	Within
Millington Clough and Tributary of Millington Clough 1-4	River	SJ71678467 to SJ7308414, SJ71148454 to SJ71898399, SJ72118423 to SJ71598389, SJ72638430 to SJ71438347, SJ72188402 to SJ72338364 SJ72258391 and SJ72158383	Moderate	BT07_S016-S066	24 April 2019 20 June 2019 20 August 2019 24 September 2019 3 September 2020	MA03	Within
Agden Brook	River	SJ72458490 to SJ72718419 and SJ72128650 to SJ71998612	Full	BT07_S005-S015, BT01_S015-S020	17 July 2018 18 July 2018	MA03	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
					11 October 2018 24 April 2019 20 August 2019 18 September 2019		
Helsdale Brook	River	SJ70466629 to SJ70766603	Full	DT25_S006-S009, DT24_S001-S004	29 May 2019 18 June 2019 21 August 2019 15 September 2020	MA04	Within
River Bollin North	River	SJ70328868 to SJ71488802	High	DT11-S001-S020	13 June 2018 27 September 2020	MA04	Within
Old Bollin and Old Bollin Tributary	River	SJ70938842 to SJ71308832	Low	DT11-S021-S044	29 May 2019 29 August 2019 17 August 2020 19 September 2020	MA04	Within
Bridgewater Canal	Canal	SJ71078708 to SJ72118660	Full	BT01_S003-S017, DT25_S001-S005	12 June 2018 29 May 2019 21 August 2019 18 September 2019	MA04	Within
Red Brook	River	SJ70019081 to SJ70609076	High	DT17_S018-S025	19 June 18 27 June 2019 21 August 2019	MA04	Within
Manchester Ship Canal and unnamed tributaries	Canal	SJ70069019 to SJ70928958 and SJ69879061 to SJ70329121	Moderate	DT10_S001-S012, DT17_S004-S017	12 April 2018 19 June 2018	MA04	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
Glaze Brook and Tributary of Glaze Brook 1 and 2	River	SJ70119137 to SJ70139128, SJ70209157 to SJ70119137, SJ68829206 to SJ69959133, SJ68629265 to SJ68829207, SJ68739248 to SJ68629246 and SJ68739237 to SJ68579229	Full	DT17_S001-S003 and DT17_S026-S029, DT09_S001-S012, DT16_S001-S009, DT08_S001-S029	14 February 2018 7 March 2018 14 March 2018 19 June 2018 26 June 2018 20 September 2018 23 May 2019 29 May 2019 18 June 2019 27 June 2019 8 August 2019 15 August 2019 21 August 2019 13 August 2020 9 September 2020	MA04	Within
Holcroft Lane Brook	River	SJ68169334 to SJ68469299, SJ68579344 to SJ68799323, SJ69009345 to SJ68119274, SJ68109281 to SJ68179279, SJ68549305 to SJ690392668 and SJ6892092677 to SJ6884692501	Moderate	DT07_S001-S070	13 February 2018 21 February 2018 14 March 2018 28 June 2018 30 May 2019 6 August 2019 7 August 2019 13 August 2019 14 August 2019	MA05	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
Tributary of Cross Brook 1 and Partridge Lake Fisheries	River	SJ64659482 to SJ64409461	Full	DT15_S001-S004	8 August 2019	MA05	Within
Jibcroft Brook	River	SJ64239581 to SJ63969574	Full	DT23_S001-S004	21 August 2019	MA05	Within
Carr Brook and Tributary of Carr Brook 1	River	SJ63819598 to SJ64379669 and SJ62679662 to SJ63669738	Moderate	DT22_S001-S011, DT06_S001-S013	22 May 2019 23 May 2019 20 August 2019 11 September 2019 10 August 2020	MA05	Within
Small Brook	River	SJ62629801 to SJ63239819	Moderate	DT05_S001-S013	20 September 2018 10 August 2020	MA05	Within
Hey Brook and Tributary of Hey Brook 1-6	River	SJ62589933 to SJ62499837, SJ62309854 to SJ62099856, SJ61859853 to SJ62349860, SJ61859853 to SJ62069843 and SJ62349875 to SJ61909885, SJ61329891 to SJ62239929, SJ61959881 to SJ61739905 and SJ61709882 to SJ61639901, SJ61509982 to SD61170009	High	DT14_S001-S027, DT04_S001-S018, DT03_S012-S018, DT21_S001-S008, DT13_S001-S006, DT02_S031-S033, DT01_S008-S028, DT19_S003-S007	31 January 2018 1 February 2018 14 June 2018 26 June 2018 27 June 2018 28 June 2018 18 September 2018 25 September 2018 28 September 2018 21 May 2019 22 May 2019 11 July 2019 31 July 2019 1 August 2019	MA05	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
					11 September 2019 29 July 2020 10 August 2020 12 August 2020 8 September 2020		
Nan Holes Brook and Tributary of Nan Holes Brook 1 and 2	River	SJ60129990 to SD61170009, SD60560000 to SD60580007 and SJ60169968 to SD61170009	Moderate	DT03_S001-S011, DT03_S021, DT03_S042-S047	14 June 2018 19 September 2018 28 September 2018 21 May 2019 21 August 2019	MA05	Within
Windy Bank Brook	River	SJ60139961 to SJ61309993	Full	DT03_S022-S037	14 June 2018 26 June 2018 19 September 2018 28 September 2018 21 May 2019 24 September 2019	MA05	Within
Locker Lane Drain	Drain	SD60260057 to SD60280062	Full	DT12_S001	22 May 2019	MA05	Within
Coffin Lane Brook and Tributary of Coffin Lane Brook 1 and 2	River	SD60080072 to SD60510097, SD60470104 to SD60060142 and SD60130095 to SD59830109	Full	DT02_S003-S026, DT02_S033-S034, DT12_S002-S005	27 June 2018 22 May 2019 10 August 2020 8 September 2020	MA05	Within
Leeds and Liverpool Canal (Leigh Branch)	Canal	SD60520134 to SD60440150, SD601001981to SD59580225 and SD59730197 to	Full	DT19_S001-S002, DT01_S001-S007	6 February 2018 26 June 2018	MA05	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
		SD5986602144			25 September 2018 21 May 2019 22 May 2019 20 August 2019 29 July 2020		
Timperley Brook	River	SJ80638597 to SJ80278614, SJ80428658 to SJ80178669	Moderate	BT14_S001-S007, BT16_S001-S003	15 May 2019	MA06	Within
River Bollin and unnamed tributaries	River	SJ79778401 to SJ79298437, SJ79208455 to SJ79558454 and SJ79598443 to SJ79408440, SJ79648468 to SJ79658473, SJ78698422 to SJ78688451	High	BT03_S001-S018, BT03_S033, BT06_S001-S003	13 June 2018 27 September 2018 24 April 2019 29 May 2019 30 May 2019 18 June 2019 18 July 2019 20 August 2019 17 August 2020	MA06	Within
Drains to M56	Drains	SJ79828453 to SJ79938473	Full	BT03_S028-S032	18 July 2019	MA06	Within
Fairywell Brook	River	SJ81168645 to SJ80768690	High	BT19_S001-S007	15 May 2019 28 August 2019	MA07	Within
Baguley Brook and unnamed tributaries	River	SJ82148881 to SJ82048919	Moderate	CT06_S001-S006	20 June 2019 22 August 2019	MA07	Within
River Mersey	River	SJ84009066 to SJ83369087, SJ84169056 to SJ84009066, SJ84049079 to SJ83409097,	Full	CT07_S001-S007, CT04_S001-S002, CT03_S001-S011,	20 June 2019 25 June 2019	MA07	Within

Watercourse or water body and site name	Feature type	OS grid reference (start and finish)	Level of access within required extent	Ecology survey code	Survey dates	CA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
		SJ83369087 to SJ83419108		CT02_S001-S002	14 August 2019		
River Medlock	River	SJ85149759 to SJ85809793	High	CT05_S001-S011	9 July 2019 4 September 2019	MA08	Within

