

Appendix 4 – Water Framework Directive (Screening) Assessment

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Hallam Land Management Ltd.

Land at Carr Road, Deepcar, Sheffield

WATER FRAMEWORK DIRECTIVE ASSESSMENT

October 2018

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1.0 INTRODUCTION

Background

- 1.1 Hallam Land Management Ltd. (HLM) have submitted a planning application (Ref. 17/04673/OUT) to Sheffield City Council for outline planning permission for up to 93 residential dwellings and associated open space on land north of the junction between Hollin Busk Lane and Carr Road, Deepcar.
- 1.2 ARP Associates have produced a Flood Risk Assessment for the proposed development as part of the planning application submission. This assessment considered surface water drainage for the development and concluded that:
- “A direct connection to a watercourse is considered the most suitable method of discharging surface water based on site layout and topography, Clough Dike, which flows adjacent to the northern boundary, is deemed a suitable receptor.”¹*
- 1.3 Clough Dike flows through a wooded valley known as Fox Glen Wood, and this valley has been designated as a Local Wildlife Site.
- 1.4 Concerns have been raised regarding the potential ecological impacts on the woodland and stream habitats that might result from this drainage strategy. Consequently, FPCR Environment and Design Ltd. have been commissioned by HLM to consider these potential impacts. This has been achieved via two separate approaches:
- An assessment of the potential impact on the woodland ground flora along two routes that the drainage system might take within the woodland; and
 - A Water Framework Directive Assessment (WFDA) (a screening assessment).
- 1.5 This report covers the WFDA, a separate report has been produced for the impact on the woodland ground flora.

2.0 EUROPEAN UNION WATER FRAMEWORK DIRECTIVE

- 2.1 Following a restructuring of the European Water Policy, the European Water Framework Directive (WFD) was adopted in 2000 as the operational tool for setting objectives for the protection of water in the European Union (EU).
- 2.2 The WFD has seven key aims:
- Expanding the scope of water protection to all waters: surface waters and groundwater;
 - Achieving ‘good status’ for all waters by set target dates;
 - Water management based on river basins;
 - A ‘combined approach’ of emission limit values and quality standards;
 - Getting the prices right;
 - Getting the citizen involved more closely; and
 - Streamlining legislation.

- 2.3 “Good status” for all waters includes, amongst other factors, the protection of the aquatic quality of all surface waters. Due to the ecological variability which exists across European waters the WFD considers that the reference point against which biological quality should be assessed is that which would be expected in conditions of minimal anthropogenic impact².
- 2.4 Ecological protection of waters has two elements: “good ecological status” and “good chemical status”. In some circumstances, the WFD allows Member States to identify and designate artificial water bodies (AWB) and heavily modified water bodies (HMWB) in accordance with Article 4(3). In these instances, “good ecological status” is replaced by “good ecological potential”³.
- 2.5 Good ecological status or “good ecological potential” is defined in Annex V of the WFD. This involves three overarching elements of quality:
- Biological Elements;
 - Hydromorphological Elements supporting the Biological Elements; and
 - Chemical and Physiochemical Elements supporting the Biological Elements.
- 2.6 For rivers (Annex V 1.1.1) the Biological Elements comprise:
- Composition and abundance of aquatic flora (macrophytes and phytobenthos);
 - Composition and abundance of macroinvertebrate fauna; and
 - Composition, abundance and age structure of fish fauna.

Implementation of the EU Water Framework Directive in England

- 2.7 In terms of advancing implementation of the WFD in England, the EA is the lead authority for many of the WFD objectives.
- 2.8 The water environment is managed via catchments in England and Wales. These are formed by 11 river basin districts, with each district having a River Basin Management Plan (RBMP). The EA produces these plans in their role as the competent authority for the WFD in England and Wales. The RBMPs contain all relevant information regarding the water environment within the river basin district, including the ecological status of all water bodies and the actions that are needed to meet the WFD’s objectives for their ecological status by set target dates⁴. Within each area covered by a RBMP there are then a sub-set of ‘management catchments’. Catchment partnerships (formed by stakeholders with an interest in the water environment) seek to engage in local actions to protect and enhance the water environment, thereby assisting compliance with the WFD.
- 2.9 The WFD has set timetables for achieving objectives. At the end of 2015, the timetable entered the second management cycle (Cycle 2) which will extend to 2021. The third and final cycle (Cycle 3) will then conclude in 2027, by which time all objectives should be met⁵.
- 2.10 The WFD places a legal requirement on Member States to ensure that any proposed scheme causes no deterioration to the current ecological status of a water body or prevents that water body from achieving its expected status by set target dates. By the end of Cycle 1, not all target objectives had been met; as a result, alternative objectives (principally extended deadlines and less stringent objectives) have been set for many water bodies. This means that for many water bodies there are now extended deadlines beyond 2015 with the aim to achieve good status by 2021 or 2027. This includes water bodies within the River Humber RBMP⁶ (the river basin district within which Clough Dike is located).

- 2.11 In certain circumstances, Article 4.7 of the Directive allows exemptions which enable schemes that would be non-compliant with the WFD to take place, subject to the scheme meeting conditions as set out in Article 4.7⁷. Otherwise, all schemes which have the potential to affect a water body and either its “ecological status” or “ecological potential” must demonstrate compliance with the WFD objectives.
- 2.12 The status of the various elements used to define the overall ecological status of a water body is defined by five categories as shown in Table 1⁶. These statuses are colour coded.

Table 1: Definition of Status in the Water Framework Directive

Status	Definition
High	Near natural conditions. No restriction on the beneficial uses of the water body. No impacts on amenity, wildlife or fisheries.
Good	Slight change from natural conditions as a result of human activity. No restriction on the beneficial uses of the water body. No impact on amenity or fisheries. Protects all but the most sensitive wildlife.
Moderate	Moderate change from natural conditions as a result of human activity. Some restriction on the beneficial uses of the water body. No impact on amenity. Some impact on wildlife and fisheries.
Poor	Major change from natural conditions as a result of human activity. Some restrictions on the beneficial uses of the water body. Some impact on amenity. Moderate impact on wildlife and fisheries.
Bad	Severe change from natural conditions as a result of human activity. Significant restriction on the beneficial uses of the water body. Major impact on amenity. Major impact on wildlife and fisheries with many species not present.

- 2.13 To ensure compliance with the legal requirements that result from the WFD it is important that proposed works in and around the water environment do not result in any of the outcomes listed in Table 2.

Table 2: Project Outcomes which would be Non-Compliant with the WFD

No.	Outcome resulting from a project or plan
1	Cause a deterioration in ecological status/potential of a water body
2	Prevent a water body from meeting its objective of good ecological status/potential
3	Prevent or compromise WFD objectives being met in other water bodies
4	Cause failure to meet good groundwater status, or result in a deterioration of groundwater status
5	Prevent the implementation of mitigation measures which define the hydromorphological designation of heavily modified water bodies

- 2.14 EA guidance for undertaking a WFDA states that:

“Your WFD risk assessment needs to demonstrate with a high level of confidence that your activity supports these [RBMP] objectives.”⁸

3.0 SCHEME DETAILS

Scale and Nature of the Development

- 3.1 As indicated in the introduction, the proposal is for outline planning permission for up to 93 residential dwellings and associated open space.

Proposed Drainage Scheme

- 3.2 A Flood Risk Assessment (FRA) for the development has been produced¹ and this concluded that surface water drainage would be best achieved via direct discharge to Clough Dike.
- 3.3 Since the FRA was published additional investigations have taken place to determine suitable options to achieve discharge into Clough Dike. Figure 1 shows the proposed location for the drainage channel. Two potential routes for the channel within this area were initially identified, one following a straight course, the other following a sinuous course; the final route is a hybrid design with a gently curving route. Various designs were considered for the type of structure needed to convey the water down the relatively steep banks of the Glen. The chosen design is an overland open channel filled with a rock cascade with a 6m wide maintenance easement. The cascade would be fed via a ductile iron pipe with an initial flow control at the head of the pipe to discharge water from a Sustainable Drainage Scheme (SuDS) attenuation basin. Figures 2 & 3 show the proposed design layout.
- 3.4 The proposed scheme will provide adequate water treatment, and flow control prior to discharge as per Sheffield City Council's best practice guidance⁹.

Biodiversity

- 3.5 Whilst a full assessment of the habitats and species within the proposed development site has been prepared in support of the submitted planning application, Fox Glen sits outside of the application boundary.
- 3.6 The citation for the non-statutory Local Wildlife Site designation that has been afforded to the woodland lists the following features as the reasons for this designation:
- Small area of upland oak woodland (UKBAP priority habitat);
 - Running water [stream] (UK & LBAP priority habitat);
 - Native bluebell *Hyacinthoides non-scripta* (LBAP priority and protected species);
 - Song Thrush *Turdus philomelos* (UKBAP priority species); and
 - Treecreeper *Certhia familiaris* (LBAP priority species).

