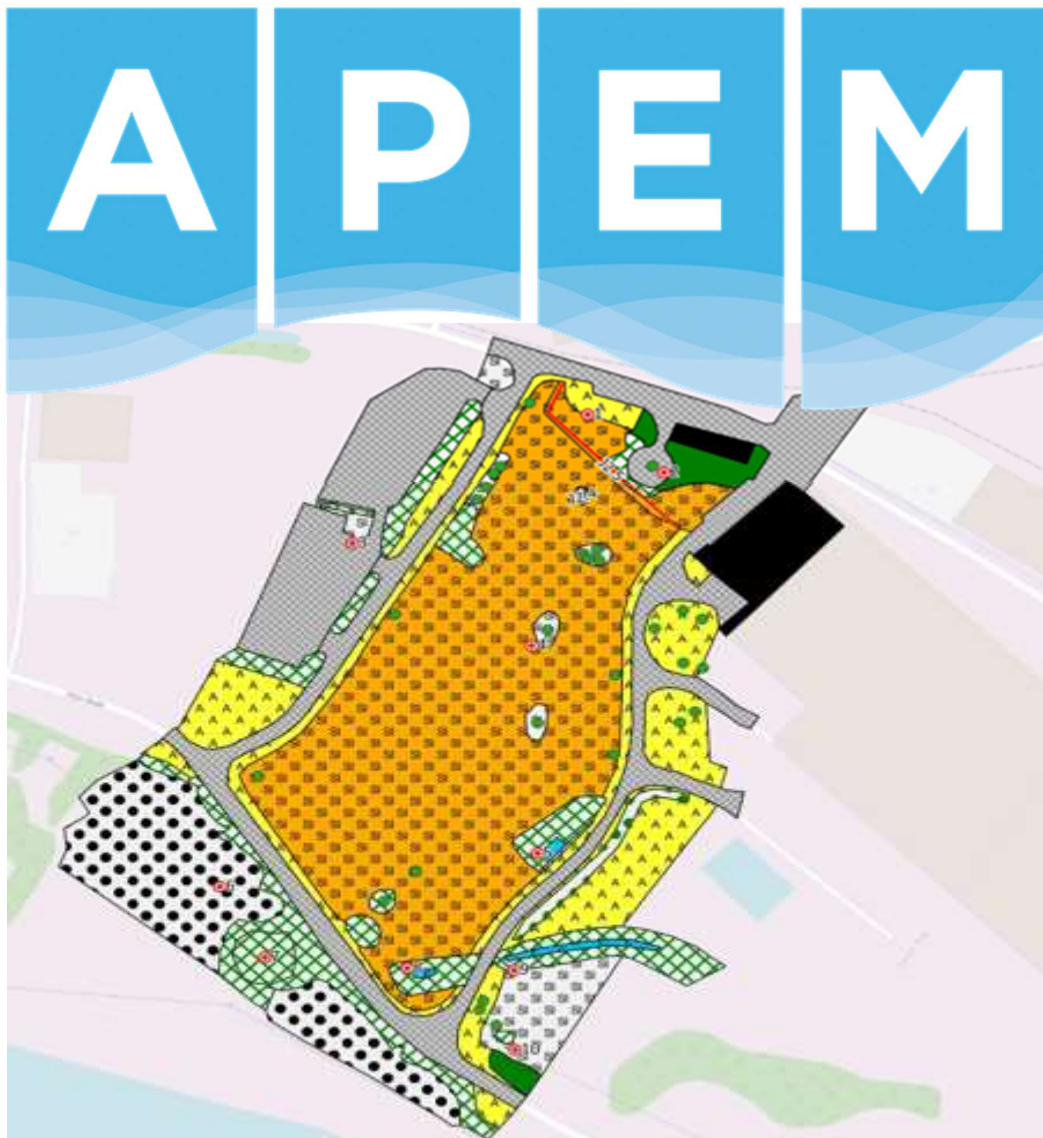




Dee Crossing Ecological Survey Report

Dŵr Cymru/Welsh Water

APEM Ref P5198

April 2021

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V3	23/04/2021	All	All	Responding to DCWW comments; including report restructuring, inclusion of birds walkover, UKHab data (AppG) and edits throughout.	Richard Wells

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1. Introduction

APEM Ltd were commissioned by Dŵr Cymru/Welsh Water (hereafter: DCWW), to carry out a series of baseline ecological surveys, in relation to a proposed new pipeline crossing of the River Dee.

1.1 Scheme overview

DCWW are proposing to install a new water main (two pipes) to increase resilience of supply between Connah's Quay and the development areas to the north of the River Dee. The route of the proposed pipeline requires a directional drill beneath the tidal River Dee.

The project "site" straddles the Dee estuary between the Shotton Tata Steel site to the north and Connah's Quay to the south (detailed layout drawing presented as Appendix A). The proposed works will involve installation of two parallel pipes via directional drilling for approximately 1km under the river (and the associated intertidal areas). The north site will be used for the drill 'exit pit' and pipe laydown (the drill will be made from south to north) and the south site will be used for the drill 'entry pit'. The route of the new pipeline is a short distance from the existing network, into which connections will be made.

Above ground, the proposed works will largely be confined to the two working compounds associated with entry (south) and exit (north) pits (Figure 1-1). Outside the compounds (and associated access roads), the main construction phase footprint will be associated with the pipe laydown area in the north (a large area is required for pipeline laydown and joining prior to pulling in) (Figure 1-1). Construction activities will operate in the region of 12 hours on site a day.

The scheme also includes an 'enhancement area' which is proposed for biodiversity net gain enhancements (Figure 1-1).

1.2 Survey overview

The following surveys were undertaken:

- A Preliminary Ecological Appraisal (PEA) of the proposed project areas (e.g. methods Section 2.1);
- Great Crested Newt (*Triturus cristatus*; GCN) Environmental DNA (eDNA) pond survey (e.g. methods Section 2.2);
- Bat transect survey of the southern area (e.g. methods Section 2.3); and
- Wintering birds walkover survey (e.g. methods Section 2.4).