3.2 Deviations, constraints and limitations

3.2.1 The following constraints and limitations were encountered:

- field surveys were limited to locations where landowner permission had been obtained or areas that were accessible to the public;
- surveys were carried out from within the watercourse or from both banks of the watercourse wherever possible, except where access or health and safety constraints prevented this;
- topography and vegetation structure at some locations may have restricted surveys alongside some watercourses/water bodies. While it would still be possible to observe signs of water vole activity in such habitats, evidence may have been under-recorded at these locations;
- in order to complete the maximum number of surveys within the timeframe allowed, some were completed during periods when water levels were high and/or after periods of heavy rainfall. While signs of water vole activity can still be detected under such conditions, evidence may have been under-recorded as field signs may have been washed away or be less visible;
- due to limitations on land access within the available survey timeframe, it was not possible to carry out two survey visits to each site between April and October or to allow a two-month interval between surveys at all sites. This resulted in a restricted survey season with consequently fewer opportunities for encountering water vole field signs. Evidence of water vole activity at the sites where fewer surveys were carried out, or the interval between surveys was shorter, may be under recorded. This reduces the confidence in any negative results obtained during surveys;
- due to significant land access constraints, a deviation was approved whereby water vole surveys were undertaken only along those watercourses and on those water bodies within 100m (instead of 300m) of the land required for the construction of the Proposed Scheme. Where watercourses were at least in part within the land required for the construction of the Proposed Scheme, watercourses were subject to surveys to a 300m (instead of 2km) extent both upstream and downstream of where they cross the land required for the construction of the Proposed Scheme;
- where particular limitations are relevant to the interpretation of the baseline these are discussed within the baseline section of the relevant CA; and
- due to the low number of water vole signs encountered and the partial access to watercourses the application of the population formula for estimating water vole population size (Morris *et al.* 1998)[20] was not possible.

[20] Morris, P., Morris, M., MacPhearson, D., Strachan, R., and Woodroff, G. (1998), *Estimating numbers of water voles Arvicola terrestris: a correction to the published method,* Journal of Zoology, 246, P61-62.

3.3 Baseline

3.3.1 A summary of all positive evidence of water vole (from within the period identified as relevant in the SMR) is provided in Table 4.

Table 4: Summary of all positive evidence of water vole

Name of watercourse (and ecology survey code where applicable)	Location	OS grid reference	Nature of activity recorded	CA	Distance from Proposed Scheme (m) and orientation
Swill Brook (desk study data)	Land east of B5071 Crewe Road, East Shavington	SJ705519	Adult sighting	MA01	1.3km north-west
Field drains east of A5020 (desk study data)	South of Crewe and north of Weston village and A500 Cheshire	SJ724532	Adult sighting	MA01	Immediately adjacent/within
Watercourse at Electra Way (desk study data)	Crewe Business Park Electra Way	SJ7054	Adult sighting	MA01	400m west
River Weaver (desk study data)	Dairy House Farm, Nantwich	SJ664569	Adult sighting	MA01	1.2km south-west
Field drains east of Trent and Mersey Canal (desk study data)	Yeawood Farm	SJ737598	Adult sighting	MA01	3.1km east
Shropshire Union Canal (desk study data)	North of Rookery Wood	SJ67656390	Present	MA02	Within
Park Farm Marina (desk study data)	Park Farm Marina, Davenham	SJ68187172	Present	MA02	75m west
River Dane (desk study data)	East of Leftwich	SJ667720	Present	MA02	1.5km west
Field drains/ponds west of Arley Brook (desk study data)	North-east of Feldy	SJ70047904 to SJ70057905	Three records of presence	MA03	35m east
Millington Clough (BT07_S016_WV2_Visit1_F001_020920,	Millington Clough	SJ72588430 to SJ72588431	Two burrows, latrine, feeding remains and footprints	MA03	Within

Name of watercourse (and ecology survey code where applicable)	Location	OS grid reference	Nature of activity recorded	CA	Distance from Proposed Scheme (m) and orientation
BT07_S016_WV2_Visit1_F002_020920 and BT07_S016_WV2_Visit1_F003_020920)					
South of Bridgewater Canal (desk study data)	Domville Close, Statham	SJ68408720	Present	MA04	2km west
Bridgewater Canal (desk study data)	North of Dunham Town	SJ741882	One adult	MA04	2.9km east
Lymm Golf Course/Lymm Playing Fields (desk study data)	North of Statham	SJ678878 to SJ683880	Two burrows and one adult	MA04	2.0km west
Rixton Clay Pits (desk study data)	Rixton Clay Pits	SJ684901 to	One adult and one burrow	MA04	1.3km west
Manchester Ship Canal (desk study data)	Partington	SJ71739193	One adult	MA04	1.3km north-east
River Bollin (DT11_S013_WV2_Visit1_F001_130618)	River Bollin north of Wet Gate Lane Farm	SJ70988817	Latrine and feeding remains	MA04	Within
Red Brook (desk study data)	South of Partington	Between SJ71079053 and SJ72289050	Eight burrows and two adult sightings	MA04	347m east
Tributary of Glaze Brook 1 (DT09_S012_WV2_Visit1_F001_290519, DT09_S012_WV2_Visit1_F002_290519 and DT09_S012_WV2_Visit3_F001_290519)	Tributary of Glaze Brook 1, west of Bridge Farm	SJ68859204	Latrine, burrow and feeding remains	MA04	90m west
Drains to the south of	Partington	SJ71739193	Water vole sighting, burrows and	MA04	1.3km east

Name of watercourse (and ecology survey code where applicable)	Location	OS grid reference	Nature of activity recorded	CA	Distance from Proposed Scheme (m) and orientation
Manchester Ship Canal (desk study data)			latrines		
New Moss (desk study data)	Cadishead Moss	SJ70399331	Ten burrows, feeding remains and two latrines	MA04	1.1km east
Little Woolden Moss (desk study data)	Little Woolden Moss	SJ688962, SJ699952 and SJ698952	Thirty-four burrows and one latrine	MA04	Within
Field drains west of Whitegate Farm (desk study data)	White Gate Farm	SJ68849628	Three latrines and feeding remains	MA04	779m north
Tributary of Holcroft Lane Brook (desk study data)	Risley Moss LNR	SJ670917 to SJ665921	Five adults	MA05	995m south-west
Tributary of Holcroft Lane Brook (desk study data)	Risley Landfill	SJ669935	One adult	MA05	Within
Tributary of Holcroft Lane Brook (desk study data)	Risley Landfill	SJ656935	One adult	MA05	446m south
Tributary of Holcroft Lane Brook (desk study data)	Risley Landfill	SJ667941	One adult	MA05	Within
Highfield Moss (desk study data)	Highfield Moss	SJ61369560 to SJ61369560	One adult, thirty-two latrines and six burrows	MA05	1.3km west
Ellams Brook (desk study data)	Ellams Wood, Dean Moor Wood	SJ587968	One adult	MA05	1.5km east
Partridge Lakes (desk study data)	Partridge Lakes	SJ644944 to SJ646946	Two adults	MA05	Within
Bickershaw Colliery SBI/Bickershaw Country Park (desk study data)	East of Westleigh and south of Wigan	SD63470024 to SD63260165	Sixteen records of water vole presence	MA05	2.2km east
Barlow's Farm SBI (desk study data)	Barlow's Farm/Barlow's Wood east of Bickershaw	SD62530230 to SD62950238	One adult, twenty-four latrines, three burrows and feeding remains	MA05	2.4km east

Name of watercourse (and ecology survey code where applicable)	Location	OS grid reference	Nature of activity recorded	CA	Distance from Proposed Scheme (m) and orientation
Blakeleys Environmental, Energy and Ecology Centre (desk study data)	Blakeleys Environmental, Energy and Ecology Centre	SD61530186 to SD61570210	Five records of water vole sightings	MA05	1.3km east
Low Hall SBI (desk study data)	North of Platt Bridge	SD610033 to SD61040331	Two burrows and two latrines	MA05	1.4km north-east
Wigan Flashes (desk study data)	Wigan Flashes adjacent to the Leeds and Liverpool Canal	SD59110241 to SD58150416	Five adults, forty-two burrows, eighty-nine latrines, feeding remains and runs	MA05	628m west
Ince Brook (desk study data)	Amberswood Common	SD59810422 to SD60500470	Two burrows and thirteen adults recorded feeding remains and thirteen latrines	MA05	1.7km north
Field drains south of Rossmere (desk study data)	Lindow Moss	SJ821806 to SJ834811	Three adult sightings	MA06	3.5km south-west
Rostherne Mere NNR (desk study data)	Rostherne Mere NNR	SJ740838 to SJ752839	Three adult sightings	MA06	80m west
Field drains to the south of M60 (desk study data)	Abney Hall Park	SJ86108929	Single adult sighting	MA07	2.3km south-east

Hough to Walley's Green (MA01)

3.3.2 There were no confirmed records of water vole within MA01 from field surveys. The desk study returned nine records, all of which were located outside of the land required for the construction of the Proposed Scheme. Water vole populations were confirmed from the following locations:

- a single adult sighting from land east of the B5071, at Swill Brook (SJ705519), 1.3km to the north-west of land required for the construction of the Proposed Scheme;
- a single adult sighting from field drains to the east of the A5020 (SJ724532), at Crotia Mill Farm, within and immediately adjacent to the land required for the construction of the Proposed Scheme;
- a single adult sighting from watercourses at Electra Way, Crewe (SJ7054), 400m to the west of land required for the construction of the Proposed Scheme;
- a single adult sighting from the River Weaver, at Dairy house Farm, Nantwich (SJ664569), 1.2km to the south-west of land required for the construction of the Proposed Scheme; and
- a single adult sighting from field drains east of the Trent and Mersey Canal, at Yeawood Farm (SJ737598), 3.1km to the east of land required for the construction of the Proposed Scheme.

