Yorkshire Wildlife Trust

Smithies Marsh,

off Smithies Lane, Barnsley

Biodiversity Enhancement Management Plan 2022-2052

Site Address:	Smithies Marsh, Smithies Lane Barnsley
Central grid reference:	SE 3445 0815
Revision:	2
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Site name	**Smithies Marsh**
Central NGR	SE 3445 0815
Nearest postcode	
Location	Off Smithies Lane, Barnsley
Status	Section falls within a LWS – Barnsley Canal at Wilthorpe
County	South Yorkshire
Planning authority	Barnsley Metropolitan Borough Council

1.0 Introduction

1.1 Site description

Smithies Marsh is located to the north of the Dearne (see Figure 1). It consists of two parts; to the south there is an area of low-lying land within the floodplain of the Dearne; to the north there is an area which slopes up the valley side to the disused railway line.

The northern portion is on sloping dry ground, whereas the southern portion lies on the River Dearne floodplain and is the focus of the scheme. The Dearne flows in a south-easterly direction.

The landscape context of the study site is of significance. The Dearne catchment is a sub-catchment of the River Don, itself one of the major sub catchments of the Humber river system. Along the Dearne from its source in Upper Cumberworth to its confluence with the River Don at Denaby are many well-known wetlands of nature conservation significance, including recently designated wetland Sites of Special Scientific Interest (SSSIs) at Wombwell Ings, Broomhill Flash, Old Moor, Bolton Ings, Edderthorpe Flash, Carlton Marsh, Adwick Washlands, Denaby Ings and Worsbrough Reservoir. Some of these are encompassed by the Dearne Nature Improvement Area (NIA) – a designation recognising the importance of the collective importance of these wetlands at landscape scale, though the site falls 0.6 km outside of the NIA boundary.

1.2 Site location

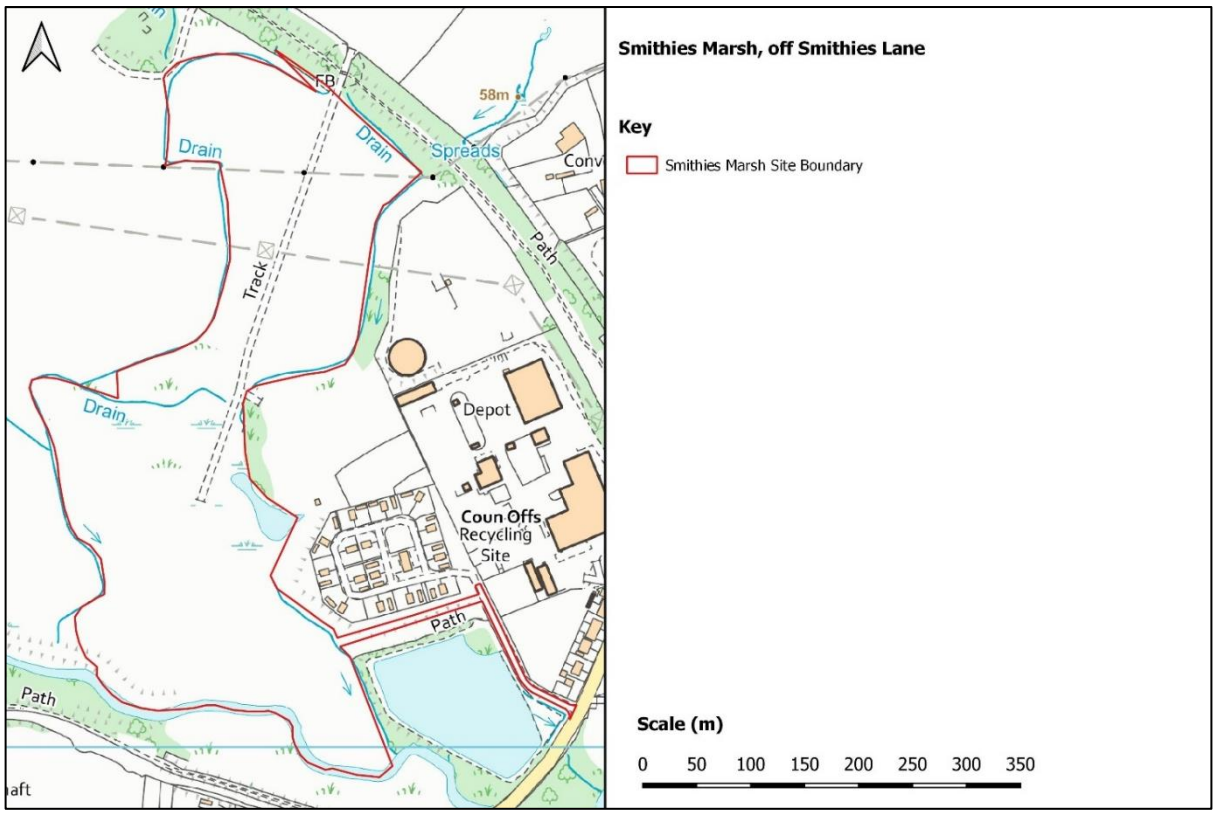


Figure 1: Site location

1.3 Strategic significance

The following data sources and resources were searched to gather information on the strategic significance of the Site and its habitats:

- Multi-Agency Geographic Information for the Countryside (MAGIC);
- Barnsley Biological Records Centre and South Yorkshire Bat Group, 1 km data search;
- Barnsley Local Plan 2012-2029.
- Barnsley Biodiversity Action Plan; and
- Barnsley River Dearne Valley Corridor, Green Infrastructure.

A section of the Site forms part of an ecological unit within Barnsley Canal at Wilthorpe Local Wildlife Site and is designated as wetland habitat, it also falls within a wider context of the River Dearne Green Corridor, identified in the Barnsley Local Plan 2012 – 2029 (adopted 2019), and within 0.6 km of the Dearne Green Valley Heart Nature Improvement Area.

The Site therefore is classed as '**within area formally identified in local strategy'** in the metric.

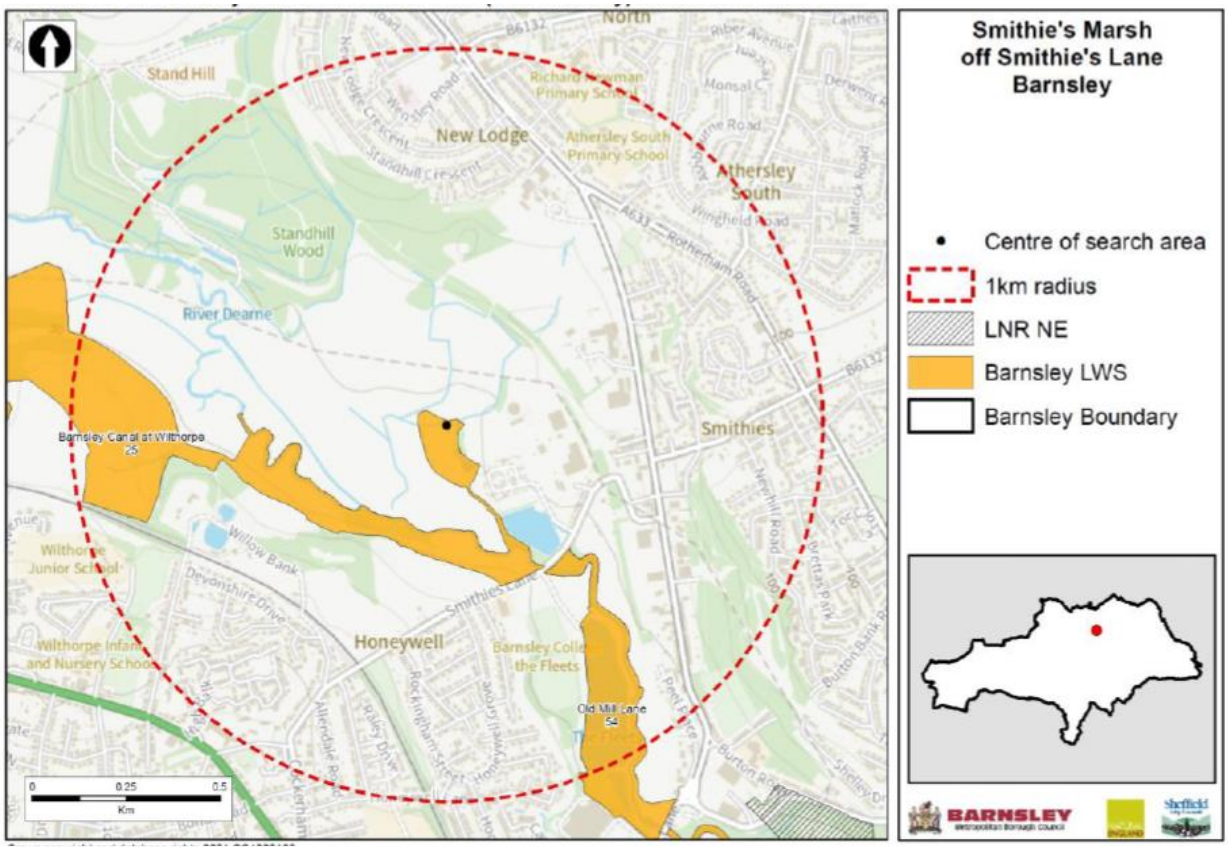


Figure 2: Statutory and non-statutory sites within a 1 km radius of Smithies Marsh

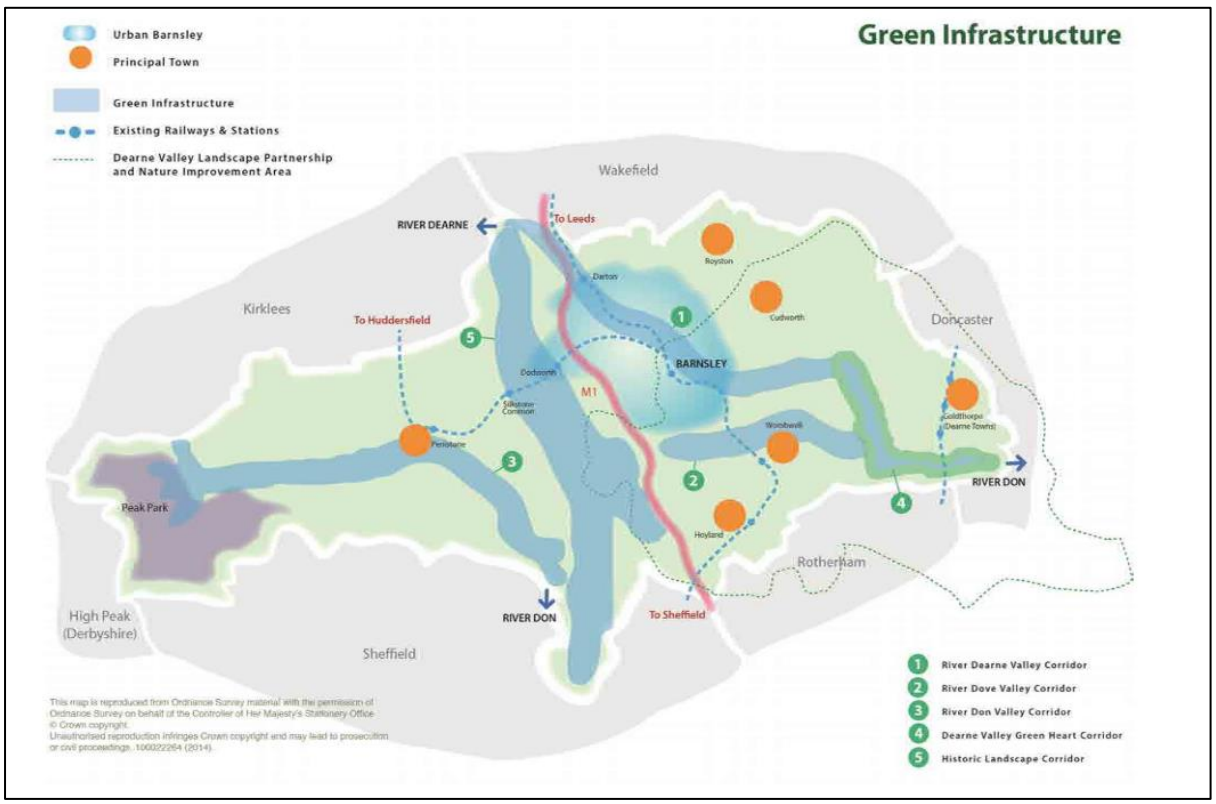


Figure 3: Barnsley Metropolitan Borough Council Green Infrastructure map (Barnsley Local Plan 2012-2029)

1.4 Visitor usage

The site has access from a public footpath (formerly a railway line) on the northern boundary and a desire line from Smithies fishing pond; currently it shows little sign of use by members of the public.

