Sheffield & Rotherham

Steelhenge ©Chris Senior

Reserve Management Plan

Centenary Riverside

April 2020 - March 2030

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For nature, for everyone

Acknowledgements

Sheffield and Rotherham Wildlife Trust would like to thank the many individuals who have contributed to the formulation of this management plan. In particular, thanks go to Oskar Seime, Jacob Sendall and Tony Askins for their work on the text.

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INTRODUCTION

Sheffield and Rotherham Wildlife Trust is part of a national association of 47 local Wildlife Trusts, which work with communities throughout the UK to protect wildlife in town and country. Sheffield and Rotherham Wildlife Trust aims to promote conservation, advance education in environmental matters, and improve the quality of life in Sheffield and Rotherham, through the development and promotion of sustainable land management practices, linked directly to both rural and urban regeneration.

Centenary Riverside is the centre-piece of the 2009 Phase 1 Rotherham Renaissance Flood Alleviation Scheme. Its primary purpose is to provide flood storage capacity and mitigation to help protect Rotherham from serious flooding from the River Don, as experienced in the summer of 2007 and winter of 2019. Since Sheffield and Rotherham Wildlife Trust have taken over management of the site in 2009 there have been 15 significant flood events.

Complementing its flood defence role, Centenary Riverside is managed by Sheffield and Rotherham Wildlife Trust to maximise its biodiversity value, its contribution to the green infrastructure of Rotherham and its value to the local community and visitors. The site gained Local Nature Reserve status in 2016.

As an urban site, it provides a green oasis in the middle of the industrial and commercial area of west Rotherham. Being on the banks of the River Don, it provides a 'stepping stone' for wildlife moving along the river corridor, linking up to the nearby Blackburn Meadows wetland (1.5 km west) and down river to the adjacent Don Island.

1.1 Purposes and formulation of the plan

This management plan has been formulated for the following reasons:

- To provide comprehensive and cohesive information about the Local Nature Reserve in one document, with reference to other documents where necessary.
- To outline the key long-term aims and the associated objectives that form the framework of management.
- To outline the rationale for management so as to give a clear and comprehensive explanation of why aspects need management and what form that management will take.
- To provide a key document from which projects are developed and associated funding sought.
- The plan allows consistency and continuity so that when changes of staff take place, or changes in ownership or disposal of the land occurs, then management aims, objectives and prescriptions are continued.

The work programme is set out within this document. However, the nature of work programmes is such that they vary and are modified due to unanticipated changes or developments. Therefore, the full annual work programmes are kept and updated electronically at the Sheffield and Rotherham Wildlife Trust office.

1.2 Structure of the plan

This management plan is divided into sections.

Section 1 gives an overview of the plan

Section 2 provides a detailed description of the reserve.

Section 3 of the plan gives the Trust's **vision** for the reserve: the condition we are aiming to achieve by 2050. It then lists the reserve's **features**, the most valued elements of the site for which it is managed.

For each feature, a number of **attributes** and **factors** are then identified. **Attributes** are measurable qualities of a feature, against which its condition will be monitored in order to judge the effectiveness of management. **Factors** are anything that has the potential to influence or change a feature, or to affect the way in which it is managed.

Once the attributes and factors affecting a feature have been identified, each feature is then **evaluated**. During evaluation, the current condition of the feature is compared to that contained in the vision and its performance against the attributes identified discussed. The impact of factors – which can be positive or negative – on the feature, or its management, are likewise evaluated. From this evaluation **management objectives** are then set.

Section 4 comprises the work programme where the management prescriptions for the features are listed.

Section 5 of the plan comprises the **Figures**: maps that accompany the text.

Section 6 of the plan are the **Appendices**, where supporting information is given.

SITE DESCRIPTION

1.3 General Information

Location and Site Boundaries

Figure 1: Site Location and Boundaries

The entrance to Centenary Riverside nature reserve is at O.S. Grid Reference SK421 921 in the Templeborough area of west Rotherham, a mixed commercial and business area close to the town centre. The reserve covers an area of 4.5 ha, bordered by train tracks in the north, the River Don in the south and east and industry to the west. The site is approximately 1 km from junction 34 on the M1 motorway, and less than a kilometre from Rotherham town centre.

Local Land Use and Ownership

Figure 2: Local Land Ownership

Information below is contained within the 2012 'Heads of Terms Agreement' but has not been updated since this time.

Rotherham Metropolitan Borough own land to the north, beyond the railway corridor. This reclaimed industrial site has established trees and shrubs and areas of open grassland. The Trans Pennine Trail runs through this site.

To the west lies Blackburn Meadows nature reserve, managed by Sheffield City Council, which provides an important ecological link within the Don corridor. Further to the west lies the visitor attraction, Magna Science Park.

The waste ground at the entrance way to the reserve is privately owned by Pendragon, with the adjacent land being owned by Hinchcliffe. In 2019 Pendragon extended the fenced area for Evans Halshaw Citroën Showroom. On the opposite side of Riverside Way access road is land owned by GAT Investments Ltd (Evans Halshaw Citroën Showroom) and Westcourt Properties Ltd (Burrows Toyota Showroom).

Site tenure and occupancy

Rotherham Metropolitan Borough Council owns the freehold to Centenary Riverside. Sheffield and Rotherham Wildlife Trust lease the land from Rotherham Metropolitan Borough Council. This 99 year lease commenced April 2009.

NB: This is not a legal document. Please refer to the original tenure documents before taking any decision or any action that may have legal implications.

Landscape Character and Context

Centenary Riverside falls within Natural England's Natural Character Area (NCA) Profile 38: Nottinghamshire, Derbyshire and Yorkshire Coalfield. This area has seen great change over the past few centuries due to widespread industrialisation and development. A generally low-lying area, with hills and escarpments above wide valleys, the landscape over half of the NCA (64 per cent) is currently designated as greenbelt land. Very little of the NCA is designated for geology or nature conservation, but instead the landscape is dotted with many pockets and patches of habitat where species find refuge.

Centenary Riverside lies at the bottom of a wide valley but is steeply sloped, with the upper part of the reserve lying above the floodplain. From its upper plateau it offers views over the river, adjacent housing and industrial premises. It's mosaic of wet and dry habitats - swamp, open water, grassland and scrub – though all secondary in nature, are typical of the landscape which once fringed the River Don as it passed through its floodplain. Over time, much of this primary habitat has been lost to housing and industrial development (in particular, open casting), giving the local area an urban and industrial character. The area immediately surrounding the reserve has long been industrial and dominated by the manufacture of steel. As these enterprises have declined the land they once dominated has opened up, and a new green landscape is developing in which the river and adjacent waterbodies are an important feature. Consequently, Centenary Riverside today now form one of a chain of green sites through which both people and wildlife can move and lies within the Rotherham Rivers Living Landscape Area (**Figure 3**).

Policy context & relationship with other plans

Centenary Riverside is designated as a Local Nature Reserve by RMBC.

The RMBC Local Plan Core Strategy, which replaced the old Rotherham Unitary Development Plan in 2015, states that

Objective 12: Managing the water environment.

> *By the end of the plan period, implementation of the plan's policies to regulate development will have conserved, managed and enhanced the borough's water environment and contributed to the wider integrated management of water catchments. The risks of pollution of rivers and water resources, depletion of water supplies, flooding and harm to biodiversity and leisure interests will have been minimised by implementation of the plan's policies.*

Policy CS 20: Biodiversity and Geodiversity.

> *The Council will conserve and enhance Rotherham's natural environment. Biodiversity and geodiversity resources will be protected, and measures will be taken to enhance these resources in terms of nationally and locally prioritised sites, habitats and features and protected and priority species.*

Priority will be given to:

> *Supporting the positive management and protection of nationally, regionally and locally designated sites for nature conservation;*
>
> *Managing land use sympathetically, understanding the naturally functioning processes of habitat succession, flood & water management and climate*

change adaptation; contributing to landscape-scale and green infrastructure delivery.

The Site is part of the wider Living Don Living Landscape programme covering the Upper Don Basin within South Yorkshire - upstream of Sprotbrough, Doncaster. A partnership project, 'The Living Don', led by Sheffield and Rotherham Wildlife Trust, is working to enhance a number of ecological networks or 'Living Landscape' areas by creating or enhancing habitats, naturalising water bodies and improving green infrastructure such as footpath links and cycleways. Community engagement is central to all these activities to ensure that local needs are met, and the Living Landscape is sustainable for the future.

The objectives of the Living Don Living Landscapes programme are as follows:

- To manage core sites within the landscape to provide quality areas for biodiversity and recreation.
- To connect the core sites with other green spaces including other nature reserves, parks, allotments and gardens.
- To undertake and promote positive management of the natural environment to provide an ecologically functional landscape that provides ecological, economic, social and environmental services.
- To promote and enable appropriate public access to, and enjoyment of, wildlife reserves throughout Sheffield and Rotherham.

To increase public understanding of the Living Don area's local natural heritage, and participation of local people in the care and enjoyment of their local environment.

Public Rights of Way and Access

Centenary Riverside does not contain any designated Public Rights of Way.

The Environment Agency holds a right of access across the reserve to the sluice gate (manual penstocks). This requirement is detailed in the 'Heads of Terms of Conditions':

> *"Weather permitting, vehicular access is available along the top of the main flood embankment to the downstream side of the flood release mechanism at Firth Rixon (left bank). Access is required to open the manual penstocks following an overtopping event…and to inspect / maintain the flap valves structure."*

Sheffield and Rotherham Wildlife Trust have a legal responsibility to keep this route clear of shrubs and trees to ensure vehicular access is possible.

Reserve management and constraints

The reserve is managed by the Trust's Living Landscapes Manager (North), with support from a Community Wildlife Ranger and the Trust's Land Management Team. At the time of writing the manager for Centenary Riverside is Mr Rob Miller nature.reserves@wildsheffield.com

Management Constraints:

No development is to take place upon the flood defence bank.

During the site's construction, major areas of chemical contamination, remaining from its industrial past were located and removed. To prevent harm from residual chemical contaminants and small physical industrial remains the site was entirely covered with a 600mm cap of 'clean' subsoil (apart from the islands in the lagoon). No excavation is recommended within the site due to the risk of exposing any remaining contamination. The Environment Agency will not clear silt from the flood plain until it has reached a depth of 1m.

Access is also required to both pipes connecting the river to the lagoon along the boundary between the lagoon and the river. The Trust is also required to ensure both pipes connecting the river to the flood pond are kept clear of debris so their function is unimpeded.

Health and Safety

Sheffield and Rotherham Wildlife Trust has detailed polices, which are amended and updated at regular intervals or when key legislation changes. A series of procedures have been produced, covering scenarios such as working on site, lone working, and use of machinery. A Health and Safety working group monitors accidents and incidents, and feeds these into further H&S policies and/or procedures. Risk assessments are carried out for each task and site, and reviewed regularly.

Centenary Riverside is regularly patrolled by Sheffield and Rotherham Wildlife Trust staff and volunteers. Problems such as broken infrastructure or graffiti are logged on and addressed as soon as possible. Problems and incidents reported by members of the public are also logged and dealt with as necessary.

There is no litter bin or dog bin on the site. The Trust's general policy since taking on the site has been not to provide this infrastructure (due to costs and impact upon the natural landscape), and instead to encourage people to take their litter and dog waste home with them for safe disposal.

A dedicated patrol team visits the site on a regular basis, undertakes a litter pick, and reports issues identified on the site. SRWT's land management team also carry out regular work days on the reserve. As well as ongoing maintenance, they also carry out litter picks, report vandalism and deal with any other issues as required.

After flood events, litter and debris is often have been deposited on site in quantity. The site is cleaned as soon as possible after such events.

Site history and past management

Rotherham Metropolitan Borough Council own Centenary Riverside. Up until the late 1800s the area was known as Bromley Sands, and was used for livestock grazing as well as being a place of recreation. During the 20th Century the area of Templeborough was well known for its steelworks, reputed to be a mile long, and employing 10,000 people at its height in the mid-20th century. The steelworks became part of the British Steel Corporation after nationalisation in 1967. The steelworks closed in 1993.