1.3 Site overview

For the purposes of this report, the site is delineated into the following areas (as shown on Figure 1-1 and introduced in the following sections):

- North working area;
- South working area;
- Enhancement area;
- Pipe laydown area.

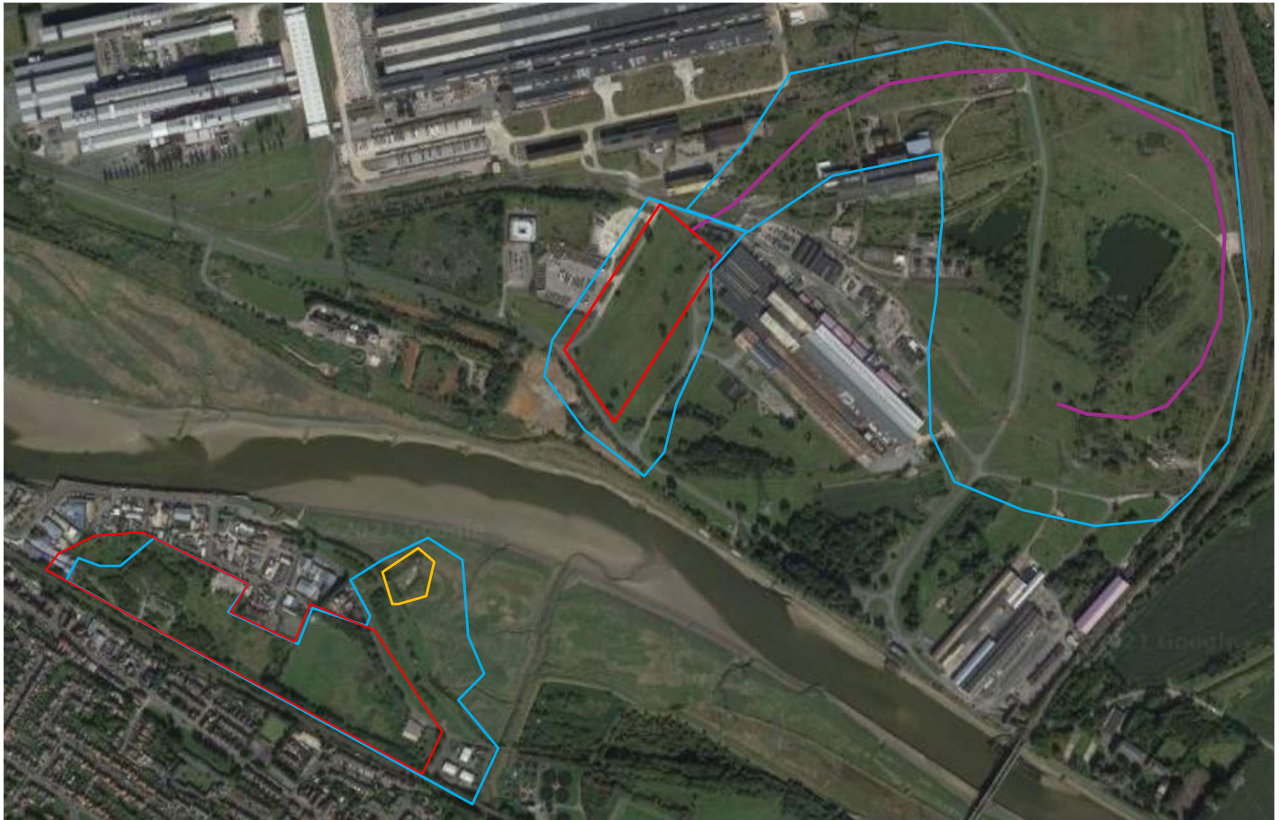


Figure 1-1 Aerial Photograph showing ecological survey extent (PEA) outlined in blue.

Figure notes: Red = working area excluding laydown; orange = enhancement area; purple = pipe laydown area (indicative at time of draft report)

1.3.1 North working area

The north working area lies within the grounds of the large TATA steel works on Deeside. The area is currently very open and comprised almost entirely of short, managed grassland (mostly amenity) with isolated trees, while to the south of the area is a hedgerow dividing the site from a former lagoon, now dried up and comprised of soft sand.

The area is part of the grounds of the larger steelworks complex and is entirely surrounded, either by areas of similar short, managed amenity grassland, or hardstanding and industrial buildings. Connectivity to areas of more ecological interest is limited, but a hedgerow running

along the northern coast of the Dee estuary does link to some larger areas of woodland and scrub to the southeast and northwest, around the edges of the steelworks. The saltmarsh on the northern bank of the estuary is narrow and restricted close to the north working area.

1.3.2 South working area

The south working area comprises a strip of open brownfield land along the northern side of the North Wales Mainline railway, within Connah's Quay, Flintshire. The area currently comprises largely urban regeneration scrub and ruderal vegetation in the northwest, the area known as "Crumps yard", becoming progressively more grass dominated towards the southeast, the southwestern end comprising a managed amenity grassland sports pitch and rough grassland. The margins of the area were almost entirely made up of dense scrub with a few emergent trees.

The south working area is largely surrounded by development, with industrial units on Dock Road to the west and north, while the railway forms the southern boundary, beyond which is an urban residential area. Only the eastern boundary is substantially undeveloped, with a series of small fields to the southeast, however beyond this is further industrial development. The area is almost entirely isolated from other open habitat by the river and surrounding built up areas, however there are two narrow corridors providing some connectivity to the wider area; the river corridor and the railway line. The railway in particular forms a narrow but densely vegetated corridor connecting the site to open country with hedgerows and small wooded areas to the northwest and southeast. The river corridor is characterised by open saltmarsh habitat of varying width, with limited taller vegetation.