The objectives at this site are to encourage desired use of the site (walking, bird watching etc.), to engage with local communities and businesses and to actively discourage antisocial uses (quad bikes, fly tipping etc.).

1.5 Habitats on site

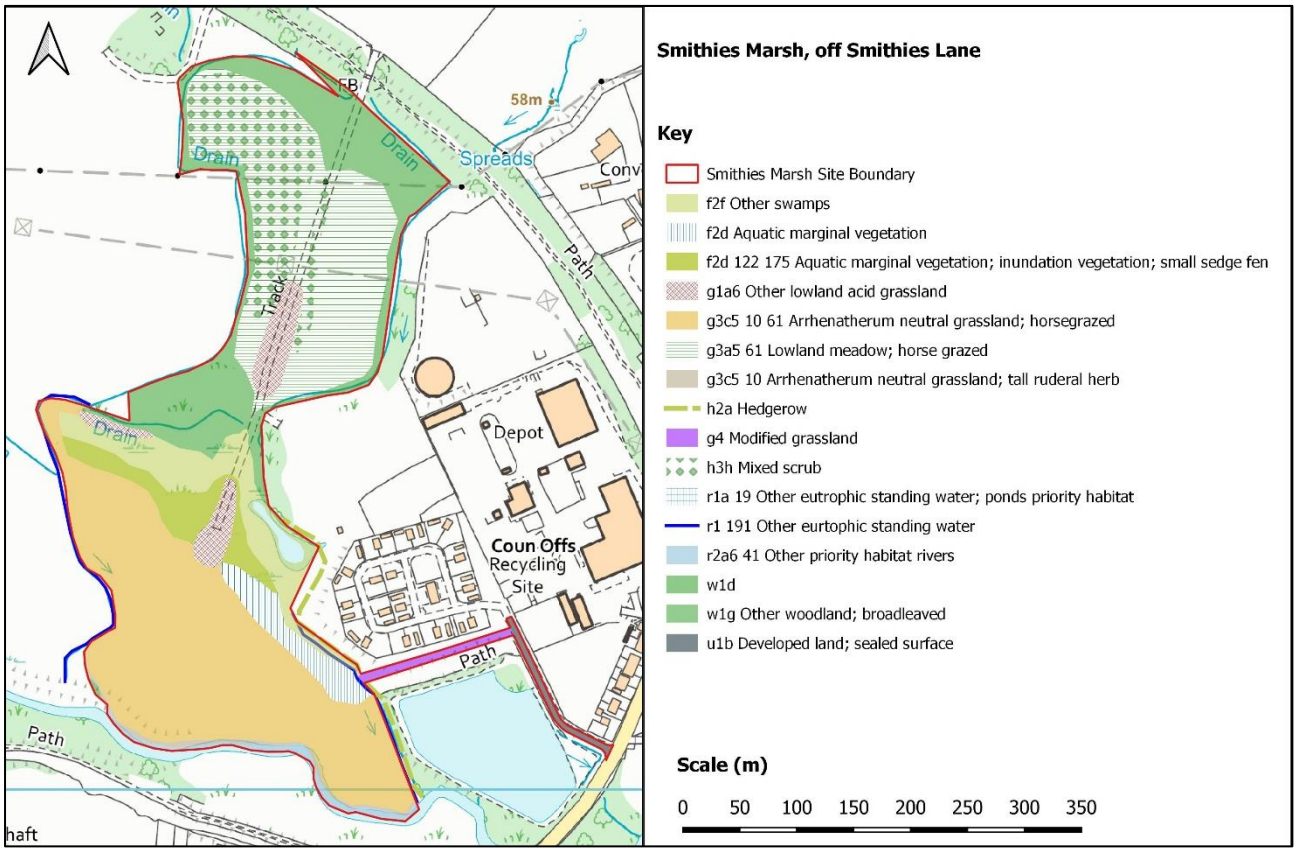


Figure 4: Site UK Habitats

1.6 The project

The scheme is intended to reconnect the Dearne to its original floodplain, and create additional wetland features including:

- re-profiling of 4 no. sections of the northern bank of the Dearne totalling 250 m in length
- creation of 5 no. shallow > 0.75 m deep scrapes) See Figures 6 - 8)
- creation of 3 no. shallow > 0.75 m deep ponds – pond margins will follow slope and length of scrape as indicated in Figure 6

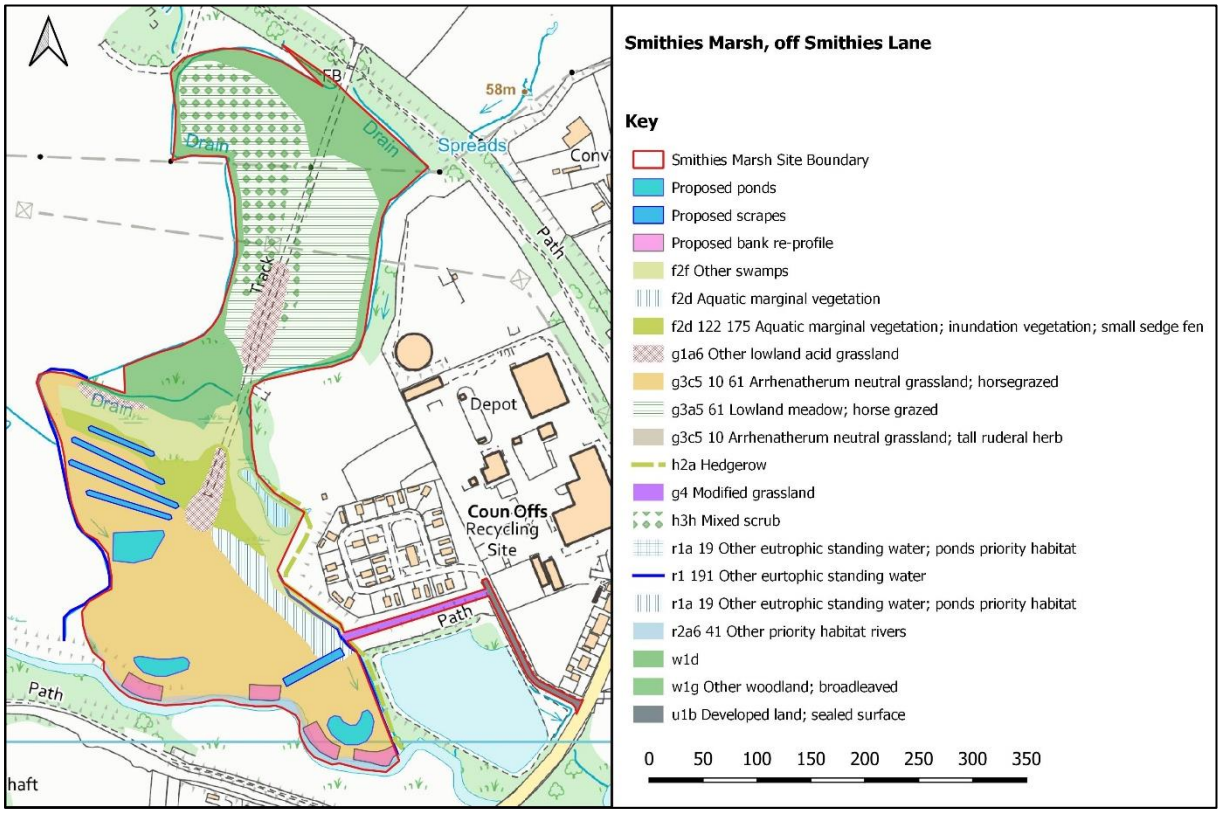


Figure 5: Site plan proposals

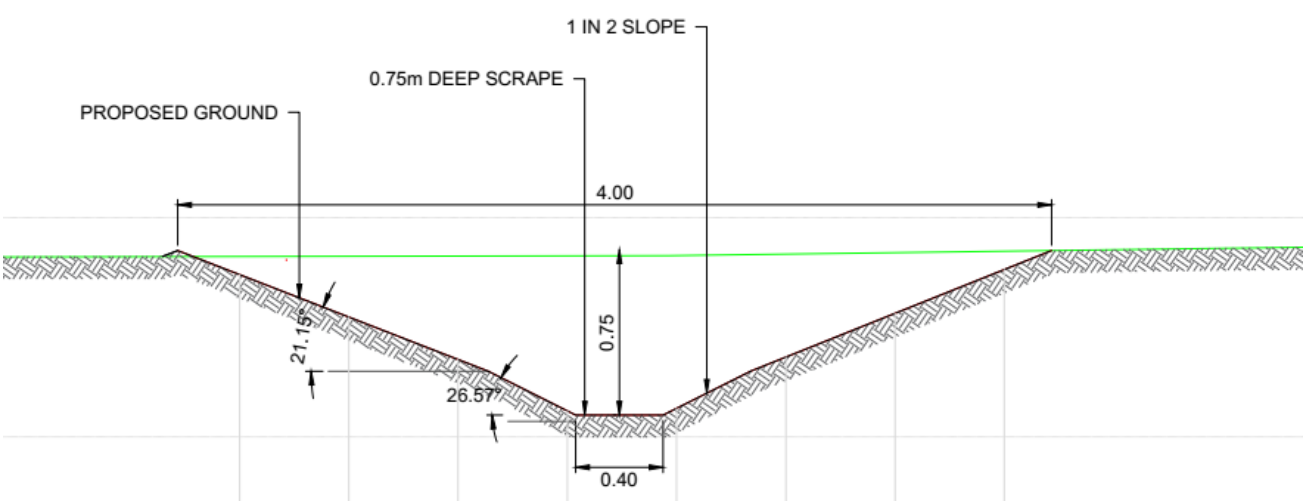


Figure 6: Cross section of three scrapes in the western section of the site (SM1 and SM3) (Figures in m)

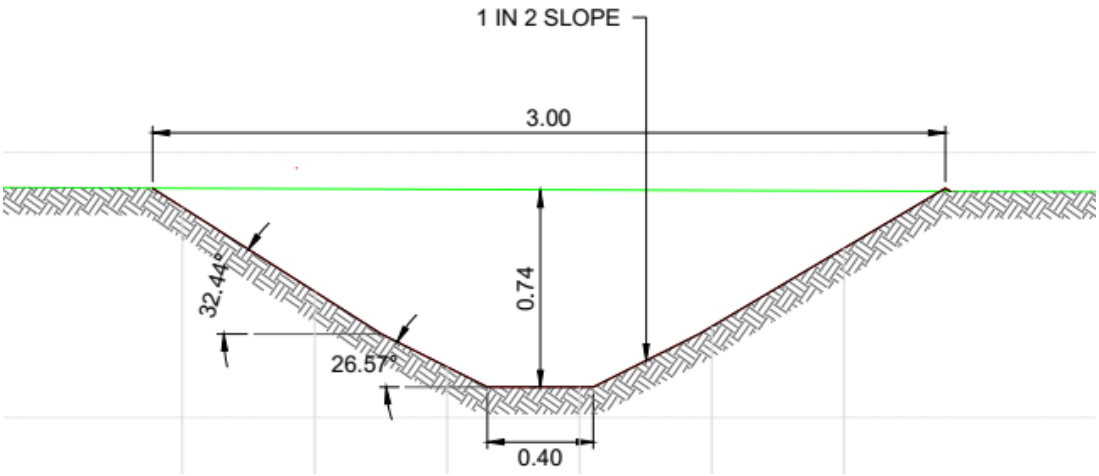


Figure 7: Cross section of one scrape in the western section of the site (SM1 and SM3) (Figures in m)