The large melting shop at Templeborough was producing about 11,000 tons of ingots per week in 1953, equivalent to an output of 550,000 tons of steel per annum. The plant at the Templeborough melting shop consisted of seven open hearth furnaces of 60 tons capacity for the production of acid and basic steel

ingots. All the furnaces were fired by producer gas provided by a battery of four 3-ton Morgan gas machines. The melting shop was mainly devoted to the production of high and medium carbon steels and alloy steels, some of which were sold to customers in ingot form. The greater proportion of the output was used within the works for the production of forgings, railway tyres, wheels, axles and springs, and certain rolled products.

The relics of this area's industrial past are being celebrated in the site's new incarnation, with the Steel Henge sculpture on the flood defence bank being constructed from reclaimed iron moulding casts. The concrete foundations of the steelworks have been retained to create landscape features within the flood pond & to provide wildlife habitats, and the creation of giant deck chair sculptures reflects both the massive forms of the steel industry, and the increasing use of the Don for leisure.

The area around the reserve was regularly flooded over the years by the River Don, causing disruption and inconvenience to local businesses and people. A severe flood event in 2007 highlighted the need for a flood defence system. This new system aimed to rebuild the confidence of existing business, and help to attract new business to the area as the adjacent land can be developed with greatly reduced risk of flooding.

Since 2009, Sheffield and Rotherham Wildlife Trust has managed the site to create biodiversity value and recreational and educational benefits.

Services, easements & emergency access routes

Figure 4: Services & vehicular access

The large DOGSTAR gas pipe runs alongside the rail track at the eastern boundary of the site, crossing over the rail track and entering Centenary Riverside from its north eastern border into the scrub area. The gas pipe follows the boundary northwards and leaves the site at the most northern tip.

Telecommunication services exist to the south east of the site.

Vehicular access into the reserve is possible only via the footbridge to the east of the site from Riverside Way.

The Environment Agency have a legal vehicular right of vehicular access to the river bank, to allow maintenance of the water inlet pipe and sluice. This access route must be kept clear of vegetation by the Trust.

1.4 Environmental Information

Climate

Data is available for the thirty-year average (1989 - 2018) from the local Sheffield weather station (see Table 1).

Table 1. Local climate data for Centenary Riverside

Location	Mean Annual Rainfall (mm)	Mean temperature (ºC)	
		Max	Min
Sheffield (131m)	816.68	13.79	6.89

The prevailing wind is from the west.

It is recognized and accepted that changes in climate may affect the species composition on the reserve and that future species conservation plans will adapt to accommodate these changes.

Given the current uncertainty on the quantitative effect of climate change on the UK's climate (other than an acceptance that climatic extremes will become more frequent) and the difficulty in distinguishing the effect of climate change from other factors – changes in land use, disease etc. – no recommendations to manage specific species or assemblages in response to climate change are made at this time. Instead, general measures to make the reserve more resistant to climate change will be adopted. However, the effect of more frequent flood events on the reserve is discussed in section 3.

Topography

Centenary Riverside lies on the northern bank of the River Don, at an altitude between 29.4 metres and 25.4 metres above ordnance datum.

Geology

Rotherham falls in the Natural England Coal Measures Natural Area. The underlying bedrock is characterised by alternating sandstones and shales. The underlying geology is not thought to be significance in this context due to the secondary nature of the site.

Soils

The site's soils and substrates are largely a result of the Environment Agency's work to create the flood plain and flood bank. Contours were altered to a great extent. The sites' previous industrial use resulted in areas of contaminated land. Some of this contaminated material has been removed from the site during construction. The entire site (apart from the islands in the lagoon) is capped with 600mm of uncontaminated subsoil to cover physical contaminants and any residual chemical contamination. Compost was spread to a depth of 190mm in planting areas on top of the flood defence bank. No compost was spread on the flood defence bank itself. The boundary riverbank to the east was the site of a benchmark stabilisation project comparing planted coir rolls to a new technique of laying grass-seeded compost filled netting tubes (Soxx).

Hydrology and drainage

Figure 5: Hydrology

The River Don runs along the south and east boundaries of the site. The reserve forms a floodplain which is in hydrological continuity with the adjacent River Don (via 3 pipes) and is periodically inundated during

times of high river level. The cycle of flooding and receding waters leads to material from the river being deposited on the river bank and lagoon. Deposits include silt, litter, woody debris, vegetative materials and seeds. Invasive species such as Japanese knotweed and Himalayan balsam are a continuous problem as they are deposited on site during these inundations.

The site provides areas of wet woodland, reeds, tall ruderals and grassland alongside the River Don. The site contains a small lagoon, including reed beds and islands for breeding wild fowl. The area of the main water body covers 1-2 hectares depending on the water levels.

A pond was excavated in the northwest of the site which was 1600mm at its deepest, and 500m^2. Due to its location on top of an exposed bank, the pond is fed only by rainwater and consequently has a significantly reduced area of open water during much of the year and has, at times, needed to be topped up manually.

In times of wet weather small rills are present on the flood bank, and areas of ephemeral standing water appear along some sections of the path network. A small scrape has been created near the top path, in the northeast corner of the site close to Steel Henge, in order to relieve the path from run off. This is regularly full of water and is beginning to be vegetated with wetland species. A further two scrapes have been created adjacent to the path at the bottom of the meadow bank, again to aid drainage. These scrapes are seasonally wet.

1.5 Biodiversity

The majority of Centenary Riverside habitats were planted or seeded with the wetland areas being left to regenerate naturally. A programme of surveys for vegetation, birds, invertebrates, mammals and amphibians have been carried out, and along with observational data form the baseline for future management and monitoring the impact of that management

Notable habitats and species

The national and local priority habitats and species found on site during the past 10 years are listed below.

There have been a number of attempts to introduce pillwort (*Pilularia globulifera*) into the pond and one of the scrapes. Pillwort is an internationally threatened species in the UK Biodiversity Action Plan (UK BAP). It also receives general protection under the Wildlife and Countryside Act 1981, and is classified as vulnerable in the UK. A stable population was not established and these attempts have ceased as it became apparent that the pH of the pond water was higher than is tolerated by this species.

Table 2: Local BAP Priority habitats and species

Rotherham Local BAP Priorities	
Habitats	Species
Woodland Wetland	Reed bunting (*Emberiza schoeniclus*) Grass snake (*Natrix natrix*) Bullfinch (*Pyrrhula pyrrhula*) Lapwing (*Vanellus vanellus*)

Table 3: UK BAP Priority habitats and species

UK BAP Priorities – middle list An updated list of these can be found at: **http://jncc.defra.gov.uk/page-5718**	
Habitats	Species
Wet woodland Rivers Ponds	Linnet (*Carduelis cannabina*) Reed bunting (*Emberiza schoeniclus*) Bullfinch (*Pyrrhula pyrrhula*) Song thrush(*Turdus philomelos*) Grass snake (*Natrix natrix*) Dingy Skipper (*Erynnis tages*)

Lapwing (*Vanellus vanellus*), a species previously recorded on the reserve, is no longer present as it prefers open ground and the maturation of the habitats present on site means it is no longer suitable for this species.

A number of species found within the reserve receive special protection under the Wildlife and Countryside Act 1981.

Habitats

Figure 6: Phase 1 Habitat Survey 2014

The habitats present at Centenary Riverside include riverine, standing freshwater, wet woodland, reed bed, tall ruderal, grassland and scrub. These are described in more detail below.

Wet Woodland

Areas to the east and west of the lagoon were planted with a mix of half-standards and whips with in a semi-random fashion alongside the main water body and the River Don in 2009. These areas are now dominated by willow species, including crack willow (*Salix fragilis*), white willow (*Salix alba*), osier (*Salix vimilalis*) and goat willow (*Salix caprea*), with alder (*Alnus glutinosa*) and downy birch *(Betula pubescens*) also present. This woodland provides an important habitat for numerous invertebrates and birds.

Freshwater habitats

Two freshwater habitats –riverine and standing fresh water– are present on site.

The River Don forms the reserve boundary, with the body of the river itself lying immediately adjacent to the reserve. The riverine habitats it supports on the reserve include wet woodland, areas of reed and tall ruderal vegetation, and areas of bare ground following inundations.

The standing freshwater habitats on site comprise the lagoons that lie on the floodplain, and the pond that lies on the plateau above.

The lagoons were left to develop naturally alongside the planted wet woodland areas. They support aquatic vegetation including common reed (*Phragmites australis*), bulrush (*Typha latifolia*) and reed sweet grass (*Phalaris arundinacea*) and other freshwater herbs. Over the past decade repeated silt deposits from innundations have drastically reduced the area and depth of water in the lagoons and they are undergoing succession to wet woodland and ruderal vegetation. At the time of writing no open water remains in the western lagoon and very little in the eastern. Without dredging these openwater habitats will be lost.

The plateau pond was originally designed as one waterbody and still functions this way in times of high rainfall. During dry weather however, the pond draws down to create four smaller ponds separated by areas of bare ground. These four pondlets each have a different vegetative character. Three support a range of aquatic vegetation including common mare's tail (*Hippuris Vulgaris)*, water purslane (*Ludwigia Palustris*) and yellow flag iris (*Iris pseudacorus*), whilst the forth holds only algae. New Zealand pygmyweed (*Crassula helmsii*), an invasive non-native, is found in this pond.

Tall ruderal and invasive non native species

Tall ruderals dominate much of the lower part of the site between the wet woodland and river. Species include common nettle (*Urtica dioica*), garlic mustard (*Aliaria petiolata*), mugwort (*Artemisia sp.*), broad-leaved dock (*Rumex obtusifolius*), thistle (*Cirsium sp*.), and great willowherb (*Epilobium hirsutum*). Himalayan balsam (*Impatiens glandulifera*) is prolific, with small amounts of other problem species such as giant hogweed (*Heracleum mantegazzianum*) and Japanese knotweed (*Fallopia japonica*) also present. All three of these species are regularly removed from site but are reintroduced with each inundation.

Scrub

The reserve's plateau was partially planted as dry woodland with sessile oak (*Quercus petrea*) as the dominant species within a mix that also included downy birch (*Betula pubescens*), hazel (*Corylus avellana*), crab apple (*Malus sylvestris*) and small-leaved lime (*Tilia cordata*). Woodland edges were planted with a mix dominated by dog rose (*Rosa canina*) and hawthorn (*Crataegus monogyna*).

In recent years the Trust made the decision to manage this area as scrub woodland, coppiced in rotation, with isolated specimens of larger trees selected to grow to maturity

Grassland

The flood bank and plateau to the east of the pond is covered with native perennial meadow dominated by ox-eye daisy (*Leucanthemum vulgare*), yarrow (*Achillea millefolium*) and fennel (*Foeniculum vulgare*).

The plateau to the east of the pond and around Steel Henge was originally seeded with a mix of urban common perennial and non-native prairie species. Non-native species were specified to provide more colour than native alone, and extend the flowering period of the mix, both considered important factors in garnering interest in the site when it first opened. Species remaining from this original mix include greater burnet (*Sanguisorba officinalis*), goat's rue (*Galega officinalis*), ladies bedstraw (*Galium verum*) and Michaelmas Daisy (*Aster novi-belgii*). Common bird's-foot trefoil (*Lotus corniculatus*) has been seeded in in recent years.

Fungi

No information has so far been gathered about the range of fungi on site. Due to the secondary nature of the reserve, and the age of vegetation, it is suspected that its fungal interest is low.

Fauna

Invertebrates

Many species of invertebrate are supported by the range of habitats present on this reserve. Lepidoptera are particularly well represented, with 23 species having been recorded since the reserve's inception – a high number for a reserve of this size. These include many butterfly species, such as common blue (*Polyommatus icarus*), dingy skipper (*Erynnis tages*), red admiral (*Vanessa atalanta*) and peacock (*Inachis io*) and moths including burnet moths (*Zygaena sp.*) and humming-bird hawk-moth (*Macroglossum stellatarum*).

