peakecology LIMITED
ECOLOGICAL CONSULTANTS

Appendix E: River Condition Assessment

Keuper Gas Storage Project

ISSUE RECORD

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The information and advice contained in this report has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

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1 INTRODUCTION

1.1 Scope of Report

This report has been prepared by Peak Ecology Ltd on behalf of Keuper Gas Storage Limited. It provides the results of a River Condition Assessment (RCA) carried out in 2025, associated with the Proposed Development.

The purpose of this report is to:

- Describe the baseline condition of the watercourse;
- Assess the biodiversity value of the habitat; and
- Calculate the baseline biodiversity River Units.

This report does not include an evaluation of impacts or detailed mitigation; this will be provided within the EcIA. This report does not include the results of a Water Framework Directive assessment; this will be reported separately upon completion.

The results of this assessment should be included within the Biodiversity Net Gain assessment for the site.

The information and advice contained in this report has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct.

1.2 Study Area

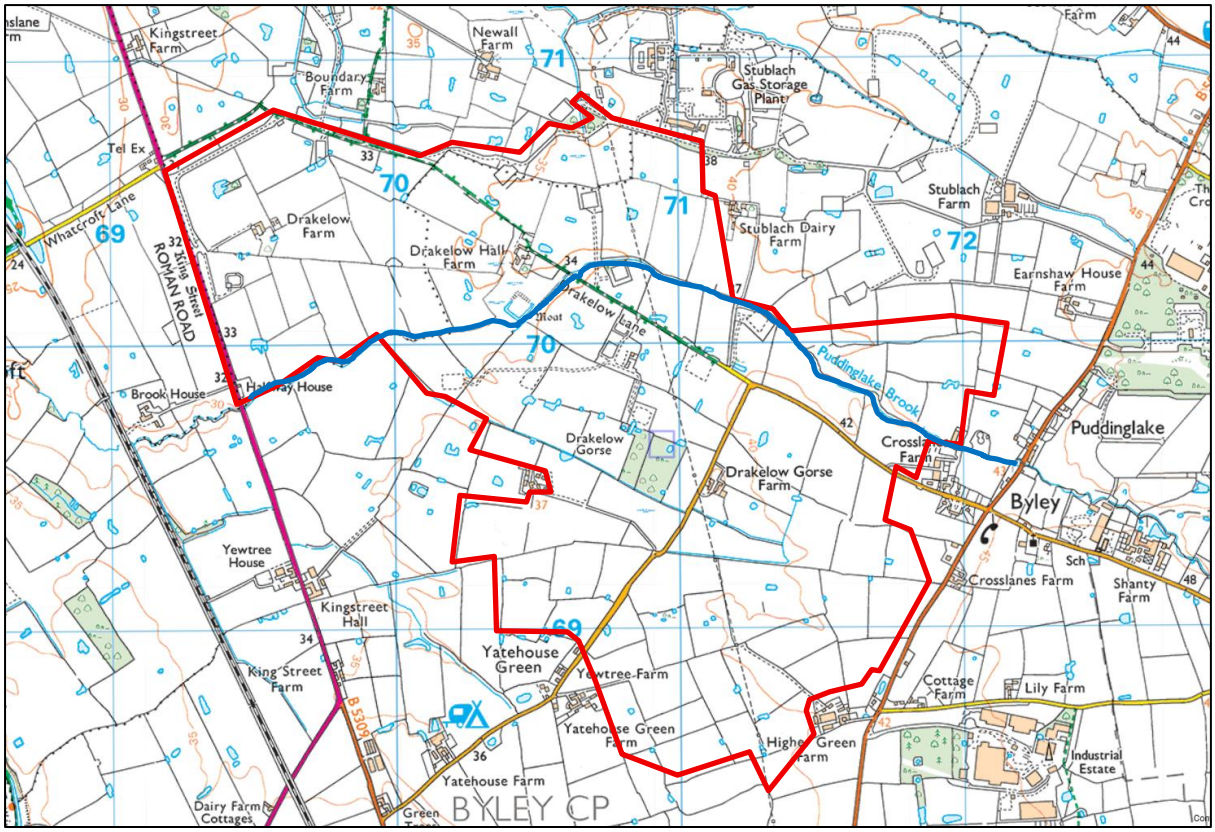
A single watercourse, Puddinglake Brook, was situated on Site, within the southern half of the Site, flowing east to west. The Study Area for the RCA comprised the length of the brook present within the red-line boundary.

The section of the brook within the site falls within the Dane Operational Catchment. Puddinglake Brook has its own individual sub-catchment within the Dane Operational Catchment which has a poor ecological status. The dominant contributor to the poor ecological status of Puddinglake Brook is the surrounding agricultural and rural land management (DEFRA, 2022).

Puddinglake Brook was not identified as a Priority Habitat River by Natural England (Natural England , 2023).

The site location is illustrated below.