It is understood that a photovoltaic array (PV, or solar farm) will shortly be installed on the north-western part of the south working area on behalf of Flintshire County Council. It is likely that this work will have been carried out prior to the commencement of the DCWW scheme, (resulting in habitat changes to this part of the survey area). Survey results for the entire south working area are retained in this report for completeness, however the PV area will not form part of the proposed works area (at the time of survey of the south working area pipe laydown area had yet to be confirmed).

1.3.3 Enhancement area

The proposed enhancement area is located on the parcel of land to the north of Dock Road; Dock Road separating this land from the south working area (Figure 1-1; orange boundary). The current land-use is managed meadow grassland with sharply defined areas of dense scrub, generally under 4m tall. The northern boundary of this zone runs along the top of a flood defence earthwork separating the scrub and grassland zone from the large open saltmarsh to the north (southern bank of the Dee estuary), which is dominated by grasses.

The proposed enhancement area is currently characterised by an elevated earth and sand embankment, approximately 1.5 - 2m above the surrounding ground level. The embankment is surrounded by tall grassland and bramble scrub and topped with gravel (and some concrete structures). The area is becoming progressively covered over with scrub and shrubs, though this has yet to become dense and gravel is largely still visible

1.3.4 *Pipe laydown area*

The proposed pipe laydown area lies adjacent to the north working area, also within the grounds of the TATA steel works. The area is very open, but less intensely managed than the north working area, comprising semi-improved neutral rough grassland and scattered and dense scrub, along with roads, rails and buildings. The grassland is intensively managed along the road verges and near buildings; being cut very short here, but is otherwise of mid length, between 0.2 and 0.5m. The rough grassland is evidently managed to prevent scrub encroachment; though some large areas are becoming overgrown with dense scrub of bramble, roses and small trees. The area contains two large ponds which are stocked with fish by a local angling group, and some small woodland fragments.

The pipe laydown area is surrounded to the north, south and west by similar works areas of grassland, hardstanding and industrial buildings. The eastern boundary is formed by a railway corridor. Connectivity to areas of more ecological interest is principally via the railway corridor to the east, which contains stands of dense scrub surrounded by open ground around the tracks.

2. Methodology

2.1 Preliminary Ecological Appraisal Method

The survey comprised a Preliminary Ecological Appraisal (hereafter: PEA) carried out to EcIA standard following the standard CIEEM guidance on Ecological Impact assessment (CIEEM 2018). The PEA included a desk study of local ecological records and Phase 1 habitat surveys. The surveys were carried out on behalf of APEM Ltd by Tim Yardley ACIEEM of Enfys Ecology Ltd., a suitably experienced, professional ecologist.

2.1.1 Desk Study Method

The desk study comprised a consultation with Cofnod, the local environmental record centre for North Wales, accessed via Aderyn, the Welsh Local Environmental Record Centre (LERC) partnership. The purpose of the desk study was to determine the presence of statutory and non-statutory sites for nature conservation, and obtain records of protected, notable, or (formerly) Biodiversity Action Plan (BAP) species and habitats from within and surrounding the areas of interest (a 2km search radius was applied). The records were used to inform the survey and recommendations, and to provide context for evaluating the species and habitats found during the survey.

2.1.2 Habitat Surveys Method

The purpose of the habitat surveys was to gain baseline ecological data on the species and habitats present on the site, identify the requirement for further protected species surveys, identify any potential ecological constraints to potential development or, equally, enhancement of the site, or surrounding area. Where necessary, suitable general mitigation and/or compensation strategies for these issues are recommended as appropriate (Section 6). Whilst APEM were not commissioned to undertake a BNG assessment, habitats have been classified according to the UKHab classification process (in addition to Phase 1) to aid any future BNG assessment; UKHab data is provided in Appendix G.

Surveys were conducted by an experienced ecologist walking over the site and (where access permitted) immediately adjacent areas. All habitat types on site were visited. Notes were taken on the habitat types present and their suitability for protected species, and target notes were used to record any habitats or features of particular note, following the standard methodology (JNCC 2010). A list of plant species encountered was recorded. Notes were taken where needed, to allow classification under UK habitat classification (UK habitat working group 2018), should this be required for future biodiversity net gain assessment.

A search for evidence of and/or habitat suitability for protected species was carried out, including amphibians (including great crested newt, bats, and reptiles. Evidence of badgers (*Meles meles*) including setts, dung pits, hairs, footprints, and scratching posts or trees was searched for. Trees with suitable features for roosting bats, including knot holes and other crevices, hollow trunks and dense ivy coverage were identified, and potential habitat features for protected species were identified.

Where accessible, a somewhat wider area than the proposed development area was mapped (and surveyed), this was to ensure that all possible areas which may be affected were

captured as the development area boundaries do not always coincide with ground features, and that any protected species which may be close enough to the site to be disturbed by the works were identified. The survey therefore examined at least 30m beyond the site boundaries where this was possible.

No redline boundary was provided for the pipe layout area, so the proposed route was surveyed along with a 30m 'buffer' either side to ensure sufficient area around the pipe layout area was captured. The surveyed buffer could not be extended to 30m in the north eastern corner due to lack of access (to a railway corridor), these areas were viewed from the site.

Table 2-1 presents the dates and survey conditions for the habitat surveys undertaken. Habitats and species found within a discrete area of land are obviously subject to change; this report should therefore be considered valid for a period of two years (from September 2020) in accordance with best practice.

Table 2-1: Habitat survey dates and survey conditions

Area	Date	Conditions	Data reliability (given date, conditions and limitations**)
South working area	27/08/20	Generally dry and overcast, but warm. Heavy rain eventually set in late in the day.	Reliable baseline assessment of sites and habitats.
Enhancement area			Reliable baseline assessment of sites and habitats.
North working area	14/09/20	Clear and dry	Reliable baseline assessment of sites and habitats.
Pipe laydown area	11/01/21	Cold and overcast; dry except for a short period of very light rain.	Reliable baseline assessment of sites and habitats*.