Aspects of the Proposed Development of Relevance to the WFDA

- 3.7 Appraisal of the proposed development has identified that discharge of surface water drainage from the proposed development into Clough Dike, which is a tributary of the Little Don has the potential to directly or indirectly affect the three 'overarching elements of quality' of local water body receptors in close vicinity to the proposed development. This potential impact arises from:
- The quality of the discharged water; and

- The need for a physical connection into Clough Dike.

4.0 ASSESSMENT METHODOLOGY

4.1 This WFDA has involved the following stages.

Desk Study

- 4.2 Working documents associated with the proposed development have been reviewed to ensure that all aspects of the proposed works that should be screened for inclusion in the assessment have been given due consideration. Following this review, the potential issues at a water body scale have been identified.
- 4.3 The study also included reference to the Humber River Basin Management Plan⁶ to identify any actions and objectives that might be relevant for the River Soar and Grand Union Canal or other waterbodies falling within the scope of the assessment.
- 4.4 The EA Catchment Planning System¹⁰ database has also been interrogated for relevant information.

Field Survey

- 4.5 As Fox Glen Wood is located outside of the planning application boundary it was not subjected to a detailed ecological survey as part of the planning application. Therefore, to gather information required for this WFDA the stream was surveyed on 30th May 2018 to record the stream hydromorphology. This was undertaken by a Principal Ecologist from FPCR. The survey lasted approximately 4 hours.

Limitations to the Survey

- 4.6 The survey was undertaken at an optimum time to record woodland vegetation and the stream was fully accessible. Therefore, there were no known limitations to the survey.

Impact Assessment

- 4.7 The results of the desk study and field surveys have been used to assess the type and magnitude of the potential impacts and to identify mitigation measures required to ensure compliance with the WFD.
- 4.8 The criteria used for determining the magnitude of potential impacts are shown in Table 3.

Table 3: Magnitude Criteria

Magnitude	Criteria
Major	<p>An effect which would alter the status (positively or negatively) of one or more of the ecological elements used to define the overall ecological status of a water body (WFD quality element) such that the status would be lower, e.g. was good, now moderate (negative), or higher resulting in 'good ecological status' or 'good ecological potential' being achieved (positive). Examples would be construction of a dam or weir within a watercourse, preventing fish passage (negative), the installation of fish passes on existing weirs or removal of weirs (positive), canalisation of a natural watercourse (negative).</p> <p>An effect which would cause a failure to meet good groundwater status.</p>
Minor	<p>An evident effect (positive or negative) on one or more of the WFD quality elements but not to the extent that it would result in a change of the status of the element for the water body. Examples would be bridge construction (negative), channel modifications for biodiversity improvements (positive).</p> <p>An effect which results in a deterioration of groundwater status.</p>
Negligible	<p>A hardly detectable effect (positive or negative) on one or more of the WFD quality elements.</p>

- 4.9 Whilst at individual project level there would be no requirement for mitigation for effects of Minor magnitude as compliance with the WFD would be achieved, at a catchment level the minor impacts arising from multiple projects could cumulatively result in a Major effect on the WFD quality elements. Consequently, the assessment process has taken the view that mitigation is considered necessary for both Major and Minor impacts.
- 4.10 The concluding part of the assessment considers whether the five key WFD compliances identified by the EA would be met if the identified mitigation measures were in place; e.g. would the proposed works meet the legal requirement to be compliant with the WFD.

5.0 THE ASSESSMENT

Scoping

- 5.1 Clough Dike is located within the area covered by the River Humber Basin Management Plan and falls within the Don Upper Operational Catchment¹⁰ and more locally within the Little Don from Source to River Don sub-catchment. Approximately 650m of the brook from its confluence with the Little Don is classed as Main River.
- 5.2 It is assumed that the site currently drains to Clough Dike. The proposed surface water drainage scheme for the development will involve attenuation features, appropriate treatment trains such as oil traps and other features to ensure compliance with Sheffield City Council guidance for Sustainable Drainage Systems⁹. It is then proposed that the attenuated and treated water will be discharged at greenfield runoff rates to Clough Dike via an open overland channel with a rock cascade fill.
- 5.3 At these spatial scales, it was judged that the WFDA should consider the Clough Dike from its source within Fox Glen until the outfall which discharges into the culverted section. As most of the survey length is classed as an ordinary watercourse it was considered important that the assessment should, where appropriate, have consideration of the Little Don which is the main river that Clough Dike feeds into.

Baseline Conditions

Catchment Level Data

- 5.4 Baseline hydromorphology, ecological and physiochemistry data is available for the Little Don from Source to River Don. This is summarised in Table 4¹¹. The overall water body is currently failing ('Moderate' 2016, target 'Good' by 2027), but with the acknowledgement that there are disproportionately expensive burdens to achieving this objective. Specific areas of failure are:
- Biological quality elements - Macrophytes and Phytobenthos Combined ('Moderate' 2016, target 'Good' by 2027); and
 - Biological quality elements - Invertebrates ('Moderate' 2016, target 'Good' by 2027)

Table 4: Little Don from Source to River Don WFD Baseline Data Summary

Element		2014 (Cycle 1)	2016 (Cycle 2)	Objectives
Overall Water Body		Moderate	Moderate	Good by 2027
ECOLOGICAL				
Ecological (Overall)		Moderate	Moderate	Good by 2027
Ecological Biological Quality Elements (Overall)		Moderate	Moderate	Good by 2027
Ecological – Biological Quality Elements	Fish	Moderate	Good	Good by 2015
	Invertebrates	Moderate	Moderate	Good by 2027
	Macrophytes	-	-	-
	Macrophytes & Phytobenthos Combined	-	Moderate	Good by 2027
	Phytobenthos	-	-	-
Hydrological Supporting Elements (Overall)		Supports good	-	Supports good by 2015
Ecological – Hydromorphological Supporting Elements	Hydrological Regime	Supports good	-	Supports good by 2015
Physio-chemical Quality Elements (Overall)		Good	Good	Good by 2015
Ecological – Physico-chemical quality elements	Acid neutralising capacity	-	High	Good by 2015
	Ammonia (Phys-Chem)	High	High	Good by 2015
	Biochemical Oxygen Demand (BOD)	Bad	-	-
	Dissolved Oxygen	High	High	Good by 2015
	pH	High	High	Good by 2015
	Phosphate	Good	Good	Good by 2015
	Temperature	High	High	Good by 2015
Specific Pollutants (Overall)		High	High	High by 2015
Specific Pollutants	Arsenic	High	-	-
	Triclosan	High	-	-
	Manganese	-	High	High by 2015
	Copper	High	High	High by 2015
	Iron	High	High	High by 2015
	Zinc	High	High	High by 2015
	Ammonia (Annex 8)	-	-	-
Supporting Elements (Surface Water)		Moderate	Moderate	Good by 2027

Element		2014 (Cycle 1)	2016 (Cycle 2)	Objectives
Supporting Elements	Mitigation Measures Assessment	Moderate or less	Moderate or less	Good by 2027
CHEMICAL				
Chemical (Overall)		Good	Good	Good by 2015
Chemical – Other Pollutants		Does not require assessment	Does not require assessment	Does not require assessment
Chemical – Priority Hazardous Substances		Does not require assessment	Good	Good
Chemical – Priority Substances		Good	Good	Good by 2015

Site Level Data

Hydromorphology

- 5.5 For a relatively small watercourse, Clough Dike has a varied hydromorphology but along its course there is ample evidence of past modifications from the time when Fox Glen was an open valley and a focal place for local people to meet and hold community events. In addition to the numerous paths, the Glen included a small swimming pool and paddling pools located on the line of the brook.
- 5.6 The brook is described in detail via the series of notes and photographs below.

