



River Condition Assessments

Improvements flow from here

River Condition Assessment For Todmorden Road, Littleborough

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0. Executive Summary

- 0.1** This report has been prepared at the request of CRP Limited. It relates to the proposed re-development works at Todmorden Road, Littleborough, Rochdale, Greater Manchester, OL15 9EG (OS Grid Reference: SD 94068 16704). The survey effort and report relate to the River Roch and Town House Brook. To fulfil this brief, River Condition Assessments undertook both a desktop study and a field survey.
- 0.2** Under the current proposals, the plans are to extend the existing industrial buildings and add new parking areas. Overall, this will result in both the permanent and temporary loss and/or alteration of some of the habitats located on the proposed re-development site.
- 0.3** The five contiguous Modular River Physical (MoRPh) assessment along with a desktop study of the reach revealed the following conditions:
- River Roch – Fairly Poor Condition.
 - Town House Brook – Fairly Poor Condition.



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1. Introduction

1.1 Rationale

This report has been prepared at the request of CRP Limited. It relates to the proposed re-development works at Todmorden Road, Littleborough, Rochdale, Greater Manchester, OL15 9EG (OS Grid Reference: SD 94068 16704). The survey effort and report relate to the River Roch and Town House Brook. To fulfil this brief, River Condition Assessments undertook both a desktop study and a field survey.

1.2 Site Description

The site is located on an industrial estate adjacent to the A6033 in Littleborough, a town in the borough of Rochdale, Greater Manchester and is bordered by two linear waterbodies, the River Roch on the eastern boundary and Town House Brook on the Northern boundary. These linear waterbodies are situated in artificial environments consisting of industrial estates, residential areas and agricultural land, with small pockets or semi-natural habitats in the form of woodlands and individual trees.

1.3 Proposed Works

Under the current proposals, the plans are to extend the existing industrial buildings and add new parking areas. Overall, this will result in both the permanent and temporary loss and/or alteration of some of the habitats located on the proposed re-development site.

1.4 Aims of Surveys

This survey aims to assess the existing canal to provide its condition of the surveyed section (**Figure 3**) of the River Roch and Town House Brook. This will subsequently feedback and input into a Biodiversity Net Gain Metric Calculation.



Figure 1: An aerial map showing the site at Todmorden Road, Littleborough (as shown by the yellow star) in relation to some of the local landscape.



Figure 2: An OS map obtained from Bing showing the site at Todmorden Road, Littleborough (as shown by the yellow star).





Figure 3: An OS map of the River Roch showing the location of the centre point of the MoRPh5 (orange circles), the reach length is shown by the yellow stars.