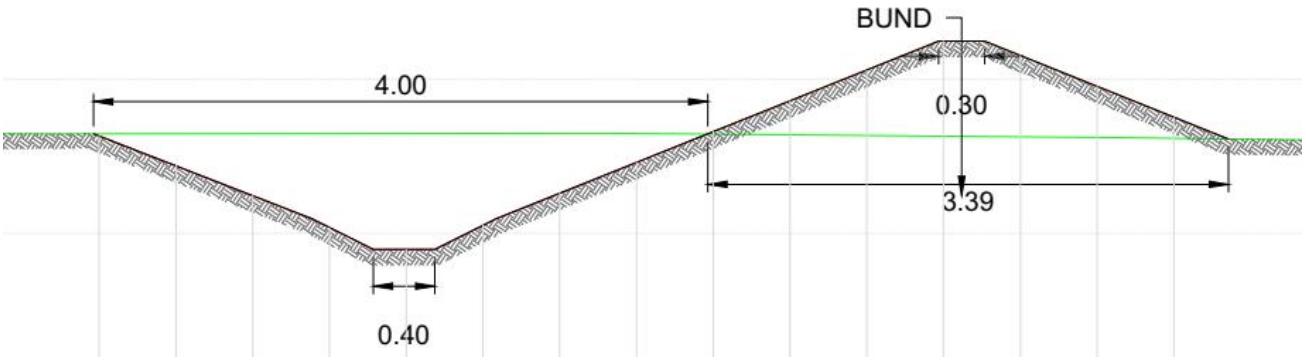


Figure 8: Cross section of one scrape in eastern section to include bund (SM1 and SM4) (Figures in m)

2.0 Objectives

Floristic communities

The Smithies Marsh Scheme has been designed to create floodplain grazing marsh with a natural hydrological system through inundation, local rainfall, and features created (scrapes and ponds) to retain seasonal standing water on site for longer periods. Though this site will be less affected than those which rely solely on one system it will be affected by annual rainfall and in turn climate change of which the impacts are varied (Natural England and RSPB 2014).

Climate change may lead to rainfall patterns which increase frequency and duration of flooding, this could result in a shift towards swamp and inundation grassland communities. Increased levels of soil phosphorus due to more frequent inundation and flooding are also likely to affect plant communities adversely (e.g., Gowing 2008). This habitat is also sensitive to reduced summer rainfall, which puts stress on wet meadow communities in late summer and autumn and may lead to changes towards drier communities (Carey 2013).

It is anticipated that shifts in flora communities will occur as a reaction to water level fluctuations, nitrogen and phosphorus loading from more frequent inundations, summer rainfall and higher temperatures. Therefore, additional hydrological control (drop board sluice, re-profiling the northern riverbank) may be required to mitigate against the effects of climate change, data from botanical surveys, water level monitoring and rainfall will inform the need for any additional hydrological feasibility report to implement any remedial actions to ensure target conditions are met.

Fauna

Amphibians

Two species of amphibian have been recorded at this Smithies Marsh common frog (breeding) and common toad. Increasing the extent of wetland habitats will enhance the site for these species by providing additional food resources.

Birds

Ones of the main objectives for the scheme is to provide food and resting places for wintering waterfowl and waders by increasing the extent and length that seasonal standing water, damp muddy margins and tussocky habitats are available for species such as greylag, mallard, gadwall, teal, goosander, moorhen, water rail, snipe, Jack snipe, lapwing, and grey heron.

Mammals

Though it is unlikely to encounter water vole at Smithies Marsh, ostensibly due to the population of American mink within the Dearne Valley catchment, enhancement (additional wetland and vegetative bank sides) provides suitable habitat for this species should a regional strategy for mink control be undertaken.

Three records for otter were returned within the search area, including spraint (recorded, 2014) on the southern bank of the River Dearne within the Site boundary. This is a transient species with large territories of several kilometres, and though unlikely it is feasible that they may occasionally utilise the river on the boundary of this Site on occasion. However, due to the potential for disturbance from dogs at this Site it is felt inappropriate to install an artificial holt.

Expanding the extent of wetland habitats at this site should result in an increase in insect mass providing additional resources for foraging bat and bird species.

Odonata

A range of Odonata has been recorded on site including the following species: southern hawker, broad-bodied chaser, common darter, emperor, common blue damselfly, azure damselfly, emerald damselfly, blue-tailed damselfly, and banded demoiselle. Creation of wetland features would provide suitable habitat for these species for sheltering, breeding, and feeding.

2.1 Habitats on site impacted by the scheme

SM1 – Grassland: Floodplain wetland mosaic (CFGM) – g3c5 10 Arrhenatherum neutral grassland scattered scrub

Total area (ha)	Current condition	Post-scheme condition	Time to target condition	Area retained by scheme (ha)	Area enhanced by scheme (ha)	Area habitat creation Priority habitat ponds (ha)	Percentage habitat area enhanced
3.81	Moderate	Good		3.81	3.55	0.27	100

This area (3.81 ha) comprises degraded neutral grassland with some characteristic species such as red fescue *Festuca rubra,* black knapweed *Centaurea nigra*, ribwort plantain *Plantago lanceolata*, abundant buttercups meadow *R. acris* and creeping *R. repens*, with regular and abundant patches of creeping thistle *Cirsium arvense*, broad-leaved dock *Rumex obtusifolius*, and ragwort *Senecio jacobaea*. Most of the area is dominated by false oatgrass *Arrhenatherum elatius* grassland. These latter species are all indicative of heavy and persistent overgrazing.

This habitat forms the largest part of the southern aspect of the Site and is the focus of the enhancement scheme. It is predicted this area will be the subject to a greater number of inundations during peak flows of the Dearne due to the re-graded flood banks sections. This will allow additional water onsite for longer periods providing conditions for traditional native floodplain marginal and inundation flora, allowing for an expansion in range of existing species and creating more diverse communities throughout the Site.

The creation of shallow ponds and scrapes will enhance micro wetland habitats by increasing seasonal standing open water onsite providing additional habitat and dispersal opportunities for aquatic and semi-aquatic species such as invertebrates, amphibians, grass snake, water vole and flora.

Initially flora species will be allowed to naturally disperse around and in created ponds and scrapes using existing seed banks on Site with weeds supressed to allow establishment. If required flora species will be enhanced by plants grown from seed collected at the Site to ensure local provenance.

See the Biodiversity and Management Plan for details on ongoing management.

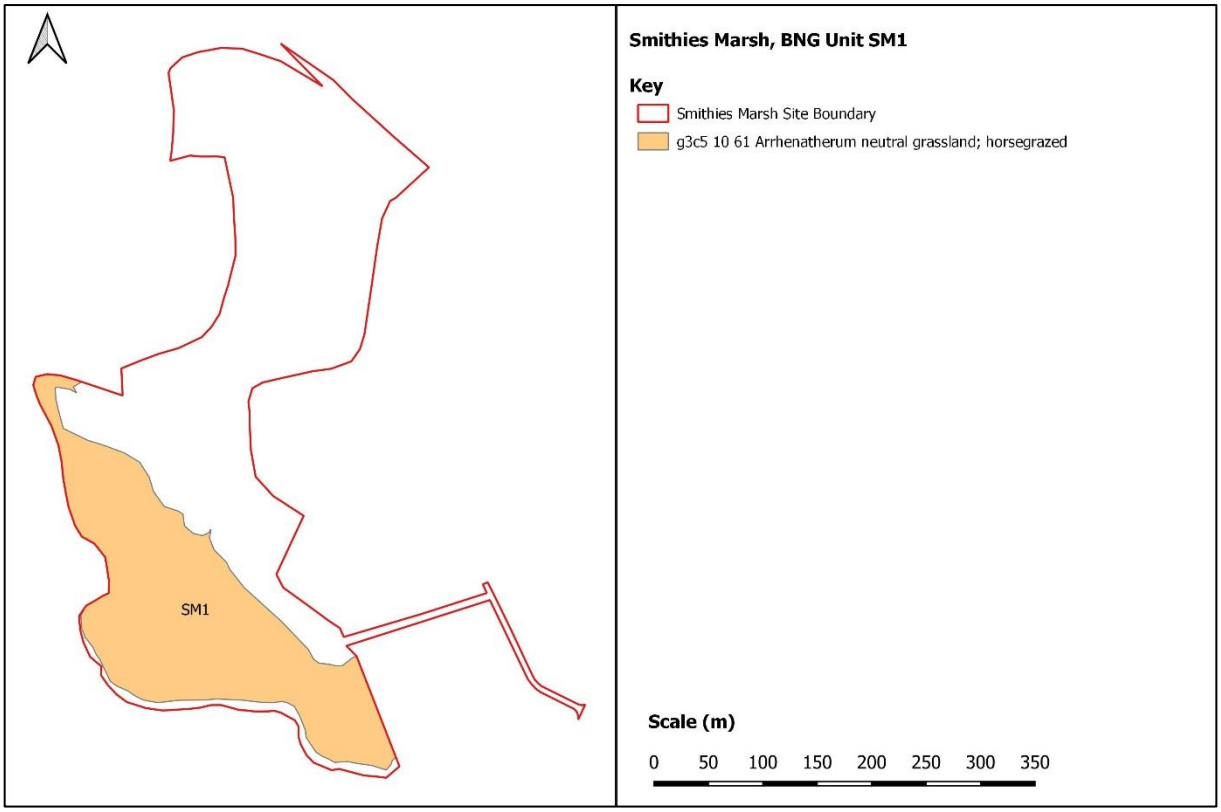


Figure 9: SM1 baseline area

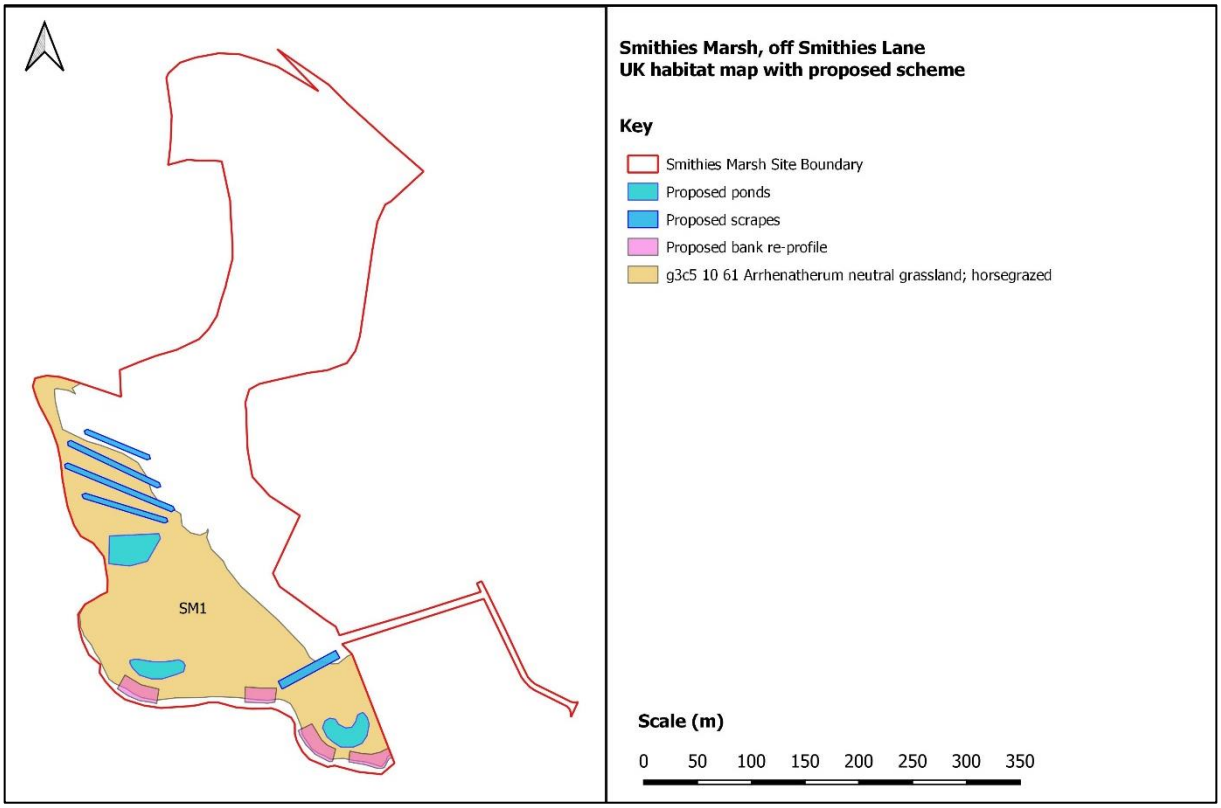


Figure 10: SM1 baseline area with proposals

SM2 – *Grassland: Floodplain wetland mosaic (CFGM) – g4 16 Modified grassland; tall ruderal herb*