Description	Photograph
A canopy of shrubs cover most of the brook bed where it issues (Photograph 1.).	 <p style="text-align: center;">Photograph 1</p>

Description	Photograph
<p>This cover eventually opens out and the stream flows over two small artificial weirs (Photograph 2)</p>	 <p style="text-align: center;">Photograph 2</p>
<p>Beyond these structures the channel widens to approximately 3m and the right bank has been reinforced but slightly further downstream after a stretch of medium-sized cobbles an unvegetated point bar (Photograph 3) is present</p>	 <p style="text-align: center;">Photograph 3</p>
<p>The stream then flows into an area of swamp with abundant to dominant marsh marigold <i>Caltha palustris</i>, abundant opposite-leaved golden-saxifrage, <i>Chrysosplenium oppositifolium</i> frequent yellow iris <i>Iris pseudacorus</i> (and more rarely a variegated hortical variety), occasional great willowherb <i>Epilobium hirsutum</i>, creeping buttercup <i>Ranunculus repens</i>, broad-leaved dock <i>Rumex obtusifolius</i> and wavy bitter-cress <i>Cardamine flexuosa</i> and small amounts of bog stitchwort <i>Stellaria alsine</i>. This area was previously a pool for swimming which had been constructed across the channel. (Photograph 4)</p>	 <p style="text-align: center;">Photograph 4)</p>

Description	Photograph
<p>Immediately downstream of this the stream flows beneath a stone footbridge (Photograph 5)</p>	 <p style="text-align: center;">Photograph 5</p>
<p>Downstream of the bridge the channel is approximately 2m wide and the substrate is formed by large moss-covered cobbles which form a gentle rocky cascade (Photograph 6). Small sections of the bank have been reinforced.</p>	 <p style="text-align: center;">Photograph 6</p>
<p>A large, debris dam had recently been constructed across the channel (Photograph 7) after which the stream flows through a narrowed channel with steep banks which locally support stands of bryophytes</p>	 <p style="text-align: center;">Photograph 7</p>

Description	Photograph
<p>A second recently constructed debris dam soon appears and beyond this the channel flows through an S-bend and here the clay banks (Photograph 8) become vertical and support abundant <i>Pellia Pellia</i> sp. and frequent notched pouchwort <i>Calypogeia arguta</i> with some young hard-fern <i>Blechnum spicant</i>.</p>	 <p style="text-align: center;">Photograph 8</p>
<p>Downstream of the dam the channel is formed by a short stretch of rocky cascade (Photograph 9) before changing to a channel substrate formed by bedrock with a shallow thin flow. Here the channel is approximately 1.5m wide.</p>	 <p style="text-align: center;">Photograph 9</p>
<p>Approaching the next debris dam there is a small unvegetated cobble point bar with an adjacent steep right bank. The channel then widens to approx. 3.5m. In this area there is an old pipe (Photograph 10) which is forming a small weir with an associated plunge pool and large fallen tree over the top of the pool.</p>	 <p style="text-align: center;">Photograph 10</p>

Description	Photograph
<p>After this feature the stream flows through a very narrow channel less than 1m wide before widening over a bedrock substrate which forms a shallow stepped-weir (Photograph 11). The channel then widens further to approximately 4m with the substrate formed by bed-rock.</p>	 <p style="text-align: center;">Photograph 11</p>
<p>Downstream the stream flows through a man-made structure (Photograph 12) which was most likely the remnants of the old paddling pools, and there is then a small stone footbridge.</p>	 <p style="text-align: center;">Photograph 12</p>
<p>Downstream of this there is again a small rocky cascade followed by a channel substrate formed by cobbles. Another man-made structure appears in the channel which then narrows to approximately 2m wide and the banks are reinforced, followed by a stretch (Photograph 13) where the channel substrate is formed by slabs of bedrock. The narrowed channel continues up to a small footbridge and in this area the banks have been reinforced with gabion baskets.</p>	 <p style="text-align: center;">Photograph 13</p>

Description	Photograph
<p>Further downstream there is an adjacent boardwalk and the flow subsides to just a sparse flow over the cobble substrate.</p>	 <p style="text-align: center;">Photograph 15</p>
<p>A debris screen is located across the channel before a final straight run (Photograph 16) over a substrate approaching an outfall, beyond which the stream is culverted as it progresses towards its confluence with the Little Don. At the time of the survey this final stretch was dry.</p>  <p style="text-align: center;">Photograph 17</p>	 <p style="text-align: center;">Photograph 16</p>

Table 5: Plant Species List for the Brook Margins

Taxon	Common Name	Abundance
<i>Athyrium filix-femina</i>	Lady-fern	Frequent
<i>Dryopteris dilatata</i>	Broad Buckler-fern	Frequent
<i>Geum urbanum</i>	Wood Avens	Frequent
<i>Chrysosplenium oppositifolium</i>	Opposite-leaved Golden-saxifrage	Frequent to locally abundant
<i>Lamiastrum galeobdolon</i> ssp. <i>montanum</i>	Yellow Archangel	Locally frequent to abundant
<i>Rubus fruticosus</i> agg.	Bramble	Locally frequent to abundant

Taxon	Common Name	Abundance
<i>Alliaria petiolata</i>	Garlic Mustard	Occasional
<i>Epilobium montanum</i>	Broad-leaved Willowherb	Occasional
<i>Galium aparine</i>	Cleavers	Occasional
<i>Holcus mollis</i>	Creeping Soft-grass	Occasional
<i>Oxalis acetosella</i>	Wood-sorrel	Occasional
<i>Poa trivialis</i>	Rough Meadow-grass	Occasional
<i>Allium ursinum</i>	Ramsons	Occasional to locally frequent
<i>Ficaria verna</i> ssp. <i>verna</i>	Lesser Celandine	Occasional to locally frequent
<i>Hyacinthoides non-scripta</i>	Bluebell	Occasional to locally frequent
<i>Ranunculus repens</i>	Creeping Buttercup	Occasional to locally frequent
<i>Geranium robertianum</i>	Herb Robert	Rare to locally frequent
<i>Blechnum spicant</i>	Hard-fern	Rare
<i>Caltha palustris</i>	Marsh marigold	Rare
<i>Epilobium hirsutum</i>	Great Willowherb	Rare
<i>Filipendula ulmaria</i>	Meadowsweet	Rare
<i>Heracleum sphondylium</i>	Hogweed	Rare
<i>Impatiens glandulifera</i>	Indian Balsam	Rare
<i>Iris pseudacorus</i>	Yellow Iris	Rare
<i>Rumex obtusifolius</i>	Broad-leaved Dock	Rare
<i>Stellaria alsine</i>	Bog Stitchwort	Rare
<i>Urtica dioica</i>	Common Nettle	Rare
<i>Valeriana officinalis</i>	Common Valerian	Rare
<u>BRYOPHYTES</u>		
Liverworts		
<i>Calypogeia arguta</i>	Notched Pouchwort	Present
<i>Chiloscyphus polyanthos</i>	St Winifrid's Moss	Present
<i>Lunularia cruciata</i>	Crescent-cup Liverwort	Present
<i>Pellia</i> sp.	a <i>Pellia</i> [indet.]	Present. Not fruiting
Mosses		
<i>Atrichum undulatum</i>	Common Smoothcap	Present
<i>Brachythecium rutabulum</i>	Rough-stalked Feather-moss	Present
<i>Dicranella heteromalla</i>	Silky Forklet-moss	Present
<i>Fissidens bryoides</i>	Lesser Pocket-moss	Present

Taxon	Common Name	Abundance
<i>Fissidens taxifolius</i>	Common Pocket-moss	Present
<i>Kindbergia praelonga</i>	Common Feather-moss	Present
<i>Mnium hornum</i>	Swan's-neck Thyme-moss	Present
<i>Platyhypnidium riparioides</i>	Long-beaked Water Feather-moss	Present
<i>Pseudotaxiphyllum elegans</i>	Elegant Silk-moss	Present
<i>Rhizomnium punctatum</i>	Dotted Thyme-moss	Present

Invertebrates

- 5.7 The brook was not surveyed for invertebrates as part of the assessment as baseline information for this biological quality element in the wider catchment was available from the EA Catchment Data Explorer (see Table 4).
- 5.8 The varied hydromorphology along the course of the brook and its woodland setting are such that it is possible that the brook could support diverse invertebrate assemblages.

Fish

- 5.9 No survey work for this biological quality element was undertaken as baseline information was also available from the Catchment Data Explorer and is shown in Table 4.
- 5.10 The shallow depth of water and the potential for the brook to be somewhat ephemeral suggested that it was not suitable to support fish.

6.0 IMPACT ASSESSMENT

Potential Impacts and Mitigation Measures

6.1 The impact assessment is provided in tabular format in Table 6. It is considered that there is no need to consider the impacts and mitigation measures separately for the two route options (straight or sinuous).