Table notes: *January survey conducted outside of the optimal survey window however, the nature of the habitats and relatively low botanical diversity across the site, means that this was not considered to be a significant constraint. ** limitations, c.f. 'Habitat survey limitations' section below.

Habitat survey limitations

As with a survey of any site of this size, it was not possible to visit every square metre of the site or examine every stretch of ground in detail, but the entire area was walked over and representative areas of each habitat, including all features of ecological interest encountered, e.g. ponds were examined in detail. Five particular areas were inaccessible:

- The far north-western end of the south working area (as shown on Figure 1-1) was outside the ownership of Flintshire council – who provided access to the remainder of the area – and was fenced off from the rest of the site. This area was partially visible via a fence and has been assessed on this basis. As noted above this area will now form part of the planned PV development and will not form part of the final south working area.
- A strip crossing the central part of the south working area was fenced off from both ends by an impenetrable wire fence. This area was however fully visible from both east

and west, and has been assessed on that basis. Note also that final scheme design involves pipe laydown north of the river so works are unlikely to take place on this area.

- The site contained numerous areas of dense scrub, some of which was completely impenetrable despite protective clothing. This included the centre of the north-western end of the south working area, and most of the scrub patches in the northeast of this area, adjacent to the saltmarsh. These areas were viewed from the periphery.
- The railway corridor forming the southern site boundary (south working area) was generally not visible from the site except in a few areas where there were gaps in the scrub, or from a public footpath that crosses the line in the southeast.
- A buffer of at least 30m, if not more, was generally assessed around the pipe laydown route, however the route passed close to (within 10m of) inaccessible areas in the northeast and east. These could not be accessed as both were outside the ownership of TATA steel, and the eastern boundary is a working railway line. These areas were viewed from the site wherever possible and it is not thought likely that any significant features were missed.

It is therefore possible that individual plants and animal species present may have been missed within these 5 areas, especially if only present in very low numbers, but abundant, visible species were recorded and the survey is considered appropriate for a baseline overview of the site and assessment of the habitats present and ecological value therein.

The results of these surveys consist only of those species encountered during a short space of time during each survey visit. Species that use the site infrequently or at different times of the year may not be recorded, and the absence of species from the results of a single survey should not be taken as indicating species definitive absence from the area in question. Descriptions of plant species concentrate on the most obvious and abundant species present as determinants of the habitats present. Where possible, an attempt has been made to list all plant species, but this is not exhaustive (particularly in January). Any rare or notable protected or invasive species observed are highlighted.

2.2 Great Crested Newt Survey Method

2.2.1 Survey scope

Environmental DNA (eDNA) surveys for great crested newt (GCN) were undertaken in June 2020 at accessible ponds within 250 m of the north and south working areas, to provide an updated baseline of great crested newt status adjacent to the site. The survey aims were to:

- determine the presence or likely absence of GCN; and
- identify any potential constraints that GCN may pose to the delivery of the proposed development, including any requirement for mitigation or licencing.

2.2.2 GCN Survey Method - Desk Study

Aderyn was asked to provide records of non-statutory designated sites and records of protected and notable species within 2 km of the working area boundaries in June 2020. Results presented within wider desk study discussions (Section 3.2.1).

Aerial photographs and mapping (Bing Maps, accessed June 2020) of the site and its surroundings were reviewed to identify ponds within 250 m of the working areas and assess

the landscape context of the site. The proposed project is unlikely to affect GCN populations outside of the site boundary, and the site has very little suitable terrestrial habitat for GCN. For these reasons, ponds beyond 250 m were excluded from the desk study and from further survey.

Background information on the site and wider ecological context was also collected. This included a review of survey reports produced by Arcadis in 2017 covering previous site layouts.

2.2.3 GCN Survey Method – Field Survey

Habitat Suitability Index survey

A GCN Habitat Suitability Index (HSI) score was derived by applying a scoring system developed by the Herpetological Conservation Trust (ARG UK, 2010). The suitability index is calculated by allocating scores to features associated with each waterbody; these include size, water quality and macrophyte cover. These scores are then used to calculate the overall HSI for each waterbody as a number between 0 and 1, with 0 being the least suitable and 1 being the most suitable.

The HSI score allows each pond to be placed in one of five categories defining its suitability for GCN as follows:

- <0.5 = poor
- 0.5-0.59 = below average
- 0.6-0.69 = average
- 0.7-0.79 = good
- >0.8 = excellent

The location of the ponds surveyed is provided in Table 2-2 below and a pond location figure presented as Appendix E.

Table 2-2: Pond locations

Pond Reference	Pond Name	NGR
1	Effluent Ditch – TATA Steel	SJ 29797 70188
2	Fishing Lake – TATA Steel	SJ 31077 70277
3	Old No.3 Res.- TATA Steel (accessible)	SJ 30643 70033
4	Old No.3 Res -. TATA Steel (inaccessible)	SJ 30659 70018
5	Woodland Ditch – TATA Steel	SJ 30600 69981
6	Lagoon 34 – TATA Steel	SJ 30887 69845
7	South Western Pond	SJ 30116 69757

eDNA survey

Ponds were surveyed on 30 June 2020 using an eDNA sampling technique in accordance with the published methods (Williams, 2013) presented in DEFRA's Technical Advice Note WC1067 (Biggs *et al.* 2014). The weather had been suitable for the GCN survey throughout the two week period prior to the sample day (i.e. overnight temperatures generally above 5°C).

Water samples were sent to SureScreen Scientifics for analysis in line with the protocol stated in DEFRA WC1067 (Biggs *et al.*, 2014).