Total area (ha)	Current condition	Post-scheme condition	Time to target condition	Area retained by scheme (ha)	Area enhanced by scheme (ha)	Percentage habitat area enhanced
0.11	Poor	Moderate	10	0.11	0.11	100

This habitat forms part of a 1- 2 m margin along the Dearne's northern bank and is notably made up of tall ruderal herb species such as stinging nettle Urica dioica, cow parsley Anthriscus sylvestris. Creeping thistle Cirsium arvense and willow herbs spp. together with grassland spp. e.g., cocksfoot, common bent.

Himalayan balsam is present in small patches along the extent.

Prior to works this section will be subject to Himalayan balsam pulling to remove the weed burden from the strip.

Himalayan balsam is present in small patches along the extent.

To achieve moderate condition for SM2 management of non-native species Himalayan balsam, noxious weed and scrub control will form part of the Biodiversity and Management Plan. 0.11 ha of SM2 prior to coir matting installation will be reseeded with Pond Edge Mixture EP1 increasing flora diversity.

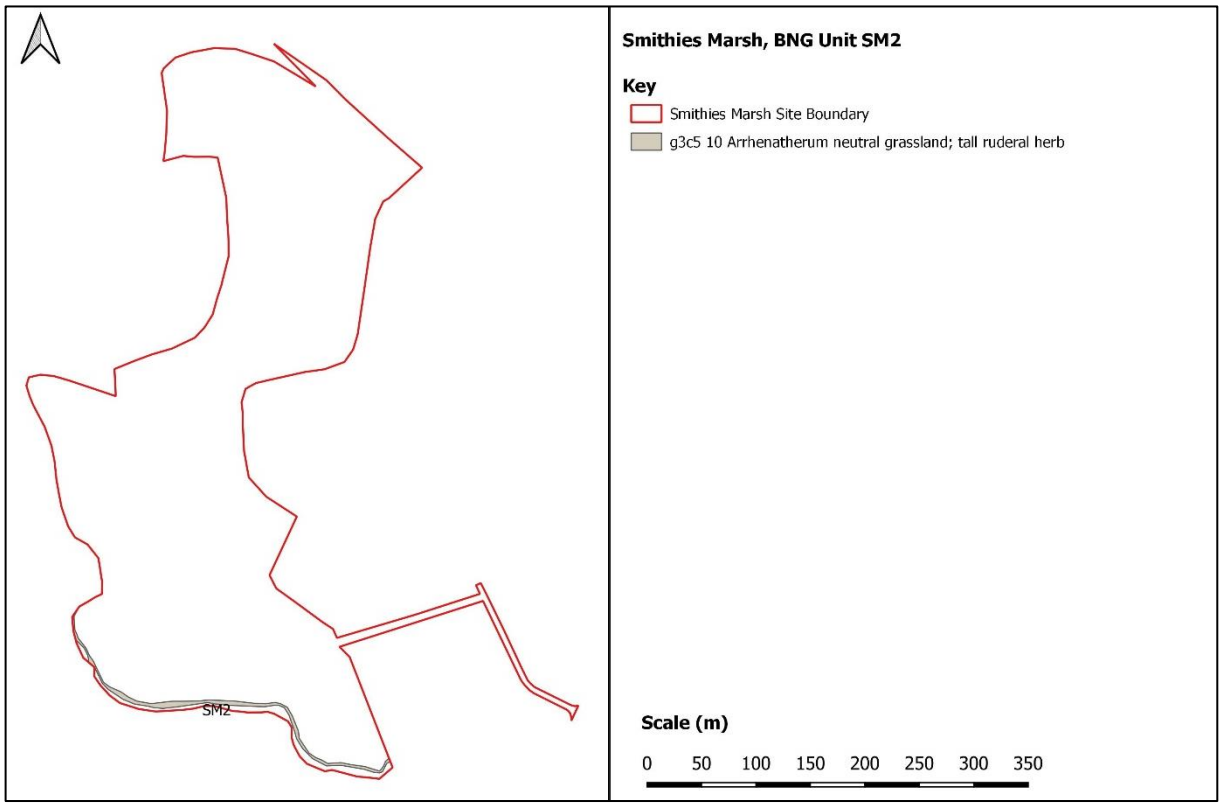


Figure 11: SM2 baseline area

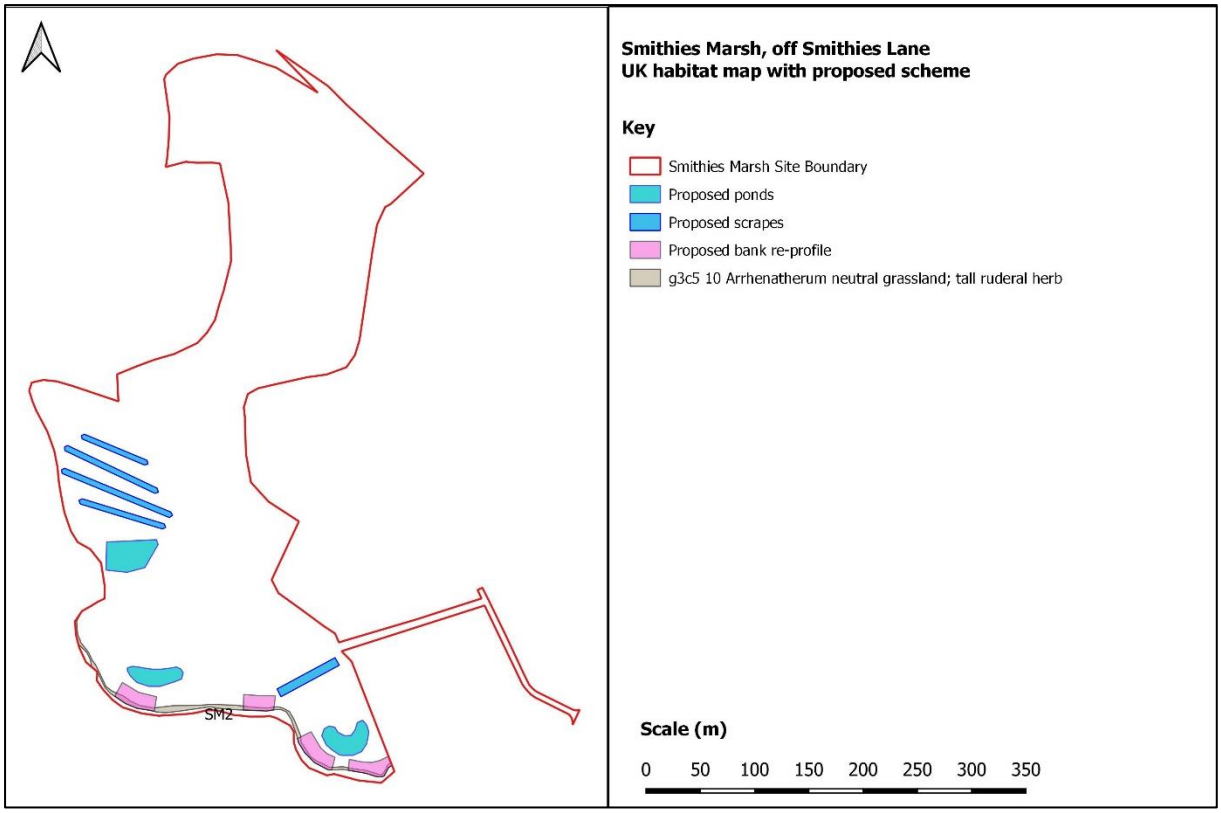


Figure 12: SM2 baseline area with proposals

SM3 – *Wetland f2d 122 175 Aquatic marginal vegetation; inundation vegetation; small sedge fen*

Total area (ha)	Current condition	Post-scheme condition	Time to target condition	Area retained by scheme (ha)	Area enhanced by scheme (ha)	Percentage habitat area enhanced
0.37	Moderate	Good	7	0.36	0.01	2.7

This area (0.37 ha) is a rich and diverse assemblage of marshland plants. Lesser water parsnip *Berula erecta*, meadowsweet *Filipendula ulmaria*, patches of marsh horsetail *Equisetum palustre*, lesser pond sedge *Carex acutiformis* and brown sedge *Carex disticha* and scattered to frequent watercress *Rorippa nasturtium-aquatica*, celery-leaved Buttercup *Ranunculus sceleratus*, brooklime *Veronica beccabunga*, figwort *Scrophularia nodosa*, flote-grass *Glyceria fluitans*, and reed sweet-grass *Glyceria maxima* are abundant. Other occasional marsh species include marsh bedstraw *Galium palustre*, water plantain *Alisma plantago-aquatica*, greater birds-foot trefoil *Lotus pedunculatus*, false fox-sedge *Carex otrubae*, bittersweet *Solanum dulcamara*, gipsywort *Lycopus europaeus*, water mint *Mentha aquatica*, the water forget-me nots *Myosotis scorpioides* and *M. laxa*, skullcap *Scutellaria galericulata*, hairy willowherb *Epilobium hirsutum*, marsh ragwort *Senecio aquaticus*, and rushes soft *Juncus effusus*, hard *J. inflexus,* blunt-flowered *J. subnodulosus* and jointed *J. articulatus*.