Table 6: Potential Impacts and Mitigation Measures

Element		Potential impact	Mitigation proposed to ensure compliance
Hydromorphological Elements	Quantity and Dynamics of Flow	<p>1. Construction of the drain outfall into Clough Dike may require a temporary and minor diversion of water to exclude water from the working space. This interruption of flow would be minor, localised and temporary and is therefore considered to be negligible and not requiring mitigation.</p> <p>2. The new discharge has the potential to alter flow rates within the brook and as the brook is relatively small, peak discharge rates could result in localised scouring but as significant stretches of the brook run over a bedrock or cobble substrate any scouring is likely to be minor and the SuDS will include attenuation and flow control features. Any localised increase in flow rate is therefore considered to be negligible and not requiring mitigation in addition to the aforementioned features within the SuDS</p>	<p>1. None</p> <p>2. Implementation of a Sustainable Drainage Scheme with attenuation features and flow controls in accordance with Sheffield City Council's local guidance⁹.</p>
	Upstream & downstream continuity and sediment transport	<p>3. The proposed works do not have the potential to alter the existing upstream and downstream continuity.</p> <p>4. Whilst there is little sediment within the brook channel, during construction of the overland channel and outfall into the brook there will be the potential for disturbed soil to enter the brook, the steep gradient of the valley side greatly increasing the chance for soil spillage into the brook. As the brook is relatively free of sediment any additional sediment loading would potentially result in a major negative impact; consequently mitigation measures are required.</p>	<p>3. None required.</p> <p>4. The working method statement for construction of the discharge channel and outfall should make provision for ensuring that displaced soil during construction is not able to enter the brook.</p>
	Floodplain connectivity	<p>5. The proposals do not involve any loss of connectivity either upstream or downstream from where.</p>	<p>5. None required.</p>
	Water body depth & width variation	<p>6. None of the proposed works would involve any change in the width or depth of the brook.</p>	<p>6. None required.</p>
	Water body structure & substrate	<p>7. None of the proposed works involve loss or alteration of any portion of the brook bed.</p> <p>8. The final outfall to the brook will require a headwall, which will represent a localised change to part of the brook wall. However, the brook has been artificially modified in many places and any impact from the new headwall would be considered to be negligible and not requiring mitigation.</p>	<p>7. None required.</p> <p>8. None required.</p>
	Riparian zone	<p>9. The route of the overland channel and the need for a 6m wide maintenance easement either side will potentially result in the loss of some tree and shrubs. The impact of this loss is considered to be negligible as the area involved is relatively small compared to the overall woodland area and any loss of woody cover will effectively create a small glade thereby enhancing the existing woodland structure.</p> <p>10. Depending on the final location of the headwall for the outfall into the brook, there is the potential for loss of some woodland ground flora within the footprint of the headwall. However, this will be a relatively small area in terms of the overall area of woodland and the impact would therefore be negligible.</p>	<p>9. None required.</p> <p>10. None required.</p>

Element		Potential impact	Mitigation proposed to ensure compliance
Biological Elements	Fish	<p>11. The brook is not considered to be suitable to support fish and the proposed works would not result in any loss or disturbance of the brook bed. Consequently, there would be no impact on fish.</p> <p>12. During construction work there is the potential for fuel and other pollutant spillages to enter the brook and for these to then be conveyed into the Little Don. Depending on the nature and scale of the pollution spillage, this has the potential to have a major, negative impact on fish populations beyond Clough Dike.</p> <p>13. There is potential for pollutants to enter the brook and be conveyed into the Little Don and potentially harm fish populations within the Little Don. Depending on the nature and scale of the pollution spillage, this has the potential to have a major, negative impact.</p>	<p>11. None required.</p> <p>12. The adoption of standard pollution methods which will form part of the various working method statements for the construction work will mitigate any potential pollution issues.</p> <p>13. The proposed drainage scheme will comply with Sheffield City Council's SuDS guidance⁹ to adequately remove contaminants prior to discharge into a watercourse. For example, the scheme will include oil traps as part of the design. The cascade design of the proposed outfall to the brook will increase oxygen levels in the discharge before it enters the brook.</p>
	Invertebrates	<p>14. Any loss of vegetation as a result of the outfall headwall into the brook will be permanent but sufficiently small in scale to be negligible.</p> <p>15. Whilst there is little sediment within the brook channel, during construction of the overland channel and outfall into the brook there will be the potential for disturbed soil to enter the brook, the steep gradient of the valley side greatly increasing the chance for soil spillage into the brook. As the brook is relatively free of sediment any additional sediment loading would potentially result in a major negative impact on aquatic invertebrate populations in the brook; consequently mitigation measures are required.</p> <p>16. During construction work there is the potential for fuel and other pollutant spillages to enter the brook resulting in an adverse effect on aquatic invertebrate assemblages within the brook. Depending on the nature and scale of the pollution spillage, this has the potential to have a major negative impact</p> <p>17. When operational, the drainage system would have the potential to convey pollutants into the brook with a resultant adverse effect on aquatic invertebrate assemblages in the brook.</p>	<p>14. None required.</p> <p>15. The working method statement for construction of the discharge channel and outfall should make provision for ensuring that displaced soil during construction is not able to enter the brook.</p> <p>16. The adoption of standard pollution methods which will form part of the various working method statements for the construction work will mitigate any potential pollution issues.</p> <p>17. The proposed drainage scheme will comply with Sheffield City Council's SuDS guidance⁹ to adequately remove contaminants prior to discharge into a watercourse. For example, the scheme will include oil traps as part of the design. The cascade design of the proposed outfall to the brook will increase oxygen levels in the discharge before it enters the brook, this will benefit invertebrate populations within the brook.</p>
	Phytobenthos and macrophytes	<p>18. Macrophytes are not a feature of the brook and the proposed works will not result in any increased shading, therefore there will be no effect on this element.</p>	<p>18. None required.</p>
Physiochemical Elements		<p>19. The proposed SuDS for the development involves final discharge of surface water into Clough Dike. There is potential for this discharge to alter the current levels of the various physiochemical elements within the brook and further afield in the Little Don. As the proposal is for residential development, any pollution spillage is likely to be relatively minor, but none-the-less still with the potential to have a major, negative impact.</p>	<p>19. The proposed drainage scheme will comply with Sheffield City Council's SuDS guidance⁹ to adequately remove contaminants prior to discharge into a watercourse. For example, the scheme will include oil traps as part of the design.</p>
Specific Pollutants		<p>20. The proposed SuDS for the development involves final discharge of surface water into Clough Dike. There is potential for this discharge to alter the current levels of the various physiochemical elements within the brook and further afield in the Little Don. As the proposal is for residential development, any pollution spillage is likely to be relatively minor, but none-the-less still with the potential to have a major, negative impact.</p>	<p>20. The proposed drainage scheme will comply with Sheffield City Council's SuDS guidance⁹ to adequately remove contaminants prior to discharge into a watercourse. For example, the scheme will include oil traps as part of the design.</p>
Chemical		<p>21. The proposed SuDS for the development involves final discharge of surface water into Clough Dike. There is potential for this discharge to alter the current levels of the various physiochemical elements within the brook and further afield in the Little Don. As the proposal is for residential development, any pollution spillage is likely to be relatively minor, but none-the-less still with the potential to have a major, negative impact.</p>	<p>21. The proposed drainage scheme will comply with Sheffield City Council's SuDS guidance⁹ to adequately remove contaminants prior to discharge into a watercourse. For example, the scheme will include oil traps as part of the design.</p>

7.0 CONCLUSIONS

7.1 The proposals have been considered against the five key areas of compliance to test whether the proposals would be compliant with WFD legislation. This is presented in tabular format below.

Table 7: Impact Assessment Conclusions

Potential Outcome	Assessment	Conclusion
(1) Cause a deterioration in ecological status/potential of the water body (e.g. from poor to bad)	The Little Don from source to River Don has a status of 'Moderate'. The assessment has shown that the predicted effects on hydromorphological and biological elements are of no greater magnitude than minor negative and that these will be adequately mitigated by the proposed mitigation.	This outcome will be avoided and the WFD objective will be met.
(2) Prevent the water body from meeting its objective of good ecological status/potential	Mitigation measures have been proposed for all identified potential major and minor impacts on WFD quality elements. Therefore, with these mitigation measures in place, there would be no impacts arising from the proposed development that would prevent the Little Don from meeting its objective of overall good ecological status.	The objective will be met
(3) Prevent or compromise WFD objectives being met in other water bodies	Clough Dike discharges into the Little Don, which eventually becomes the River Don. Potential impacts which could have an impact on this water body relate to water quality and fish and invertebrate populations. The assessment has concluded that potential impacts on these features at the local (or site) level will be adequately mitigated by the proposed mitigation. Therefore, there would be no impact on these distant, but connected, waterbodies.	The objective will be met
(4) Cause failure to meet good groundwater status, or result in a deterioration of groundwater status	The proposed drainage strategy will involve discharge of surface water to watercourses rather than infiltration, so there should be no impact on groundwater quality and therefore status.	The objective will be met.
(5) Prevent the implementation of mitigation measures which define the hydromorphological designation of heavily modified water bodies.	The Little Don is classified as a HMWB. The assessment has shown that the proposals would not have any effect on implementation of the mitigation measures for this waterbody.	The objective will be met.

7.2 The overriding conclusion is that the proposals are, with the identified mitigation measures in place, compliant with the WFD. Whilst there is the potential of effects on the hydromorphological, biological, physiochemical, or chemical elements of a magnitude up to major negative, appropriate measures have been identified to mitigate these. Consequently, it is considered that there is no requirement for further assessment to establish more detailed baseline conditions for these elements, and this preliminary level assessment has been adequate to test compliance.