2.2.4 GCN Survey Limitations

Some ponds were dry and therefore not tested. The ponds were not accessible around the entirety of their perimeters due to steep sloping sides and in some cases dense vegetation. The percentage of the pond perimeter surveyed is recorded and sent off with the samples so that this can be taken into consideration when the samples are analysed.

There were two water tanks to the east of the north working area boundary. The eastern most of these tanks was not accessible as the water was out of reach and there was no safe way to access it. This is not considered to be a significant constraint to the survey however as the western tank could be accessed and sampled.

2.3 Bat Survey Method

To understand how bats may be using the site, a walked transect survey was undertaken on part of the southern site, based on habitat suitability identified in the habitat survey. The requirements for a bat survey were scoped during early scheme design; it is notable that the pipe laydown and entry pit are now confirmed to the north of the river which reduces the footprint and scale of activities in the south working area, therefore the requirements for a bat survey may not have been deemed essential in hindsight.

The survey was carried out following the guidelines set by the Bat Conservation Trust Good Practice Guidelines (Collins, 2016). It comprised a walked transect along a pre-determined route, with a series of static listening points. The transect was walked at a constant speed where possible, with a one-minute walk, followed by a three-minute stop. Records were made of activity and species of bats, during both the walk and the stops. An Anabat Scout was used to detect the calls and to also record any activity for further analysis, if required.

Although the transect route predominantly followed the internal edge of the site boundary, covering a variety of habitats including hedgerow and scrub vegetation, the main focus was on the southern boundary hedgerow, which was identified (during habitat survey) as highly suitable for bats.

The bat activity survey was undertaken by Lucy Boyett and Keymar Wake (both accredited agents on NRW licence S086391-1) on 22/09/2020, and began at sunset, continuing until approximately two hours after sunset.

Part of the area has been previously surveyed by Arcadis in 2017 (Ellis, 2017). This survey covered only the southwestern end of the south working area, including a phase 1 habitat survey and protected species survey. The present survey serves partly as an update to this survey but covers a much enlarged area reflecting the expanded scope of the scheme (at time of survey).

2.3.1 Bat survey conditions

The bat survey took place in September, which is outside the generally accepted survey season for an initial survey for bats, (Collins, 2016), however surveys at this time of year are still acceptable practice provided conditions are appropriate. Frequent bat activity was recorded indicating that bats were still very active. The survey is considered a valid and accurate picture of bat activity in the area in September 2020.

2.4 Wintering Birds Walkover Method

2.4.1 Wintering birds survey scope considerations

The PEA review of designations and habitats (see e.g. Figure 4-1) identified that the proposed enhancement area overlaps with the Dee Estuary Special Protection Area (SPA). The Dee Estuary SPA is a designated site due to its importance for wintering waterbirds due to the intertidal flats, saltmarshes and fringing habitats, including coastal grazing marsh/fields providing feeding and roosting sites for internationally important numbers of ducks and waders.

Consultations held in October 2018 (in support of a previous iteration of this scheme) with Natural Resources Wales (Neil Smith) and Natural England (Jed Nicholson) confirmed that overwintering birds surveys would not be required to support project assessments, rather a desktop study would suffice.

A desk-based review was conducted to determine the availability of data, specifically data available to characterise the species of bird which might occur within the proposed Enhancement Area and River Dee at this location. Most of the national survey areas of the River Dee covered by the British trust for Ornithology's (BTO) Wetland Bird Survey (WeBS) core counts are focussed on the outer estuary (e.g. Figure 2-1), where the majority of the birds associated with the Dee Estuary SPA are known to reside. This could be taken to be evidence in itself that the area of proposed works is unlikely to hold a significant assemblage of SPA birds.

Due to a lack of data publicly available for the development site, and to ensure completeness, a walkover bird survey was proposed to review what species may reside on or within close proximity to the site that may be connected to the Dee Estuary SPA.