The wetland habitats contain a broad range of aquatic invertebrates. Regular records have shown 12 species of damselflies and dragonflies including the common blue (*Enallagma cyathigerum*), azure (*Coenagrion puella*) and large red (*Pyrrhosoma nymphula*) damselflies, common darter (*Sympetrum striolatum*), brown hawker (*Aeshna grandis*) and banded demoiselle (*Calopteryx splendens*) dragonflies.

The pond was surveyed in August 2014 to give baseline information about its invertebrate population and an OPAL assessment, found the pond water quality to be good. This survey showed a good variety and population size of invertebrates: Nymphs of mayflies, damselflies and dragonflies were proven to be present, as well as pond skaters, water boatman, Ramshorn snails, pond snails, orb cockle, blood worms, true worms and others.

Fish

Three-spined Sticklebacks (*Gasterosteus aculeatus)* have been found in the pond and lagoon during the invertebrate survey in 2014 and the Great Crested Newt survey in 2015.

Amphibians and Reptiles

Smooth newts (*Lissotriton vulgaris)*, common frogs (*Rana temporaria)* and common toad (*Bufo bufo)* have been recorded on the reserve. Grass snakes (*Natrix natrix*) are also present on site.

Birds

Bird records for Centenary Riverside have been collected by the Rotherham and District Ornithological Society (RDOS), and the Sheffield Bird Study Group (SBSG) and by other bird watchers over the period 2009-2020. Interpretation of this data has shown that Centenary Riverside is home to a good variety of species including some UK BAP and Red List species.

Table 5: Bird species of conservation concern recorded at Centenary Riverside (2009-2017)

Red listed species of high conservation concern		Amber listed species of medium conservation concern	
Lapwing	*Vanellus vanellus*	Mute swan	*Cygnus olor*
Starling	*Sturnus vulgaris*	Mallard	*Anas platyrhynchos*
Grey Wagtail	*Motacilla cinerea*	Shoveler	*Anas clypeata*
Linnet	*Cardueli cannabina*	Goldeneye	*Bucephala clangula*
Ringed Plover	*Charadrius hiaticula*	Gadwall	*Anas strepera*
Lesser redpoll	*Carduelis cabaret*	Eurasian Teal	*Anas crecca*
Mistle trush	*Turdus viscivorus*	Common Sandpiper	*Actitis hypoleucos*
Song thrush	*Turdus philomelos*	Green Sandpiper	*Tringa ochropus*
Redwing	*Turdus iliacus*	Snipe	*Gallinago gallinago*
		Lesser black backed gull	*Larus fuscus*
		Black headed gull	*Chroicocephalus ridibundus*
		Stock dove	*Columba oenas*
		Reed bunting	*Emberiza schoeniclus*
		Meadow pipit	*Anthus pratensis*
		Dunnock	*Prunella modularis*
		Kingfisher	*Alcedo atthis*
		Kestrel	*Falco tinnunculus*
		House martin	*Delichon urbicum*

	Bullfinch	*Pyrrhula pyrrhula*
	Willow warbler	*Phylloscopus trochilus*

A total of 9 red listed birds of high conservation concern were recorded by the Sheffield Bird Study Group from 2009 to 2017 (**Table 5**). Some species, such as lapwing, snipe, little ringed plover and starling have gone from being common on site to being either rare or no longer recorded. This is due to succession processes on site, particularly on the floodplain, reducing breeding and feeding opportunities for these birds. Conversely, linnet (*Cardueli cannabina*) and redwing (*Turdus iliacus*), species favouring woodland and scrub, occur in high numbers on the reserve.

A total of 19 amber listed birds of medium conservation concern have been recorded at the same period (**Table 5**). Waterfowl including mute swans (*Cygnus olor*), mallard (*Anas platyrhynchos*), teal (*Anas crecca*) and gadwalls (*Anas strepera*) are found on the riverbank and, formerly, on the lagoons. Kingfisher (*Alcedo atthis*) and green sandpiper (*Tringa ochropus)* are also regularly recorded along the river, whilst reed bunting favours the lagoons and associated reed beds.

Willow warbler (*Phylloscopus trochilus*) and bullfinch (*Pyrrhula pyrrhula*) favour the woodland on the reserve.

Reed warbler (*Acrocephalus scirpaceus*) and white throat (*Curruca communis*) are both migratory warblers which are recorded as breeding on the reserve.

House martins (*Delichon urbicum*), sand martins (*Riparia riparia*) and swallows (*Hirundo rustica*) use Centenary Riverside as a feeding ground in the summer.

Mammals

Small mammal surveys were carried out in September 2012, 2014 and 2016. These confirmed the presence of bank voles (*Myodes glareolus*), common shrews (*Sorex araneus*) and wood mice (*Apodemus sylvaticus*), which frequent areas of tall ruderal, meadow and scrub on the upper parts of the reserve . Over the surveyed years the number of mammals caught in these areas has declined. This is most likely linked to the maturing of vegetation and the change of the grassland character over time.

Stoats (Mustela ermine) and Weasels (*Mustela nivalis*) are regularly recorded on site as well as rabbits (*Oryctolagus cuniculus*), which presence also is indicated by damaged bark on young trees. American Mink (*Neovison vison*) have occasionally been seen on the river corridor and otter (*Lutra lutra*) are also known to use this stretch of the Don.

Wood deposited around the site after flood events are used to create habitat piles to help support mammal species populations.

An otter holt was constructed along the riverbank close to the west boundary but has now be silted up. However 3 additional artificial holts are present in the area.

1.6 Cultural

Archaeology

No archaeological features are present on the reserve although several relics from the site's industrial past are located around the site entrance, including the elements which make up Steel Henge.

Stakeholders

Environment Agency

Statutory body responsible for flood management.

Rotherham Borough Council

As owners of the site and also as the statutory body overseeing its Local Nature Reserve status.

Local community

Centenary Riverside is located within the ward of Boston Castle. Boston Castle has a population of 14,500 (2017) and covers an area of 813 hectares in central and south central Rotherham, including Rotherham Town Centre and residential areas to the south. It is the most diverse ward in Rotherham with extensive retail and commercial area in the town centre, industrial areas at Templeborough and Ickles, areas of extreme deprivation and affluent suburbs. The ward also has the highest minority ethnic population in Rotherham.

The ward contains 5% of the Borough's population. It is a young ward, with higher than the average number of younger people and, conversely, a slightly lower than average population aged 65 and over.

Boston Castle has a high Black and Minority Ethnic (BME) population. In 2011, 36.8% residents were from a BME community, over four times the Borough average. The largest minority ethnic grouping in the ward (24.2%) comprise people of Asian heritage.

Health of residents in the ward is below both the Rotherham and national average. The number of people claiming to be in "bad/very bad general health" is 8.3% compared to Rotherham's average of 7.6% and the national average of 6%. The total percentage of economically inactive people was 44.6% in 2011 compared to Rotherham's average 38.2%. Educational attainment is also below the Borough and the national averages.

This is a community in which many suffer deprivation. Whilst it does not suffer from lack of high quality green space, in the case of Centenary, lack of connectivity makes the site far less accessible to local people than other in the area.

Recreational visitors

Centenary is a quiet site but is visited by local naturalists, anglers, dog walkers and employees of adjacent businesses.

Site Infrastructure

Figure 7. Site Infrastructure

Water level management

Two water flow pipes connect the River Don to the lagoon, allowing water to drain from the lagoons when the river level drops. They also function as fish passes. It is the responsibility of Sheffield and Rotherham Wildlife Trust to keep these clear. Regular checks are carried out and vegetation, silt and litter removed.

Boundary fencing and obligations for maintenance

There is a metal security fence running along the northern boundary separating the site from the railway. This fence and its maintenance is the responsibility of Network Rail.

The adjacent business is responsible for the maintenance of the boundary fence along the west of the site.

The boundary between CRS and Don Island owned and maintained by The Canal and Riverside Trust

Path network

The site contains a network of crushed brick surfaced paths and plastic mesh mesh-reinforced grass paths allowing wheelchair and pushchair access around much of the site. To encourage visitors to keep to the upper areas of the site (creating less disturbance for wildfowl nesting in the lagoon) the more formal crushed brick surfaced paths do not extend beyond the top of the flood defence bank.

In certain areas, where paths can become waterlogged, scrapes have been created to provide localised drainage. These scrapes provide valuable wildlife habitats.

The top path has been widened to allow vehicle access on to site, and to the compost pit. Sleepers are installed on either side of this path to prevent encroachment from grass, and to prevent erosion from run off.

A boardwalk has been installed to enable visitors to cross the lagoon. In times of high water level the boardwalk can be submerged and is prone to silt deposition when the water recedes. Silt is removed following flooding events to maintain the safety and appearance of the boardwalk.

The access bridge is owned by RMBC who are responsible for its maintenance. Post and rail fences around the buttresses of the bridge restrict access onto the bridge structure. There is further post and rail fencing to restrict access to the area through which the DOGSTAR pipe passes. These are maintained and repaired by SRWT as they are prone to vandalism.

Access Furniture

There are 3 benches on the site. These are regularly cleaned and repaired and the areas around them periodically mown to prevent the build-up of vegetation.

Compost pit

There is currently a compost pit on site, which is used to deposit arisings from meadow cuts, reed management, and other maintenance works. As a compost pit nears capacity a new pit is dug in adjacent ground.

Grass snakes are present on the site and may use the compost pit for nesting. Compost turning is not done between early summer and October to reduce the chances of damaging grass snake eggs. Wooden debris from the site is piled around the compost pits to maximise opportunities for small mammals and reptiles.

Interpretation

Interpretation on this site is innovative and does not tend to follow the pattern of providing information boards, but rather deploys artistic installations to invoke the site's history and future.

There are two large interpretative features on site:

Steel Henge is constructed from large iron casting moulds and is designed to allow visitors to experience the huge scales and weights involved in the steel industry. Due to theft of two pieces of the Henge it is now incomplete.

Railway sleeper deckchairs reference that this is a newly accessible riverside available for the general public to enjoy. While not encouraged, it is possible to climb on these structures. They are regularly monitored to ensure they are structurally sound.

In addition to this, there is a metal archway at the end of the boardwalk, and an etched steel interpretation panel at the entrance to the reserve.

Information and events

Rotherham MBC has an impressive archive of historical information of the Templeborough area, including the area now covered by the reserve.

An information leaflet is available, in PDF format, is available to download from the Trust's website www.wildsheffield.com, which also provides an overview of the reserve and links to this management plan.

SRWT includes Centenary Riverside in its annual events programme, where its history and present ecological interest is disseminated through a variety of public events such as guided walks and pond dipping sessions.

Outdoor Learning

Its relatively small size and variety of different habitat types gives the reserve potential to be used for comparative habitat studies, however its lack of facilities in terms of shelter and toilets limit its use by schools and groups to short, half day sessions.

Funding from Countryside Stewardship is used by the Trust's outdoor learning team to carry out school visits to the reserve each year. The children involved tend to be in Key Stage 2 and come to the site to pond dip in the top pond.

The University of Sheffield Department of Landscape Architecture has previously visited the reserve with students who have a particular interest in brownfield remediation and flood defence solutions.

The Pond originally had a dipping platform. This was destroyed by fire in 2019. Due to fluctuations in water levels this boardwalk was often too far from the water during the warmer months when pond-

dipping activities took place more often. This factor and the uncertainty regarding future frequency of pond dipping activities contributed to the decision not to replace the boardwalk. Pond-dipping is still possible and continues to take place from the pond banks.

1.7 Economics

Past funding

The lease of Centenary Riverside Local Nature Reserve has come with a sizable endowment that has been invested so that the interest generated can be used for the maintenance and development of the site. During the site's creation and development, several grants were secured for a range of activities including the initial landscaping, creation of the plateau pond, community engagement, interpretation, ecological survey and consultation, publicity and project management. Grants have come from ERDF, SITA Trust, Biffaward and Rotherham MBC.

During the past five year management period funding has also come from Tesco and Outokumpu environmental tax credits via Mondegreen. The reserve also receives some Countryside Stewardship funding.

Marketing

Printed material

Centenary Riverside features in SRWT leaflets detailing all reserves, and also is mentioned as a Living Landscape site in SRWT's publication, "A Living Landscape".