3.3.3 A number of 'Local Key Areas'[21] for water vole, identified as part of the National Water Vole Database and Mapping Project (McGuire and Whitfield, 2017)[22], coincide with the Hough to Walley's Green CA. Surveys carried out by Cheshire Wildlife Trust in 2018, however, recorded no evidence of water vole presence within 400m of the land proposed for the construction of the Proposed Scheme (Powell, 2019)[23]. The lack of evidence of confirmed water vole populations is also consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19]. The report suggests that water vole is largely absent in the north-west due to the presence of mink (*Neovision vision*), coupled with encroachment by invasive plants, including Himalayan balsam and Japanese knotweed, and a lack of suitable burrowing sites due to engineered watercourse banks. Although field surveys have not been completed due to access constraints, water vole are assumed to be present at a low density along the Gresty Brook, as part of a wider metapopulation associated with Wistaston Brook.

[21] Local Key Areas are likely to support one of the following: several colonies of water voles occupying an area of a river system or waterway; robust populations at large but isolated non-linear sites; and a series of sub-populations that form a metapopulation covering an extensive upland area.

[22] McGuire, C. and Whitfield, D. (2017), *National Water Vole Database and Mapping Project Part 1 Project Report 2006-2015*, Hampshire and Isle of White Wildlife Trusts.

[23] Powell, A. (2019), *Draft Water Vole status in Cheshire. Interim Report,* Cheshire Wildlife Trust.

Gresty Brook

3.3.4 No desk study records were returned for Gresty Brook; however, there were three records downstream from the Wistaston Brook (SJ686543, SJ684543 and SJ683544). These comprised a latrine, unspecified field sign and an adult sighting; the closest of which was 900m west of the confluence with Gresty Brook, and 2.4km to the west of land required for the construction of the Proposed Scheme. Due to access constraints, no field surveys have been carried out on Gresty Brook. Given the desk study returned evidence of water vole presence for connected watercourses, in the absence of field surveys, it has been assumed that a low density water vole population is present along the length of the brook as part of a metapopulation present in the wider area.

Tributary of Fowle Brook

3.3.5 No desk study records were returned for the Tributary of Fowle Brook. No evidence of water vole activity was reported, within or adjacent to the land required for the construction of the Proposed Scheme, during the field surveys.

3.3.6 Full access was granted to the watercourse, with sub-optimal water vole habitats recorded within and adjacent to the land required for the construction of the Proposed Scheme. Suitability for water vole was reduced due to low water levels, poor habitat connectivity and regular disturbance along the watercourse. Water vole is, therefore, considered absent from this watercourse. This is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19], which states that water vole is largely absent from the north-west region.

Wimboldsley to Lostock Gralam (MA02)

3.3.7 There were no confirmed records of water vole within MA02 from field surveys. However, possible presence, in the form of unidentified rodent footprints, was recorded for Smoker Brook adjacent to the land required for the construction of the Proposed Scheme. The desk study returned nine records, comprising a combination of confirmed water vole presence and possible presence. Of these, five do not confirm current water vole presence due to the lack of corroborating field signs. Adult sightings were returned from:

- the Shropshire Union Canal (SJ67656390) in 2013, immediately adjacent to the land required for the construction of the Proposed Scheme north of Rookery Wood;
- Park Farm Marina (SJ68187172) in 2013, 75km west of land required for the construction of the Proposed Scheme; and
- the River Dane (SJ667720) in 2008, 1.5km to the west of the land required for the construction of the Proposed Scheme.

3.3.8 A number of 'Local Key Areas' for water vole, identified as part of the National Water Vole Database and Mapping Project (McGuire and Whitfield, 2017), are located within or immediately adjacent to the Wimboldsley to Lostock Gralam CA. However, surveys carried

out by Cheshire Wildlife Trust in 2018 recorded no evidence of water vole presence within 400m of the land proposed for the construction of the Proposed Scheme (Powell, 2019)[23], in the Wimboldsley to Lostock Gralam area.

3.3.9 The lack of evidence of confirmed water vole populations is also consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19]. The report suggests that water vole is largely absent throughout the north-west, due to the presence of mink coupled with encroachment by invasive plants, including Himalayan balsam and Japanese knotweed, and a lack of suitable burrowing sites due to engineered watercourse banks.

Shropshire Union Canal

3.3.10 A single adult sighting of water vole was returned by the desk study for the Shropshire Union Canal in 2013 (SJ67656390) from north of Rookery Wood immediately adjacent to land required for the construction of the Proposed Scheme in MA02. It is, therefore, likely that water vole was present at a low density. No confirmed evidence of water vole activity was reported during the field surveys. Field signs were limited to a possible burrow east of Wimboldsley Grange (SJ67756334) and two possible records of feeding signs north of Wimboldsley Wood (SJ67806439 and SJ67826455).

3.3.11 Full access was granted to this section of the canal, with sub-optimal water vole habitats recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to canalised banks, coupled with high levels of regular disturbance, pollution and agricultural run-off. Although minimal shading was present along the canal section, in-channel vegetation was limited. In addition, signs of mink were recorded during the surveys. Although confirmed evidence of water vole was returned by the desk study, the field survey results suggest that water vole is absent from the watercourse, within and adjacent to the land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011) [19].

Tributary of River Weaver 2

3.3.12 No desk study records were returned for the Tributary of River Weaver 2 and no evidence of water vole activity was reported during the field surveys.

3.3.13 Full access was granted to the watercourse, although dense vegetation restricted access and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited, due to dense vegetation, low water levels, high turbidity, high levels of regular disturbance and poor habitat connectivity. Water vole is, therefore, considered absent from the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

The Dingle

3.3.14 No desk study records were returned for The Dingle. However, a single, unspecified record was returned for the Shropshire Union Canal, approximately 500m north of The Dingle (SJ67656390), in 2013. Although there were no corroborating field signs, it is considered likely that water vole was historically present, at a low density, within the wider landscape. No evidence of water vole activity was reported during the field surveys.

3.3.15 Full access was initially granted to the watercourse, but later revoked. In addition, dense vegetation restricted access and visibility and some signs of water vole may have been missed. Only one of the two required survey visits was undertaken due to subsequent access constraints. Sub-optimal water vole habitats were recorded, within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to limited ground flora, high levels of pollution from agricultural run-off and high levels of shading by dense, impenetrable woodland and scrub. Although possible water vole records were returned by the desk study for the Shropshire Union Canal, connectivity between the watercourses was poor. Whilst survey effort has been compromised by access constraints, water vole is considered absent from the watercourse, within and adjacent to the land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

River Wheelock and Tributaries

3.3.16 No desk study records were returned for River Wheelock and its associated tributaries. No evidence of water vole activity was reported during the field surveys.

3.3.17 Full access was granted to the majority of the watercourses, although dense vegetation restricted access and visibility, and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to extensive (80%) bankside shading from the adjacent hedgerow and woodland, restricting bankside vegetation growth along the watercourse. In addition, connectivity with the wider landscape was considered poor. Water vole is, therefore, considered absent from the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

River Dane and Tributary 3

3.3.18 A single desk study record, in the form of a field sighting, was provided for the River Dane (SJ667720), from 2008, to the immediate east of Northwich, 1.5km to the west of the land required for the construction of the Proposed Scheme. Although there were no corroborating field signs, it is considered likely that water vole was historically present, at a low density. No evidence of water vole activity was reported during the field surveys.