Figure 1: Location Plan*



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1.3 Planning Context and Legislation

As of the 12th February 2024, under Schedule 14 of the Environment Act 2021, all major developments in England must be subject to the Biodiversity Gain condition. Schedule 15 applies the BNG requirement to NSIPs; however, this provision is not yet in force; it is expected to be introduced in 2026. Whilst the National Planning Policy Framework (Ministry of Housing, Communities and Local Government, 2024) does not contain specific policies relevant to NSIPs, Policies 187 and 192 are relevant to the consideration and protection of the natural environment and biodiversity. Details should be provided for how proposals will minimise impacts on and provide measurable net gains for biodiversity; including establishing and safeguarding wildlife-rich habitats and networks, protection of priority species, and the conservation, restoration and enhancement of priority habitats.

In relation to watercourse habitats, sufficient information is required about the current value the watercourse on Site, and the likely value of the watercourse habitats post-development on site, to secure measurable net gains for biodiversity as a result of the development.

The Statutory Biodiversity Net Gain User Guide (DEFRA, 2024) states:

> *"The riparian zone is a set area from the bank top of the watercourse. The bank top is where there is a break in slope between the river channel and the surrounding land.*

> *The riparian zone supports features which influence the hydrological, geomorphological and biological functions or processes within the channel. It also provides ecological function for riparian or aquatic species.*
>
> *If the site boundary crosses into the riparian zone, you should:*
>
> *include adjacent lengths of watercourse in the watercourse module"*

Policy ENV 4 - Biodiversity and Geodiversity within the adopted Cheshire West and Chester Local Plan (Cheshire West and Chester Council, 2015) states:

> *The Local Plan will safeguard and enhance biodiversity and geodiversity through the identification and protection of sites and/or features of international, national and local importance.*
>
> *Sites will be protected from loss or damage taking account of:*
>
> - *The hierarchy of designations of international, national and local importance*
> - *The irreplaceability of habitats, sites and/or features and contribution to the borough's ecological network of sites and features*
> - *Impact on priority habitats and protected/priority species*
>
> *Development should not result in any net loss of natural assets, and should seek to provide net gains. Where there is unavoidable loss or damage to habitats, sites or features because of exceptional overriding circumstances, mitigation and compensation will be required to ensure there is no net loss of environmental value.*

The adopted Local Plan also identifies the site as within the Cheshire West and Chester Council Green Belt.

2 METHODOLOGY

2.1 River Condition Assessment

The River Condition Assessment was undertaken using the Modular River Physical Survey (MoRPh) methodology (Gurnell, et al., 2022). This assessment comprised two parts, the field survey and the river type survey, which together are used to determine a Final Condition Class for the watercourse.

2.1.1 *Field Survey*

MoRPh5 surveys are required to cover at least 20% of the total river length within the redline boundary to get representative condition results of the watercourse. Due to the length of watercourse within the redline boundary, 12 MoRPh5 surveys were completed.

Each survey comprised five contiguous lengths (modules); due to the width of the watercourse being less than 5m, the individual module lengths surveyed were 10m, which resulted in a total of 600m of the watercourse being surveyed. This was equivalent to 20% of the watercourse length within the redline boundary. This coverage accounted for any variation in

riparian and watercourse features and to take into account the areas expected to be subject to the greatest impact as a result of the proposals.

The survey assessed the bank top, including the 10m riparian zone, the bank face, the channel water margin, and the channel bed by recording the extent of a variety of positive and negative indicator features to produce a Preliminary Condition Score for the watercourse sub-reaches.