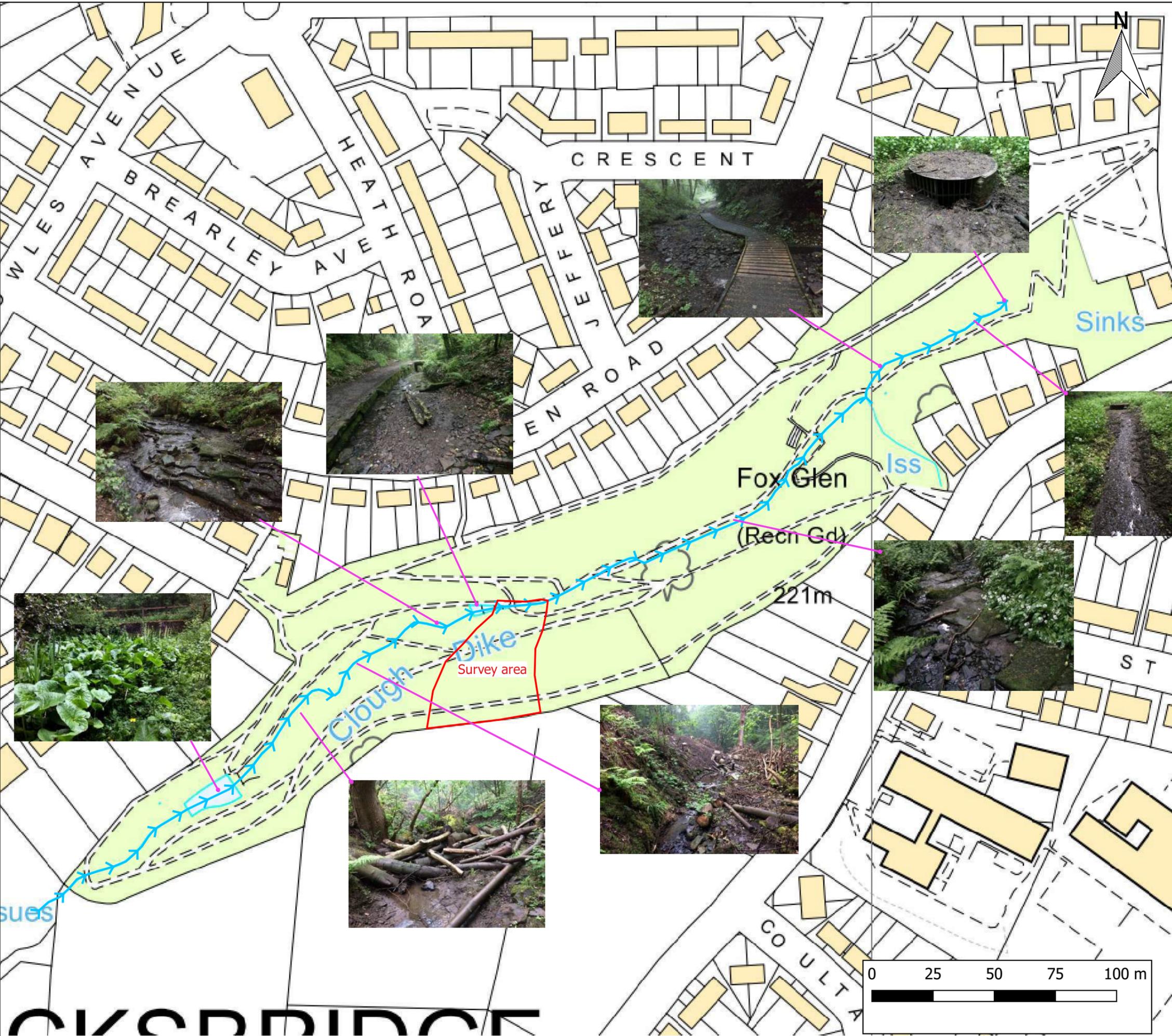
7.3 The assessment has been made with due diligence and professional judgement, and on this basis, it is considered that the conclusion that the proposed development would be compliant with the WFD objectives if the proposed mitigation is in place is made with a high level of confidence.

8.0 REFERENCES

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- ³ European Commission. (2003). *Common Implementation Strategy for the Water Framework Directive (2000/60/EC) - Guidance Document No 4 Identification and Designation of Heavily Modified and Artificial Water Bodies*. [online]. Available at: [https://circabc.europa.eu/sd/a/f9b057f4-4a91-46a3-b69a-e23b4cada8ef/Guidance%20No%204%20-%20heavily%20modified%20water%20bodies%20-%20HMMWB%20\(WG%202.2\).pdf](https://circabc.europa.eu/sd/a/f9b057f4-4a91-46a3-b69a-e23b4cada8ef/Guidance%20No%204%20-%20heavily%20modified%20water%20bodies%20-%20HMMWB%20(WG%202.2).pdf) [Accessed 26/07/2018].
- ⁴ Environment Agency & Sustainability West Midlands. (2012). *Local Authority Services and the Water Environment – Advice Note on the Water Framework Directive for Local Authorities across the Midlands*. [online]. England: Environment Agency & Sustainability West Midlands. Available from: <http://www.swdevelopmentplan.org/wp-content/uploads/2013/05/Advice-note-on-water-framework.pdf> [Accessed 26/07/2018].
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- ⁷ European Communities. (2009). *Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance Document No.20 Guidance on exemptions to the Environmental Objectives*. [online] Luxembourg: European Communities. Available from: http://ec.europa.eu/environment/water/water-framework/objectives/pdf/Guidance_document_20.pdf [Accessed 26/07/2018].
- ⁸ Environment Agency. (2016). *Water Framework Directive risk assessment – How to assess the risk of your activity – 6 April 2016*. [online]. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/522426/LIT_10445.pdf [Accessed 26/07/2018]
- ⁹ Bell, D., Ward, R., Kaye, G., Nowell, R., & Swales, P. (2015). *South Yorkshire Interim Local Guidance for Sustainable Drainage Systems*. [online]. Available at: <https://www.sheffield.gov.uk/content/dam/sheffield/docs/planning-and-development/planning-applications/South%20Yorkshire%20Interim%20Local%20Guidance%20for%20SuDS.pdf> [Accessed 26/07/2018]
- ¹⁰ Environment Agency. (2018). *Catchment Data Explorer – (most recent update 2/5/2018)*. [online]. Available at: <http://environment.data.gov.uk/catchment-planning/> [Accessed 26/07/2018].
- ¹¹ Environment Agency. (2018). *Catchment Data Explorer: Little Don from Source to River Don*. [webpage]. Available at: <https://environment.data.gov.uk/catchment-planning/WaterBody/GB104027057460> [Accessed 26/07/2018].

Figures

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Legend

- Proposed location of drainage channel
- > Clough Dike

rev	date	description	drn	chkd
A	31.07.18	Minor amends	NJL	NJL
-	26.07.2018	First Draft	NJL	NJL

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Hallam Land Management
Land at Deepcar