News and articles about the reserves are printed in SRWT's Kingfisher magazine, which is sent out to members three times a year.

Websites

Centenary Riverside Nature Reserve has a page on the Sheffield and Rotherham Wildlife Trust website. This gives general information about the reserve, including directions and species of interest. The web page can be found at: https://www.wildsheffield.com/reserves/centenary-riverside/

All community and outdoor learning activities are promoted on Sheffield and Rotherham Wildlife Trusts website as well as the Facebook and Twitter pages.

RESERVE VISION AND FEATURES OF INTEREST

3.1 Site Vision

Nestled in a meander of the River Don, Centenary Riverside nature reserve is an important green oasis lying amongst the industry, commerce and transport network of west Rotherham. Created on the site of a former steelworks to provide flood storage capacity, the reserve supports a range of aquatic and terrestrial habitats, providing ecological value as one of a number of green stepping stones on the river corridor.

Centenary Riverside is dynamic. Its mosaic of habitats are successional, and in a constant state of flux. On the floodplain change is driven by the river, by the cycles of inundation and deposition that reshape the land, tear up vegetation and drive the succession from open water to dry land. Upslope, shrub and tree seedlings strive to invade the grassland, and to mature into woodland. Retaining the mosaic of wetland, swamp, grassland, scrub and woodland, resetting this succession whilst retaining the element of dynamism, is key to retaining the reserve's biodiversity and forms the basis of our management works.

The reserve is rich in invertebrates, which in turn support a range of birds and amphibian species. Grass snake are common. A permanent pond is present above the floodplain, and acts as a reservoir for aquatic species that might otherwise be washed away during to flood events.

An urban site, the reserve provides a valuable social amenity, and well used by local workers, dog walkers, and fishermen. The well-kept path network encourages visitors to concentrate their footfall on the eastern end of the site, leaving the western end less disturbed for wildlife. Steel Henge provides a focal interest for visitors, referencing the industrial past of the site.

Well-behaved dogs are welcome on the reserve; with dog owners assiduous about keeping them under control, and in picking up after them and in removing their waste from site.

3.2 Feature 1. Flood Storage

Objective: To retain 2.4 ha of flood storage capacity on site.

Attributes

Attribute	Performance Indicator	Monitoring
Silt depth	Average silt depth <1m above river level across the floodplain.	Silt depth measurement
Water exchange between reserve and River Don	Flow pipes in and out of floodplain clear	Annual inspection

Factors

A factor is anything that has the potential to influence or change a feature, or to affect the way in which a feature is managed.

Factors	Rationale	Management Required (Yes/no/monitor)	Technical Indicator of control	Monitoring
Flood events	Each time the Don rises and floods the reserve, silt deposition on the floodplain increases. Over time, this raises the level of the floodplain, decreasing its utility for future flood water storage.	Yes	<1m silt deposition on floodplain	Record number of flood events annually Silt depth monitoring

Evaluation

In order to function as a unit of flood storage, Centenary Riverside must be able to take on water when the River Don breaks its banks. Its capacity is then determined by the volume of water it can hold.

Each time the reserve's floodplain is flooded, silt deposition occurs, raising the level of the floodplain slightly. Over time, this increasing height will make the reserve less likely to take on water during flood events. Consequently, in order to continue to act as flood storage, **periodic dredging of the floodplain will be necessary**. Previous guidance from the Environment Agency suggests such action may need to be taken once silt depth on the floodplain > 1m.

However, dredging the floodplain is costly. To date, minor dredging activities have been carried out with the silt being deposited elsewhere on the reserve. When the volume of silt is such that onsite disposal is not possible, a large increase in dredging costs (50-60k at today's prices) is foreseen.

Whilst periodic dredging of the floodplain is potentially viable, financial issues may arise should the frequency of inundations (and therefore silting) increase. Many factors, such as rainfall, increasing urban runoff and climate change may increase the likelihood of inundation, whilst others – such as natural flood management up catchment – may decrease it. At the time of writing, an increase in inundations over time seems likely, meaning the need for dredging may become more frequent. Consequently, **SRWTwill work together with RMBC and the EA to determine how often dredging should occur and how it will be funded**. This should include the identification of possible local donor sites for the silt.

During flood events water enters and exits the floodplain via a sluice and Cover maintenance of sluice and outflow pipes. These, together with the access track, will be maintained by the Trust according to the terms of the lease, throughout the period covered by this plan.

Management Aims

1.0 To retain 2.4 ha of flood storage capacity on site.

1.1 To carry out extensive dredging works on the reserve's floodplain when sediment depths >1m

1.2 To maintain the infrastructure associated with flood storage capacity

For management prescriptions see 4.0 Work Programme.

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3.3 Feature 2. Wetland Mosaic

Objective: To retain a 2.4 ha mosaic of wetland habitats on the reserve.

Attribute	Performance Indicator	Monitoring
Habitat mosaic	On the floodplain: 10%-80% of total area wet woodland 10% -60% of area open water 5% -80% of total area reedbed/swamp	Remote sensing using aerial photography and/or drone footage
Species composition	Wet woodland canopy dominated by willow species Reserve supports a population of grass snake	Casual observation

Factors

Factors	**Rationale**	**Management Required** **(Yes/no/monitor)**	**Technical Indicator of control**	**Monitoring**
Frequency of inundation	Each inundation brings with it silt deposition, thereby contributing to the succession from wetland to dry.	Monitor	Wetland habitats retained on floodplain	Number of inundations per year to be recorded
Climate change	Global temperatures are predicted to continue rising over the course of the century. Although the exact effect on the climate of the UK is not known, it is thought that the result is likely to include to an increase in climatic variability, with extremes in temperature, wind speed and **rainfall** becoming more common. Consequently, climate change is likely to increase both the need for the reserve to function as an area of floodwater storage and the rate of silt deposition on its floodplain. Long-term changes in climate may also affect the species which the reserve is able to support long-term and future species conservation plans will need to take this into account	No, monitor	No loss of wetland habitat across the reserve	

Factors	Rationale	Management Required (Yes/no/monitor)	Technical Indicator of control	Monitoring
Invasive non-native species	3 invasive non native species – Japanese knotweed, giant hogweed and Himalayan balsam - are common along the River Don and are deposited onto its floodplain during inundation events. These species are invasive and can displace native flora, and Giant hogweed can cause chemical burns if handled.	Yes	Japanese Knotweed and Giant Hogweed not present on site. India balsam is not the dominant species in reedbed/swamp/open water habitats .	Yes, annual inspection

Evaluation of current condition

The reserve's wetlands comprise the habitats of the floodplain plus the seasonal ponds and scrapes on the plateau.

The floodplain is **entirely covered** with a **mosaic** of wet habitats: reedbeds, tall ruderals, open water, bare mud and wet woodland. The **distribution of these habitats is dynamic, driven by successional processes and periodic inundation by the river.** The distribution and complexity of habitat margins is largely governed by these natural processes (e.g. flood events, wind throw) and maximizes the individual and combine ecological value of this feature.

Characteristic vegetation communities comprising native plants provide favorable environments for a wide variety of birds, invertebrates, fungi and other associated wetland species. These communities expand or contract in response to flood events, and local soil and water depths and conditions. Each stage of the succession favours certain species whose populations again rise and fall in response to these changes. For example, wading birds such as lapwing and ringed plover utilised the site during its early years when the lagoons were large and offered good feeding habitat with an open aspect. No, with the succession to wet woodland, these species have given way to others. This change in species composition over time is a normal feature of successional sites.

Water quality in the lagoons is variable and dependent of the quality of the floodwater and silt that is brought into the reserve during inundation events. Contamination of the floodplain by waste materials and litter is also an unavoidable consequence of flooding. The Trust will attempt to address this by **clearing debris deposited when floodwaters recede**.

At the time of writing the area of open water available on site is very small, especially in summer, as repeated inundation has silted the lagoons. Consequently, areas of swamp and wet woodland, both of which are tolerant of shallow water, are increasing. This increase is currently within the limits for the feature set out above, however, in order set back successional processes and create new open water habitat, it is our intention that **dredging of the lagoon areas takes place within the lifetime of this plan**, with silt deposited on site when possible (see 3.4 below).

The wet woodland on site has developed rapidly since its inception. The presence of woodland alters the flow of water across the floodplain during flood events, slowing it and so encouraging silt deposition (as does the island and theboardwalk). Consequently, the western lagoon silts faster than the eastern. The amount of willow carr on the floodplain is increasing rapidly as silting moves the succession towards dry land. It should be noted that, although wet woodland itself is desirable and a priority habitat, its development on the floodplain does not negate the need for periodic dredging as, with no intervention, the willow carr itself would eventually succeed to secondary woodland as the floodplain raises and dries.

Of the 3 INNS found on the floodplain, the most widespread is Himalayan balsam. Japanese knotweed and giant hogweed are periodically brought in by flood water but are kept under control by an annual programme of removal. Himalayan balsam seed however, is brought in in such numbers, that it is unrealistic to eradicate it from the reserve. Balsam "forests" are dominant along the riverbank, and do provide substantial nectar for insects although their benefit for wildlife is limited as few invertebrates feed or breed on their leaves. Consequently, **annual control measures will be undertaken** to limit the spread and density of this species and, in particular, to prevent it dominating the swamp and marginal vegetation on the edge of the lagoons.

Sitting above the flood retention banks, the reserve's plateau is a much drier than the floodplain below. Here, a pond and seasonal scrapes have been created to hold surface run off (scrapes) and to provide opportunities for pond dipping. The design of the pond is such that it is fed only by rainwater and, in recent

years this has led to periods of very low water levels where only its deepest four areas hold water and become, in effect, separate small ponds. This extensive drying has led to a decline in water quality and wetland vegetation has been lost from much of its periphery and its seasonally shallow areas, which remains bare with areas of liner showing through. Attempts to pump water from the lagoons to the pond were successful for a few years but are no longer possible as the lagoons themselves have dried up. This lowering of water levels meant that boardwalk ceased to function, being so far from the water's edge. It has since been lost to vandalism. The ponds itself is infested with the INN *Crassula helmsii* meaning that tools are dipping equipment used in it must be decontaminated after use.

Despite these problems, **this pond will be retained on the reserve** both for biodiversity reasons – it provides a safe reservoir for species such as frog that can be washed out of the lagoons by flooding – and for educational purposes. When possible**, its water levels will be maintained artificially during dry periods** but this will be achieved by importing water to site, to prevent contaminants from the lagoon being introduced. Efforts will be made to revegetate its periphery, with **marginal vegetation being established in shallow water and native oxygenating plants being introduced to deeper area**s. The boardwalk will not be replaced; due to the variation in water level over the course of the year, pond dipping activities will now take place from its banks.

The reserve supports a varied herpetafauna of which the top predator is grass snake. The presence of grass snake on the reserve is indicative of a healthy amphibian population which in turn indicates a wetland in good condition. Consequently, the presence of grass snake is an attribute of the reserve's wetland mosaic. In order to support grass snake, the reserve will need to provide not only prey species (amphibians) but a suitably heterogenous habitat structure for shelter and basking, and suitable sites for breeding and hibernation. The majority of these will be provided by the dynamic processes of succession and its reversal described elsewhere in this plan, however **the creation of compost heaps and deadwood piles above the floodplain** will specifically benefit this species.

Management Aims

2.0 To retain a 2.4 ha mosaic of wetland habitats on the reserve.

- 2.1 To periodically set back the succession to dry land on the floodplain through active conservation management.
- 2.2 To control INNS across the floodplain.
- 2.3 To retain and manage the plateau pond
- 2.4 To support a population of grass snake on the reserve.

For management prescriptions see 4.0 Work Programme.

3.4 Feature 3. Scrub and grassland mosaic

Objective 3: To retain a 2 ha mosaic of woodland, scrub and species-rich grassland on the reserve.