Figure 2: Surveyed sub-reaches

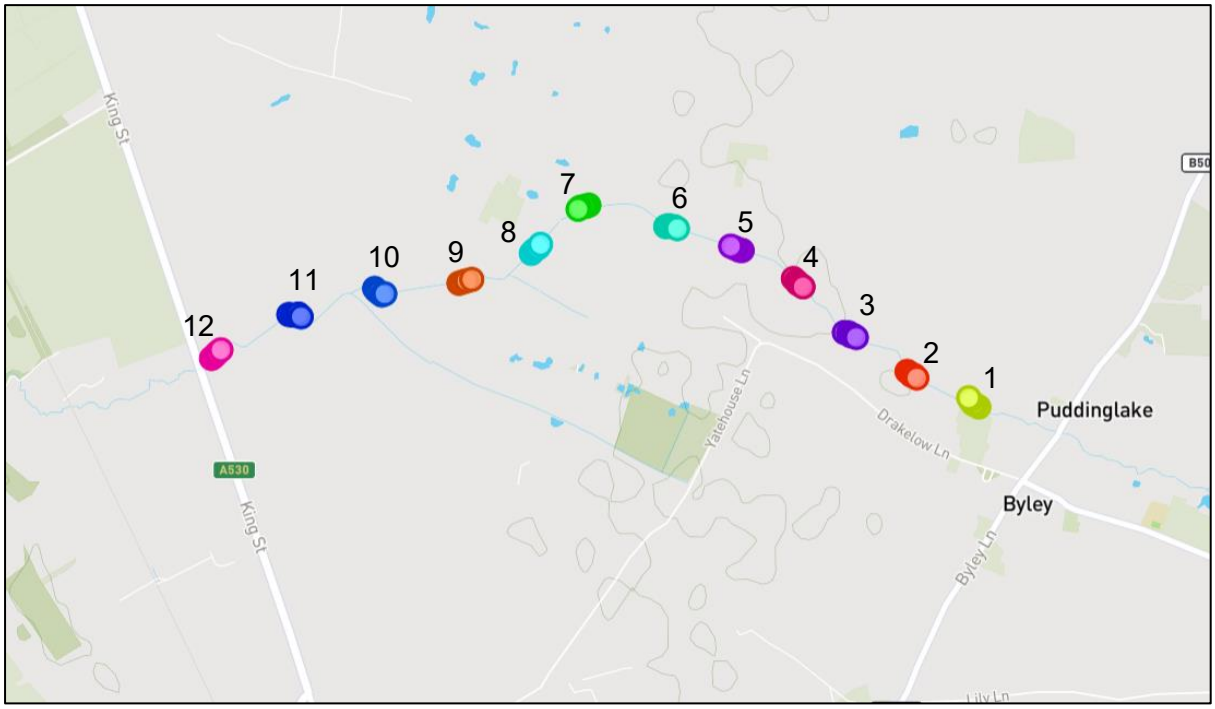

Table 1: Sub-reach locations

Sub-reach	Central Grid Reference
1	SJ 71929 69655
2	SJ 71733 69747
3	SJ 71541 69874
4	SJ 71375 70039
5	SJ 71178 70152
6	SJ 70973 70225
7	SJ 70691 70222
8	SJ 70539 70155
9	SJ 70313 70054
10	SJ 70038 70019
11	SJ 69773 69949
12	SJ 69517 69827

2.1.2 *River Type Survey*

The surveyed sub-reaches were then assessed in the context of the wider watercourse reach to determine the Indicative River Type. This was achieved by combining features assessed in the field with features measured by desk-based study.

2.2 Survey Details and Surveyors

The survey was carried out by Senior Ecologist Niamh Sherborne assisted by Field Ecologist Libby Norton over two days, 09/06/2025 and 11/06/2025. Niamh has been a professional ecologist for four years, is accredited in the use of MoRPh survey techniques and is experienced in the use of the Biodiversity Net Gain metric.

2.3 Limitations

2.3.1 *Access*

Access was only possible from one side of the bank for the majority of the survey due to dense vegetation growth and/or field boundaries preventing access. However, due to the narrow watercourse width this was not considered a constraint to the survey as the opposite bank top and face could be easily seen.

Steep bank sides and dense vegetation growth meant that the channel bed and bank sides were obscured in some areas.

2.3.2 *Survey Timings and Conditions*

The survey was completed within optimal time of year (May, June and October); this ensures that terrestrial vegetation, including non-native species are identifiable, where present, and that aquatic vegetation has been able to develop, while still being able to see the channel bed.

Rainfall in the weeks prior to the survey was unseasonably low, and this may have resulted in a lower water level during the survey.

3 RESULTS

3.1 Field Survey

Table 2 provides a summary of the watercourse reach surveyed.

Table 2: Summary of watercourse habitat types and conditions

Reach	UK Habitat Classification	BNG Habitat Type	Description
Puddinglake Brook	r1b Other Rivers and Streams	Watercourse - Other Rivers and Streams	Puddinglake Brook was surveyed across 12 sub-reaches. The surveyed area lay between the two road culverts beneath the B5081 (upstream) and the A530 (downstream).

Puddinglake Brook was a small homogenous stream that ran through the site from east to west. The bank tops were largely dominated by agricultural land, with scrub and hedgerows present at the bank edge in some areas. The watercourse banks were mostly steep-sided with a small section that had been reinforced. It appeared that the upstream extent of the watercourse had been dredged at some point resulting in vertical bank faces with very little vegetation growth, compared to the downstream extent which displayed a more varied vegetation structure on the river banks. The channel bed was predominantly silt, with gravel-pebble the coarsest bed material present.

Full field survey results are presented in the tables below, with indicative photographs provided at the end of this Appendix.