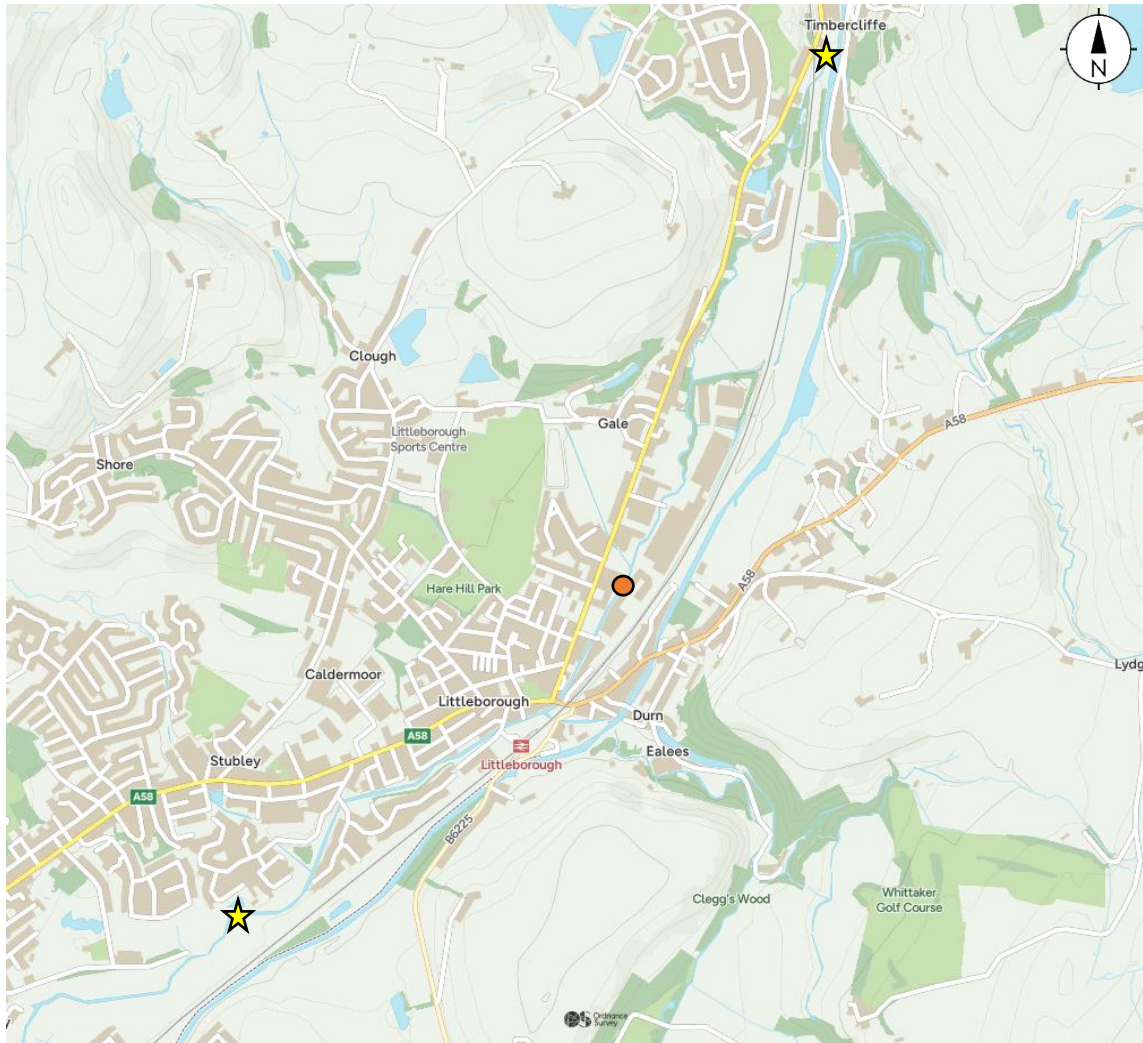
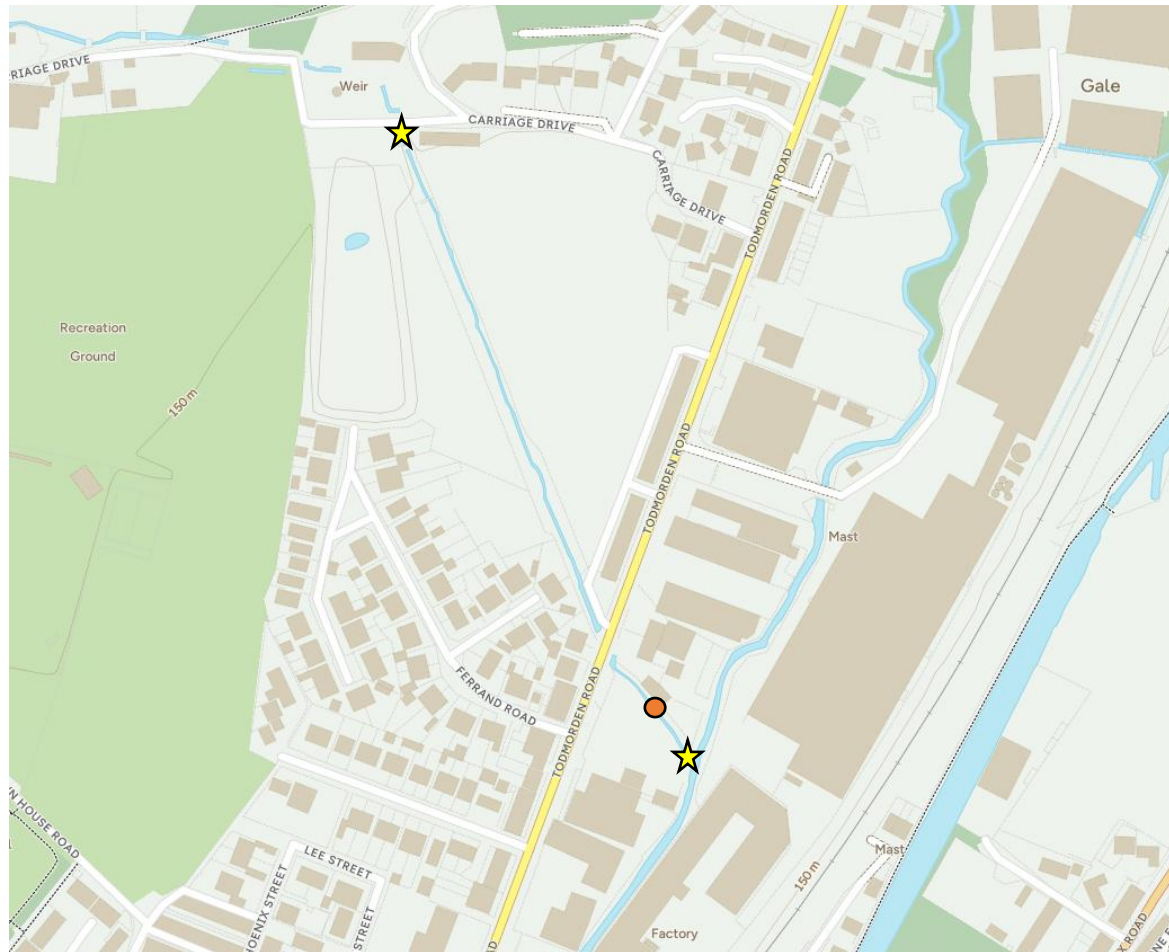