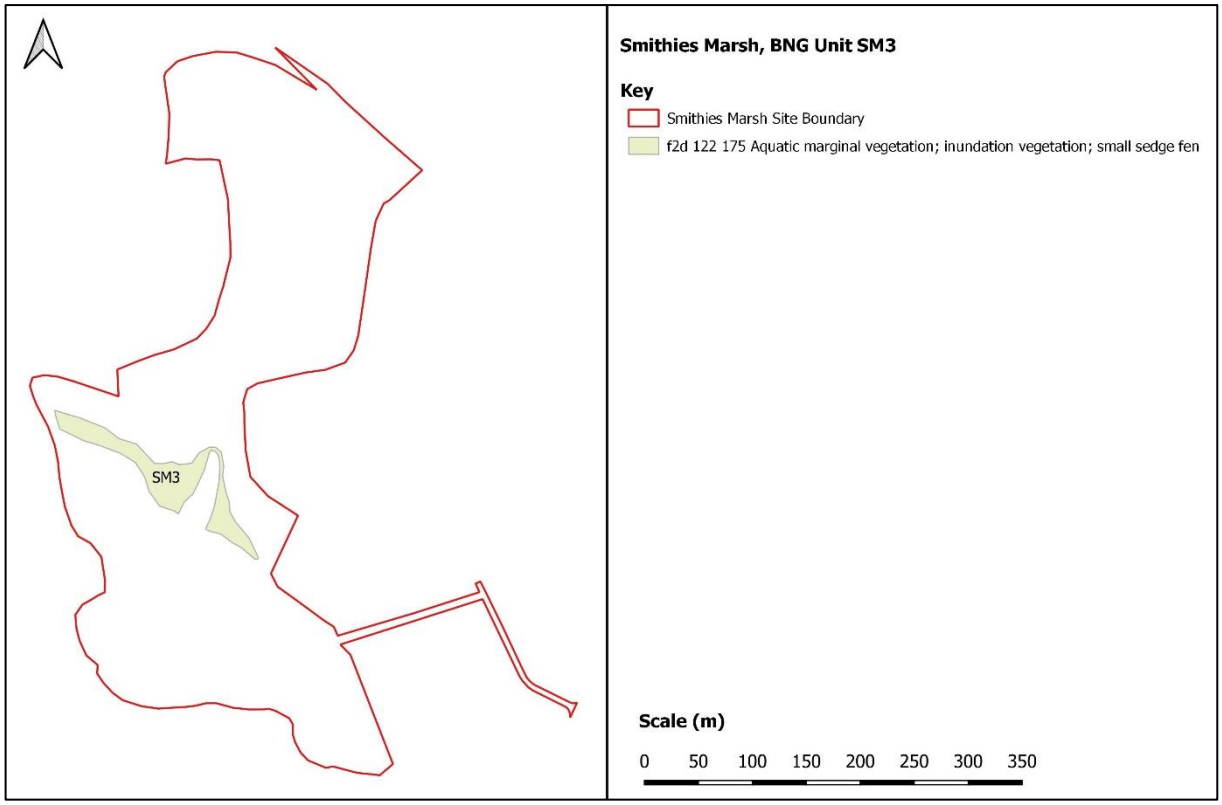


Figure 13: SM3 baseline area

One shallow scrape and the eastern tips of two additional shallow scrapes will be created during restoration works. Vegetation will be allowed to regenerate on bare soils from existing seed banks. The extent and number of species will be monitored. If after year 3 the target number of species

indicative of this habitat (5-9 species per m^2) is not met, the ground will be prepared to accept seed and/or plug plants of local provenance.

If noxious weed species exceed 5-15% of the total area appropriate herbicide will be used to control their extent by spot spraying.

Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation) ensuring micro habitats exist within the wetland for less competitive flora species and aquatic fauna.

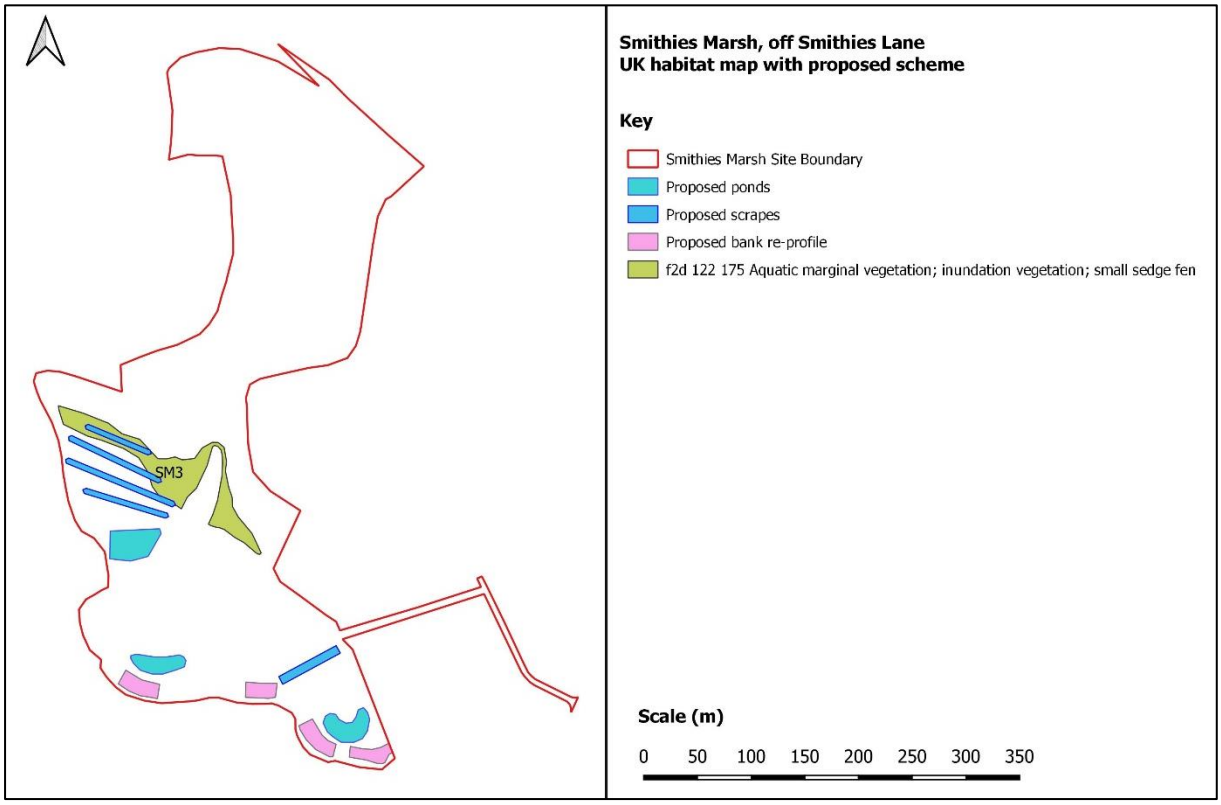


Figure 14: SM3 baseline area with proposals

SM4 – *Wetland: f2d Aquatic marginal vegetation*

Total area (ha)	Current condition	Post-scheme condition	Time to target condition	Area retained by scheme (ha)	Area enhanced by scheme (ha)	Percentage habitat area enhanced
0.47	Poor	Moderate	7	0.03	0.03	6.38

The marsh habitat (0.47 ha) grades into a marshy grassland inundation community on the southern side of the main swamp. Here a carpet of silverweed *Potentilla anserina* grows with the grasses creeping bent *Agrostis stolonifera*, annual meadow-grass *Poa annua* and marsh foxtail *Alopecurus geniculatus* with white clover *Trifolium repens* as the community further grades into the semi-improved neutral grassland to the south. There is a patch of great burnet *Sanguisorba major* and the grass meadow foxtail *Alopecurus pratensis* indicative of a more traditional floodplain meadow in the historic past.

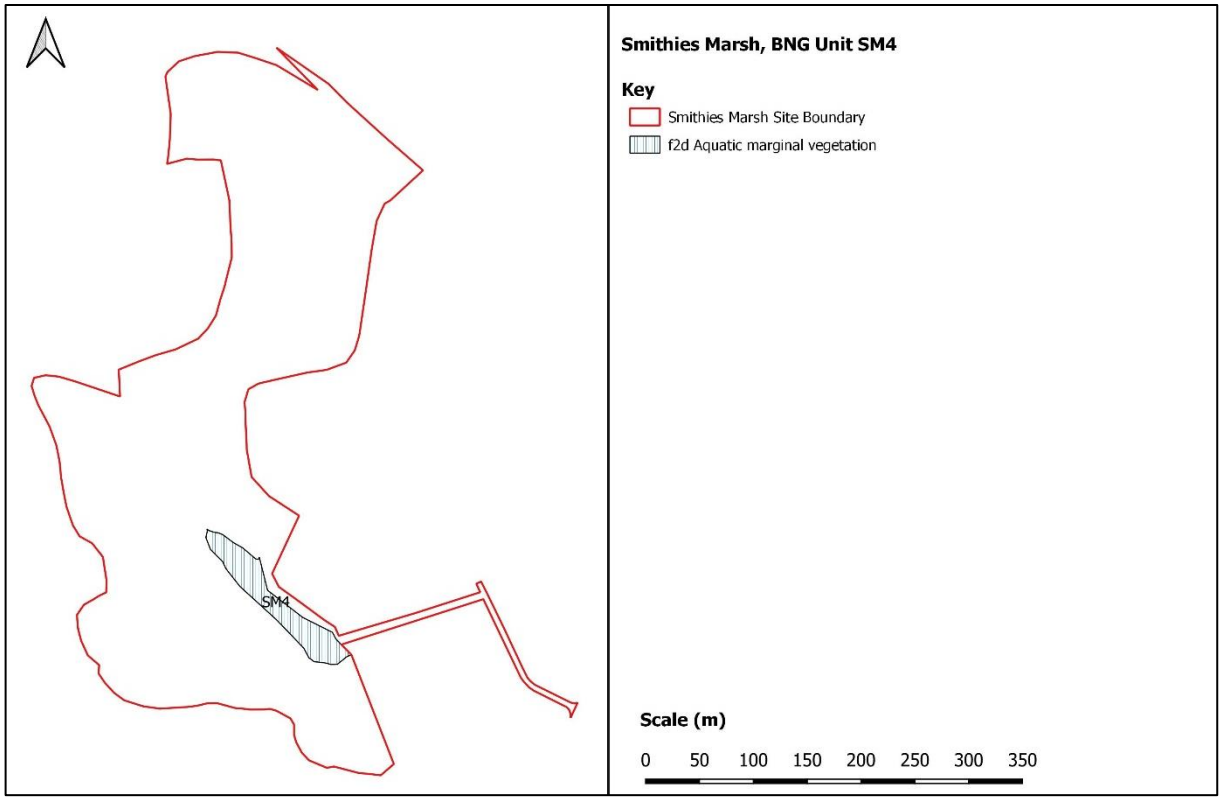


Figure 15: SM4 baseline area

This area will have the northern tip of a shallow scrape created during restoration works in SM1 habitat. Vegetation will be allowed to regenerate from existing seed banks. The extent and number of species will be monitored. If after year 3 the target number of species indicative of floodplain meadow such as great burnet (5-9 species per m^2) is not met, the ground will be prepared to accept seed and/or plug plants of local provenance.

If noxious weed species exceed 5-15% of the total area appropriate herbicide will be used to control their extent by spot spraying.

Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance.

Summer cutting to reduce reed competitive ability, allowing more diverse mix of vegetation) ensuring micro habitats exist within the wetland for less competitive flora species and aquatic fauna.

Reconnecting the Dearne to its floodplain will achieve good condition for 0.03 ha of SM4. Bare soil left from scrape creation will be allowed to regenerate from existing seed beds, allowing conditions for wetland species to expand their extent.

To ensure noxious weed species and scrub do not encroach the area botanical monitoring will be in place with control set out in the Biodiversity and Management Plan for the Site.