Table 3: Field Survey Results

Reach Name	Puddinglake Brook
Sub-reach Name	1
Project Name	Storengy
Survey Type	Pre-project
Preliminary Condition Score	-0.12955466
Shape	0.5471698
Average Width	1.16
Positive Index Average	0.94736844
Negative Index Average	-1.0769231

A6	FALSE
A7	Gravel Pebble
A8	Silt
River Type	K

Overdeep	Likely

			Baseline	**Proposed**
Bank top	Vegetation structure	B1	1	
	Tree feature richness	B2	0	
	Water-related features	B3	0	
	NNIPS cover	B4	0	
	Managed ground cover	B5	-2	
Bank face	Riparian vegetation structure	C1	1	
	Tree feature richness	C2	0	
	Natural bank profile extent	C3	3	
	Natural bank profile richness	C4	2	
	Natural bank material richness	C5	1	
	Bare sediment extent	C6	1	
	Artificial bank profile extent	C7	0	
	Reinforcement extent	C8	-2	
	Reinforcement material severity	C9	-2	
	NNIPS cover	C10	0	
Channel margin	Aquatic vegetation extent	D1	0	
	Aquatic morphotype richness	D2	0	
	Physical feature extent	D3	0	
	Physical feature richness	D4	0	
	Artificial features	D5	0	
Channel bed	Aquatic morphotype richness	E1	2	
	Tree features richness	E2	1	
	Hydraulic features richness	E3	2	
	Natural features extent	E4	1	
	Natural features richness	E5	1	
	Material richness	E6	3	
	Siltation	E7	0	
	Reinforcement extent	E8	0	
	Reinforcement severity	E9	0	
	Artificial features severity	E10	-4	
	NNIPS extent	E11	0	
	Filamentous algae extent	E12	0	

Condition Score	-0.12955466
	Fairly Poor
Overdeep Markdown	Poor

Reach Name	Puddinglake Brook
Sub-reach Name	2
Project Name	Storengy
Survey Type	Pre-project
Preliminary Condition Score	0.38866398
Shape	0.6057692
Average Width	1.26
Positive Index Average	1.1578947
Negative Index Average	-0.7692308

A6	FALSE
A7	Gravel Pebble
A8	Sand
River Type	K

Overdeep	Likely

			Baseline	**Proposed**
Bank top	Vegetation structure	B1	1	
	Tree feature richness	B2	0	
	Water-related features	B3	0	
	NNIPS cover	B4	0	
	Managed ground cover	B5	-2	
Bank face	Riparian vegetation structure	C1	1	
	Tree feature richness	C2	0	
	Natural bank profile extent	C3	3	
	Natural bank profile richness	C4	2	
	Natural bank material richness	C5	1	
	Bare sediment extent	C6	1	
	Artificial bank profile extent	C7	0	
	Reinforcement extent	C8	-2	
	Reinforcement material severity	C9	-2	
	NNIPS cover	C10	0	
Channel margin	Aquatic vegetation extent	D1	0	
	Aquatic morphotype richness	D2	0	
	Physical feature extent	D3	0	
	Physical feature richness	D4	0	
	Artificial features	D5	0	
Channel bed	Aquatic morphotype richness	E1	2	
	Tree features richness	E2	1	
	Hydraulic features richness	E3	2	
	Natural features extent	E4	1	
	Natural features richness	E5	1	
	Material richness	E6	3	
	Siltation	E7	0	
	Reinforcement extent	E8	0	
	Reinforcement severity	E9	0	
	Artificial features severity	E10	-4	
	NNIPS extent	E11	0	
	Filamentous algae extent	E12	0	

Condition Score	0.38866398
	Moderate
Overdeep Markdown	Fairly Poor

Reach Name	Puddinglake Brook
Sub-reach Name	3
Project Name	Storengy
Survey Type	Pre-project
Preliminary Condition Score	0.23076923
Shape	0.67741936
Average Width	1.26
Positive Index Average	1
Negative Index Average	-0.7692308

A6	FALSE
A7	Gravel Pebble
A8	Sand
River Type	K

Overdeep	Likely

			Baseline	**Proposed**
Bank top	Vegetation structure	B1	2	
	Tree feature richness	B2	0	
	Water-related features	B3	0	
	NNIPS cover	B4	0	
	Managed ground cover	B5	-2	
Bank face	Riparian vegetation structure	C1	1	
	Tree feature richness	C2	0	
	Natural bank profile extent	C3	2	
	Natural bank profile richness	C4	3	
	Natural bank material richness	C5	1	
	Bare sediment extent	C6	2	
	Artificial bank profile extent	C7	-4	
	Reinforcement extent	C8	0	
	Reinforcement material severity	C9	0	
	NNIPS cover	C10	0	
Channel margin	Aquatic vegetation extent	D1	1	
	Aquatic morphotype richness	D2	1	
	Physical feature extent	D3	1	
	Physical feature richness	D4	1	
	Artificial features	D5	0	
Channel bed	Aquatic morphotype richness	E1	1	
	Tree features richness	E2	1	
	Hydraulic features richness	E3	1	
	Natural features extent	E4	2	
	Natural features richness	E5	1	
	Material richness	E6	2	
	Siltation	E7	-3	
	Reinforcement extent	E8	0	
	Reinforcement severity	E9	0	
	Artificial features severity	E10	-1	
	NNIPS extent	E11	0	
	Filamentous algae extent	E12	0	

Condition Score	0.23076923
	Moderate
Overdeep Markdown	Fairly Poor

Reach Name	Puddinglake Brook
Sub-reach Name	5
Project Name	Storengy
Survey Type	Pre-project
Preliminary Condition Score	0.48582995
Shape	0.76
Average Width	1.14
Positive Index Average	0.94736844
Negative Index Average	-0.46153846