Figure 4: An OS map of the Town House Brook showing the location of the centre point of the MoRPh5 (orange circles), the reach length is shown by the yellow stars.





2. Survey Methodology

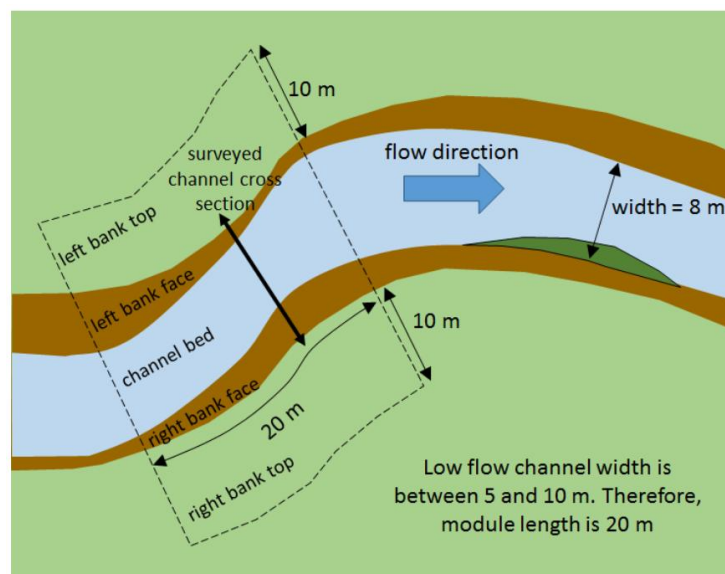
2.1 Field Survey Methodology

2.1.1 MoRPh 5 Surveys

The Modular River Physical (MoRPh) survey (Shuker et al., 2017, Gurnell et al., 2019) is used to collect field information for subreach of a river with the aim of surveying at least 20% of the total river length within the area of a proposed development.

MoRPh surveys capture information on short lengths (modules) of river that are approximately twice the river width (width < 5 m, length = 10 m; width > 5 m and < 10 m, length = 20 m; width > 10 m and < 20 m, length = 30 m; width > 20 m and < 30 m, length = 40 m). For 'canals and navigable rivers' and for 'large rivers', where the bed material and submerged bed features are not visible (i.e., many rivers > 20 m width and all > 30 m width), module lengths should be 50 m. MoRPh surveys extend away from the river to 10 m from the bank top on both banks and record information relating to the bank tops, bank faces, channel-water margin, and the riverbed as well as channel dimensions. The surveys are designed to be conducted on a single river thread. For assessing river condition, a MoRPh5 subreach survey is comprised of 5 contiguous MoRPh module surveys to capture information for sub reaches of 50, 100, 150, 200 m in length according to the river width.