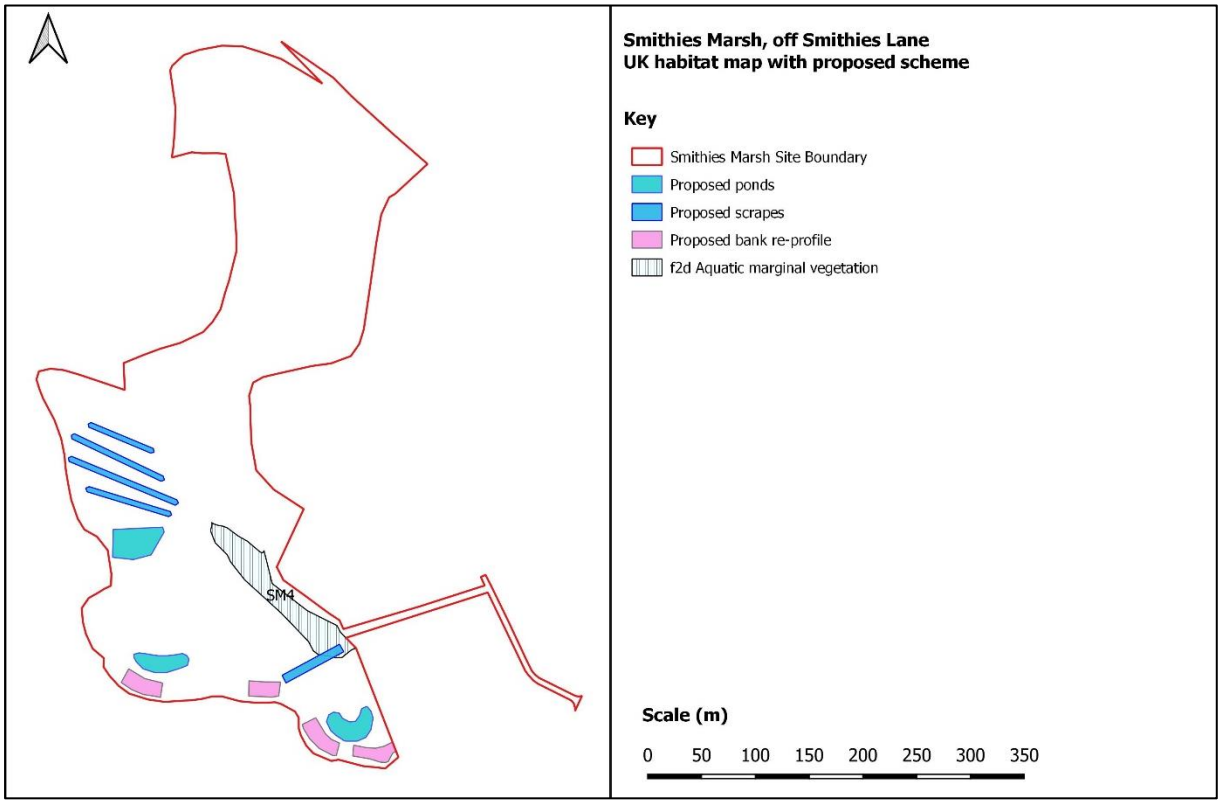


Figure 16: SM4 baseline area with proposals

R1 – *r2a6 41 Other priority habitat: rivers*

Total length (km)	Current condition	Post-scheme condition	Length retained by scheme (km)	Length enhanced by scheme (km)	Percentage habitat km enhanced
0.32	Moderate	Fairly good	0.16	0.16	50

The River Dearne is a single thread, alluvial river which has been heavily modified historically within the vicinity of the site. Upstream of the site, a c.1km stretch of river has been straightened, resulting in a significant loss of sinuosity from the planform of the river.
The disconnected palaeo channel is still evident within the floodplain and reconnection of this channel in the future would provide an excellent opportunity to significantly increase the hydromorphology of the Dearne. The historic channel straightening and realignment continues to influence the present-day morphology. The channel-floodplain connectivity is generally poor throughout the site, most likely due to incision in response to the historic channel realignment, coupled with channel deepening to increase conveyance.

Downstream the channel is overwide and, consequently, the flow velocity is low. The river is unable to flush fine sediment through the reach during low flows, causing it to deposit on the bed and smother the gravels present in the substrate. The banks are steep and the low flow water levels are c.2m below the surrounding floodplain on the left bank. The riparian cover is patchy, with stretches of mature trees interspersed with areas of grassy banks and Himalayan balsam. At the far downstream extent of the site, a combination of bank collapse and fine sediment deposition is causing a fine sediment berm to develop on the inside of the channel meander on the left bank

Upstream towards the top end of the Site, and beyond into the surrounding farmland, the hydromorphology of the river improves substantially. The right bank floodplain connectivity is good and there is a large area of wet woodland in the vicinity of the palaeo channel on the right bank floodplain associated with the old river course. The river width is narrower and more varied through this section and flow velocity is faster than in the downstream portion of the site. As a result, the riverbed exhibits more diversity, with riffled flow over gravel deposits in places.

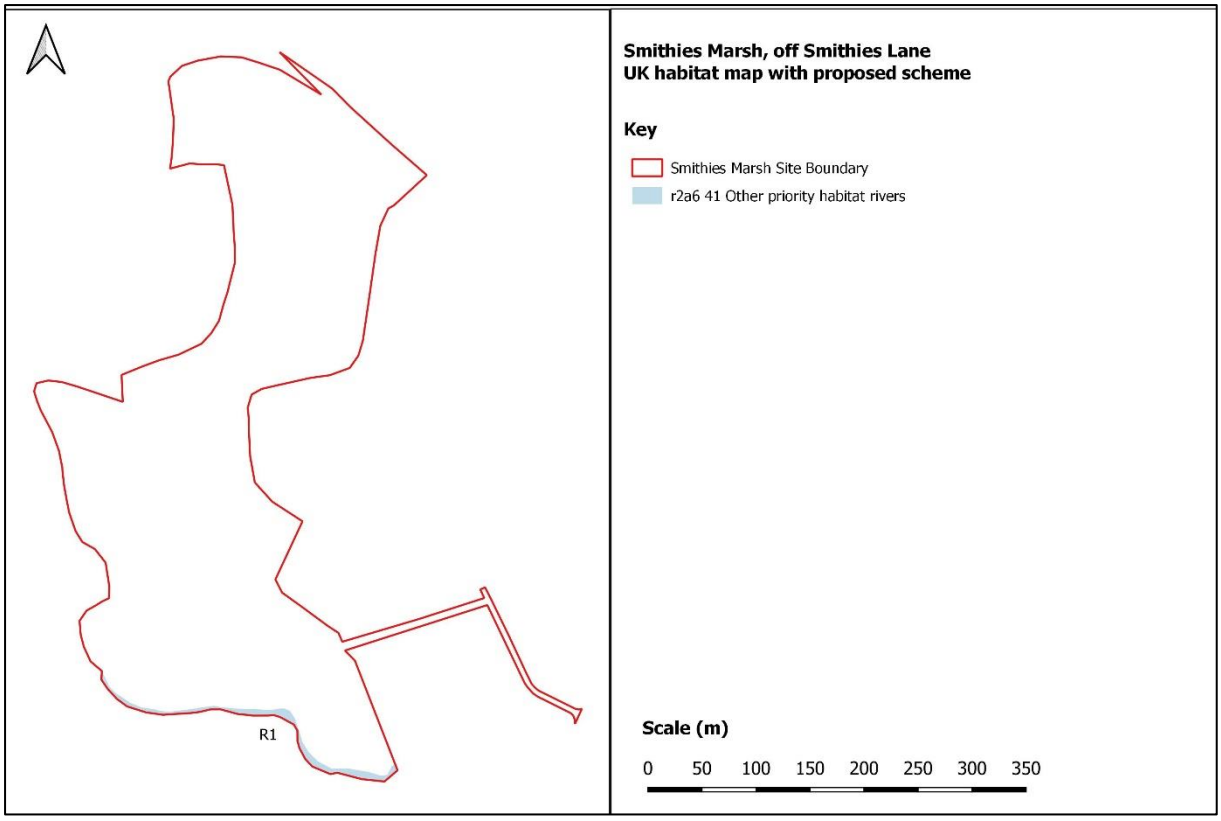


Figure 17: R1 baseline area

A MoRPH5 field survey was used to assess the condition of the Dearne which flows west to east along the southern boundary of the Site. Data from the field survey and proposed habitat enhancements were run through Cartographer to generate a post-intervention condition for this section of river. See Figures 2 and 14.

The proposed works to a 250 m section of the River Dearne affords the opportunity to improve the aquatic, bank face and bank top habitats within this section. These improvements are summarised as follows:

- Replanting on the left bank top, providing more diverse botanical communities;
- Reprofiling of the left bank face with a gravel pebble berm improving the diversity of the left bank profile; and
- Removal and management of Himalayan balsam on both bank tops and bank face.

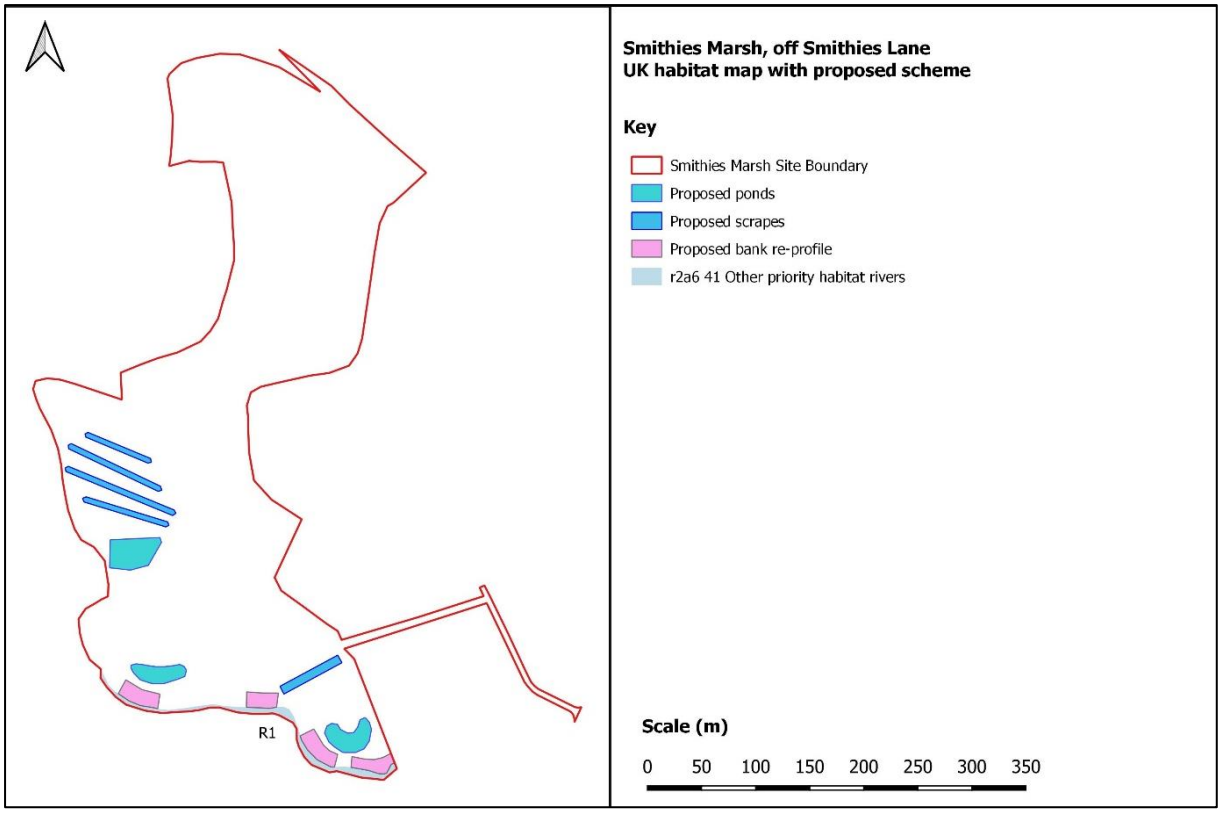


Figure 18: R1 baseline area with proposals

2.2 Monitoring and reporting

Contained within Appendix 1 Biodiversity and enhancement management plan is the monitoring and reporting programme. A report which indicates current condition assessments together with data from the monitoring programme and any remedial actions required to meet targets will be sent to BMBC in December of the target year.

Unit reference	Years to target condition	Report to Barnsley Metropolitan Borough Council (BMBC) Planning Department
SM1	4	December Year 4
SM2	7	December Year 10
SM3	7	December Year 7
SM4	10	December Year 7
R1	N/A	

The monitoring programme includes:

- Installation of two dipwells in Year 1 to monitor water levels on site with data from loggers downloaded quarterly
- Data from rainfall and river levels will be taken from Rainfall and river flow: weekly reports for England - GOV.UK (www.gov.uk) and EA monitoring stations (Upstream – downstream Dearne at Barnsley Weir / Cundy Cross / Darton) annually

- Survey of 21 fixed 1x1m^2 quadrats throughout the units and survey in Years 2, 3, 4, 5 and thereafter every five years
- Soil analysis will be undertaken Years 1, 4, 10, 20 and 30
- WeBS survey following BTO methodology bi-annually after Year 3

This monitoring programme will provide data to allow management of the site and highlight issues which require remedial actions to enable units to reach target conditions.