A6	FALSE
A7	Silt
A8	Silt
River Type	K

Overdeep	Likely

			Baseline	**Proposed**
Bank top	Vegetation structure	B1	1	
	Tree feature richness	B2	0	
	Water-related features	B3	0	
	NNIPS cover	B4	0	
	Managed ground cover	B5	-2	
Bank face	Riparian vegetation structure	C1	3	
	Tree feature richness	C2	2	
	Natural bank profile extent	C3	3	
	Natural bank profile richness	C4	3	
	Natural bank material richness	C5	1	
	Bare sediment extent	C6	4	
	Artificial bank profile extent	C7	0	
	Reinforcement extent	C8	0	
	Reinforcement material severity	C9	0	
	NNIPS cover	C10	0	
Channel margin	Aquatic vegetation extent	D1	0	
	Aquatic morphotype richness	D2	0	
	Physical feature extent	D3	0	
	Physical feature richness	D4	0	
	Artificial features	D5	0	
Channel bed	Aquatic morphotype richness	E1	1	
	Tree features richness	E2	1	
	Hydraulic features richness	E3	0	
	Natural features extent	E4	1	
	Natural features richness	E5	1	
	Material richness	E6	2	
	Siltation	E7	0	
	Reinforcement extent	E8	0	
	Reinforcement severity	E9	0	
	Artificial features severity	E10	0	
	NNIPS extent	E11	0	
	Filamentous algae extent	E12	0	

Condition Score	0.48582995
	Moderate
Overdeep Markdown	Fairly Poor

Reach Name	Puddinglake Brook
Sub-reach Name	6
Project Name	Storengy
Survey Type	Pre-project
Preliminary Condition Score	0.79352224
Shape	0.9324324
Average Width	1.38
Positive Index Average	0.94736844
Negative Index Average	-0.15384616

A6	FALSE
A7	Silt
A8	Silt
River Type	K
Overdeep	Likely

			Baseline	**Proposed**
Bank top	Vegetation structure	B1	2	
	Tree feature richness	B2	0	
	Water-related features	B3	0	
	NNIPS cover	B4	0	
	Managed ground cover	B5	-2	
Bank face	Riparian vegetation structure	C1	1	
	Tree feature richness	C2	0	
	Natural bank profile extent	C3	2	
	Natural bank profile richness	C4	2	
	Natural bank material richness	C5	1	
	Bare sediment extent	C6	1	
	Artificial bank profile extent	C7	-3	
	Reinforcement extent	C8	0	
	Reinforcement material severity	C9	0	
	NNIPS cover	C10	-1	
Channel margin	Aquatic vegetation extent	D1	2	
	Aquatic morphotype richness	D2	1	
	Physical feature extent	D3	1	
	Physical feature richness	D4	1	
	Artificial features	D5	0	
Channel bed	Aquatic morphotype richness	E1	2	
	Tree features richness	E2	1	
	Hydraulic features richness	E3	1	
	Natural features extent	E4	0	
	Natural features richness	E5	0	
	Material richness	E6	1	
	Siltation	E7	0	
	Reinforcement extent	E8	0	
	Reinforcement severity	E9	0	
	Artificial features severity	E10	0	
	NNIPS extent	E11	0	
	Filamentous algae extent	E12	0	

Condition Score	0.79352224
	Moderate
Overdeep Markdown	Fairly Poor

Reach Name	Puddinglake Brook
Sub-reach Name	7
Project Name	Storengy
Survey Type	Pre-project
Preliminary Condition Score	0.23076923
Shape	0.92424244
Average Width	1.22
Positive Index Average	1
Negative Index Average	-0.7692308

A6	FALSE
A7	Gravel Pebble
A8	Silt
River Type	K

Overdeep	Likely

			Baseline	**Proposed**
Bank top	Vegetation structure	B1	1	
	Tree feature richness	B2	0	
	Water-related features	B3	0	
	NNIPS cover	B4	0	
	Managed ground cover	B5	-2	
Bank face	Riparian vegetation structure	C1	2	
	Tree feature richness	C2	1	
	Natural bank profile extent	C3	3	
	Natural bank profile richness	C4	3	
	Natural bank material richness	C5	4	
	Bare sediment extent	C6	1	
	Artificial bank profile extent	C7	2	
	Reinforcement extent	C8	0	
	Reinforcement material severity	C9	0	
	NNIPS cover	C10	0	
Channel margin	Aquatic vegetation extent	D1	0	
	Aquatic morphotype richness	D2	0	
	Physical feature extent	D3	0	
	Physical feature richness	D4	0	
	Artificial features	D5	0	
Channel bed	Aquatic morphotype richness	E1	0	
	Tree features richness	E2	1	
	Hydraulic features richness	E3	1	
	Natural features extent	E4	0	
	Natural features richness	E5	0	
	Material richness	E6	2	
	Siltation	E7	0	
	Reinforcement extent	E8	0	
	Reinforcement severity	E9	0	
	Artificial features severity	E10	0	
	NNIPS extent	E11	0	
	Filamentous algae extent	E12	0	