Water Framework Assessment Plan

Figure 1 **7301-E-11** 31/7/2018

L:/Deepcar/7301-E-Fox Glen Survey.qgs

Figure 2: Indicative Design

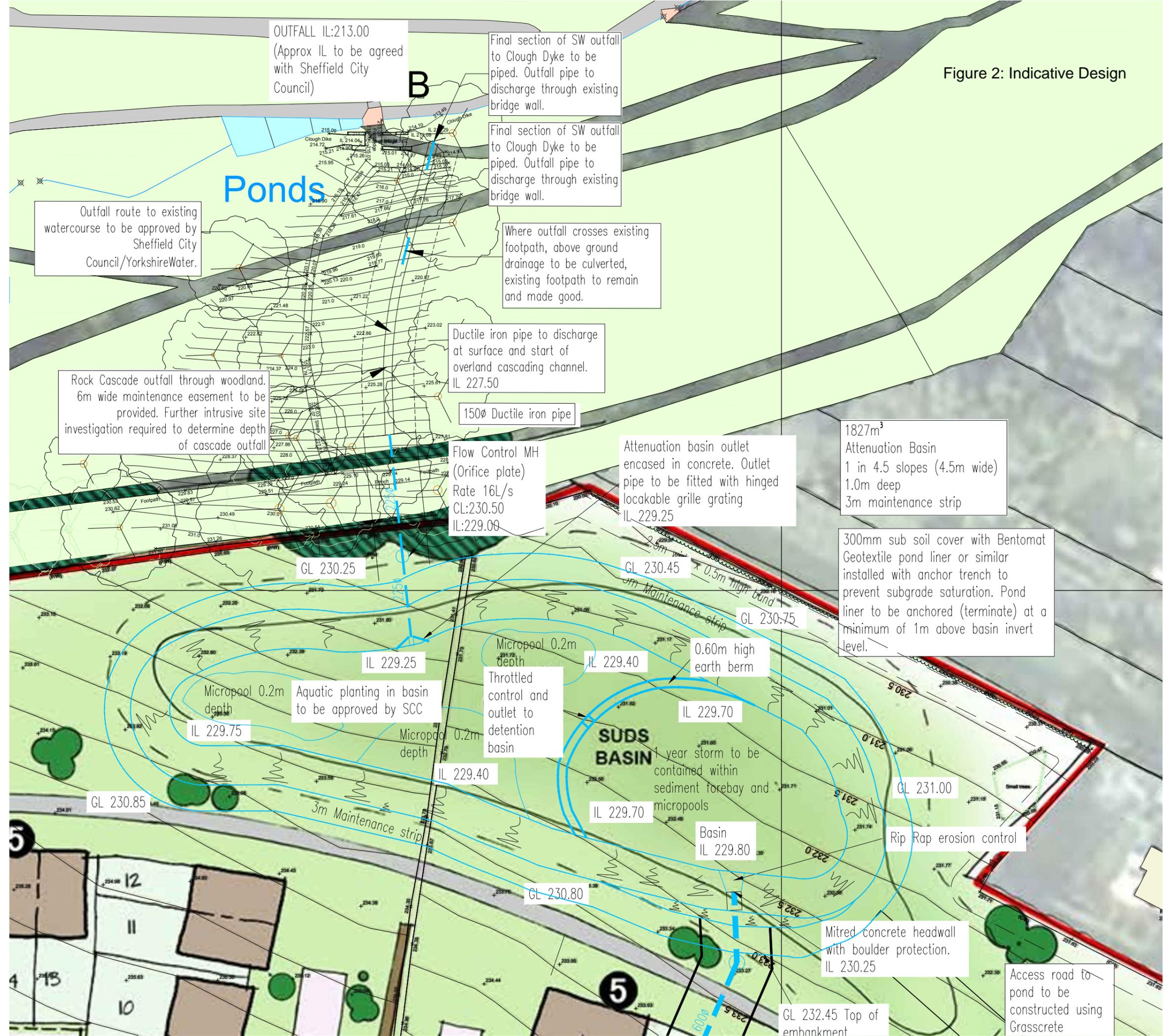
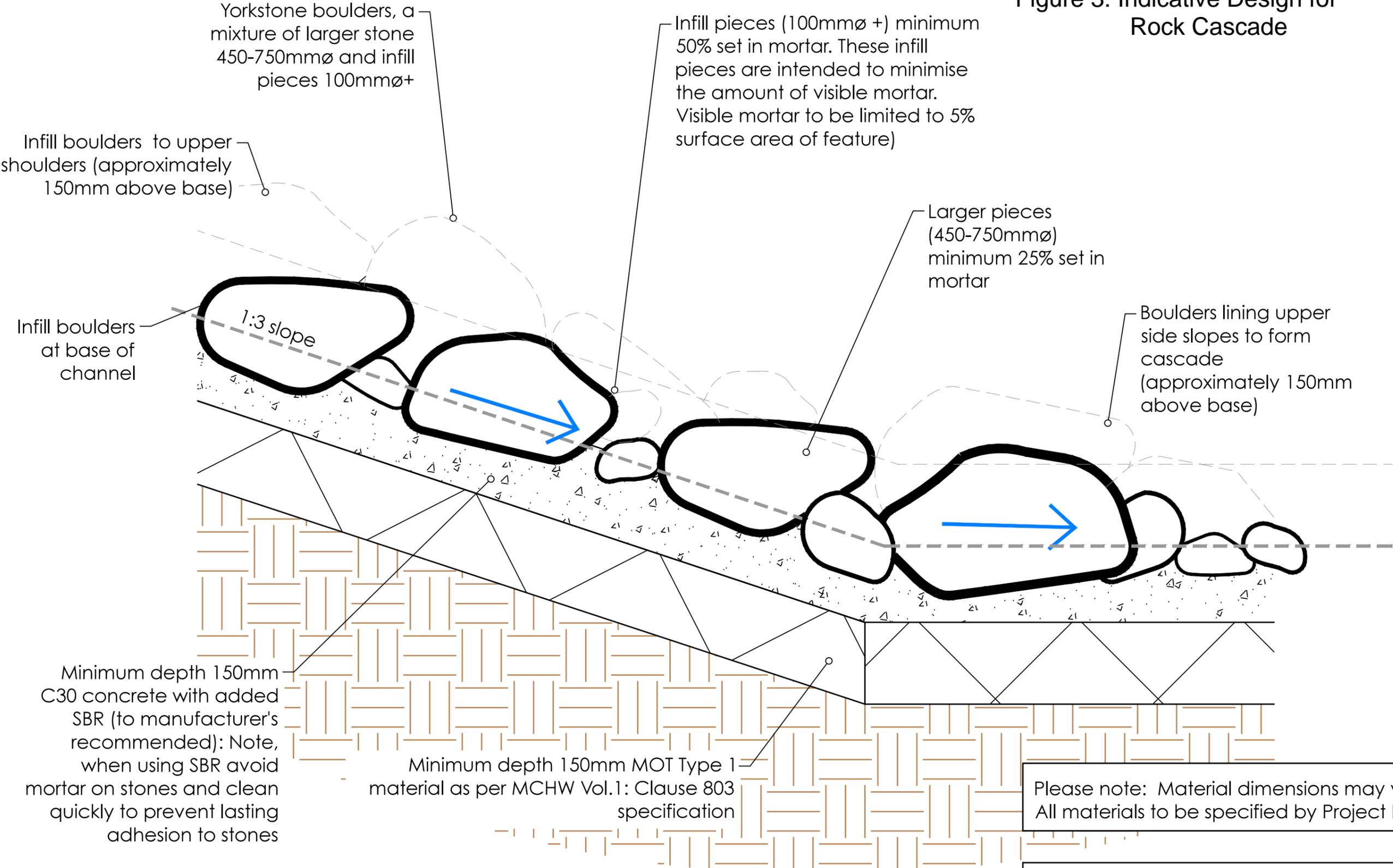


Figure 3: Indicative Design for Rock Cascade



Please note: Material dimensions may vary.
All materials to be specified by Project Engineer

Refer to the latest Guidance:
Interpave - www.paving.org.uk
SuDS Manual - www.ciria.org
British Standards Institution - www.bsigroup.com

Detail 28 Boulder Cascade
Scale 1:10 at A4

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Appendix 5 – Fox Glen Local Wildlife Site (LWS) Assessment

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Hallam Land Management Ltd.

Land at Carr Road, Deepcar, Sheffield

Fox Glen Woodland Survey of Proposed Drainage Route

October 2018

FPCR Environment and Design Ltd

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3.0 RESULTS3

4.0 DISCUSSION.....6

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Figure 1: Survey Area Plan

1.0 INTRODUCTION

1.1 Hallam Land Management Ltd. (Hallam) have submitted a planning application (Ref. 17/04673/OUT) to Sheffield City Council for outline planning permission for up to 93 residential dwellings and associated open space on land north of the junction between Hollin Busk Lane and Carr Road, Deepcar.

1.2 ARP Associates have produced a Flood Risk Assessment for the proposed development as part of the planning application submission. This assessment considered surface water drainage for the development and concluded that:

“A direct connection to a watercourse is considered the most suitable method of discharging surface water based on site layout and topography, Clough Dike, which flows adjacent to the northern boundary, is deemed a suitable receptor.”¹

1.3 Clough Dike flows through a wooded valley known as Fox Glen Wood, and this valley has been designated as a Local Wildlife Site, with the citation for this non-statutory designation listing the following features as the reasons for this designation:

- Small area of upland oak woodland (UKBAP priority habitat);
- Running water [stream] (UK & LBAP priority habitat);
- Native bluebell *Hyacinthoides non-scripta* (LBAP priority and protected species);
- Song Thrush *Turdus philomelos* (UKBAP priority species); and
- Treecreeper *Certhia familiaris* (LBAP priority species).

1.4 Concerns have been raised regarding the potential ecological impacts on the woodland and stream habitats that might result from this drainage strategy. In response to these concerns, Hallam have commissioned FPCR Environment and Design Ltd. to consider these potential impacts. This has been achieved via two separate approaches:

- An assessment of the potential impact on the woodland ground flora along a proposed route for the drainage system within the woodland; and
- A screening Water Framework Directive Assessment (WFDA).

1.5 This report covers the woodland flora issue and a separate report has been produced for the WFDA.

2.0 METHODOLOGY

2.1 The location of the area where the chosen drainage channel type would be located is shown by the red line boundary on Figure 1. Two potential routes for the channel within this area were initially identified, one following a straight course, the other following a sinuous course; the final route is a hybrid design with a gently curving route. On 30th May 2018, the vegetation within this area was surveyed by recording the species present within the different woodland layers. The recording method was to produce a plant species list with assessments of abundance and additional field notes. This was undertaken by a Principal Ecologist from FPCR Environment and Design Ltd., with the survey lasting approximately 1 ½ hours.