Figure 5: MoRPh layout taken from the MoRPh Survey Field Guide (Gurnell et al., 2019)



The survey captures the extent and character of bank and bed sediments, morphological and hydraulic features/habitats, riparian and aquatic vegetation extent and structure, presence and extent of non-native invasive plant species (NNIPS), bank top land use pressures, human interventions within the river channel, and the cross-sectional dimensions of the river channel.

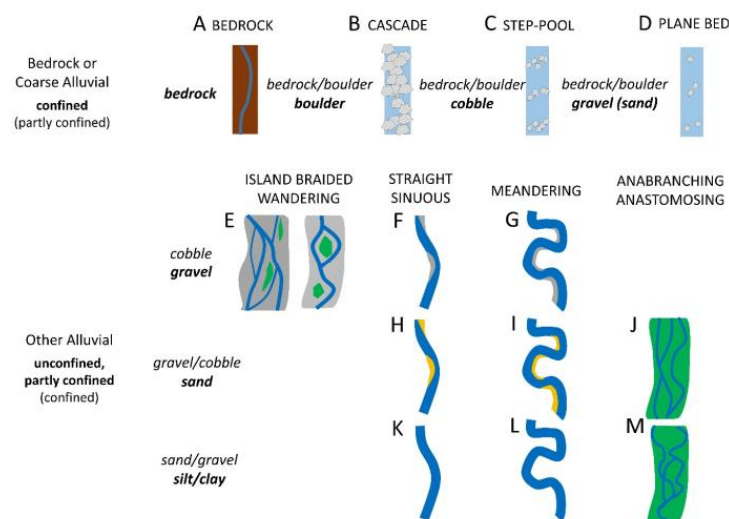


2.2 Desktop Survey Methodology

2.2.1 River Type

River condition is assessed in the context of different river types. Identifying the broad types or classes of river in combination with the field data generates the river's condition. There are fifteen river types in England, thirteen near-natural, canals and navigable rivers, and large rivers. Discrimination of these types is based mainly upon a reach-scale desk study but is supported by bed material information from MoRPh5 subreach-scale field surveys. Near- Natural River types are defined primarily by their planform and bed material, supported by the degree to which they are confined by their valley and also the valley gradient. Large rivers are those that are too wide or deep for reliable bed material information to be collected during a MoRPh field survey. Canals and navigable rivers form the final river type. Their modified nature prevents the assignment of an indicative 'near-natural' type.

Figure 6: Thirteen near-natural river types (Gurnell et al., 2019)



River type indicators are combined to determine the indicative river type. Five indicators (A1-A5) are assessed by a desk study of an extended 'homogenous' reach within which the project area is located. A further three (A6-A8) are automatically estimated from MoRPh5 subreach field survey data once it has been uploaded into the information system.

Source	Code	Indicator	Description
Desk study	A1	Braiding index (BI)	The number of wet channels separated by vegetated or unvegetated bars or islands.
Desk study	A2	Sinuosity index (SI)	The reach river length divided by the reach valley length.
Desk study	A3	Anabranching index (AI)	The number of unvegetated channels separated by vegetated bars or islands.
Desk study	A4	Level of confinement	Ability to change course.
Desk study	A5	Valley gradient	The elevation difference between the upstream elevation and downstream elevation divided by the reach valley length.
Field Study	A6	Bedrock reaches	Is bedrock extensive in 3 or more MoRPhs.
Field Study	A7	Coarsest bed material size class	coarsest bed material size class across all 5 MoRPhs.
Field Study	A8	Average alluvial bed material size class	Average bed material size class across all 5 MoRPhs.



2.2.2 River Condition

River condition indicator scores are automatically extracted from MoRPh5 field surveys. Indicators summarise either the 'natural' morphology, sediment, and vegetation related (i.e., positive) aspects of a MoRPh5 subreach or local human interventions and pressures (i.e., negative aspects). These positive and negative indicators are listed below.

Each river condition indicator is automatically assigned a score from 0 to 4 (positive indicators) or 0 to -4 (negative indicators) once the MoRPh5 field survey data have been uploaded into the information system. These condition indicators not only feed into the final condition assessment but they also provide information on why the subreach has been assigned a particular condition and where to focus effort when attempting to improve condition.