Condition Score	0.23076923
	Moderate
Overdeep Markdown	Fairly Poor

Reach Name	Puddinglake Brook
Sub-reach Name	8
Project Name	Storengy
Survey Type	Pre-project
Preliminary Condition Score	0.8987854
Shape	0.45454547
Average Width	1
Positive Index Average	1.0526316
Negative Index Average	-0.15384616

A6	FALSE
A7	Slit
A8	Silt
River Type	K

Overdeep	Likely

			Baseline	**Proposed**
Bank top	Vegetation structure	B1	1	
	Tree feature richness	B2	0	
	Water-related features	B3	0	
	NNIPS cover	B4	0	
	Managed ground cover	B5	-2	
Bank face	Riparian vegetation structure	C1	1	
	Tree feature richness	C2	1	
	Natural bank profile extent	C3	3	
	Natural bank profile richness	C4	4	
	Natural bank material richness	C5	1	
	Bare sediment extent	C6	4	
	Artificial bank profile extent	C7	0	
	Reinforcement extent	C8	0	
	Reinforcement material severity	C9	0	
	NNIPS cover	C10	0	
Channel margin	Aquatic vegetation extent	D1	0	
	Aquatic morphotype richness	D2	0	
	Physical feature extent	D3	1	
	Physical feature richness	D4	1	
	Artificial features	D5	-1	
Channel bed	Aquatic morphotype richness	E1	1	
	Tree features richness	E2	1	
	Hydraulic features richness	E3	2	
	Natural features extent	E4	2	
	Natural features richness	E5	1	
	Material richness	E6	2	
	Siltation	E7	0	
	Reinforcement extent	E8	0	
	Reinforcement severity	E9	0	
	Artificial features severity	E10	-2	
	NNIPS extent	E11	0	
	Filamentous algae extent	E12	0	

Condition Score	0.8987854
	Moderate
Overdeep Markdown	Fairly Poor

Reach Name	Puddinglake Brook
Sub-reach Name	9
Project Name	Storengy
Survey Type	Pre-project
Preliminary Condition Score	0.5910931
Shape	0.73504275
Average Width	1.72
Positive Index Average	1.0526316
Negative Index Average	-0.46153846

A6	FALSE
A7	Slit
A8	Silt
River Type	K

Overdeep	Likely

			Baseline	**Proposed**
Bank top	Vegetation structure	B1	1	
	Tree feature richness	B2	1	
	Water-related features	B3	0	
	NNIPS cover	B4	0	
	Managed ground cover	B5	-2	
Bank face	Riparian vegetation structure	C1	3	
	Tree feature richness	C2	0	
	Natural bank profile extent	C3	3	
	Natural bank profile richness	C4	3	
	Natural bank material richness	C5	1	
	Bare sediment extent	C6	0	
	Artificial bank profile extent	C7	0	
	Reinforcement extent	C8	0	
	Reinforcement material severity	C9	0	
	NNIPS cover	C10	0	
Channel margin	Aquatic vegetation extent	D1	1	
	Aquatic morphotype richness	D2	2	
	Physical feature extent	D3	0	
	Physical feature richness	D4	0	
	Artificial features	D5	0	
Channel bed	Aquatic morphotype richness	E1	2	
	Tree features richness	E2	1	
	Hydraulic features richness	E3	1	
	Natural features extent	E4	0	
	Natural features richness	E5	0	
	Material richness	E6	2	
	Siltation	E7	0	
	Reinforcement extent	E8	0	
	Reinforcement severity	E9	0	
	Artificial features severity	E10	0	
	NNIPS extent	E11	0	
	Filamentous algae extent	E12	0	

Condition Score	0.5910931
	Moderate
Overdeep Markdown	Fairly Poor

Reach Name	Puddinglake Brook
Sub-reach Name	10
Project Name	Storengy
Survey Type	Pre-project
Preliminary Condition Score	1.2145749
Shape	1.3174603
Average Width	1.66
Positive Index Average	1.3684211
Negative Index Average	-0.15384616

A6	FALSE
A7	Slit
A8	Silt
River Type	K

Overdeep	Likely

			Baseline	**Proposed**
Bank top	Vegetation structure	B1	2	
	Tree feature richness	B2	2	
	Water-related features	B3	0	
	NNIPS cover	B4	0	
	Managed ground cover	B5	-2	
Bank face	Riparian vegetation structure	C1	2	
	Tree feature richness	C2	0	
	Natural bank profile extent	C3	1	
	Natural bank profile richness	C4	2	
	Natural bank material richness	C5	1	
	Bare sediment extent	C6	2	
	Artificial bank profile extent	C7	-4	
	Reinforcement extent	C8	0	
	Reinforcement material severity	C9	0	
	NNIPS cover	C10	-1	
Channel margin	Aquatic vegetation extent	D1	0	
	Aquatic morphotype richness	D2	0	
	Physical feature extent	D3	1	
	Physical feature richness	D4	1	
	Artificial features	D5	0	
Channel bed	Aquatic morphotype richness	E1	0	
	Tree features richness	E2	1	
	Hydraulic features richness	E3	1	
	Natural features extent	E4	2	
	Natural features richness	E5	1	
	Material richness	E6	2	
	Siltation	E7	-3	
	Reinforcement extent	E8	0	
	Reinforcement severity	E9	0	
	Artificial features severity	E10	0	
	NNIPS extent	E11	0	
	Filamentous algae extent	E12	0	