3.0 RESULTS

Description

3.1 The southern boundary of the woodland in the survey area is formed by a drystone wall with a surfaced path a few feet inside the wood running parallel with the wall. From this path there is a steep north facing slope running down to Clough Dike in the valley bottom. An extensive area on the slope is dominated by bramble *Rubus fruticosus* agg. with



few other plant species present. The canopy is relatively thin here and formed by a few ash *Fraxinus excelsior* with small numbers of sycamore *Acer pseudoplatanus* and pedunculate oak *Quercus robur*. Whilst the understorey is moderately species-diverse, many of the shrubs/young trees forming this woodland layer are represented by single shrubs and the presence of hornbeam *Carpinus betulus* and a horticultural variety of hawthorn *Crataegus monogyna* ('Paul's New Double Scarlet') reflect past management of the valley, as does the presence of cultivated daffodil *Narcissus* agg. Whilst bramble is the main species in this area, male-fern *Dryopteris filix-mas* is frequent but other species forming the field layer are locally frequent, occasional or rare. Bluebell (one of the reasons for the Local Wildlife Site designation) is just rare to locally occasional. The vascular plant component is complimented by a reasonable covering of a small number of our most common and abundant woodland bryophytes, including the ubiquitous common feather-moss *Kindbergia praelonga*.

3.2 At the base of the slope the stream has been heavily modified; an artefact from when the valley was open land and a focal place for relaxation and public events for the local community ('The Glen' was gifted to the Deepcar and Stocksbridge communities in 1911)². Immediately downstream of this built structure the stream banks become relatively species rich (see Stream Margin species list in Table 1).



Table 1: Species List

Taxon	Common Name	Abundance
Canopy		
<i>Fraxinus excelsior</i>	Ash	Occasional
<i>Acer pseudoplatanus</i>	Sycamore	Rare
<i>Quercus robur</i>	Pedunculate Oak	Rare
Understorey		
<i>Fraxinus excelsior</i>	Ash	Occasional
<i>Ilex aquifolium</i>	Holly	Occasional
<i>Sambucus nigra</i>	Elder	Occasional
<i>Rubus idaeus</i>	Raspberry	Rare to occasional
<i>Acer pseudoplatanus</i>	Sycamore	Rare
<i>Carpinus betulus</i>	Hornbeam	Rare
<i>Corylus avellana</i>	Hazel	Rare
<i>Crataegus monogyna</i> (Hortal var.)	'Paul's New Double Scarlet'	Rare
<i>Rosa arvensis</i>	Field-rose	Rare
<i>Sorbus aucuparia</i>	Rowan	Rare
Field Layer		
<i>Rubus fruticosus</i> agg.	Bramble	Frequent to locally abundant/dominant
<i>Dryopteris dilatata</i>	Broad Buckler-fern	Frequent
<i>Athyrium filix-femina</i>	Lady-fern	Locally frequent
<i>Geum urbanum</i>	Wood Avens	Locally frequent
<i>Holcus lanatus</i>	Yorkshire-fog	Locally frequent
<i>Alliaria petiolata</i>	Garlic Mustard	Occasional to locally frequent
<i>Hedera helix</i>	Ivy	Occasional to locally frequent
<i>Pteridium aquilinum</i>	Bracken	Occasional to locally frequent
<i>Acer pseudoplatanus</i> (seedlings)	Sycamore (seedlings)	Occasional
<i>Anthriscus sylvestris</i>	Cow Parsley	Occasional
<i>Cardamine flexuosa</i>	Wavy Bitter-cress	Occasional
<i>Epilobium montanum</i>	Broad-leaved Willowherb	Occasional
<i>Fraxinus excelsior</i> (seedlings)	Ash (seedlings)	Occasional
<i>Galium aparine</i>	Cleavers	Occasional
<i>Ilex aquifolium</i> (seedlings)	Holly (seedlings)	Occasional
<i>Poa trivialis</i>	Rough Meadow-grass	Occasional
<i>Taraxacum officinale</i> agg.	Dandelion	Occasional
<i>Urtica dioica</i>	Common Nettle	Occasional
<i>Narcissus</i> agg.	Cultivated daffodil	Rare but very locally frequent
<i>Hyacinthoides non-scripta</i>	Bluebell	Rare but very locally occasional
<i>Chamerion angustifolium</i>	Rosebay Willowherb	Rare
<i>Dactylis glomerata</i>	Cock's-foot	Rare
<i>Heracleum sphondylium</i>	Hogweed	Rare
<i>Holcus mollis</i>	Creeping Soft-grass	Rare

Taxon	Common Name	Abundance
<i>Lonicera periclymenum</i>	Honeysuckle	Rare
<i>Moehringia trinervia</i>	Three-nerved Sandwort	Rare
<i>Persicaria bistorta</i>	Common Bistort	Rare
<i>Ranunculus acris</i>	Meadow Buttercup	Rare
<i>Sorbus aucuparia</i> (seedlings)	Rowan	Rare
Ground flora bryophytes		
<i>Kindbergia praelonga</i>	Common Feather-moss	Present
<i>Brachythecium rutabulum</i>	Rough-stalked Feather-moss	Present
<i>Dicranella heteromalla</i>	Silky Forklet-moss	Present
<i>Pellia</i> sp. [indet.]	a <i>Pellia</i> sp. [indet.]	Present
<i>Fissidens taxifolius</i>	Common Pocket-moss	Present
Stream margins		
<i>Geum urbanum</i>	Wood Avens	Locally frequent
<i>Cardamine flexuosa</i>	Wavy Bitter-cress	Occasional
<i>Ficaria verna</i> subsp. <i>verna</i>	Lesser Celandine	Occasional
<i>Allium ursinum</i>	Ramsons	Rare
<i>Asplenium scolopendrium</i>	Hart's-tongue	Rare
<i>Chrysosplenium oppositifolium</i>	Opposite-leaved Golden-saxifrage	Rare
<i>Lamiastrum galeobdolon</i> subsp. <i>montanum</i>	Yellow Archangel	Rare
<i>Persicaria bistorta</i>	Common Bistort	Rare
<i>Valeriana officinalis</i>	Common Valerian	Rare
Bryophytes		
<i>Lunularia cruciata</i>	Crescent-cup Liverwort	Present
<i>Platyhypnidium riparioides</i>	Long-beaked Water Feather-moss	Present
<i>Lophocolea bidentata</i>	Bifid Crestwort	Present
<i>Chiloscyphus polyanthos</i>	St. Winifrid's Moss	Present

4.0 DISCUSSION

- 4.1 Fox Glen Wood has been designated as a Local Wildlife Site due to the presence of specific habitats and species. The potential impacts of the proposed work on these features are discussed below.

Small Area of Upland Oak Woodland (UKBAP Priority Habitat)

- 4.2 Whilst there is not a definitive definition for what constitutes 'upland' this generally relates to areas with an altitude above 300m above sea level but others consider upland to encompass areas which have an upland type of environment irrespective of altitude³. With a maximum altitude of 230m, Fox Glen is considerably lower than 300m. The woodland structure and composition is typical of what might be expected in lowland secondary woodland. Therefore, the presence of any upland oak woodland seems somewhat tenuous.
- 4.3 Sessile oak is not present in the survey area and this area is not indicative of upland oak woodland. Therefore, the proposals would not involve any impact on this habitat type.
- 4.4 The ground flora is not particularly species-diverse with a very small number of species forming the bulk of the vegetation. The overall species composition is typical of secondary semi-natural woodland with very few species present which would be considered to be Ancient Woodland Indicator species. This reflects the history of the site and the fact that it was formerly a more open habitat type.
- 4.5 There would be a permanent loss of ground flora along the line of the drainage channel, and temporary disturbance on the adjacent ground during construction. However, the survey has shown that the ground flora is not particularly species-diverse with the majority formed by a small number of common and widespread species. Following construction it can be anticipated that the ground flora will recover relatively quickly from the temporary disturbance with no long-lasting detrimental effect.

Running Water [Stream] (UK & LBAP Priority Habitat)

- 4.6 Clough Dike forms one of the headwaters of the Little Don (also known as the The Porter), with its source less than 1km from the Little Don. As such, it is representative of the UK BAP priority habitat⁴ (now a Habitat of Principal Importance as listed on Section 41 of the NERC Act 2006). The aforementioned Water Framework Directive Assessment considers the potential impact on this priority habitat.