3.3.19 Full access was granted to this section of the River Dane, with moderate access to the associated tributaries. Dense vegetation restricted access and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to high turbidity and poor water quality. In addition, food sources for water vole were limited to scattered herbs and occasional grasses. Extensive areas of the watercourse banks were also bare and subject to erosion.

3.3.20 Due to the historical water vole presence from the River Dane, 5.5km to the north of the surveyed section, it is possible that they remain present within the watercourse at a low density. However, the species is considered absent from the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. This is due to poor habitat suitability coupled with the presence of mink recorded during field surveys and noted as part of the citation for the River Dane, Bostock SBI. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Trent and Mersey Canal and Crossings

3.3.21 No desk study records were returned for the Trent and Mersey Canal and its associated 1st and 3rd crossings. An unspecified water vole record was returned from Park Hall Marina (SJ68207170) in 2013, 86m west of the land required for the construction of the Proposed Scheme and the canal. Although there were no corroborating field signs, it is considered likely that water vole was historically present at a low density. No evidence of water vole activity was reported during the field surveys.

3.3.22 A high level of access was granted to the watercourse and its associated tributaries. Sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to canalised banks coupled with high levels of regular disturbance, pollution and agricultural run-off. Extensive sections of the tributaries were dry. Although minimal shading was present along the canal section, in-channel vegetation was limited. Although water vole was recorded as possibly present at Park Hall Marina in 2013, water vole is considered absent from the Trent and Mersey Canal, within and adjacent to the land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Puddinglake Brook

3.3.23 No desk study records were returned for Puddlinglake Brook. No evidence of water vole activity was reported during the field surveys.

3.3.24 A high level of access was granted to Puddinglake Brook, although dense vegetation restricted access and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to low water levels,

high levels of shading limiting foraging resources and pollution from the surrounding agricultural land. In addition, signs of mink were recorded during the surveys. Water vole is, therefore, considered absent from the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Gad Brook and Tributary 3

3.3.25 A single unspecified desk study record of water vole was provided south of Gad Brook, from Park Hall Marina (SJ68207170) in 2013, 86m west of the land required for the construction of the Proposed Scheme. Due to the lack of corroborating field signs, water vole presence has not been confirmed. No evidence of water vole activity was reported during the field surveys.

3.3.26 A high level of access was granted to Gad Brook and its associated tributary, although dense vegetation restricted access and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded within and partially within the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to dense vegetation, including dense stands of Himalayan balsam limiting bankside vegetation growth, high levels of shading and steep banks. In addition, signs of mink were recorded during the surveys. Although water vole was recorded as possibly present at Park Hall Marina in 2013, water vole is considered absent from the watercourse within and adjacent to land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Wade Brook

3.3.27 A single desk study record of a water vole burrow was returned for Wade Brook, to the north-west of Griffiths Park (SJ674739), 915m to the west of land required for the construction of the Proposed Scheme, in 2009. Due to the lack of corroborating field evidence, water vole presence has not been confirmed. Due to access constraints, no field surveys have been carried out. It is possible, however, that where burrows were recorded, individuals were present in the recent past but have since disappeared.

3.3.28 The watercourse falls within a Local Key Area due to the historical presence of a known metapopulation. Surveys carried out by Cheshire Wildlife Trust in 2018 (Powell, 2019)[23] recorded no evidence of water vole from the brook and is it considered that the population may be locally extinct. For this reason, it has been assumed that water vole is absent from the Wade Brook.

Peover Eye and unnamed tributaries

3.3.29 A single desk study record of an unspecified water vole field sign was returned for the Peover Eye, to the east of the M6 (SJ73447439), in 2007, 2.9km to the east of land required for the construction of the Proposed Scheme. Due to the lack of corroborating field evidence, water vole presence has not been confirmed. No confirmed desk study records of water vole presence were returned for the Peover Eye and its associated tributaries, and no evidence of water vole activity was reported during the field surveys.

3.3.30 Full access was granted to the watercourses, although dense vegetation restricted access and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to high levels of shading (70-100%), dense stands of Himalayan balsam limiting foraging resources and poor connectivity. In addition, signs of mink were recorded during the surveys. Water vole is, therefore, considered absent from the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Wincham Brook

3.3.31 No desk study records were returned for Wincham Brook, although an unspecified water vole field sign was returned from the Trent and Mersey Canal (SJ67807490), 250m to the north of the confluence with the brook. The record dates from 1997 and was from 1.1km to the north-west of land required for the construction of the Proposed Scheme. Due to the lack of corroborating field evidence, coupled with the age of the record, water vole presence has not been confirmed. No evidence of water vole activity was reported during the field surveys.

3.3.32 Full access was granted to the watercourses, although dense vegetation restricted access and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to high levels of shading (70-100%), dense stands of Himalayan balsam limiting foraging resources and poor connectivity. In addition, signs of mink were recorded during the surveys. Water vole is, therefore, considered absent from the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Smoker Brook and Tributaries 1 and 2

3.3.33 No desk study records were returned for Smoker Brook and its associated tributaries. Low numbers of possible water vole signs (four) were recorded during the field surveys within

Smoker Wood between SJ70267607 and SJ71107620. This included possible water vole footprints and a collapsed burrow from the riparian corridor adjacent to the land required for the construction of the Proposed Scheme. Due to the lack of corroborating field evidence coupled with the uncertainty over the species associated with the records[24], water vole presence has not been confirmed.

3.3.34 Full access was granted to the watercourses, although dense vegetation restricted access and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to high levels of shading (70-100%), dense stands of Himalayan balsam limiting foraging resources and poor connectivity. In addition, signs of mink were recorded during the surveys. Whilst possible signs of water vole were recorded, it is considered that the species is absent from the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. This is due to the sub-optimal habitat quality, coupled with the presence of mink. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Pickmere to Agden and Hulseheath (MA03)

3.3.35 There was a single confirmed record of water vole presence within MA03 from field surveys. This comprised footprints, two burrows, feeding remains and a single latrine along Millington Clough to the north-east of Sandhole Farm (SJ72588430 to SJ72588431) from within the land required for the construction of the Proposed Scheme. The evidence indicates the presence of a low-density population[25] (in line with Strachan, Moorhouse and Gelling, 2011)[26].

3.3.36 The desk study returned three records of water vole presence, three records of water vole foraging signs and one latrine, all of which were located outside the land required for the construction of the Proposed Scheme. The records of presence were from 35m east of the land required for the construction of the Proposed Scheme (SJ70047904, SJ70057905 and SJ70057905) south-east of Feldy, to the west of Arley Brook. In addition, two records of water vole burrows were returned from within the land required for the construction of the Proposed Scheme from Agden Brook (SJ726843), within the Hulseheath to Manchester Airport (MA06). These desk study records do not confirm water vole presence due to the lack

[24] It is difficult to distinguish water vole feeding remains from those of bank vole (*Myodes glareolus*) and field vole (*M. agrestis*). Similarly, brown rat footprints and water vole footprints can be difficult to separate with confidence.

[25] Population density has been determined in accordance with The Water Vole Conservation Handbook, which states that where there are fewer than five latrines per 100m of watercourse bankside habitat during the second half of the season (July to September) or fewer than two during the first half of the season (mid-April to end of June), the relative population density is 'Low'.

[26] Strachan, R, Moorhouse, T, and Gelling M. (2011), *Water Vole Conservation Handbook: Third Edition*. Wildlife Conservation Research Unit, Oxford.

of corroborating field signs, although it is possible that water vole are present at a low density. The desk study also returned two records of water vole absence, both from water bodies within Dunham Park SSSI (SJ73628710 and SJ73768738).

3.3.37 The limited evidence of water vole within MA03 is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19]. The report suggests that water vole is largely absent due to the presence of mink coupled with encroachment by invasive plants, including Himalayan balsam and Japanese knotweed, and a lack of suitable burrowing sites due to engineered watercourse banks.