Condition Score	1.2145749
	Fairly Good
Overdeep Markdown	Moderate

Reach Name	Puddinglake Brook
Sub-reach Name	11
Project Name	Storengy
Survey Type	Pre-project
Preliminary Condition Score	1.1093117
Shape	1.4
Average Width	2.1
Positive Index Average	1.2631578
Negative Index Average	-0.15384616

A6	FALSE
A7	Slit
A8	Silt
River Type	K

Overdeep	Likely

			Baseline	**Proposed**
Bank top	Vegetation structure	B1	2	
	Tree feature richness	B2	0	
	Water-related features	B3	0	
	NNIPS cover	B4	0	
	Managed ground cover	B5	-2	
Bank face	Riparian vegetation structure	C1	2	
	Tree feature richness	C2	1	
	Natural bank profile extent	C3	3	
	Natural bank profile richness	C4	3	
	Natural bank material richness	C5	1	
	Bare sediment extent	C6	4	
	Artificial bank profile extent	C7	0	
	Reinforcement extent	C8	0	
	Reinforcement material severity	C9	0	
	NNIPS cover	C10	0	
Channel margin	Aquatic vegetation extent	D1	0	
	Aquatic morphotype richness	D2	0	
	Physical feature extent	D3	1	
	Physical feature richness	D4	1	
	Artificial features	D5	0	
Channel bed	Aquatic morphotype richness	E1	0	
	Tree features richness	E2	1	
	Hydraulic features richness	E3	1	
	Natural features extent	E4	0	
	Natural features richness	E5	1	
	Material richness	E6	1	
	Siltation	E7	2	
	Reinforcement extent	E8	0	
	Reinforcement severity	E9	0	
	Artificial features severity	E10	0	
	NNIPS extent	E11	0	
	Filamentous algae extent	E12	0	

Condition Score	1.1093117
	Moderate
Overdeep Markdown	Fairly Poor

Reach Name	Puddinglake Brook
Sub-reach Name	12
Project Name	Storengy
Survey Type	Pre-project
Preliminary Condition Score	1.0890688
Shape	2.2727273
Average Width	2
Positive Index Average	1.4736842
Negative Index Average	-0.3846154

A6	FALSE
A7	Slit
A8	Silt
River Type	K

Overdeep	Likely

			Baseline	**Proposed**
Bank top	Vegetation structure	B1	2	
	Tree feature richness	B2	1	
	Water-related features	B3	0	
	NNIPS cover	B4	0	
	Managed ground cover	B5	-2	
Bank face	Riparian vegetation structure	C1	1	
	Tree feature richness	C2	0	
	Natural bank profile extent	C3	1	
	Natural bank profile richness	C4	2	
	Natural bank material richness	C5	1	
	Bare sediment extent	C6	4	
	Artificial bank profile extent	C7	-4	
	Reinforcement extent	C8	0	
	Reinforcement material severity	C9	0	
	NNIPS cover	C10	0	
Channel margin	Aquatic vegetation extent	D1	0	
	Aquatic morphotype richness	D2	0	
	Physical feature extent	D3	1	
	Physical feature richness	D4	1	
	Artificial features	D5	-1	
Channel bed	Aquatic morphotype richness	E1	0	
	Tree features richness	E2	1	
	Hydraulic features richness	E3	1	
	Natural features extent	E4	1	
	Natural features richness	E5	1	
	Material richness	E6	2	
	Siltation	E7	-3	
	Reinforcement extent	E8	0	
	Reinforcement severity	E9	0	
	Artificial features severity	E10	-4	
	NNIPS extent	E11	0	
	Filamentous algae extent	E12	0	

Condition Score	1.0890688
	Moderate
Overdeep Markdown	Fairly Poor

3.2 River Type Survey

The River Type of the wider watercourse reach was determined, using the Cartographer Software, to be of Type K. Features typical of this River Type are shown in Table 3.