Native Bluebell *Hyacinthoides non-scripta* (LBAP Priority and Protected Species)

- 4.7 Bluebell are present in the survey area and this species is listed as being one of the reasons for designation of the woodland as a Local Wildlife Site. The LWS citation notes that this is a protected species. Whilst this is correct, as bluebell (specifically *Hyacinthoides non-scripta*) is listed on Schedule 8 of the Wildlife and Countryside Act 1981 (as amended), but only in respect of Section 13(2) which states:

“(2) Subject to the provisions of this Part, if any person—

(a) sells, offers or exposes for sale, or has in his possession or transports for the purpose of sale, any live or dead wild plant included in Schedule 8, or any part of, or anything derived from, such a plant; or

(b) publishes or causes to be published any advertisement likely to be understood as conveying that he buys or sells, or intends to buy or sell, any of those things, he shall be guilty of an offence".⁵

- 4.8 The proposed works would potentially result in the intentional uprooting and destruction of bluebell but for this species this would not be a contravention of Section 13(1) of the Act as bluebell do not receive protection in respect of this Section of the Act.
- 4.9 Irrespective of this, any potential harm to bluebell can easily be mitigated due to the fact that this is a bulb species. This means that if construction of the drainage system resulted in any bluebells being dug up, the bulbs could simply be replanted nearby in an undisturbed area, where they would grow again.

Song Thrush *Turdus philomelos* (UKBAP Priority Species)

- 4.10 Song thrush was an original UKBAP priority species for which a Species Action Plan (SAP) was written⁶ and consequently, this is now a species of principal importance covered under Section 41 (England) of the NERC Act (2006)⁷. It is also on the Birds of Conservation Concern (BoCC)⁸ Red List. The decline in song thrush populations in the UK since the mid 1970's has been well documented but the cause of this decline is still not fully understood. The original UKBAP SAP indicated that drainage and loss of permanent pasture were implicated, but Fuller *et al.* (2005)⁹ consider that loss of damp ground and understorey within woodland habitats may have implications for fledgling and juvenile survival rates.
- 4.11 The proposed works have the potential to result in the loss of some understorey. However, the areas involved are relatively small in comparison to the overall size of the woodland. This loss will be permanent within the footprint of the drainage channel and 3m either side of the channel which will need to be maintained free of woody vegetation to provide open conditions for maintenance of the structure. Away from these areas, any loss of understorey will be temporary and shrubs are likely to regenerate quickly.
- 4.12 For these reasons, the proposed works would have a negligible impact on any song thrush population.

Treecreeper *Certhia familiaris* (LBAP Priority Species)

- 4.13 The Local Wildlife Site citation lists treecreeper *Certhia familiaris* as a LBAP priority species but there does not appear to be any record of this being historically¹⁰, or currently¹¹ a priority species within the Sheffield BAP so inclusion of this species as a reason for the Local Wildlife Site designation is unclear.
- 4.14 Treecreeper is not a species of principal importance⁷ and is included on the Birds of Conservation Concern⁸ green list. It is therefore a species which occurs regularly in the UK and not a species considered to be a priority for conservation.
- 4.15 As for song thrush, the minor permanent and temporary loss of woodland habitat due to the proposed drainage work would have a negligible impact on this common and widespread species.

Willow Tit *Poecile montanus* (UK BAP Priority Species)

- 4.16 Although willow tit is not listed as a reason for the LWS designation, it is a Species of Principal Importance⁷ and a BoCC Red List species⁸, reflecting concerns following dramatic population declines and contraction in range. As for song thrush, the reasons for this decline are not fully understood but loss of damp, young woodland has been identified as a possible factor¹².
- 4.17 Willow tit have been recorded in the wider Stocksbridge area and Fox Glen has been identified as a potential site for this species and the recent management to create woody debris dams along Clough Dike was specific enhancement work for this priority species; the objective being to hold back water to create damper conditions within the wood¹³.
- 4.18 The proposed drainage work would complement this habitat management work. The attenuated flow that the drainage system would operate under would ensure a controlled flow into the Clough Dike and help to maintain the damp conditions that the aforementioned management work is attempting to achieve.
- 4.19 As discussed for song thrush, the proposed works will potentially result in the loss of some understorey but the areas involved would be small. Although some of this loss would be permanent elsewhere the loss would be temporary and shrubs are likely to regenerate quickly. This regeneration would form young woodland and therefore have the potential to provide suitable habitat for this species. Any short-term disturbance during the construction period would be minimised undertaking the work outside the main nesting period.
- 4.20 As part of the wider development, additional enhancements for this species will be provided through landscape planting to create a graded woodland edge to the south west of the proposed development. The species mix and management will be subject to detailed design but if appropriate, the edge mix can include wetland species such as willow and alder.

5.0 CONCLUSION

- 5.1 The proposed work to construct and maintain a drainage system through Fox Glen Wood to discharge into Clough Dike would have no more than a negligible adverse impact on the features for which the woodland has been afforded the non-statutory designation as a Local Wildlife Site.
- 5.2 The proposals would potentially have an impact on the small population of bluebell within the proposed area of works where the drainage channel would be located. This impact could however be mitigated by re-planting any uprooted bulbs into undisturbed areas adjacent to the working area.

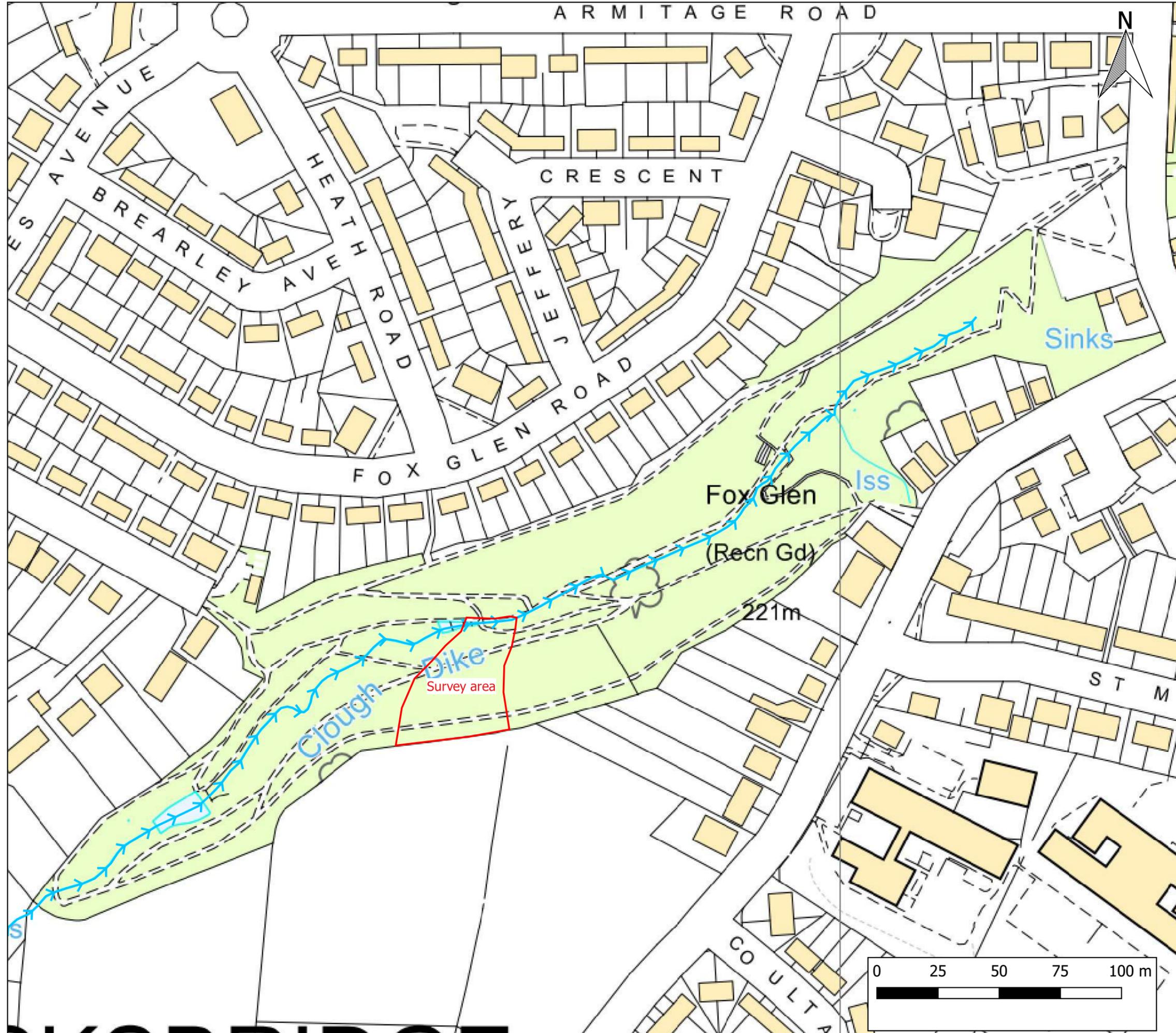
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Figures

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Legend
 Survey Area

rev	date	description	drn	chkd
A	31.07.2018	Minor amends	NJL	NJL
-	23.07.2018	First Draft	NJL	NJL

fpcr

- masterplanning
- environmental assessment
- landscape design
- urban design
- ecology
- architecture
- arboriculture

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Hallam Land Management
 Land at Deepcar

**Woodland Survey
 (Drainage Proposals)**

Figure 1 **7301-E-10**

31/7/2018

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