Appendix 1: Biodiversity and enhancement management plan actions

Site name	Smithies Marsh	**Location (Central NGR)**	SE 3445 0815
Organisation responsible for management	Yorkshire Wildlife Trust		
Date management started	October 2022	**Date this plan was last updated**	August 2022

Habitat enhancement plan SM1

Habitat parcel	Area (ha)	Starting habitat type	Starting distinctiveness	Starting condition	Target habitat type	Target distinctiveness	Target condition	Time remaining to target
SM1	3.81	Grassland: Floodplain wetland mosaic (CFGM)	High	Moderate	Floodplain	High	Good	4

Initial habitat enhancement SM1

Management activity SM1	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Year 1												
Create 3 no. shallow ponds (contractor)									✓	✓		
Create 5 no. shallow scrapes (contractor)									✓	✓		

Ongoing management SM1

Management activity SM1	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Years 1 – 3												
Install 15 fixed 1 x 1m quadrat points for botanical monitoring (YWT) **Year 1**				✓								
Install 2 no. dipwells (YWT) **Year 1**				✓								
Allow pond/scrape marginal vegetation to regenerate from existing seed bank				✓	✓	✓	✓	✓				
Botanical survey using fixed quadrat points (target 5-9 species per $1m^2$) undertaken May-July **Years 2 and 3**					✓	✓	✓					

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.
You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Management activity SM1	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 1 – 3												
Soil analysis undertaken during any month **Year 1** to inform management of flora species habitats repeated **Years 4 / 10 / 20 / 30**	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
If regeneration of pond and scrape marginal flora species is unsuccessful by **Year 3** collect seed (Subject to permission from landowners/statutory bodies) target species e.g., include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw). 50% of seed should be supplied to Nosterfield Well Wetlands Nursey, Mires Beck Nursery and/or Adwick Community Enterprise who will propagate seed and supply back as plugs for planting in **Year 4 / 5,** and 50% of seed to be stored and dried for sowing in **Year 4. This action should be repeated on a 5-year basis – in Years 10 / 15 / 20**							✓	✓	✓			
Cut and collect/bale of the grassland areas should be undertaken after July 16 of each year to reduce the nutrient levels within the soil and aid seed dispersal on site.							✓	✓				
Monitor % cover of noxious weeds e.g., creeping thistle				✓			✓					
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate*.				✓	✓							
Monitor scrub e.g., self-set birch, sycamore, willow, bramble				✓								
Cut and collect/bale of the grassland areas should be undertaken after July 16 of each year to reduce the nutrient levels within the soil and aid seed dispersal on site.							✓	✓				
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other suitable treatment*	✓	✓								✓	✓	✓
Remove Himalayan balsam by pulling annually when present						✓	✓					

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.
You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Management activity SM1 – continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 1 – 3												
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
Collect monthly rainfall data from Rainfall and river flow: weekly reports for England - GOV.UK (www.gov.uk)				✓								
Monitor water table levels using on site dipwell data quarterly (loggers set to record hourly)	✓			✓				✓				✓
Monitor river levels annually using EA (Upstream – downstream Dearne at Barnsley Weir / Cundy Cross / Darton) annually				✓								
Undertake WeBs survey **bi-annually** following BTO methods starting **Year 3**	✓	✓	✓	✓					✓	✓	✓	✓
Management activity SM1	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 4 – 10												
Botanical survey using fixed quadrat points undertaken May-July **Years 4 / 6 / 8 / 10** Target 5-9 species per $1m^2$ – indicative species for range extension include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw					✓	✓	✓					

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.
You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Management activity SM1 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 4 – 10												
Remove Himalayan balsam by pulling annually when present						✓	✓					
If regeneration of flora species is unsuccessful by **Year 10** collect seed (Subject to permission from landowners/statutory bodies) target species e.g., include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw). 50% of seed should be supplied to Nosterfield Well Wetlands Nursey, Mires Beck Nursery and/or Adwick Community Enterprise who will propagate seed and supply back as plugs for planting in **Year 11 / 12,** and 50% of seed to be stored and dried for sowing in **Year 11. Seed collected should reflect habitat conditions – using soil analysis/moisture levels etc.**			✓	✓					✓			
Monitor growth of seedling/young plants (target 5-9 species per $1m^2$)				✓			✓	✓	✓			
Cut and collect/bale of the grassland areas should be undertaken after July 16 of each year to reduce the nutrient levels within the soil and aid seed dispersal on site.							✓	✓				
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate*				✓	✓							
Monitor scrub e.g., self-set birch, sycamore, willow, bramble annually				✓								
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other suitable treatment*	✓	✓								✓	✓	✓

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.
You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Management activity SM1 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 4 – 10												
Cut and collect/bale of the grassland areas should be undertaken after July 16 of each year to reduce the nutrient levels within the soil and aid seed dispersal on site.							✓	✓				
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
Soil analysis undertaken during any month **Year 10** to inform management of flora species habitats repeated **Years 20 / 30**												
Collect monthly rainfall data from Rainfall and river flow: weekly reports for England – GOV.UK (www.gov.uk)				✓								
Monitor water table levels using on site dipwell data quarterly (loggers set to record hourly)	✓			✓				✓				✓
Monitor river levels annually using EA (Upstream – downstream Dearne at Barnsley Weir / Cundy Cross / Darton) annually				✓								
Undertake WeBs survey **Years 4 / 7 / 10** following BTO methods	✓	✓	✓	✓					✓	✓	✓	✓
Year 4 provide report to BMBC planning department current condition assessment and a plan for any remedial actions which many be required to be undertaken to meet target conditions and fulfil obligations for Biodiversity Net Gain.											✓	✓
Management activity SM1	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 11 - 20												
Botanical survey using fixed quadrat points (target 5-9 species per 1m^2) undertaken May-July **Years 12 / 14 / 16 / 18 / 20**					✓	✓	✓					
Cut and collect/bale of the grassland areas should be undertaken after July 16 of each year to reduce the nutrient levels within the soil and aid seed dispersal on site.							✓	✓				
Remove Himalayan balsam by pulling annually when present						✓	✓					
Monitor % cover of noxious weeds e.g., creeping thistle annually				✓			✓					

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.
You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Management activity SM1 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 11 - 20												
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate*				✓	✓							
Monitor scrub e.g., birch, sycamore, willow, bramble annually				✓								
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other suitable treatment*	✓	✓								✓	✓	✓
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
Cut and collect/bale of the grassland areas should be undertaken after July 16 of each year							✓	✓				
If flora species targets are unmet is by **Year 15 and/or Years 20 / 30** – seed /plug plants of local provenance should be used to meet target conditions (see management action in Year 3 and Year 10 and for methodology). **Seed collected should reflect habitat conditions – using soil analysis/moisture levels etc.**												
Collect monthly rainfall data from Rainfall and river flow: weekly reports for England - GOV.UK (www.gov.uk)				✓								
Monitor water table levels using on site dipwell data quarterly (loggers set to record hourly)	✓			✓				✓				✓
Monitor river levels annually using EA (Upstream – downstream Dearne at Barnsley Weir / Cundy Cross / Darton) annually				✓								
Year 11 If botanical surveys and water level monitoring indicate insufficient water levels onsite to meet target conditions due to effects of climate change etc., commission hydrological feasibility report to provide remedial actions e.g., installation of drop board sluice on eastern ditch and/or and re-profiling additional sections of northern bank of Dearne. Remedial actions should be undertaken where feasible by **Year 15.** Subject to permissions and permits.	✓											
Soil analysis undertaken during and month **Year 20** to inform management of flora species habitats repeated **Year 30**												

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You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Management activity SM1	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 21 - 30												
Undertake WeBs survey **bi-annually** following BTO methods	✓	✓	✓	✓					✓	✓	✓	✓
Botanical survey using fixed quadrat points (target 5-9 species per $1m^2$) undertaken May-July **Years 22 / 24 / 26 / 28 / 30**					✓	✓	✓					
Cut and collect/bale of the grassland areas should be undertaken after July 16 of each year to reduce the nutrient levels within the soil and aid seed dispersal on site.							✓	✓				
Remove Himalayan balsam by pulling annually when present						✓	✓					
Monitor % cover of noxious weeds e.g., creeping thistle				✓			✓					
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate*				✓	✓							
Monitor scrub e.g., self-set birch, sycamore, willow, bramble annually				✓								
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other suitable treatment*	✓	✓								✓	✓	✓
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
Soil analysis undertaken during and month **Year 30** to inform management of flora species habitats												
Collect monthly rainfall data from Rainfall and river flow: weekly reports for England - GOV.UK (www.gov.uk)				✓								
Monitor water table levels using on site dipwell data quarterly (loggers set to record hourly)	✓			✓				✓				✓
Monitor river levels annually using EA (Upstream – downstream Dearne at Barnsley Weir / Cundy Cross / Darton) annually				✓								
Undertake WeBs survey **bi-annually** following BTO methods	✓	✓	✓	✓					✓	✓	✓	✓

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.
You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Habitat enhancement plan SM2

Habitat parcel	Area (ha)	Starting habitat type	Starting distinctiveness	Starting condition	Target habitat type	Target distinctiveness	Target condition	Time remaining to target
SM2	0.11	Grassland: Floodplain wetland mosaic (CFGM)	High	Poor	Grassland: Floodplain wetland mosaic (CFGM)	High	Moderate	10

Initial habitat enhancement SM2

Management activity	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Year 1 SM2												
Remove Himalayan balsam by pulling (YWT)						✓	✓	✓				
Install screening into water course to prevent mobilisation of silt downstream whilst allowing fish passage (contractor)												
Re-profile 4 no. sections of riverbank following specification from technical drawings using long reach 360 (contractor)									✓	✓		
Prepare bare ground to accept seed (contractor)									✓	✓		
Sow with Pond Edge Mixture EP1 for stabilisation of bank and increased flora diversity prior to installing coir matting (contractor)									✓	✓		
Install coir matting following instructions from supplier using wooden pegs (contractor)									✓	✓		

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You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Ongoing management SM2

Management activity SM2	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 1 - 3												
Install 3 fixed 1 x 1m quadrat points for botanical monitoring (YWT) **Year 1**				✓								
Botanical survey using fixed quadrat points (target 5-9 species per 1m^2) undertaken May-July **Year 3** Target 5-9 species per 1m^2 – indicative species for range extension include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me, gipsywort), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw.					✓	✓	✓					
Remove Himalayan balsam by pulling annually when present							✓	✓				
Monitor growth of seedling/young plants (target 5-9 species per 1m^2)					✓			✓				
Prepare ground to except seed if seedling growth is poor or bare ground exists. Reseed with Pond Edge Mixture EP1 / plug plant any bare areas of bank **Year 2** and/or **Year 3**	✓	✓								✓	✓	✓
Monitor % cover of noxious weeds e.g., creeping thistle				✓			✓					
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate				✓	✓							
Monitor scrub e.g., self-set birch, sycamore, willow, bramble annually				✓								

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.
You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Management activity SM2 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 1 - 3												
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other	✓	✓								✓	✓	✓
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
Management activity SM2	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 4 - 10												
Botanical survey using fixed quadrat points (target 5-9 species per $1m^2$) undertaken May-July **Years 4 / 6 / 8 / 10** Target 5-9 species per $1m^2$ – indicative species for range extension include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw					✓	✓	✓					
Remove Himalayan balsam by pulling annually when present							✓	✓				
Monitor % cover of noxious weed e.g., creeping thistle when area exceeds >5% of cover treat control with appropriate herbicide e.g., Clopyralid/glyphosate when required				✓			✓					

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.
You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Management activity SM2 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 4 - 10												
Monitor growth of seedling/young plants (target 5-9 species per 1m^2)				✓			✓					
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other	✓	✓								✓	✓	✓
Encroachment of competitive reed/grass species e.g., Typha/Phragmites will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation).	✓									✓	✓	✓
Year 10 provide report to BMBC planning department current condition assessment and a plan for any remedial actions which many be required to be undertaken to meet target conditions and fulfil obligations for Biodiversity Net Gain.											✓	✓
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.