Table 4: Features associated with 'Type K' rivers

River Type Features		Present On Site?
Confinement	Unconfined	Yes
Threads	Single	Yes
Planform	Straight/sinuous	Yes
Coarsest Bed Material Size Class	Fine Sand - Silt	No
Channel Bed	Riffle	Yes
	Emergent broad-/linear-leaved	No
	Submerged broad-/linear-/ fine-leaved	No
Channel Banks and Margins	Emergent broad-/linear-leaved	No
Bank Tops / Floodplain Edge	Wetland	No
	Connected/ disconnected backwaters and side channels	No

3.3 Final Condition Class

The preliminary condition class assigned to all sub-reaches, expect sub-reach One and Ten, was **Moderate.** Sub-reach One was assigned a preliminary condition class of **Fairly Poor** and sub-reach Ten was assigned a preliminary condition class of **Fairly Good**. The preliminary condition score was calculated as a result of the positive and negative indicators identified during the survey.

For river Type K, the preliminary condition score thresholds for assigning final condition class are shown in Table 4.

Table 5: Threshold values for assigning final condition class for River Type K

Condition Class	Preliminary Condition Score
Good	>1.9
Fairly Good	>1.2
Moderate	>0.2
Fairly Poor	>-1.0
Poor	≤-1.0

The river shape score calculated by the cartographer software was then considered for each sub-reach to estimate the likelihood of the watercourse being 'overdeep' (Table 5), often caused by historical channel modifications. Where a channel is overdeep, this results in a hydrological disconnect between the watercourse and its riparian margins and floodplains, which in turn reduces its potential to support biodiversity.

The river condition assessment guidance states:

> *'Shape is used to assess the likelihood of a surveyed channel being sufficiently overdeep to adversely affect its hydrological/ecological lateral connectivity:*
>
> *If Shape has a value of ≤2 the river is highly likely to be overdeep;*
>
> *If Shape has a value of ≤4 the river is likely to be overdeep, especially if the Width is greater than 10m.'*

Where a river is considered to be overdeep, the final condition class should be reduced by one class level. For the surveyed sub-reaches, the river shape scores were consistent with our assessment that the watercourse was overdeep partially due to historical management including dredging.

It should be noted that the water level was likely to have been below average due to the lack of rainfall in the weeks prior to the survey; however, it is highly likely that the watercourse would be overdeep even at normal water levels.

Table 6: Final condition score

Sub-reach	Preliminary Condition Score	Condition Class	Shape Score	Overdeep?	Final Condition Class - Adjusted
1	-0.130	Fairly Poor	0.547	Yes	Poor
2	0.389	Moderate	0.606	Yes	Fairly Poor
3	0.231	Moderate	0.677	Yes	Fairly Poor
4	0.773	Moderate	0.987	Yes	Fairly Poor
5	0.486	Moderate	0.760	Yes	Fairly Poor
6	0.794	Moderate	0.932	Yes	Fairly Poor
7	0.231	Moderate	0.924	Yes	Fairly Poor
8	0.899	Moderate	0.455	Yes	Fairly Poor
9	0.591	Moderate	0.735	Yes	Fairly Poor
10	1.215	Fairly Good	1.317	Yes	Moderate
11	1.109	Moderate	1.400	Yes	Fairly Poor
12	1.089	Moderate	2.273	Yes	Fairly Poor

3.4 Biodiversity Net Gain Calculations – Watercourse Units

3.4.1 *Baseline Watercourse Units*

The Statutory Biodiversity Metric Calculation Tool calculates a baseline number of watercourse units by considering the final condition class determined by the MoRPh field and river type surveys, the strategic significance of the watercourse in the local area, and the extent of encroachment on the watercourse and riparian zone.

The total length of watercourse within the Site boundary was approximately 3km. This has been evenly divided between the 12 sub-reaches in order to assign condition scores to the full reach, and to subsequently calculate the baseline Watercourse Units for the Site.

The watercourse was assigned a high strategic significance categorised within the metric as 'formally identified in local strategy', as the Site is located within the Cheshire West and Chester Council Green Belt, as described in the adopted Local Plan.

Table 7: Baseline Watercourse Units

Reach	Condition Assessment	Strategic Significance	Watercourse Encroachment	Riparian Encroachment	Baseline Watercourse Units
Sub-reach 1	Poor	Formally identified in local strategy	Major – presence of a section of culvert within the sub-reach	Major/Major – permanent pasture present across the majority of the riparian zone	0.65
Sub-reaches 2-9	Fairly Poor	Formally identified in local strategy	Minor – small land bridge present	Major/Major – permanent pasture present across the majority of the riparian zone	12.42
Sub-reach 10	Moderate	Formally identified in local strategy	No encroachment	Major/Major – permanent pasture present across the majority of the riparian zone	2.59
Sub-reaches 11-12	Fairly Poor	Formally identified in local strategy	Major – minor weir feature across full width of channel in sub-reach 12	Major/Major – permanent pasture present across the majority of the riparian zone	1.94
				Total Baseline Watercourse Units	**17.60**

Table 8: Field Survey Photographs

No.	Description	Photograph
1	Overgrown river bank and river top vegetation blocking view of the river channel	
2	Overgrown bank face vegetation	
3	Dredged channel with artificial steep sides	

No.	Description	Photograph
4	Low water level	

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