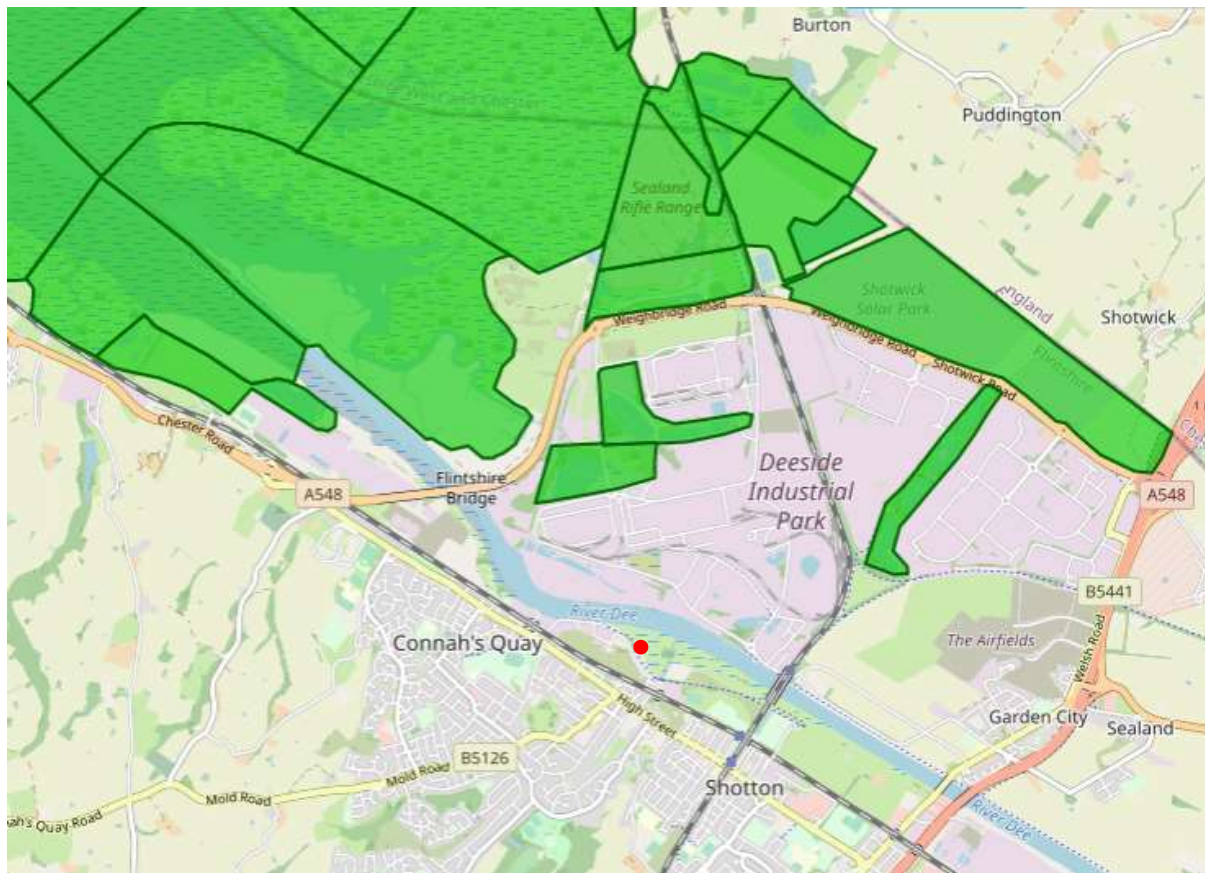


Figure 2-1 WeBS Sites in vicinity of project site

Figure notes: Red dot shows approx. location of the enhancement area. Image copied from WeBS online hosted by the BTO on behalf of the WeBS partners. ©British Trust for Ornithology.

2.4.2 Wintering birds survey methodology

A review of the potential survey methods available (Gilbert et al., 2012) for the likely species within the proposed enhancement area led to the selection of the 'total area count' method. In addition to this method surveys were undertaken during the morning and afternoon and at low and high tide to ensure that these data are representative of periods across the day and under different tidal conditions in order to observe what species may feed and / or roost here.

The survey methodology conducted was a 'total area count' of all birds present at the time of the survey, based on the WeBS Core Count Method developed by the BTO and widely applied for such data collection purposes.

The survey method included the following key components:

- Surveys were carried out when there was sufficient light to identify and count birds (between 8am and 4pm);
- All birds observed or heard within the survey boundaries (Figure 2-2) were recorded, including those flying over the site;
- Any activity that may disturb birds was also recorded;

- A specific recording form was provided that was pre-filled with the names of likely species to be encountered;
- Survey walkover route was planned that gave a complete view of the survey areas.
- Weather conditions were recorded;
- Surveys were not conducted in periods of high wind or rain as these conditions may lead to reduced bird activity and hence decreasing the likelihood of birds being recorded; and
- Any specific restrictions or access procedures set by the landowner were noted and followed.

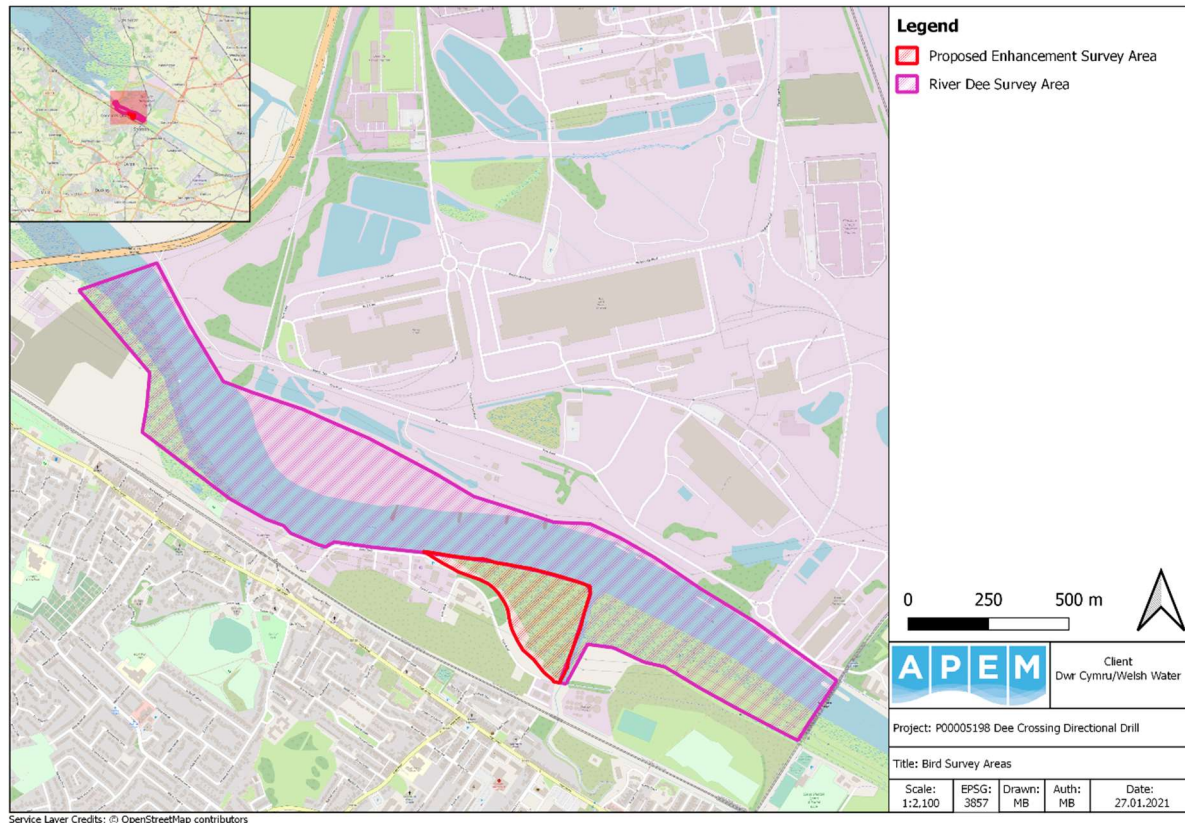


Figure 2-2 Location of the two wintering birds survey areas

Figure notes: Red line/hatching denotes the survey area surrounding the proposed Enhancement Area; the Purple line/hatching denotes the wider survey area of the adjacent River Dee.