Waterless Brook/Arley Brook

3.3.38 No desk study records were returned for Waterless Brook/Arley Brook, although a series of three unspecified field signs was returned from ponds 264m to the west of the brook, 40m to the east of the land required for the construction of the Proposed Scheme (SJ70047904, SJ70057905 and SJ70057905). Due to the lack of corroborating field evidence, coupled with the age of the records, water vole presence has not been confirmed. No evidence of water vole activity was reported during the field surveys.

3.3.39 Full access was granted to the watercourses, although dense vegetation restricted access and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitat was recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was reduced due to high levels of shading, steep banks, poor vegetation structure, high levels of disturbance and limited connectivity to suitable habitat in the surrounding area. Water vole is, therefore, considered absent from the watercourse within and adjacent to land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Tabley Brook and Tributaries 1 to 8

3.3.40 No desk study records were returned for Tabley Brook and its associated tributaries. No evidence of water vole activity was recorded during the field surveys.

3.3.41 A high level of access was granted to the watercourses, although dense vegetation restricted access and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to dry conditions, poor connectivity to suitable habitat in the wider landscape, high levels of shading and limited vegetation structure. Water vole is, therefore, considered absent from the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Millington Clough and Tributaries 1 to 4

3.3.42 No desk study records were returned for Millington Clough and its associated tributaries, although two records of possible burrows were returned from Agden Brook adjacent to the confluence with Millington Clough (SJ726843). These records are from within the land required for the construction of the Proposed Scheme within the Hulseheath to Manchester Airport CA (MA06). Due to the lack of corroborating field evidence, water vole presence has not been confirmed.

3.3.43 Evidence of water vole was recorded during field surveys along Millington Clough (SJ72588430 to SJ72588431) to the north-east of Sandhole Farm. This was in the form of two burrows, feeding remains, footprints and a single latrine within the land required for the construction of the Proposed Scheme. The evidence indicates the presence of a low density population of water vole in line with Strachan, Moorhouse and Gelling, 2011)[26].

3.3.44 A high level of access was granted to the watercourses, although dense vegetation restricted access and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded from within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to dry conditions and high levels of shading restricting vegetation structure. A low density water vole population has, however, been confirmed within the land required for the construction of the Proposed Scheme. The evidence of a low density population of water vole is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19] that suggests that water vole is largely absent in this area.

Agden Brook

3.3.45 Two desk study records of possible burrows were returned for Agden Brook (SJ726843) in 2009, from within the land required for the construction of the Proposed Scheme, although these were from within the Hulseheath to Manchester Airport (MA06). Due to the lack of corroborating field evidence, water vole presence has not been confirmed.

3.3.46 No confirmed field signs of water vole activity were recorded during the field surveys. A single possible burrow was recorded north of the A56 (SJ721865) to the west of Agden Bridge, 95m to the north-east of the land required for the construction of the Proposed Scheme.

3.3.47 Full access was granted to Agden Brook, although dense vegetation restricted access and visibility and some signs of water vole may have been missed. Suitable water vole habitats were recorded from within and adjacent to the land required for the construction of the Proposed Scheme. Although the brook provides suitable habitat for water vole, including an assemblage of rank grasses and tall ruderal vegetation, suitability was reduced due to high levels of shading (80-90%), in-channel pollution and run off from adjacent agricultural land. Although the habitat is considered suitable, due to the lack of corroborating field evidence associated with both the desk study data and field surveys, coupled with the low number of possible signs (two burrows in 2009 and one in 2018), water vole presence has not been

confirmed. Water vole is, therefore, considered absent along the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Bridgewater Canal

3.3.48 No desk study records were returned for the Bridgewater Canal from within MA03, although a single adult water vole sighting was returned from the vicinity of the canal in MA04 (SJ68408720), 2.0km west of the land required for the construction of the Proposed Scheme. No evidence of water vole activity was reported during the field surveys.

3.3.49 Full access was granted to this section of the Bridgwater Canal, with sub-optimal water vole habitats recorded from within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to the presence of reinforced, steep banks along the watercourse and generally poor connectivity to habitats within the wider landscape. Suitability for water vole was further limited by high levels of regular disturbance including anglers, a lack of emergent vegetation and limited bankside vegetation structure. Water vole is, therefore, considered absent from the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Broomedge to Glazebrook (MA04)

3.3.50 There were two confirmed records of water vole within MA04 from field surveys, with water vole colonies reported from the following locations:

- River Bollin north of Wet Gate Lane Farm (SJ70988817) within land required for the construction of the Proposed Scheme; and
- Glaze Brook Tributary 1, 80m west of the land required for the construction of the Proposed Scheme (SJ68859205).

3.3.51 Possible water vole evidence was also recorded from the following locations:

- Helsdale Brook (runs, burrows and feeding remains) within the land required from the construction of the Proposed Scheme;
- an old latrine from the River Bollin, from within land required for the construction of the Proposed Scheme; and
- an old feeding station from Glaze Brook Tributary 1 from within the land required for the construction of the Proposed Scheme.

3.3.52 The desk study returned 30 records of water vole presence, comprising a combination of unspecified records, adult water vole sightings, burrows and latrines. Five confirmed water vole colonies were recorded as follows:

- Red Brook south of Partington (between SJ71079053 and SJ72289050), 850m east of the land required for the construction of the Proposed Scheme;
- within Partington (SJ71739193), comprising water vole sightings, latrines and burrows, associated with field drains 1.4km north-east of the land required for the Proposed Scheme;
- at Little Woolden Moss (10 burrows at SJ69789519, seven burrows and one latrine at SJ69979523 and 17 burrows at SJ69399549) from within the land proposed as a mitigation/compensation area;
- at New Moss (10 burrows and two latrines at SJ70399331), 1.1km to the east of land required for the construction of the Proposed Scheme; and
- two latrines and feeding remains to the east of White Gate Farm (SJ688963), 797m north of land required for the construction of the Proposed Scheme.

3.3.53 The desk study also returned nine records of water vole absence. The closest of these is within the land proposed as a mitigation/compensation area at Little Woolden Moss. As there are also confirmed water vole colonies present at this location from the same year (2009), a precautionary approach has been taken and presence, not absence, has been assumed.

Helsdale Brook

3.3.54 No desk study records were returned for Helsdale Brook. Possible evidence of the presence of water vole was returned by the field surveys in the form of the following:

- a single burrow and feeding remains (SJ70968755) north of Bradshaw Lane; and
- feeding remains and three possible water vole runs (between SJ70968766 and SJ70958767), 100m further north of the burrow.

3.3.55 These field records are all from within or immediately adjacent to the land required for the construction of the Proposed Scheme. Whilst corroborating evidence to confirm presence was not returned by the field surveys, due to the number of signs recorded, it is considered highly likely that water vole is present on Helsdale Brook at low densities.

3.3.56 Full access was granted to Helsdale Brook, although dense vegetation restricted access and visibility and some signs of water vole may have been missed. Suitable water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited in some sections due to low or dry water levels, steep banks, reinforced banksides, high levels of shading, regular disturbance and pollution. The presence of a low density population is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

River Bollin

3.3.57 No desk study records were returned for the River Bollin within MA04. A single latrine and feeding remains were recorded during field surveys to the north-east of Wet Gate Lane Farm (SJ70988817), within the land required for the construction of the Proposed Scheme.

3.3.58 Full access was granted to the River Bollin, although dense vegetation, including stands of giant hogweed, obscured accessibility and visibility and some signs of water vole may have been missed. Suitable habitat was present within and adjacent to the land required for the construction of the Proposed Scheme. Overhanging bankside trees including oak, ash (*Fraxinus excelsior*) and willow species (*Salix* spp.) provide high levels of shading to the river. In addition, mink have also been recorded within this section, reducing the suitability of the watercourse for water vole. The presence of a latrine and feeding remains confirms water vole presence on the River Bollin within the land required for the construction of the Proposed Scheme. The low number of records of presence, however, suggest that the species is present at a low density in line with Strachan, (Moorhouse and Gelling, 2011).

Old Bollin and Tributary

3.3.59 No desk study records were returned for the Old Bollin and its tributary within MA04, although the species is recorded as present on at least one occasion between 2009 and 2018 within the 10km grid squares SJ68 and SJ78 according to the National Water Vole Monitoring Programme. No evidence was recorded by the field survey.