Location	Code and Name
Bank Top	B1 - Bank top vegetation structure
	B2 - Bank top tree feature richness
	B3 - Bank top water-related features
	B4 - Bank top NNIPS cover
	B5 - Bank top managed ground cover
Bank Face	C1 - Bank face riparian vegetation structure
	C2 - Bank face tree feature richness
	C3 - Bank face natural bank profile extent
	C4 - Bank face natural bank profile richness
	C5 - Bank face natural bank material richness
	C6 - Bank face bare sediment extent
	C7 - Bank face artificial bank profile extent
	C8 - Bank face reinforcement extent
	C9 - Bank face reinforcement material severity
	C10 - Bank face NNIPS cover
Channel – Water Margin	D1 - Channel margin aquatic vegetation extent
	D2 - Channel margin aquatic morphotype richness
	D3 - Channel margin physical feature extent
	D4 - Channel margin physical feature richness
	D5 - Channel margin artificial features
Channel Bed	E1 - Channel aquatic morphotype richness
	E2 - Channel bed tree features richness
	E3 - Channel bed hydraulic features richness
	E4 - Channel bed natural features extent
	E5 - Channel bed natural features richness
	E6 - Channel bed material richness
	E7 - Channel bed siltation
	E8 - Channel bed reinforcement extent
	E9 - Channel bed reinforcement severity
	E10 - Channel bed artificial features severity
	E11 - Channel bed NNIPS extent
	E12 - Channel bed filamentous algae extent



3. Field Results

3.1 MoRPh Description

River Name	River Roch				
Module	1	2	3	4	5
Midpoint location (NGR)	SD 94082 16657	SD 94075 16647	SD 94066 16643	SD 94063 16632	SD 94059 16622
Channel Characteristics					
INDEX 1: Number of Flow Types	2	2	2	2	2
INDEX 2: Highest Energy Present/Extensive Flow Type	Broken Waves	Broken Waves	Broken Waves	Broken Waves	Broken Waves
INDEX 3: Number of Bed Material Types	0	0	0	0	0
INDEX 4: Coarsest Present/Extensive Mineral Bed Material Type	Unknown as bed could not be seen	Unknown as bed could not be seen	Unknown as bed could not be seen	Unknown as bed could not be seen	Unknown as bed could not be seen
INDEX 5: Average Alluvial Bed Material Size (Phi Units)					
INDEX 6: Average Alluvial Bed Material Size Class	Unknown as bed could not be seen	Unknown as bed could not be seen	Unknown as bed could not be seen	Unknown as bed could not be seen	Unknown as bed could not be seen
INDEX 7: Extent of Superficial Bed Siltation	0	0	0	0	0
INDEX 8: Channel Physical Habitat Complexity	0.8333333	0.8333333	0.8333333	0.8333333	0.8333333
INDEX 9: Number of Aquatic Vegetation Morphotypes	0	0	0	0	0
Riparian Characteristics (Bank Top and Bank Face)					
INDEX 10: Riparian Physical Habitat Complexity	0	0	0	0	0
INDEX 11: Riparian Vegetation Structural Complexity	2	2	2	2	2
Human Pressures and Impacts					
INDEX 12: Degree of Human Pressure Imposed by Bank Top Land Cover	8	8	8	8	8
INDEX 13: Channel Reinforcement	0	0	0	0	0
INDEX 14: Non-Native Invasive Plant Species Extent	0	0	0	0	0
Non-Native Invasive Plants					
Himalayan Balsam	Absent	Absent	Absent	Absent	Absent
Japanese Knotweed	Absent	Absent	Absent	Absent	Absent
Giant Hogweed	Absent	Absent	Absent	Absent	Absent
Floating Pennywort	Absent	Absent	Absent	Absent	Absent