The surveyor who undertook the survey of breeding birds held over ten years' experience of standard bird survey methods including the WeBS core count / total area mapping method that was used in the survey. The surveyor had over 15 years' experience in the identification of British birds and experience in the application of the survey techniques in professional ecological surveys designed to inform impact assessment.

2.4.3 Survey limitations

Bird surveys are by their nature a sample of the birds occurring at a site. It can be expected that, for any location, if more visits are made to survey that location then a greater number of species will be observed, larger counts of individual species will be obtained.

Bird species that are secretive or cryptic (i.e. conceal their presence while breeding) may be under-recorded. This is an inherent limitation to all bird survey methods.

Bird species that are only visible after dark or only exhibit territorial activity after dark (e.g. singing or calling) may also be under-recorded. This is an inherent limitation to all diurnal bird survey methods.

4. Results

3.1 PEA Desk Study Results: Designated sites

This section includes an overview of the results of the desk study, which were used to inform the survey and conclusions. Raw data has not been included within this report but is available on request. Aderyn returned 5,229 records of 385 species from within a 2km radius (of a point in the northern corner of the north working area).

Table 4-1 presents all designated areas (statutory and non-statutory) identified within 2km of the site. Figure 4-1 presents those protected sites overlapping the site.

Table 4-1: Designated sites within 2km of the site

Distance	Site ¹	Designation	Statutory?	Site Name
0	S	Sites of Special Scientific Interest	Yes	Dee Estuary
0	S	Special Areas of Conservation	Yes	Dee Estuary
0	S	Wetland of International importance (Ramsar site)	Yes	The Dee Estuary
0	S	Special Protection Area	No	The Dee Estuary
0	S	NRW Priority Area	No	Saltmarsh habitats
0	S	Local wildlife Site (LWS) (also known as SINC)	Yes	The river Dee
70	N&S	Special Areas of Conservation	Yes	River Dee and Bala Lake
70	N&S	Sites of Special Scientific Interest	No	Afon Dyfrydwy (river Dee)
350 Northwest	PL	Local wildlife Site (LWS) (also known as SINC)	No	Shotton Steelworks

Distance	Site ¹	Designation	Statutory?	Site Name
850m West	N	National Nature Reserves	Yes	Shotton Lagoons and Reedbeds
870m south	S	Ancient Woodland Site	No	Ancient woodland site have no specific protection but are listed in the Natural Resources Wales (NRW) ancient woodland database as areas of woodland believed to be over 400 years old.
880m South	S	Sites of Special Scientific Interest	No	Connah's Quay ponds and Woodland
880m South	S	Special Areas of Conservation	No	Deeside and Buckley Newt Sites
1.38km northwest	S	RSPB Reserve	No	Dee Estuary

Table notes: 1=The closest works area to the protected site is listed here, directions given in the distance column also refer to the direction relative to this site: N: north working area, S: south working area, PL: Pipe laydown area. Two sites are essentially equidistant (70m) from north and south sites.

3.1.1 PEA Desk Study Results: Statutory protected sites

The data search returned records of eight statutory protected sites (of ecological relevance) within 2km (Table 4-1), the closest of which are the (overlapping) Dee Estuary Special Area of Conservation (SAC), Dee Estuary Special Protection Area (SPA), Dee Estuary Site of Special Scientific Interest (SSSI), and Dee Estuary Wetland of International Importance (RAMSAR Site): all of which cover the River Dee saltmarsh area up to the line of the flood defence embankment within their boundaries, therefore the proposed enhancement site lies within all three protected areas. The River Dee SSSI and the River Dee and Bala Lake SAC also cover the river up to the high tide mark, and so lie about 70m from the closest point of the working areas in the north and south. All of these sites cover a wide area and so also include substantial areas of the estuary away from the project site (generally to the northwest).

3.1.2 PEA Desk Study Results: Non-statutory sites

The search returned records of five non-statutory protected sites within the search area (Table 4-1) including two Flintshire Local Wildlife Sites (LWS), a RSPB reserve, NRW Ancient woodland site and NRW Priority area. The closest of these to the site are the River Dee local wildlife site (LWS) and the Dee estuary NRW priority area (coastal saltmarsh), both of which overlap the South working area. The river Dee LWS includes the band of land on top of the flood defence barrier, between the south working area and the proposed enhancement area, while the entire South working area and extreme southern end of the North working area lie within the NRW priority area for saltmarsh habitat, (however in reality saltmarsh habitat is restricted to the area that is river side of the flood defence barriers).

The pipe laydown route is approximately 350m from the Shotton Steelworks LWS to the northwest at its closest point, and is separated by large industrial buildings, short grassland and hardstanding.

3.1.3 Relation to the works areas

Figure 4-1 presents those protected sites overlapping the site.



Figure 4-1 Protected sites overlapping the site.

Figure notes: The approximate works areas are outlined in red. Sites are numbered in yellow: Magenta: Statutory sites, Blue: Non-statutory. 1. Dee Estuary Special Area of Conservation (SPA), Dee Estuary Special Protection Area (SPA), Dee Estuary Site of Special Scientific Interest (SSSI), and Dee Estuary Wetland of International Importance (RAMSAR Site). Not shown – River Dee SSSI (Occupies the river area in the centre only). 2. The River Dee LWS (non statutory). 3. (outer blue lines) NRW Priority area for saltmarsh habitats. The pipe laydown area (not shown) does not overlap with any protected sites. Image © Aderyn.