3.3.60 Access was granted to a limited stretch of the Old Bollin, although dense vegetation, including stands of Himalayan balsam, common nettle (*Urtica dioica*) and bindweed (*Convolvulus* spp.), obscured accessibility and visibility and some signs of water vole may have been missed. Suitable habitat was present within and adjacent to the land required for the construction of the Proposed Scheme. Banksides were largely shallow, with low levels of shading and abundant grasses/reeds.

3.3.61 Whilst no evidence of water vole was returned from the field surveys, access was granted to only a short stretch of the watercourse. Adopting a precautionary approach and given the presence of suitable habitat, the presence of water vole along the Old Bollin is considered likely as part of a wider metapopulation associated with the adjacent River Bollin. A low density population is therefore assumed for the Old Bollin and its tributary.

Manchester Ship Canal and unnamed tributaries

3.3.62 A confirmed water vole colony, comprising water vole sightings, latrines and burrows in 2007, was returned by the desk study 1.3km east of the land required for the Proposed Scheme (SJ71739193). The colony was identified within field drains, 100m south of the Manchester Ship Canal. No evidence of water vole activity was recorded during the field surveys of the canal within or adjacent to the land required for the construction of the Proposed Scheme.

3.3.63 A high level of access was granted to this section of the Manchester Ship Canal, with sub-optimal water vole habitats recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to high levels of regular disturbance, a lack of emergent vegetation and limited bankside vegetation. Although water vole were historically present to the south of the canal (to the east of the land required for the construction of the Proposed Scheme), water vole is considered absent from the Manchester Ship Canal within the land required for the Proposed Scheme. The lack of evidence of confirmed water vole populations is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Red Brook

3.3.64 Four desk study records were returned for Red Brook, the closest of which was for seven burrows recorded 347m to the east of the land required for the construction of the Proposed Scheme (SJ71079053). Due to the lack of corroborating field evidence this record does not confirm presence. However, evidence of presence was returned for this watercourse as follows:

- water vole sightings from SJ71999046, 850m east of land required for the construction of the Proposed Scheme;
- water vole sightings from SJ72059058, 950m east of land required for the construction of the Proposed Scheme; and
- a single burrow from SJ72289050, 1.1km east of land required for the construction of the Proposed Scheme.

3.3.65 No evidence of water vole was reported during the field surveys.

3.3.66 A moderate level of access was granted to Red Brook, although dense vegetation, including stands of Himalayan balsam, restricted access and visibility and some signs of water vole may have been missed. Suitable water vole habitats were recorded within and partially within the land required for the construction of the Proposed Scheme. Connectivity with the wider landscape was high, including a network of field drains and the Manchester Ship Canal. The presence of a confirmed population from desk study records, coupled with suitable habitat and connectivity with the wider landscape, suggests that a population of water vole is likely present at low densities along Red Brook.

Glaze Brook and Tributaries 1 and 2

3.3.67 No desk study records were returned for Glaze Brook and its associated tributaries. The closest records of water vole presence were from Caddishead Moss (SJ70399331) in 2008, 820m east of Glaze Brook. Confirmed water vole presence was reported during the field surveys from Tributary 1 of Glaze Brook; with water vole feeding remains associated with burrows and a latrine 80m west of the land required for the construction of the Proposed Scheme between SJ68859205 and SJ68819208. No evidence of water vole presence was recorded for Glaze Brook.

3.3.68 A high level of access was granted to Glaze Brook and its associated tributaries, although dense vegetation, including stands of Himalayan balsam, restricted access and visibility and some signs of water vole may have been missed. Whilst some suitable water vole habitats were recorded to the immediate east of the land required for the construction of the Proposed Scheme, generally habitat suitability was limited due to high levels of shading and poor vegetation structure and composition. In addition, regular disturbance on the western tributaries and the presence of mink further limit suitability. Whilst the presence of a confirmed water vole colony at Cadishead Moss suggest that Glaze Brook could form part of a wider metapopulation, water vole is considered absent from within the land required for the construction of the Proposed Scheme. In contrast, a confirmed population is present along Tributary 1, 80m west of the land required for the construction of the Proposed Scheme.

Risley to Bamfurlong (MA05)

3.3.69 There were no confirmed records of water vole presence within MA05 from field surveys. Possible evidence, in the form of a burrow, runs and feeding remains were recorded from Tributary of Hey Brook 6 (SD60130191), 141m to the east of the land required for the construction of the Proposed Scheme. In addition, although not listed as reasons for designation, water vole populations are reported to be present at Pennington Flash Local Nature Reserve (LNR), Abram Flashes SSSI and The Wigan Flashes LNR[27]. Pennington Flash lies approximately 65m to the east of land required for the construction of the Proposed Scheme. Abram Flashes and Wigan Flashes are located immediately to the east and west of the land proposed for the construction of the Proposed Scheme respectively.

3.3.70 The desk study returned 10 confirmed populations of water vole, the closest of which was from Silver Lane Brook (SJ669935) at Risley Landfill, within land required for the construction of the Proposed Scheme. Records were primarily located to the east and north of land required for the construction of the Proposed Scheme as follows:

- Risley Moss NNR/Risley Landfill site (SJ670917 to SJ665921), eight adults, the closest of which was located within the land required for the construction of the Proposed Scheme;
- Highfield Moss (SJ61369560 to SJ61369560), one adult, 32 latrines and six burrows located 1.3km west of the land required for the construction of the Proposed Scheme;
- Ellams Brook (SJ587968), one adult from 1.5km east of the land required for the construction of the Proposed Scheme;
- Partridge Lakes (SJ644944 to SJ646946), two adults from within the land required for the construction of the Proposed Scheme;

[27] Reported in the citations for each site.

- Bickershaw Colliery SBI/Bickershaw Country Park (SD63470024 to SD63260165), 16 records of water vole presence located 2.2km east of the land required for the construction of the Proposed Scheme;
- Barlow's Farm SBI (SD62530230 to SD62950238), one adult, 24 latrines, three burrows and feeding remains located 2.4km east of the land required for the construction of the Proposed Scheme;
- Blakeley's Environmental, Energy and Ecology Centre (SD61530186 to SD61570210), five records of water vole presence located 1.3km east of the land required for the construction of the Proposed Scheme;
- Low Hall SBI north of Platt Bridge (SD610033 to SD61040331), two burrows and two latrines located 1.4km north-east of the land required for the construction of the Proposed Scheme;
- Wigan Flashes (SD59110241 to SD58150416), five adults, 42 burrows, 89 latrines, feeding remains and runs located 628m west of the land required for the construction of the Proposed Scheme; and
- Ince Brook at Amberswood Common (SD59810422 to SD60500470), two burrows, 13 adults, feeding remains and 13 latrines located 1.7km north of the land required for the construction of the Proposed Scheme.

Holcroft Lane Brook

3.3.71 Four desk study records were returned for Holcroft Lane Brook. One record of possible burrows and eight water vole sightings were reported from within the land required for the construction of the Proposed Scheme. These records were from tributaries of Holcroft Lane Brook at Risley Landfill (SJ670917 to SJ667941). No evidence of water vole activity was reported during the field surveys.

3.3.72 A moderate level of access was granted to the complex of waterbodies associated with Holcroft Lane Brook, although dense vegetation, including stands of Himalayan balsam, restricted access and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme.

3.3.73 Although a good availability of food sources was present along the survey sections, low water levels and high shading reduced water vole habitat suitability. Desk study records suggest previous presence of water vole; however, the absence of any field signs suggests that they are likely absent from Holcroft Lane Brook and its associated tributaries. Taking a precautionary approach given the historical presence of water vole, a low density population is assumed present. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Tributary of Cross Brook 1 and Partridge Lake Fisheries

3.3.74 A single unspecified desk study record of possible water vole presence was returned for the Tributary of Cross Brook 1 (SJ644944). In addition, records of two adults were returned from the adjacent Partridge Lake Fisheries (SJ646946). The information provided for these water vole sightings suggests that they are within the fishery itself and therefore are from outside the land required for the construction of the Proposed Scheme. No evidence of water vole activity was reported during the field surveys. Evidence provided by the desk study is insufficient to confirm presence due to the absence of corroborative field signs. It is, however, likely that water vole was present at a low density at the time of surveys (2008). Given that no evidence of water vole activity was reported during the field surveys, water vole is considered absent from the land required for the construction of the Proposed Scheme.