River Name	Town House Brook				
Module	1	2	3	4	5
Midpoint location (NGR)	SD 94086 16783	SD 94093 16778	SD 94091 16766	SD 94101 16761	SD 94112 16749
Channel Characteristics					
INDEX 1: Number of Flow Types	1	1	1	1	1
INDEX 2: Highest Energy Present/Extensive Flow Type	Rippled	Rippled	Rippled	Rippled	Rippled
INDEX 3: Number of Bed Material Types	1	1	1	1	1
INDEX 4: Coarsest Present/Extensive Mineral Bed Material Type	Cobble	Cobble	Cobble	Cobble	Cobble
INDEX 5: Average Alluvial Bed Material Size (Phi Units)	-7	-7	-7	-7	-7
INDEX 6: Average Alluvial Bed Material Size Class	Cobble	Cobble	Cobble	Cobble	Cobble
INDEX 7: Extent of Superficial Bed Siltation	6.7	6.7	6.7	6.7	6.7
INDEX 8: Channel Physical Habitat Complexity	0.8333333	0.8333333	0.8333333	0.8333333	0.8333333
INDEX 9: Number of Aquatic Vegetation Morphotypes	0	0	0	0	0
Riparian Characteristics (Bank Top and Bank Face)					
INDEX 10: Riparian Physical Habitat Complexity	2.5	2.5	2.5	2.5	2.5
INDEX 11: Riparian Vegetation Structural Complexity	3	2.5	3.5	2.5	2.5
Human Pressures and Impacts					
INDEX 12: Degree of Human Pressure Imposed by Bank Top Land Cover	4.5	4.5	4.5	4.5	4.5
INDEX 13: Channel Reinforcement	0	0	0	0	0
INDEX 14: Non-Native Invasive Plant Species Extent	0	0	0	0	0
Non-Native Invasive Plants					
Himalayan Balsam	Absent	Absent	Absent	Absent	Absent
Japanese Knotweed	Absent	Absent	Absent	Absent	Absent
Giant Hogweed	Absent	Absent	Absent	Absent	Absent
Floating Pennywort	Absent	Absent	Absent	Absent	Absent



3.2 MoRPh5 Results

Code and Name	Score	
	River Roch	Town House Brook
B1 - Bank top vegetation structure	0	1
B2 - Bank top tree feature richness	0	0
B3 - Bank top water-related features	0	0
B4 - Bank top NNIPS cover	0	0
B5 - Bank top managed ground cover	-4	-3
C1 - Bank face riparian vegetation structure	1	2
C2 - Bank face tree feature richness	0	0
C3 - Bank face natural bank profile extent	0	3
C4 - Bank face natural bank profile richness	0	2
C5 - Bank face natural bank material richness	1	1
C6 - Bank face bare sediment extent	1	4
C7 - Bank face artificial bank profile extent	0	0
C8 - Bank face reinforcement extent	0	0
C9 - Bank face reinforcement material severity	0	0
C10 - Bank face NNIPS cover	0	0
D1 - Channel margin aquatic vegetation extent	0	0
D2 - Channel margin aquatic morphotype richness	0	0
D3 - Channel margin physical feature extent	0	0
D4 - Channel margin physical feature richness	0	0
D5 -Channel margin artificial features	0	0
E1 - Channel aquatic morphotype richness	0	0
E2 -Channel bed tree features richness	0	0
E3 - Channel bed hydraulic features richness	1	0
E4 - Channel bed natural features extent	0	1
E5 - Channel bed natural features richness	0	0
E6 - Channel bed material richness	0	1
E7 - Channel bed siltation	0	-4
E8 - Channel bed reinforcement extent	0	0
E9 - Channel bed reinforcement severity	0	0
E10 - Channel bed artificial features severity	0	-2
E11 - Channel bed NNIPS extent	0	0
E12 - Channel bed filamentous algae extent	0	0



3.3 River Type and Condition

	River Roch	Town House Brook
Upstream Grid reference	SD 94593 18000	SD 93941 17116
Down Stream Grid reference	SD 93050 15812	SD 94118 16734
River Category	Other	Other
a1 - Braiding Index	1	1
a2 – Sinuosity	1	1
a3 - Anabranching Index	1	1
a4 - Confinement	Partly Confined	Partly Confined
a5 - Reach Valley Gradient	0.00981132	0.016431924
a6 - Bedrock reach	FALSE	FALSE
a7 - Coarsest bed material size class	Cobble	Cobble
a8 - Average bed material size class	Cobble	Cobble
Calculated River Type	F - Straight/sinuuous	F - Straight/sinuuous
Overridden River Type	N/A	N/A
Shape	1.2	0.2857143
Average Width	3	1
Preliminary Condition Score	-0.097165994	0.097165994
Final Condition Class	Fairly Poor	Fairly Poor

Based on the above data, both linear waterbodies are in fairly poor condition. Remedial measures must be in place to obtain a condition of moderate or better.