Attribute	Performance Indicator	Monitoring
Habitat mosaic	On the flood banks: 100% of total area is species rich grassland On the plateau: 50%-80% of total area is species rich grassland 10%-30% of total area scrub/ secondary woodland 5% -10% of plateau area is bare ground	Remote sensing using aerial photography and/or drone footage
Species composition	Grassland sward contains $\geq$ 20 forb species Japanese Knotweed, Giant Hogweed and Himalayan Balsam are absent; bracken, bindweed and goat's-rue makes up less than 5% of grassland by area Reserve supports $\geq$ 10 butterfly species $\geq$ 5 native broadleaved tree and shrub species represented in the woodland/scrub areas.	Casual observation Casual observation, management log Butterfly transects Casual observation
Vegetation structure	Plateau woodland has varied age structure which includes mature, pole stage and sapling trees. Grassland of differing lengths always present on site.	Casual observation

Attribute	Performance Indicator	Monitoring
Standing and fallen dead wood	All trees identified for removal within the management programme are either left as standing dead-wood or felled and retained within this feature.	Management log

Factors

Factors	Rationale	Management Required (Yes/no/monitor)	Technical Indicator of control	Monitoring
Successional change	Without intervention, the flood banks and plateau would naturally succeed though rank grassland and tall ruderals to scrub and secondary woodland, leading to a net loss of biodiversity on site.	Yes – mowing and coppicing regime required to set back succession.	Ratios of different habitat types are within tolerance	Remote sensing using aerial photography and/or drone footage
Steep slopes	Management of the flood banks can be difficult due to steepness of slope. However, the banks must be mown to prevent scrub encroachment. The angle of the slope limits the machinery that can be used.	Yes	Open grassland retained on flood banks	Remote sensing using aerial photography and/or drone footage
Railway line	No trees will be allowed to develop into large specimens within x2 tree lengths of the railway line.	Yes	Scrub/grassland mosaic corridor adjacent to railway lines	Routine tree safety survey

Factors	Rationale	Management Required (Yes/no/monitor)	Technical Indicator of control	Monitoring
Nutrification	Nutrification of the soil, either by deposition of mud from dredging the floodplain or from lack of grass removal (through grazing or mowing), favours the formation of rank grassland, tall ruderals and scrub and thereby conflicts with the attribute of species richness.	Yes	Extent of grassland areas and their species richness is not compromised.	Management log Extent of silt deposition on plateau to be limited in extent
Local soil conditions	The existing soil condition is the primary and irrevocable factor in determining the distribution, diversity and composition of the ground flora.	No	N/A	N/A
Invasive non-native species	It is possible that the 3 invasive non native species commonly found on the reserve's floodplain could spread to the flood banks/plateau. Additionally, lack of appropriate grassland management (ie mowing) would allow species such as bindweed or goat's-rue to displace other species.	Yes	Japanese Knotweed, Himalayan Balsam and Giant Hogweed not present on reserve's flood banks or plateau. Extent and diversity of grassland areas is not compromised	Casual observation Butterfly survey

Evaluation of current condition

Above the reserve's flood plain flood banks rise steeply to a flat upper terrace, or plateau, area. This and the flood banks were seeded with a mixture of native and non-native wildflowers when the site was created. The plateau also includes areas of native scrub woodland planting, with occasional large specimens of sycamore and willow along the slope leading down to the railway line, which were retained when the site was landscaped. (**Figure 6).** Investigations in 2019 and 2020 found that the plateau and, to an extent the flood banks, support a highly diverse sward, with pockets of rank grassland and ruderals on the periphery of the reserve. The scrub woodland has also developed well.

The habitat type found on these higher, drier areas of the reserve shares some of the characteristics of open mosaic habitats on previously developed land, a Priority Habitat described in the UK Biodiversity Action Plan. However, the seeding and planting that took place on the reserve, together with the passage of time is shifting the communities present towards those more commonly encountered on more established sites. Nonetheless, the composition of the current communities is still highly artificial.

The secondary nature of this feature means that its value lies chiefly in its ecological function – to provide food, breeding habitat and shelter – for a wide range of biodiversity. **Management efforts will therefore focus on retaining this function rather than promoting specific species or associations of species** as might be the case on a historic grassland or ancient woodland site. However, the value to wildlife of locally native plant species is recognized. Whilst many plants can, for example, produce nectar, specific species may be necessary to fulfill a critical role in the lifecycle of other species e.g. as a larval food plant. Consequently, **locally native species will be favoured over exotic varieties** when decisions regarding management allow for differentiation between the two, for example when thinning woodland or choosing future seed mixes.

The species-richness of the reserve's grasslands, particularly in respect to forbs (herbaceous flowering plants other than grasses), make them an important source of nectar for the reserve's invertebrate fauna. In order that this species-richness is retained **the grasslands will be mown annually**, with the cuttings removed to preserve the low nutrient conditions and open sward that favour non-grass species. Regular cutting will also prevent scrub encroachment onto the grasslands. **Cutting should take place in mid-late September, to allow for the provision of late summer nectar and seed drop**. Yellow rattle (*Rhinanthus minor*) seed will also be added to the sward; this hemi-parasitic species helps reduce the vigor of the surrounding grass and promotes floral diversity.

Although cutting these grasslands will help to maintain their floral richness, it will decrease their structural diversity, which is also important for biodiversity. Consequently, **areas of rough, tussock-forming grassland will be encouraged on the periphery of the plateau**. This grassland will be cut on a 3-4 year cycle to prevent succession to scrub. Likewise, **management will maintain areas of short grassland adjacent to the plateau's path network**.

Over the period covered by this plan, **the plateau's scrub woodland will be managed by thinning and coppicing** to check its extent, diversify its structure and allow for healthy tree growth. The boundary between perennial grassland and the woodland/scrub mosaic will be managed as a fluid aspect of this feature. Scrub encroachment into grassland areas is therefore acceptable (except on the flood banks) so long as the area of meadow remains within the attribute values given above, and the criteria given within **Section 3.6 a**re met.

Standing and fallen large deadwood, created through site management, provides habitat for birds, invertebrates, fungi and other sapryophytic species, small mammals and grass snake. Inconspicuous **log piles will therefore be created** adjacent to woodland areas and on the periphery of this feature, **using woody arisings from required management works**. **Standing dead wood will be retained** where it is safe to do so.

Invasive species, and in particular INN species, are absent within the feature or subject to periodic control measures.

Management Aims

3.0 To retain a 2 ha mosaic of woodland, scrub and species-rich grassland on the reserve.

3.1 To maintain the extent and species richness of the reserve's grasslands.

3.2 To diversity the structure of the reserve's woodlands.

3.3 Prevent the colonisation of INNS across the reserve's plateau and flood banks.

For management prescriptions see 4.0 Work Programme.

3.5 Feature 4. Invertebrate Communities

Objective: the reserve supports a diverse community of terrestrial and aquatic invertebrates.

Attributes of a diverse invertebrate community

Attribute	Performance Indicator	Monitoring
Diverse range of invertebrate species live or feed on the reserve.	≥ 10 native species of butterfly can be recorded on the reserve, including dingy skipper. Reserve supports a high insect biomass in which the local lepidoptera, diptera and hymentoptera are well represented.	Butterfly transect Malaise trapping (as part of landscape scale invertebrate monitoring)

Factors

A factor is anything that has the potential to influence or change a feature, or to affect the way in which a feature is managed.

Factors	Rationale	Management Required (Yes/no/monitor)	Technical Indicator of control	Monitoring
Species rich habitat mosaic.	The reserve's mosaic of habitats and in particular, its wetland and species-rich grasslands, allow it to support a diverse range of invertebrates. Onward management to preserve this mosaic will benefit invertebrate species.	Yes	Cross reference w those for Features 2 and 3 above	Cross reference w those for Features 2 and 3 above

Factors	Rationale	Management Required (Yes/no/monitor)	Technical Indicator of control	Monitoring
Woodland structure	A woodland containing trees of each age class plus standing and fallen dead wood is necessary to support a diverse invertebrate assemblage, with each species having its own particular set of requirements.	Yes	Cross reference w those for Feature 3 above	-

Evaluation of current condition

Invertebrates comprise the most diverse group of animals in the natural communities and are widely acknowledged as playing central roles in sustaining ecosystems. Invertebrate conservation and ecological sustainability are intricately linked though often little understood. Additionally, defining the ecological importance of invertebrates is often difficult due to the diversity of highly localized and ecologically specialized species in any given community. Despite these challenges, invertebrates are recognised as forming the 'glue and building blocks' of natural ecosystems in which they act both as important predators, decomposers and part of the wider food chain.

Relatively little is known about the invertebrate communities of Centenary Riverside. Such records that exist are gathered from casual observation rather than systematic survey, however, even to the casual observer, it is clear that the reserve is alive with invertebrates and in particular insects. Consequently, **more data regarding these assemblages will be collected** during the period covered by this management plan and **the reserve will be managed to promote high invertebrate biodiversity and biomass**.

One of the most important factors needed for the maintenance of invertebrate interest at a site is structural variation. The reserve's habitats currently provide just such variation, and **future management to retain this mosaic and to promote gradual transition between different habitat types will be carried out**. These include the mowing regimes and the diversification of age structure in the scrub woodland described in sections 3.4 and 3.6 below. Additionally, the provision of dead wood, temporary and permanent water bodies and bare ground on the plateau will increase the reserve's attractiveness to a range of species.

Species-diversity, and in particular, the variety of food plants, is of prime importance when determining the ability of the reserve to support a range of invertebrates. Many species will have different requirements for different stages of their life-cycle – i.e. both the larval and adult food plants must be locally available to allow a species to persist. Management to promote both species-diversity and nectar production within the grassland will be carried out. **Native species will be favoured over garden varieties and non-natives during future seeding** as, whilst all can provide nectar, the larval food plants of many native insects such as butterflies are dependent on native plants.

Dingy skipper –a species of high conservation importance in the UK - have been recorded on the reserve in recent years, however, it is a species that favours an open sward with areas of sparse vegetation/bare ground. It's caterpillar food plant is birds-foot or greater trefoil which are currently rare on site. Currently, this species favours the car parking area and adjacent waste ground immediately outside the reserve on which to breed, with adult butterflies coming onto the reserve to nectar. However, the habitat outside the reserve is insecure, subject to fly tipping and is vulnerable to development. In consequence, efforts are being made to improve the reserve for dingy skipper by seeding in its food plant, in the hope that individuals will be able to complete its lifecycle on site within a few years.

Habitat continuity is also an important factor in retaining invertebrate interest, particularly so for species of restricted requirements or range. Although achievable on the reserve's plateau and on its flood banks, it should be noted that micro-continuity within the reserve's wetland area cannot be guaranteed due to the dynamic processes of inundation and succession that act upon the area.

Many aquatic invertebrates complete their life cycles in wetlands, and are exposed directly to the physical, chemical and biological conditions within the wetland. Due again to the process of inundation and deposition, water quality within the reserve's wetland cannot be guaranteed, which again may limit its suitability to support certain species.

Management Aims

4.0 Objective: the reserve supports a diverse community of terrestrial and aquatic invertebrates.

4.1 Manage reserve's habitats to promote invertebrate diversity and biomass.

4.2 Collect species data on reserve's insect fauna.

For management prescriptions see 4.0 Work Programme.

3.6 Feature 5. Public Access and Interpretation

Objective: Reserve is safe, well-maintained and accessible for people of all ages and physical abilities

Attributes

Attribute	Performance Indicator	Monitoring
The path network and boardwalk are well maintained	Surfaced paths, steps and boardwalk maintained in line with PRoW standards	Site patrols Maintenance log
The site is clean with low levels of litter and dog waste.	Site-wide litter is picked regularly with additional resources given to this activity after periods of inundation. Fly tipping outside the reserve entrance is reported to RMBC for clearance	Site patrols Maintenance log
The reserve is perceived as safe to move through by visitors	2m mown boundary strips are maintained along each side of the path network Sight-lines maintained through the scrub woodland on the plateau. Trees should not grow up to path edges or overhang plateau paths.	Site patrols Maintenance log
Interpretive features are well presented.	Vegetation not allowed to obstruct interpretive features. Damage / vandalism to be repaired.	Site patrols Maintenance log

Factors

Factors	Rationale	Management Required (Yes/no/monitor)	Technical Indicator of control	Monitoring
Dogs and dog walking services	Increasing dog ownership and the popularity of the reserve for commercial dog walking may lead to increasing amounts of dog-related nuisance, such as fouling, on the reserve.	Monitor	Dogs on reserve are kept under owner's control at all times. Dog faeces and abandoned bags containing the same are rare on the reserve.	Through routine patrols Monitoring of incident log
Flooding	Flooding reduces the area of the reserve accessible to visitors, increases litter on the reserve and silt deposition can obscure the riverside paths.	Yes	Reserve is clean, and all paths passable	Through routine patrols Monitoring of flooding log

Evaluation of current condition

Centenary Riverside is a safe, well-maintained reserve with low footfall. The reserve is chiefly used by local dog walkers (including commercial dog walking services), fishermen and, in good weather, people from nearby businesses who visit during their lunch hours.