3.3.75 A moderate level of access was granted to the Tributary of Cross Brook 1, although dense vegetation restricted access and visibility and some signs of water vole may have been missed. No access was provided for Partridge Lake Fisheries. Sub-optimal water vole habitats were recorded within and partially within the land required for the construction of the Proposed Scheme and all surveyed watercourses were dry. Habitat suitability was further reduced due to the lack of connectivity to other watercourses and high levels of shading from bankside vegetation. Although desk study records suggest previous presence of water vole at the adjacent Partridge Lane Fisheries, habitat was considered unsuitable during scoping surveys carried out in 2018. Water vole is, therefore, considered absent from the land required for the construction of the Proposed Scheme. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Wigshaw Lane Drains

3.3.76 No desk study records were returned for Wigshaw Lane Drains and due to access constraints, no field surveys have been carried out. A single desk study record was returned from the adjacent Partridge Lake Fisheries (SJ646946), from within 200m of Wigshaw Lane Drains. From aerial photography there appeared to be suitable habitat in the proximity of the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. Whilst both water vole and mink are both recorded as present within SJ69 under the National Water Vole Monitoring Programme, in the absence of field survey data, water vole are assumed to be present at a low density on Wigshaw Lane Drains.

Jibcroft Brook

3.3.77 No desk study records were returned for Jibcroft Brook and no evidence of water vole activity was reported during the field surveys.

3.3.78 A high level of access was granted to the brook, however, only one of the two required presence/absence survey visits was carried out. Sub-optimal water vole habitats were

recorded within and partially within the land required for the construction of the Proposed Scheme. Habitat suitability was reduced due to the limited availability of food sources present.

3.3.79 Although survey effort is incomplete, given the lack of desk study records coupled with the presence of sub-optimal habitat, water vole are considered absent from the land required for the construction of the Proposed Scheme. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Carr Brook and Tributary 1

3.3.80 No desk study records were returned for Carr Brook and its associated tributary, and no evidence of water vole activity was reported during the field surveys.

3.3.81 A low level of access was granted to the watercourses, with no evidence of water vole reported during the field surveys. The tributaries associated with Carr Brook exhibited no flow and water levels were low throughout the survey period. Whilst there was a high level of food availability across the pasture fields adjacent to the watercourse, poor connectivity and high levels of shading limited habitat suitability for water vole. Water vole is therefore considered absent from the watercourse within land required for the construction of the Proposed Scheme. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Small Brook

3.3.82 No desk study records were returned for Small Brook and due to a lack of access, no field surveys have been carried out. From aerial photography there appeared to be suitable habitat in the proximity of the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. In the absence of desk study data and in line with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19], water vole are assumed absent from Small Brook.

Hey Brook and tributaries 1 to 6

3.3.83 A single historical desk study record of water vole presence was provided from 2006, approximately 304m to the north-east of the land required for the construction of the Proposed Scheme (SD612002) within Abram Flashes SSSI. Low numbers of scattered field signs, including possible burrows, feeding signs and footprints were recorded during the field surveys from Tributary 6 (SD60130191), 173m east of the land required for the construction of the Proposed Scheme. Given the lack of corroborating evidence, the presence of water vole has not been confirmed.

3.3.84 A high level of access was granted across all watercourses within the Hey Brook complex, although dense vegetation, including stands of Himalayan balsam, restricted accessibility and visibility and some signs of water vole may have been missed. Suitable habitat for water vole was present within and adjacent to the land required for the construction of the

Proposed Scheme. The watercourses provided a high level of food source availability and good connectivity to other watercourses including ponds and lakes within the wider habitat. There was, however, a regular level of disturbance on the southernmost tributaries of Hey Brook, reducing suitability for water vole. In addition, evidence of brown rat (*Rattus norvegicus*) and mink was recorded along some sections of the brook. The low numbers of possible field signs suggest that water vole is likely present at low densities within the complex of watercourses as part of a wider metapopulation associated with a possible population at Abram Flashes. The low number of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Windy Bank Brook

3.3.85 No desk study records were returned for Windy Bank Brook. A single potential burrow was recorded from within the land required for the construction of the Proposed Scheme (SJ60999084). Given that no further evidence of activity was returned, the burrow is not considered to confirm the presence of water vole.

3.3.86 A moderate level of access was granted to the brook, although dense vegetation, including stands of Himalayan balsam, restricted accessibility and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to low water levels and poor connectivity. In addition, frequent evidence of brown rat was recorded along the brook. Water vole is, therefore, considered absent from the watercourse within land required for the construction of the Proposed Scheme. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Wigan Road Drains

3.3.87 No desk study records were returned for Wigan Road Drains and due to a lack of access, no field surveys have been carried out. From aerial photography there appeared to be suitable habitat in the proximity of the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. In the absence of desk study data and in line with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19], water vole are assumed absent from Wigan Road Drains.

Nan Holes Brook and Tributaries 1 and 2

3.3.88 No desk study records were returned for Nan Holes Brook and its associated tributaries. No evidence of water vole activity was reported during the field surveys.

3.3.89 A moderate level of access was granted for Nan Holes Brook and Tributaries 1 and 2, although dense vegetation, including stands of Himalayan balsam, restricted accessibility and visibility and some signs of water vole may have been missed. Sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the

Proposed Scheme. Habitat suitability was limited due to low water levels, presence of mink, frequent poaching by cattle, high levels of shading and pollution. In addition, evidence of brown rat was recorded along some sections of Nan Holes Brook. Suitability for water vole was higher to the east of the brook, although water levels remained very low and shading high. Water vole is, therefore, considered absent from the watercourse within land required for the construction of the Proposed Scheme. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Locker Lane Drain

3.3.90 No desk study records were returned for the Locker Lane Drain and no evidence of water vole activity was reported during the field surveys.

3.3.91 A high level of access was granted to the watercourse, with sub-optimal habitats recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was limited due to lack of water and limited vegetation structure and composition. Water vole is, therefore, considered absent from the watercourse within land required for the construction of the Proposed Scheme. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Coffin Lane Brook and Tributaries 1 and 2

3.3.92 No desk study records were returned for the Coffin Lane Brook and its associated tributaries. No evidence of water vole activity was reported during the field surveys.

3.3.93 A low level of access was granted to the watercourses and dense vegetation, including stands of bramble and Himalayan balsam, restricted accessibility and visibility and some signs of water vole may have been missed. Habitat suitability was limited due to dense vegetation and high levels of shading, limiting vegetation structure and composition. Water vole is, therefore, considered absent from the watercourse within the land required for the construction of the Proposed Scheme. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Leeds and Liverpool Canal

3.3.94 The desk study returned record of water vole presence, in the form of burrows and feeding signs, associated with Ince Moss, Scotman's Flash and Wigan Flashes 628m to the west of land required for the Proposed Scheme. Records included five adults, 42 burrows, 89 latrines, runs and feeding remains between SD59110241 and SD58150416. A population of water vole is also known to be present at Wigan Flashes (Powell and Milburn, 2011)[19].

3.3.95 Two records of water vole absence were returned by the desk study from the Leeds and Liverpool Canal. The closest of these was 30m north of the land required for the construction of the Proposed Scheme south of Abram (SD60740072). A second record of absence was recorded 256m to the west of the land required for the construction of the Proposed Scheme to the west of Bamfurlong Junction (SD59550226). Field surveys returned

no evidence of water vole, although possible presence was returned from the adjacent Hey Brook Tributary 6 (SD60130191).

3.3.96 A moderate level of access was granted to this section of the Leeds and Liverpool Canal and a series of minor watercourses to the west. Suitable water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme, but suitability was reduced due to high levels of regular disturbance and pollution, a lack of emergent vegetation and limited bankside vegetation structure. Given that no further evidence of activity was recorded, the burrow is not considered to confirm the presence of water vole. Although there is a low density population associated with Hey Brook Tributary 6, it is considered that water vole are absent from the Leeds and Liverpool Canal from within the land required for the construction of the Proposed Scheme.

Hulseheath to Manchester Airport (MA06)

3.3.97 The desk study returned 10 records of water vole, comprising unspecified field signs, adult sightings, a burrow and a single latrine. The closest of these was an unspecified field sign located immediately adjacent to the land required for the construction of the Proposed Scheme (SJ754847). Populations of water vole were confirmed at the following locations:

- three adults reported from field drains south of Rossmere at Lindow Moss (SJ821806 to SJ834811), 3.5km south-west of the land required for the construction of the Proposed Scheme; and
- three adults reported from Rostherne Mere NNR (SJ740838 to SJ752839), 80m west of the land required for the construction of the Proposed Scheme.