You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Management activity SM2	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 11 - 20												
Botanical survey using fixed quadrat points (target 5-9 species per $1m^2$) undertaken May-July **Years 12 / 14 / 16 / 18 / 20** Target 5-9 species per $1m^2$ – indicative species for range extension include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw					✓		✓					
Remove Himalayan balsam by pulling annually when present							✓	✓				
Monitor % cover of noxious weed e.g., creeping thistle when area exceeds >5% of cover treat control with appropriate herbicide e.g. clopyralid/glyphosate when required				✓			✓					
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other	✓	✓								✓	✓	✓
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.
You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Management activity SM2	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 21 - 30												
Botanical survey using fixed quadrat points (target 5-9 species per $1m^2$) undertaken May-July **Years 22 / 24 / 26 / 28 / 30** Target 5-9 species per 1m2 – indicative species for range extension include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw					✓		✓					
Remove Himalayan balsam by pulling annually when present							✓	✓				
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other	✓	✓								✓	✓	✓
Monitor % cover of noxious weed e.g., creeping thistle when area exceeds >5% of cover treat control with appropriate herbicide e.g. Clopyralid/glyphosate when required				✓			✓					
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.
You must hold a PA1-PA6A-PA6AW to spray on or near water, always refer to the manufacturers label about suitability for the task, dilution rates, recommendations for time periods, weather conditions.

Habitat enhancement plan SM3

Habitat parcel	Total starting area (ha)	Starting habitat type	Starting distinctiveness	Starting condition	Area enhancement (ha)	Target habitat type	Target distinctiveness	Target condition	Time remaining to target condition
SM3	0.37	Wetland - Reedbed	High	Poor	0.01	Wetland - Reedbed	High	Good	7 years

Initial habitat enhancement SM3

Management activity SM3	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Year 1												
Create 5 no. shallow scrapes (contractor)									✓	✓		

Ongoing management SM3

Management activity SM3	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Years 1 - 3												
Install 2 fixed 1 x 1m quadrat points for botanical monitoring **Year 1**				✓								
Allow scrape marginal vegetation to regenerate from existing seed bank in **Years 1 and 2**				✓	✓	✓	✓	✓				
Botanical survey using fixed quadrat points (target 5-9 species per $1m^2$) undertaken May-July **Years 2 / 3**					✓	✓	✓					
If regeneration of scrape marginal flora species is unsuccessful by **Year 3** prepare sections of ground to accept seed and/or plug plants of local provenance			✓						✓			
Remove Himalayan balsam by pulling annually when present						✓	✓					
Monitor % cover of noxious weeds e.g., creeping thistle				✓			✓					
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate				✓	✓							
Monitor scrub e.g., self-set birch, sycamore, willow, bramble				✓								

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.
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Management activity SM3 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 1 - 3												
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other	✓	✓								✓	✓	✓
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
Monitor % cover of noxious weed e.g., creeping thistle when area exceeds >5% of cover treat control with appropriate herbicide e.g., clopyralid/glyphosate when required				✓			✓					
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
Management activity SM3	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 4 - 10												
Botanical survey using fixed quadrat points (target 5-9 species per $1m^2$) undertaken May-July **Years 4 / 6 / 8 / 10** Target 5-9 species per $1m^2$ – indicative species for range extension include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw					✓	✓	✓					
Remove Himalayan balsam by pulling annually when present						✓	✓					
Monitor % cover of noxious weeds e.g., creeping thistle				✓			✓					
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate				✓	✓							

*Spraying near or in water please should be done as a last resort and may require an application to the EA Layout 1 (publishing.service.gov.uk) prior to work commencing.
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Management activity SM3 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 4 - 10												
Monitor scrub e.g., self-set birch, sycamore, willow, bramble				✓								
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other	✓	✓								✓	✓	✓
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
Year 7 provide report to BMBC planning department current condition assessment and a plan for any remedial actions which many be required to be undertaken to meet target conditions and fulfil obligations for Biodiversity Net Gain.											✓	✓
Management activity SM3	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 11 - 20												
Botanical survey using fixed quadrat points (target 5-9 species per $1m^2$) undertaken May-July **Years 12 / 14 / 16 / 18 / 20** Target 5-9 species per $1m^2$ – indicative species for range extension include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw					✓	✓	✓					
Remove Himalayan balsam by pulling annually when present						✓	✓					
Monitor % cover of noxious weeds e.g., creeping thistle				✓			✓					
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate				✓	✓							
Monitor scrub e.g., self-set birch, sycamore, willow, bramble				✓								
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other	✓	✓								✓	✓	✓

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Management activity SM3 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Year 11 - 20												
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
Management activity SM3	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Year 21 - 30												
Botanical survey using fixed quadrat points (target 5-9 species per 1m^2) undertaken May-July **Years 12 / 14 / 16 / 18 / 20** Target 5-9 species per 1m^2 – indicative species for range extension include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw					✓	✓	✓					
Remove Himalayan balsam by pulling annually when present						✓	✓					
Monitor % cover of noxious weeds e.g., creeping thistle				✓			✓					
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate				✓	✓							
Monitor scrub e.g., self-set birch, sycamore, willow, bramble				✓								
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other	✓	✓								✓	✓	✓

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Management activity SM3 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Year 21 - 30												
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓

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Habitat enhancement plan SM4

Habitat parcel	Total starting area (ha)	Starting habitat type	Starting distinctiveness	Starting condition	Area enhancement (ha)	Target habitat type	Target distinctiveness	Target condition	Time remaining to target condition
SM4	0.47	Wetland - Reedbed	High	Poor	0.03	Wetland - Reedbed	High	Good	7 years

Initial habitat enhancement SM4

Management activity SM4	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Year 1												
Create section of 1 no. shallow scrapes (contractor)									✓	✓		

Ongoing management SM4

Management activity SM3	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Years 1 - 3												
Install 1 fixed 1 x 1m quadrat points for botanical monitoring (YWT) **Year 1**				✓								
Allow scrape marginal vegetation to regenerate from existing seed bank				✓	✓	✓	✓	✓				
Botanical survey using fixed quadrat points (target 5-9 species per 1m^2) undertaken May-July **Years 2 and 3**					✓	✓	✓					
If regeneration of scrape marginal flora species is unsuccessful by **Year 3** prepare sections of ground to accept seed / plug plants of local provenance			✓						✓			
Remove Himalayan balsam by pulling annually when present						✓	✓					
Monitor % cover of noxious weeds e.g., creeping thistle				✓			✓					
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate				✓	✓							

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Management activity SM3 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 1 - 3												
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
Monitor scrub e.g., self-set birch, sycamore, willow, bramble				✓								
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other	✓	✓								✓	✓	✓
Management activity SM4	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 4 - 10												
Botanical survey using fixed quadrat points (target 5-9 species per $1m^2$) undertaken May-July **Years 4 / 6 / 8 / 10** Target 5-9 species per $1m^2$ – indicative species for range extension include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw					✓	✓	✓					
Remove Himalayan balsam by pulling annually when present						✓	✓					
Monitor % cover of noxious weeds e.g., creeping thistle				✓			✓					
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate				✓	✓							
Monitor scrub e.g., self-set birch, sycamore, willow, bramble				✓								
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other	✓	✓								✓	✓	✓

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Management activity SM4 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 4 - 10												
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
Year 7 provide report to BMBC planning department current condition assessment and a plan for any remedial actions which many be required to be undertaken to meet target conditions and fulfil obligations for Biodiversity Net Gain.											✓	✓
Management activity SM4	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Year 11 - 20												
Botanical survey using fixed quadrat points (target 5-9 species per $1m^2$) undertaken May-July **Years 12 / 14 / 16 / 18 / 20** Target 5-9 species per $1m^2$ – indicative species for range extension include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw					✓	✓	✓					
Remove Himalayan balsam by pulling annually when present						✓	✓					
Monitor % cover of noxious weeds e.g., creeping thistle				✓			✓					
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate				✓	✓							
Monitor scrub e.g., self-set birch, sycamore, willow, bramble				✓								
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other	✓	✓								✓	✓	✓

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Management activity SM4 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 4 - 10												
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓
Management activity SM4	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 21 - 30												
Botanical survey using fixed quadrat points (target 5-9 species per $1m^2$) undertaken May-July **Years 12 / 14 / 16 / 18 / 20** Target 5-9 species per $1m^2$ – indicative species for range extension include local rush (blunt-flowered and jointed), sedge (brown, false fox and lesser pond sedge) and grasses (flote-grass, reed sweet-grass) marginal plants along scrapes and ponds (celery-leaved buttercup, lesser water parsnip, fools watercress, brooklime, water plantain, water mint, water forget-me), extending the range of species on site inc. greater burnet, skullcap, black knapweed, greater birds-foot trefoil, marsh bedstraw					✓	✓	✓					
Remove Himalayan balsam by pulling annually when present						✓	✓					
Monitor % cover of noxious weeds e.g., creeping thistle				✓			✓					
If noxious weed species exceed >5% cover control with appropriate herbicide e.g., clopyralid/glyphosate				✓	✓							
Monitor scrub e.g., self-set birch, sycamore, willow, bramble				✓								
If scrub exceeds 5-15% of area cut and removal of brash with treatment of stumps using glyphosate or other	✓	✓								✓	✓	

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Management activity SM4 continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Years 21 - 30												
Encroachment of competitive reed/grass species will be monitored and controlled to 25% of the total area by a programme of cut and removal (**Winter cutting** of reed will maintain its dominance. **Summer cutting** to reduce reed competitive ability, allowing more diverse mix of vegetation – this work should be undertaken with hand tools e.g., brushcutter/scythe.	✓	✓								✓	✓	✓

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Habitat enhancement plan R1

Habitat parcel	Length	Starting habitat type	Starting distinctiveness	Starting condition	Length restoration (km)	Target condition
R1	0.32	Other priority habitat: rivers	Very High	Moderate	0.16	Fairly good

Initial habitat enhancement R1

Management activity R1	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Year 1												
Remove Himalayan balsam by pulling (YWT)						✓	✓	✓				
Install screening into water course to prevent mobilisation of silt downstream whilst allowing fish passage (contractor)												
Re-profile 4 no. sections of riverbank following specification from technical drawings using long reach 360 (contractor)									✓	✓		
Prepare bare ground to accept seed (contractor)									✓	✓		
Sow with Pond Edge Mixture EP1 for stabilisation of bank and increased flora diversity prior to installing coir matting (contractor)									✓	✓		
Install coir matting following instructions from supplier using wooden pegs (contractor)									✓	✓		
Install gravel berms to specification from technical drawings (contractor)									✓	✓		

Ongoing management R1

Management activity R1	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Year 1 - 3												
Removal of large litter from channel when required	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Remove Himalayan balsam by pulling annually when present						✓	✓					

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Management activity R1 - continued	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Year 4 - 10												
Removal of large litter from channel when required	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Remove Himalayan balsam by pulling annually when present						✓	✓					
Management activity R1	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Year 11 - 20												
Removal of large litter from channel when required	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Remove Himalayan balsam by pulling annually when present						✓	✓					
Management activity R1	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Year 21 - 30												
Removal of large litter from channel when required	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Remove Himalayan balsam by pulling annually when present						✓	✓					

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