The majority of visits to the site are via car with parking for these being off site on Centenary Way or informally on privately owned adjacent brownfield land. The current parking provision is adequate for the volume of visitor footfall.

There is inclusive access to the upper plateau of the site via the well maintained path network of crushed brick and reinforced grass surfaces. Where waterlogging is an issue, scrapes are created beside paths to both hold water, and also to promote evaporation in order to prevent water from seeping into the path surface material.

To encourage all visitors to keep to the upper areas of the site (creating less disturbance for wildfowl nesting in the lagoon) the more formal, surfaced paths do not extend beyond the top of the flood defence bank. Access to the riverbank is less accessible to those with mobility issues, given the steepness of the slope and the wetness of the ground adjacent to the river. However, the boardwalk crossing the lagoon is cleared of silt following flooding events.

The path network is kept inviting and perceived as safe by maintaining a 2m mown boundary strip along each path, and by the maintenance of sight lines through the scrub layer between the paths, to the west of the pond.

The access bridge remains the property of Rotherham Metropolitan Borough Council and they also remain responsible for its maintenance.

Benches on site are kept in good repair and the areas around them periodically mown to prevent the build-up of vegetation. **As these benches come towards the end of their life, they will be replaced** with parkland style sustainable oak benches with back rests.

Steel Henge, the Railway Sleeper Deckchairs, the metal archway and the etched steel interpretation panel at the entrance are all regularly monitored to ensure they are structurally sound. Steel Henge provides a focal interest for visitors as visitors enter the site and as such will remain clear and visible from the entrance. If funding can be found **it is intended that the missing parts of the henge will be replaced** over the period covered by his plan.

Well-behaved dogs are welcome on the reserve; with dog owners encouraged to keep them under control, and to collect their waste and remove it from site.

There is an issue with litter on the site, particularly on the floodplain following flood events. Litter picks take place approximately once a month, with additional efforts along the riverbank after periods of inundation, when huge amounts of litter and debris are deposited in and around the trees in the flood lagoon. Whilst there is no fly tipping on the site itself, periodic fly tipping on the brown field area outside the site entrance is reported to RMBC.

Management objectives

5.0 Reserve is safe, well-maintained and accessible for people of all ages and physical abilities.

5.1 To maintain the existing arrangement of paths and the boardwalk to good standard.

5.2 To ensure the site is inviting and safe for visitors.

5.3 To interpret the reserve's history and wildlife value to visitors, and to encourage positive treatment of the site by the public.

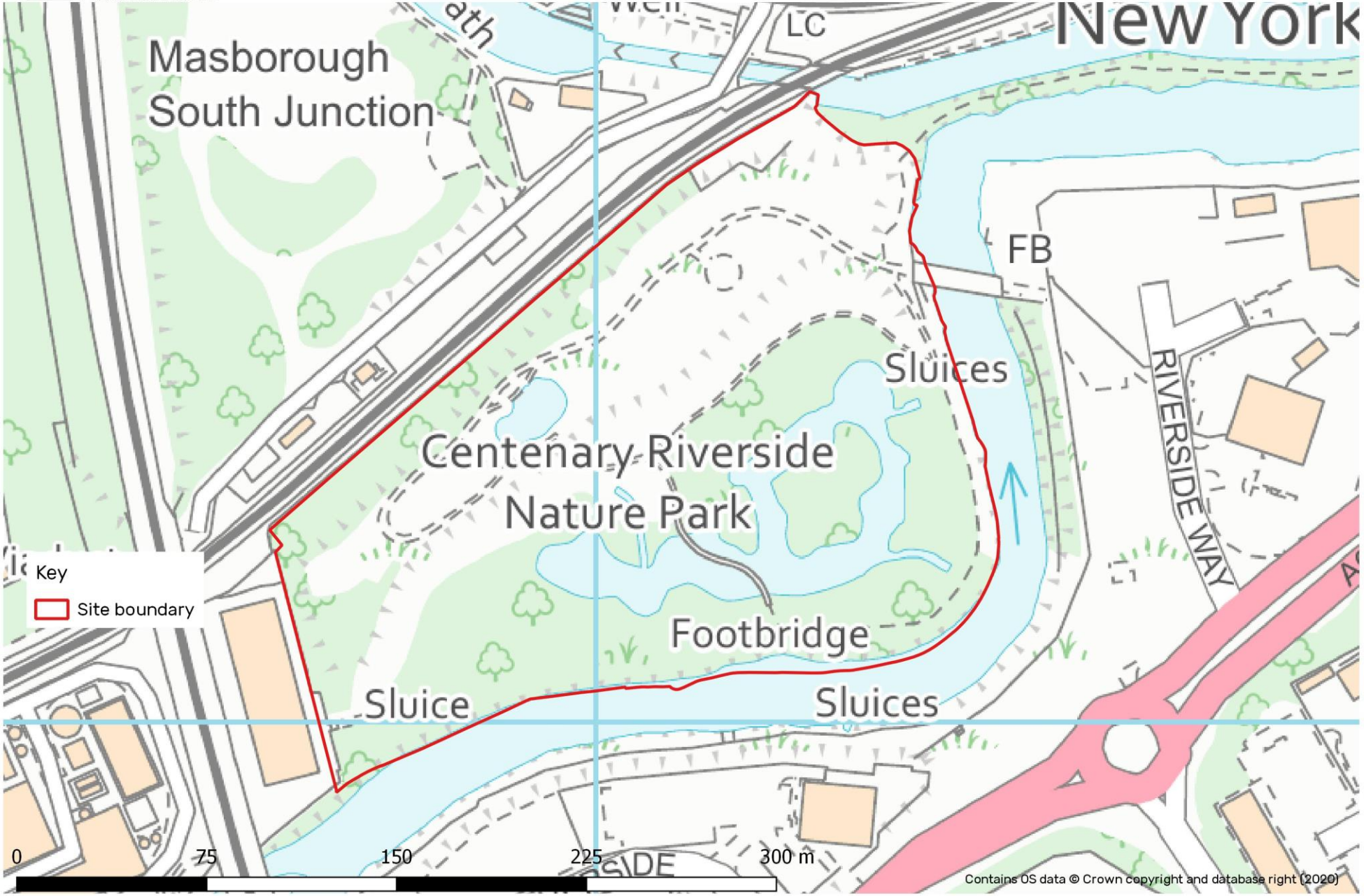
For management prescriptions see 4.0 Work Programme.