3.3.98 No incidental sightings or evidence of water vole activity were reported from within MA06. Water vole are considered likely absent from land required for the construction of the Proposed Scheme within MA06. This is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19]. The report suggests that water vole is largely absent in the north-west due to the presence of mink coupled with encroachment by invasive plants, including Himalayan balsam and Japanese knotweed, and a lack of suitable burrowing sites due to engineered banks.

Sugar Brook

3.3.99 No desk study records were returned for Sugar Brook and due to access constraints, only one of the two presence/absence survey visits was carried out. Possible evidence of water vole presence was limited to a single record of unidentified rodent footprints from 32m west of the land required for the construction of the Proposed Scheme (SJ77728257). Due to the lack of corroborating field signs, water vole presence cannot be confirmed.

3.3.100 Suitable habitat was present within and adjacent to the land required for the construction of the Proposed Scheme. However, high levels of shading (85%) limited vegetation structure and composition. It is considered that water vole are likely absent from the watercourse due

to the lack of field signs, coupled with the limited food availability. This is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Mobberley Brook

3.3.101 No desk study records were returned for Mobberley Brook and due to access constraints, no field surveys have been carried out. From aerial photography there appeared to be suitable habitat in the proximity of the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. In the absence of desk study data and in line with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19], water vole are assumed absent from Mobberley Brook.

Birkin Brook and tributaries

3.3.102 No desk study records were returned for Birkin Brook and its tributaries, and no surveys have been carried out due to access constraints. The presence of mink was reported along this watercourse during otter surveys carried out in Autumn 2019. Although no surveys have been carried out, water vole is considered absent from the Birkin Brook and its associated tributaries within land required for the construction of the Proposed Scheme. The likely absence of water vole is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Timperley Brook

3.3.103 No desk study records were returned for the Timperley Brook and no evidence of water vole activity was reported during the field surveys.

3.3.104 A low level of access was granted to Timperley Brook and its associated tributaries. Sub-optimal water vole habitats were recorded within and partially within the land required for the construction of the Proposed Scheme. Habitat suitability was reduced due to low water levels and pollution from agricultural run-off. Water vole is, therefore, considered absent from the Timperley Brook and its associated tributaries within land required for the construction of the Proposed Scheme. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Blackburn's Brook

3.3.105 No desk study records were returned for Blackburn's Brook and no surveys have been carried out due to access constraints. The presence of mink was reported along this watercourse during otter surveys carried out in Autumn 2019. Although no surveys have been carried out, in the absence of desk study data and in line with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19], water vole are assumed absent from Small Brook and its associated tributaries within land required for the construction of the Proposed Scheme.

Drains to M56

3.3.106 No desk study records were returned for the watercourses and no evidence of water vole activity was reported during the field surveys.

3.3.107 A low level of access was granted to the watercourse, with sub-optimal habitats recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was reduced due to low water levels and poor food source availability. Water vole is, therefore, considered absent from the watercourses within land required for the construction of the Proposed Scheme. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Davenport Green to Ardwick (MA07)

3.3.108 A single desk study record of confirmed water vole presence was returned from field drains to the south of the M60 at Abney Hall Park (SJ8610829), 2.3km to the south-east of land required for the construction of the Proposed Scheme. In addition, two records of absence were returned at Heaton Mersey Common (SJ86269108) and Gatley Carrs (SJ84038893) 1.7km south-east and 1.4km east of land required for the construction of the Proposed Scheme. No incidental sightings or evidence of water vole activity were reported from within MA07. It is, therefore, assumed that water vole is absent from within the land required for the construction of the Proposed Scheme. This is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19]. The report suggests that water vole is largely absent within land required for the construction of the Proposed Scheme within MA07 due to the presence of mink coupled with encroachment by invasive plants, including Himalayan balsam and Japanese knotweed, and a lack of suitable burrowing sites due to engineered banks.

Fairywell Brook

3.3.109 No desk study records were returned for Fairywell Brook and no evidence of water vole activity was reported during the field surveys.

3.3.110 A moderate level of access was granted to the watercourse, with sub-optimal habitats recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was reduced due to low water levels, poor food source availability and regular disturbance. Water vole is, therefore, considered absent from the watercourse within the land required for the construction of the Proposed Scheme. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Baguley Brook and tributaries

3.3.111 No desk study records were returned for Baguley Brook or its associated tributaries, and no evidence of water vole activity was reported during the field surveys.

3.3.112 A high level of access was granted to the watercourse, with sub-optimal habitats recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was reduced due to high levels of pollution and disturbance. Water vole is, therefore, considered absent from the watercourse within the land required for the construction of the Proposed Scheme. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

River Mersey and tributaries

3.3.113 No desk study records were returned for the River Mersey or its associated tributaries, and no evidence of water vole activity was reported during the field surveys.

3.3.114 A high level of access was granted to the watercourse, with sub-optimal habitats recorded within and adjacent to the land required for the construction of the Proposed Scheme. Habitat suitability was reduced due to the presence of reinforced banks, poor food source availability and a high level of disturbance. Water vole is, therefore, considered absent from the watercourse within the land required for the construction of the Proposed Scheme. The lack of field signs is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19].

Manchester Piccadilly Station (MA08)

3.3.115 With only minor watercourses and two canals present within a wider urban landscape, three survey transects for water vole were undertaken within MA08. The desk study returned a single unspecified record of possible historical water vole presence from the Ashton Canal (SJ84829814) in 1998, located within the land required for the construction of the Proposed Scheme. Due to the lack of corroborating field signs, water vole presence cannot be confirmed. No incidental sightings or evidence of water vole activity was reported from within MA08. This is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19]. The report suggests that water vole is largely absent due to the presence of mink coupled with encroachment by invasive plants, including Himalayan balsam and Japanese knotweed, and a lack of suitable burrowing sites due to engineered banks.

River Medlock

3.3.116 No desk study records were returned for the River Medlock and no evidence of water vole was recorded during the field survey.

3.3.117 Although full access was granted, field surveys were abandoned for reasons of health and safety. Of the three sections surveyed (S009-S011), sub-optimal water vole habitats were recorded within and adjacent to the land required for the construction of the Proposed Scheme. Vegetation, including dense bramble and stands of Himalayan balsam, obscured accessibility and visibility and some signs of water vole may have been missed. Habitat suitability was reduced due to the presence of mink, fast flow and highly fluctuating water

levels. Water vole is, therefore, considered absent from the watercourse. This is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19], which suggests that water vole is largely absent due to the presence of mink coupled with encroachment by invasive plants, including Himalayan balsam and Japanese knotweed, and a lack of suitable burrowing sites due to engineered banks.

Ashton Canal

3.3.118 The desk study returned a single unspecified field record of water vole. This was located within the land required for the construction of the Proposed Scheme (SJ84829814), 30m south of the confluence with the Rochdale Canal. Due to the lack of corroborating field signs, coupled with the age of the desk study record (1998), water vole presence cannot be confirmed. No field surveys have been carried out due to access constraints. From aerial photography there appeared to be suitable habitat in the proximity of the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. Coupled with the historical desk study record, it is considered that a low-density population associated with the Ashton and Rochdale canals may be present. This is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19], which suggests that water vole is largely absent due to the presence of mink coupled with encroachment by invasive plants, including Himalayan balsam and Japanese knotweed, and a lack of suitable burrowing sites due to engineered banks.

Rochdale Canal

3.3.119 The desk study returned no records of water vole from the Rochdale Canal. An unspecified water vole field sign was returned from the Ashton Canal, 30m south of the confluence with the Rochdale Canal (SJ84829814). Due to the lack of corroborating field signs, coupled with the age of the desk study record (1998), water vole presence cannot be confirmed. No field surveys have been carried out due to access constraints. From aerial photography there appeared to be suitable habitat in the proximity of the watercourse within and adjacent to the land required for the construction of the Proposed Scheme. Coupled with the historical desk study record, it is considered that a low-density population associated with the Ashton and Rochdale canals may be present. This is consistent with the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011)[19], which suggests that water vole is largely absent due to the presence of mink coupled with encroachment by invasive plants, including Himalayan balsam and Japanese knotweed, and a lack of suitable burrowing sites due to engineered banks.

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