4. References

Gurnell, A.M., England, J., Shuker, L.C. and Wharton, G., 2019. The contribution of citizen science volunteers to river monitoring and management: International and national perspectives and the example of the MoRPh survey. *River Research and Applications*, 35(8): 1359-1373.

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Gurnell, A.M., England, J., Shuker, L.C. and Wharton, G., 2020. The MoRPh Survey Technical Reference Manual 2020 version. Modular River Survey.

Shuker, L.J., Gurnell, A.M., Wharton, G., Gurnell, D.J., England, J., Finn Leeming, B. and Beach, E., 2017. MoRPh: a citizen science tool for monitoring and appraising physical habitat changes in rivers. *Water and Environment Journal*, 31(3): 418-424.



5. Appendices

Appendix A: Site Photographs



Appendix A: Site Photographs

Plate 1: River Roch MoRPh 1 across stream.



Plate 2: River Roch MoRPh 1 upstream.





Plate 3: River Roch MoRPh 1 downstream.



Plate 4: River Roch MoRPh 2 across stream.





Plate 5: River Roch MoRPh 2 upstream.



Plate 6: River Roch MoRPh 2 downstream.





Plate 7: River Roch MoRPh 3 across stream.



Plate 8: River Roch MoRPh 3 upstream.





Plate 9: River Roch MoRPh 3 downstream.



Plate 10: River Roch MoRPh 4 across stream.





Plate 11: River Roch MoRPh 4 upstream.



Plate 12: River Roch MoRPh 4 downstream.





Plate 13: River Roch MoRPh 5 across stream.



Plate 14: River Roch MoRPh 5 upstream.





Plate 15: River Roch MoRPh 5 downstream.



Plate 16: Town House Brook MoRPh 1 across stream.





Plate 17: Town House Brook MoRPh 1 upstream.



Plate 18: Town House Brook MoRPh 1 downstream.





Plate 19: Town House Brook MoRPh 2 across stream.



Plate 20: Town House Brook MoRPh 2 upstream.





Plate 21: Town House Brook MoRPh 2 downstream.



Plate 22: Town House Brook MoRPh 3 across stream.





Plate 23: Town House Brook MoRPh 3 upstream.



Plate 24: Town House Brook MoRPh 3 downstream.





Plate 25: Town House Brook MoRPh 4 across stream.



Plate 26: Town House Brook MoRPh 4 upstream.





Plate 27: Town House Brook MoRPh 4 downstream.



Plate 28: Town House Brook MoRPh 5 across stream.





Plate 29: Town House Brook MoRPh 5 upstream.



Plate 30: Town House Brook MoRPh 5 downstream.





6. Notice to Readers: Conditions of this Report

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The latest good practice guidelines put in place by Natural England or the relevant statutory conservation bodies have been followed by the surveyors on site. If those methodologies fail to identify a protected species during the survey efforts, no responsibility can be attributed to Elite Ecology. If any of these guidelines are adapted between the date(s) of the surveys being undertaken and the submission of this report, then River Condition Assessments takes no responsibility for this.

Should any equipment be damaged or lost on site at the fault of the client(s), then River Condition Assessments withholds the right to charge 100% above the current market value for that exact product or the nearest similar product.

The survey results purport the current status of the site and its potential for protected species utilisation at the time of surveying. It should not be viewed as a complete list of the possible flora and fauna species that could be using the site at different times of the year.

River Condition Assessments has been provided with full payment for this report and thus the product has been released to the client(s) for the purpose of their planning application. If any part of the report is lost or altered without the written permission of River Condition Assessments, then the entire report becomes invalid. Due to the potential for continual change within the natural world, this report is valid for **2 years only** from the date of the last survey visit. If this report is submitted after the 2 year deadline, then a further updated inspection will be required to ascertain whether the site remains in the same condition as it was when initially inspected.

No reliance should be made on any such comments in relation to the structural integrity of the features located on the surveyed site. All information within the report is based solely on evidence that has been found on site during the service provided. No individual opinion or inference will be made other than that of the suitably qualified ecologist appointed to the project.