FIGURES

Sheffield & Rotherham

Centenary Riverside

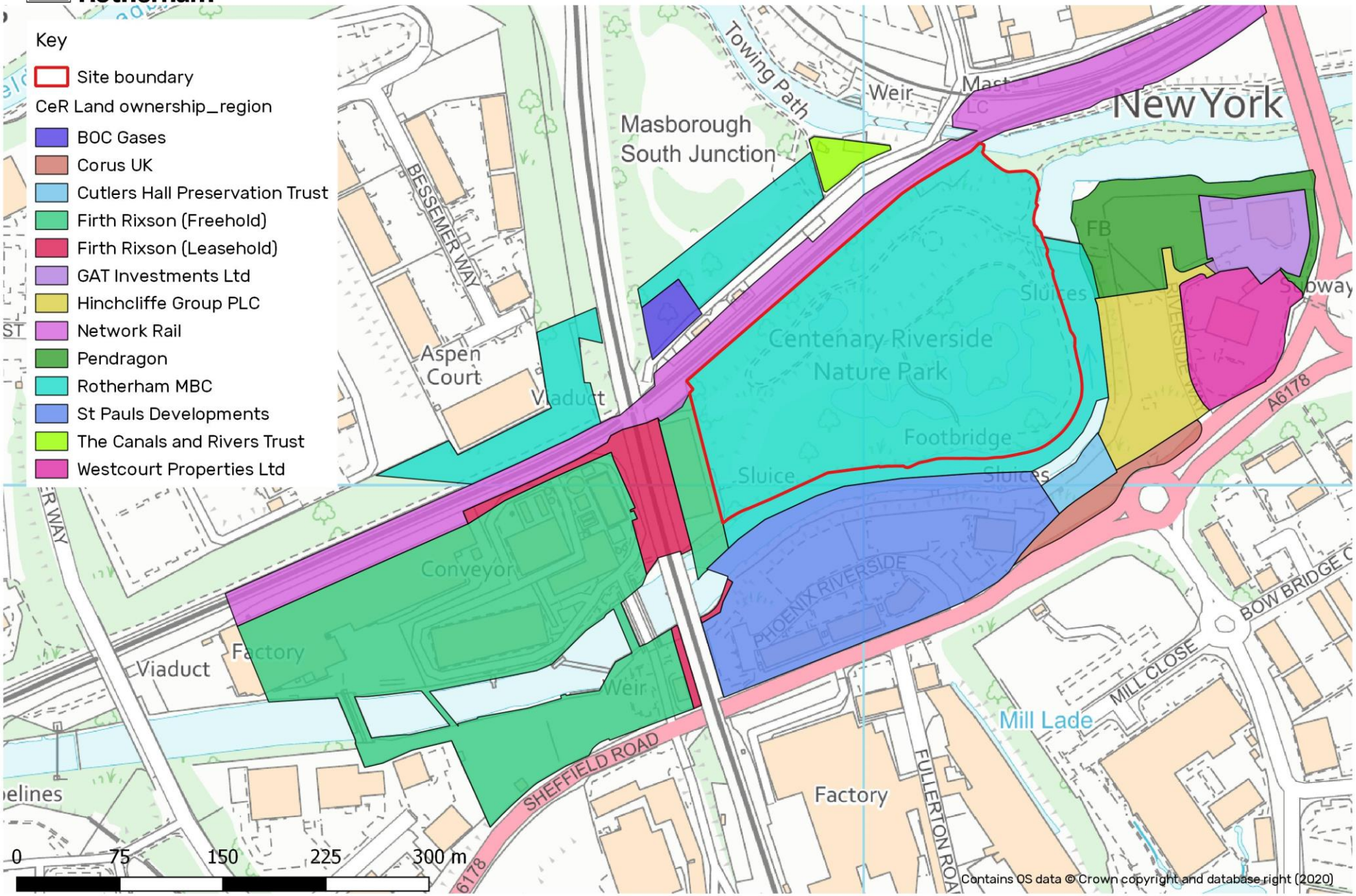
Fig.1 Site location & boundary



Sheffield & Rotherham

Centenary Riverside

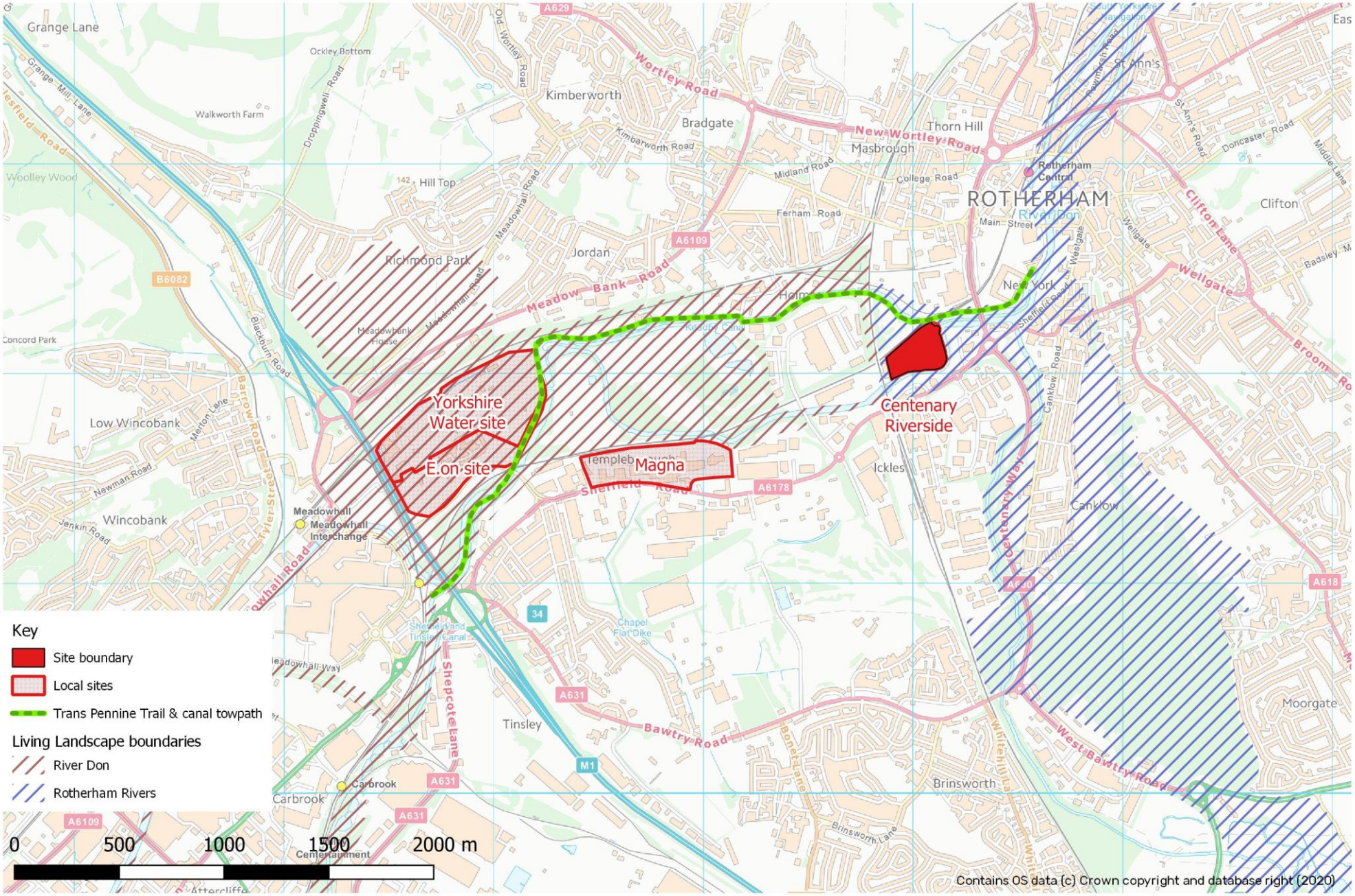
Fig.2 Local land ownership



Sheffield & Rotherham

Centenary Riverside

Figure 3 Wider landscape



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Centenary Riverside

Fig 4. Services & vehicular access

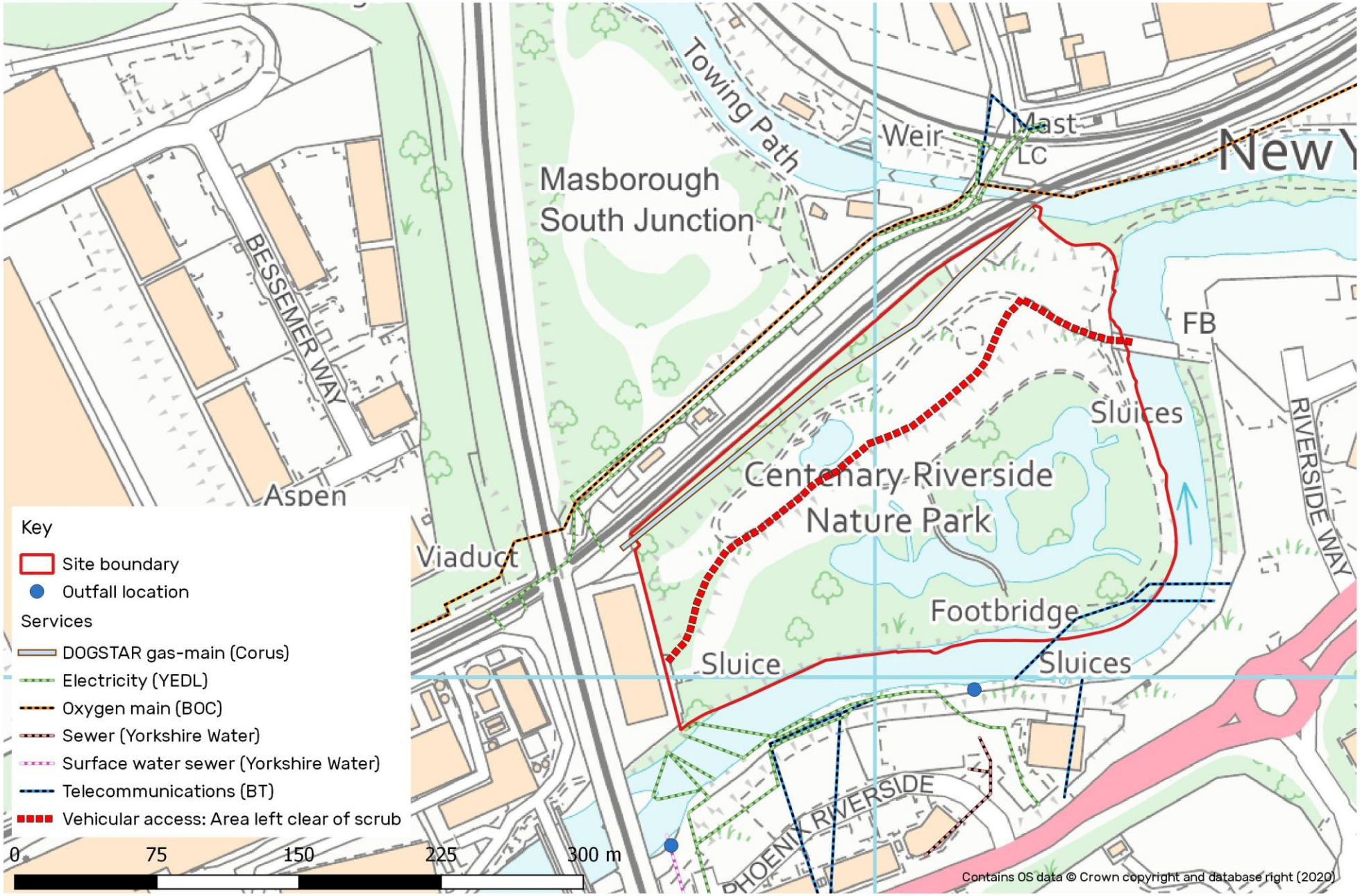

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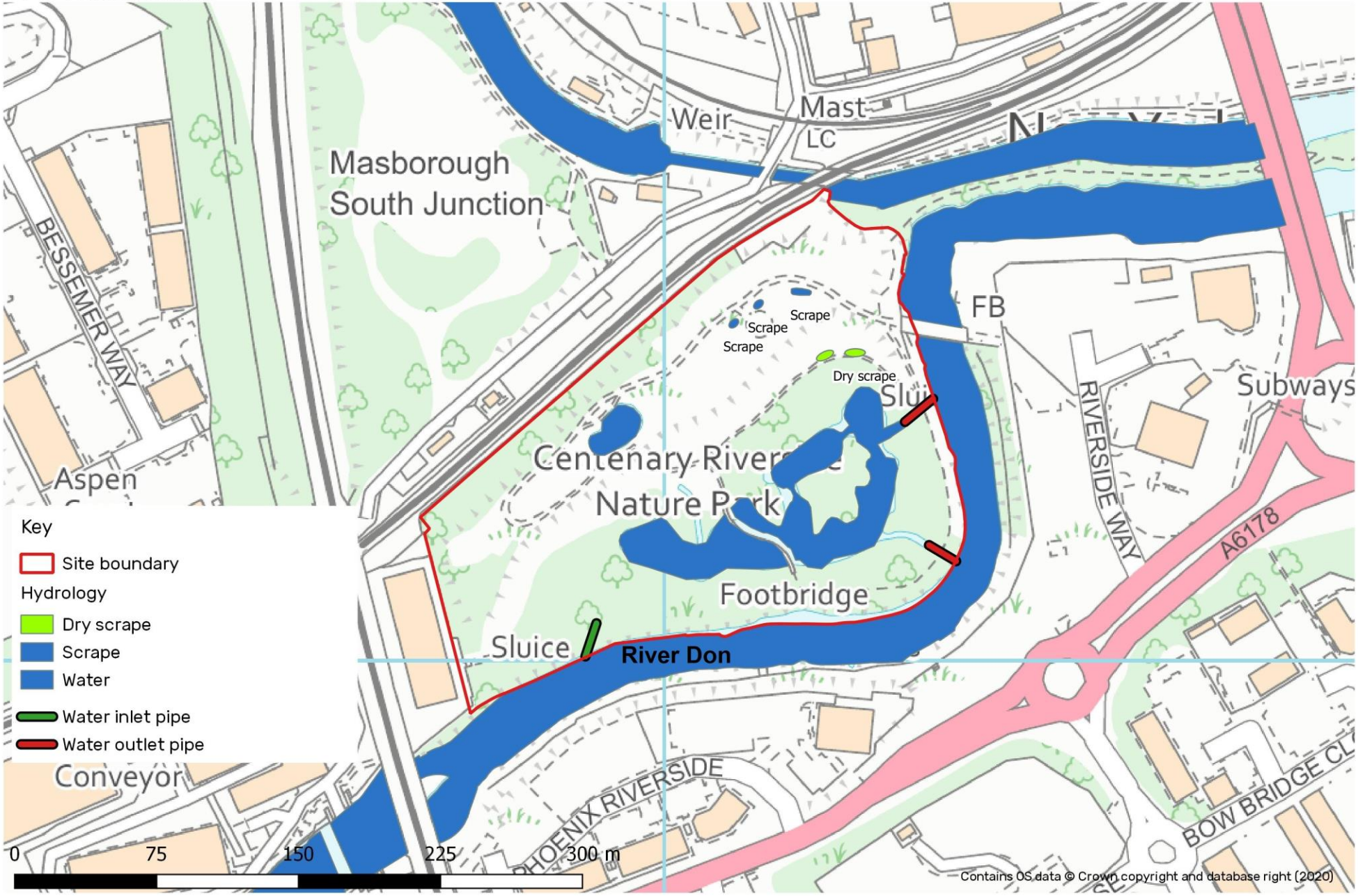
Fig 5. Hydrology



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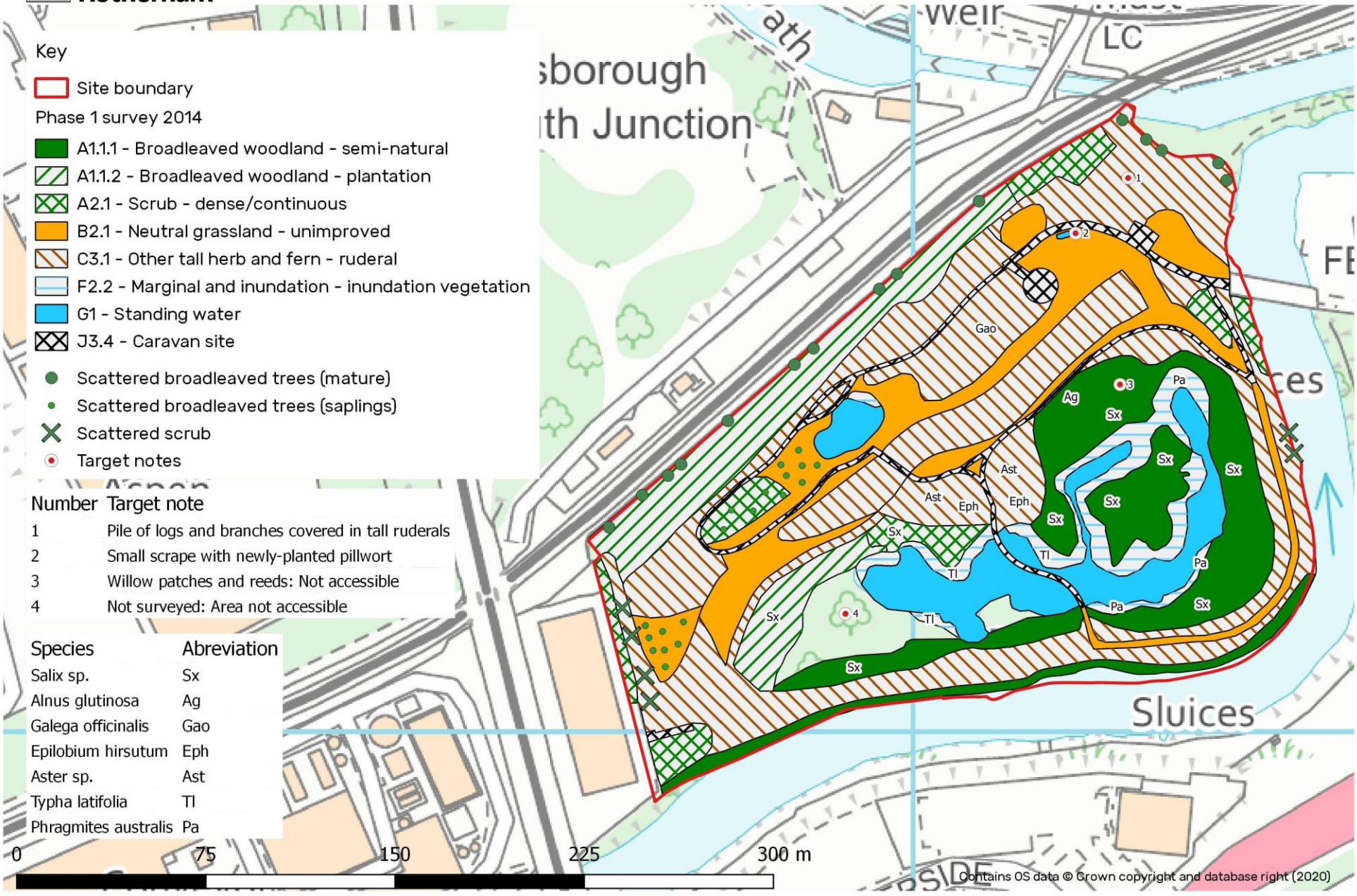
Centenary Riverside

Fig 6. Phase 1 habitat survey 2014



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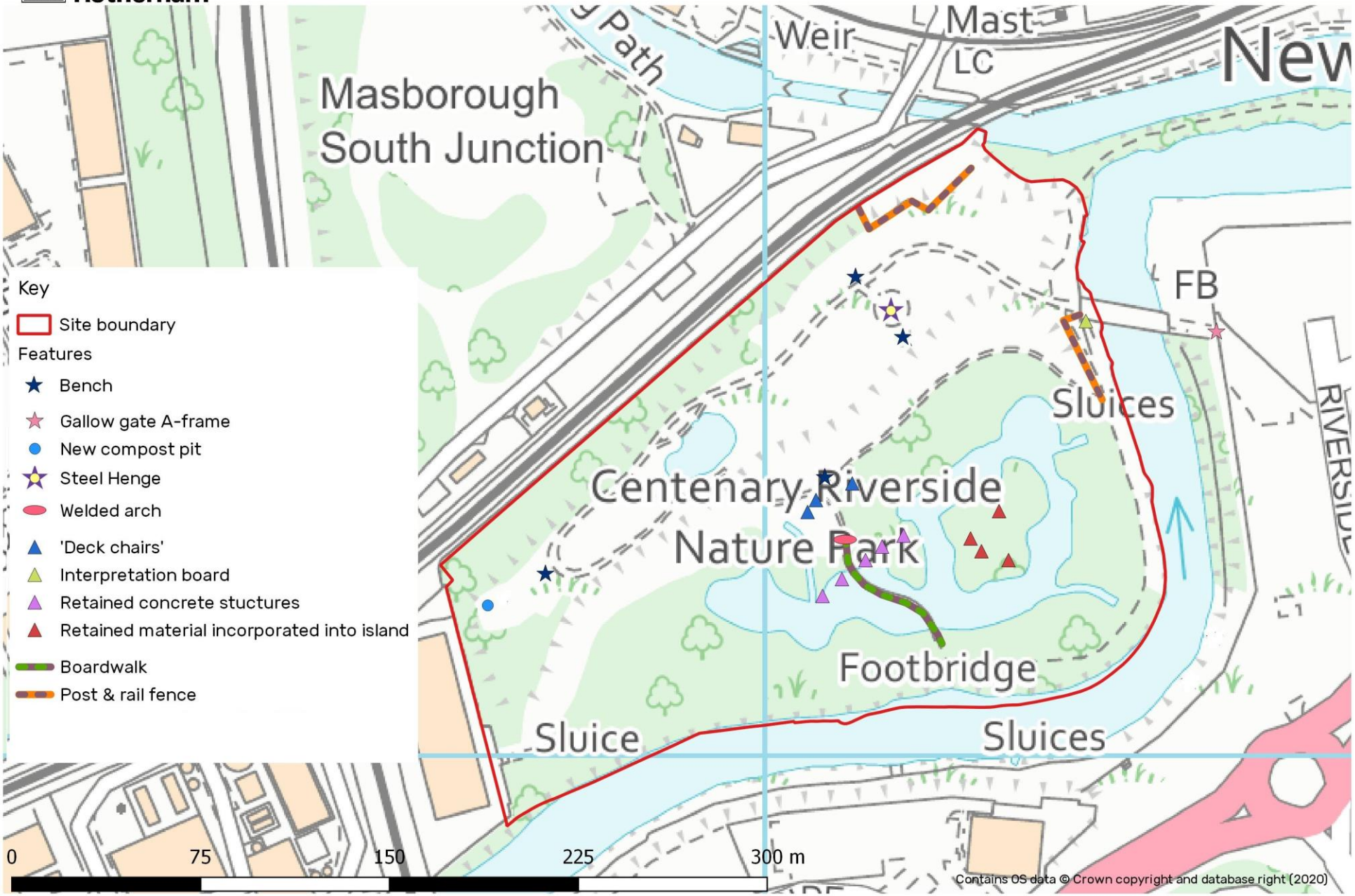
Centenary Riverside

Fig 7. Infrastructure



WORK PROGRAMME

The electronic version of the following table is kept on the Sheffield and Rotherham Wildlife Trust system, so that the work can be recorded, and the work programme updated as necessary. Please note that the work programme is a working document and can be subject to change over the ten year management period.

Feature	Objective no.	Objective with prescriptions	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Flood Storage Capacity	**1**	**To retain 2.4 ha of flood storage capacity on site.**											
	1.1	To manage silt depth on the floodplain											
		Install 6 poles to measure flood/silt depth across the floodplain		X									
		Monitor silt depth across the floodplain		X	X	X	X	X	X	X	X	X	X
		Work with the Environment Agency and RMBC to identify and secure funds to dredge the reserve's floodplain should sediment depths >1m						***as required***					
		Dredge floodplain to retain flood capacity						***as required***					
	1.2	To maintain the infrastructure associated with flood storage capacity											
		Maintain outflow pipes by removing vegetation and blockages from openings to allow passage of water	X	X	X	X	X	X	X	X	X	X	X
		Keep EA access route to sluice clear of shrubs and trees to allow vehicular access along its length	X	X	X	X	X	X	X	X	X	X	X
Wetland Mosaic	**2**	**To retain a 2.4 ha mosaic of wetland habitats on the reserve.**											
	2.1	To periodically set back the succession to dry land on the floodplain through active conservation management											
		Create areas of open water by dredging			X								X
	2.2	To control INNS across the floodplain											
		Search for and treat Japanese Knotweed across the floodplain	X	X	X	X	X	X	X	X	X	X	X
		Search for and remove Giant Hogweed across the floodplain	X	X	X	X	X	X	X	X	X	X	X
		Pull and remove Himalayan balsam growing with the lagoon area	X	X	X	X	X	X	X	X	X	X	X
	2.3	To retain the plateau pond											
		Establish marginal and emergent vegetation in sections of the pond where it is lacking			X								
		Maintain summer water levels in pond using IBC						***as required***					
		Remove excess vegetation from sections of pond					X			X			X
	2.4	**To retain a population of grass snake on the reserve**											
		Compost grass clippings and Himalayan balsam on site creating suitable egg-laying spots for grass snake above the flood plain	X	X	X	X	X	X	X	X	X	X	X
		Install grass snake hibernaculae on the reserve		X									

Feature	Objective no.	Objective with prescriptions	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Woodland, scrub and grassland mosaic	**3**	**To retain a 2 ha mosaic of woodland, scrub and species-rich grassland on the reserve**											
	3.1	To maintain the extent and species richness of the reserve's grasslands											
		Mow and rake off grassland areas on central plateau	X	X	X	X	X	X	X	X	X	X	X
		Mow and rake off grassland on flood banks	X	X	X	X	X	X	X	X	X	X	X
		Strim areas of tussock grassland on the plateau's periphery		X			X			X			X
	3.2	To diversity the structure of the reserve's woodlands											
		Select specimen trees across the plateau to grow on to maturity		X									
		Halo thin selected trees			X								
		Create sight lines through woodland areas on plateau by coppicing				X			X			X	
		Create habitat piles with arisings from woodland works				X			X			X	
	3.3	Prevent the colonisation of INNS across the reserve's plateau and flood banks											
		Search the reserve's plateau and flood banks for Himalayan balsam. Remove if found.	X	X	X	X	X	X	X	X	X	X	X
		Search the reserve's plateau and flood banks for Japanese knotweed. Remove if found.	X	X	X	X	X	X	X	X	X	X	X
		Search the reserve's plateau and flood banks for giant hogweed. Remove if found.	X	X	X	X	X	X	X	X	X	X	X
Invertebrate fauna	**4**	**Reserve supports a diverse community of terrestrial and aquatic invertebrates.**											
	4.1	Manage reserve's habitats to promote invertebrate diversity and biomass											
		Cross reference w 2.1-3.3 above											
	4.2	Collect additional information on reserve's insect fauna											
		Install malaise trap on the reserve			X								
		Carry out butterfly transects on the reserve's grasslands			X	X	X	X	X	X	X	X	X
Public Access	**5**	**Reserve is safe, well-maintained and accessible for people of all ages and physical abilities.**											
	5.1	To maintain the existing arrangement of paths and the boardwalk to good standard.											
		Maintain path network, with mown boundary strips along surfaced paths	X	X	X	X	X	X	X	X	X	X	X
		Clear silt from boardwalk following flooding events	X	X	X	X	X	X	X	X	X	X	X

Feature	Objective no.	Objective with prescriptions	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	5.2	To ensure the site is inviting and is safe for visitors.											
		Carry out tree safety survey in line with Trust's tree safety procedure	X		X		X		X		X		X
		Create and maintain sight lines through woodland sections between paths		X				X				X	
		Replace 3 benches					X						
		Carry out regular litter picks on site	X	X	X	X	X	X	X	X	X	X	X
	5.3	To interpret the reserve's history and wildlife value to visitors, and to encourage positive treatment of the site by the public.											
		Maintain existing interpretative features as required	X	X	X	X	X	X	X	X	X	X	X
		Ensure sight lines from steel henge to site entrance remain clear	X	X	X	X	X	X	X	X	X	X	X
		Keep hard standing around base of steel henge free of vegetation		X		X		X		X		X	
		Encourage local stewardship of the reserve through community ranger scheme			X	X	X	X	X	X	X	X	X
		Effect a repair to steel henge by replacing stolen parts					X						

Appendix I – Table of Acronyms

CRS – Centenary Riverside

EA – Environment Agency

RMBC- Rotherham Metropolitan Borough Council

SRWT – Sheffield and Rotherham Wildlife Trust