All the statutory designated sites within 500m of the site (all areas) cover the same area, either the River Dee or the saltmarsh area on either bank of the estuary. As such, the only surface works area which is directly within these sites (e.g. Figure 4-1) is the proposed enhancement area north of the flood defence embankment. The route of the proposed pipeline passes beneath these designations i.e. the horizontal directional drill will pass underneath the River Dee and its estuary. The relevant sites are all designated to protect wetland and saltmarsh habitats within the estuary, or marine/estuarine (water) habitats from undue impact.

The entire South working area is within the Natural Resources Wales (NRW) priority area for saltmarsh habitat. NRW Priority habitat areas are large scale areas which were prioritised for targeted conservation work (primarily carried out by NRW), based on factors including the habitats within them. Only the saltmarsh areas are relevant to this designation, not the other habitats in the works area; there is no saltmarsh areas in the south working area (this is clearly limited to the area riverside of the flood defence embankment).

The only other protected site (non-statutory) in close proximity to the project site (Figure 4-1) is the River Dee LWS, which covers the meadow and scrub areas north of Dock Road. There

are no surface works planned in this area, although it is adjacent to both the South works area (separated by Dock Road) and the enhancement area. Local wildlife sites are areas designated by local authorities for additional wildlife protection, and may or may not be managed for biodiversity. This site is managed by Flintshire Countryside Services as a meadow and scrub nature reserve.

3.2 PEA Desk Study Results: Species

This section highlights species records of particular relevance to the proposed works, including those from within the works area. Aderyn returned very limited number of records from the areas north of the river, which is assumed to reflect limited recorder effort, the site being on private land (the TATA steelworks). (There were also a number of bird records accurate to 1km OS grid square level which overlap this area). Most of the species data below refers to the South working area, unless specified.

3.2.1 PEA Desk Study Results: Fauna

Within the South working area there are records of common lizard (*Lacerta vivipara*) adjacent to the railway line on the southern boundary, however this record dates to 1999 and therefore an up to date presence is not confirmed. There are also records of otter (*Lutra lutra*) from the River Dee, but also dating from 1999. In 2008 water vole (*Arvicola amphibious*) were recorded from the southern bank of the Dee, only 60m outside the site boundary. There are also numerous bird records from within the site. Almost all the recent records from the site are birds, recorded in 2019.

There were no records of badger (*Meles meles*), or bats within the sites, but plentiful recent badger records within the wider area, (none nearer than 100m to the site). Most are within Connah's Quay to the south. The nearest bat records are occasional roosts or sightings recorded in Connah's Quay to the south. The only records of great crested newt (*Triturus cristatus*) are from 1985, over 500m south of the site.

The data search did not return any records of GCN within 1km of the site. The nearest GCN record was 1.3 km from the site and originated from Wepre Park in Connah's Quay in 2018.

There were no species records within 50m of the pipe layout route in the northeast. There are a few records within the area enclosed by the curve of the route; all of which are invertebrates; 3 Common bumblebee species, and the aquatic snail *Physella acuta*; recorded from the large pond in the centre of this area. Badger were recorded 370m to the southeast beyond the railway corridor. Water vole were recorded at the Shotton steelworks LWS 500m to the northwest.

3.2.2 PEA Desk Study Results: Flora

There are no records of invasive non-native plants from within 2km of the survey areas. There has been a program to remove Japanese knotweed and Himalayan balsam from parts of the TATA site according to site staff (as reported by Tata staff during the survey), but this has not been recorded on the Aderyn system. However, there are records of three invasive species to the east of the pipe laydown route; Japanese knotweed (*Reynoutria japonica*) was recorded in several spots to the northeast of the northeastern corner of the area, the closest just over 200m from the route, past the railway corridor, and also 380m to the southeast. Giant

Hogweed (*Heracleum mantegazzianum*) was also recorded to the northeast, 550m away, and Himalayan balsam (*Impatiens glandulifera*) was recorded at 1km grid square level, also to the northeast.

There are a few plant records of interest from within the South working area, though none are of greater than local conservation concern (Marsh helleborine, Blue Fleabane and Fairy Flax). Similarly, the saltmarsh immediately to the north, where there are records of many seeded goosefoot, curved hard grass and strawberry clover.

3.3 PEA Survey Results: Maps and Target Notes

The following phase 1 habitat and feature types were recorded within and adjacent to the sites:

- A1.1.1 Broadleaved woodland
- A2.1 Scrub – Dense/continuous
- A2.2 Scrub – Scattered
- A 3.1 Scattered broadleaved trees
- B2.2 Semi-improved neutral grassland
- B6 Species Poor semi-improved grassland
- C3.1 – Tall Ruderal herb
- F2.1 Marginal vegetation
- G1.1 Standing water – eutrophic
- G1.2 Standing water – mesotrophic
- G1.6 Standing water – brackish
- G2.1 Running water
- H2.6 Saltmarsh – dense/continuous
- J1.2 Amenity Grassland
- J1.3 Ephemeral/short perennial vegetation
- J2.1.2 Intact hedgerow – species poor
- J2.3.2 Intact hedgerow with trees – species poor
- J2.4 Fence
- J2.5 Wall
- J2.6 Dry ditch
- J3.6 Buildings (*Also used here for standing infrastructure e.g. oil tanks, pumps*).
- J4 Bare ground
- J5 Other Habitat – *This category has been used here to represent hardstanding, (including roadways, asphalt and concrete pads devoid of vegetation) which is not a standard phase 1 habitat type.*

Phase 1 habitat maps of the site (x3 maps) and target note information are provided in this Section. In addition:

- site photographs taken at the time of survey are presented as Appendix B;
- detailed walkover notes including full description of habitats and evidence of species presence are presented as Appendix C;
- additional details of plant diversity (species lists for each habitat) are presented as Appendix D.

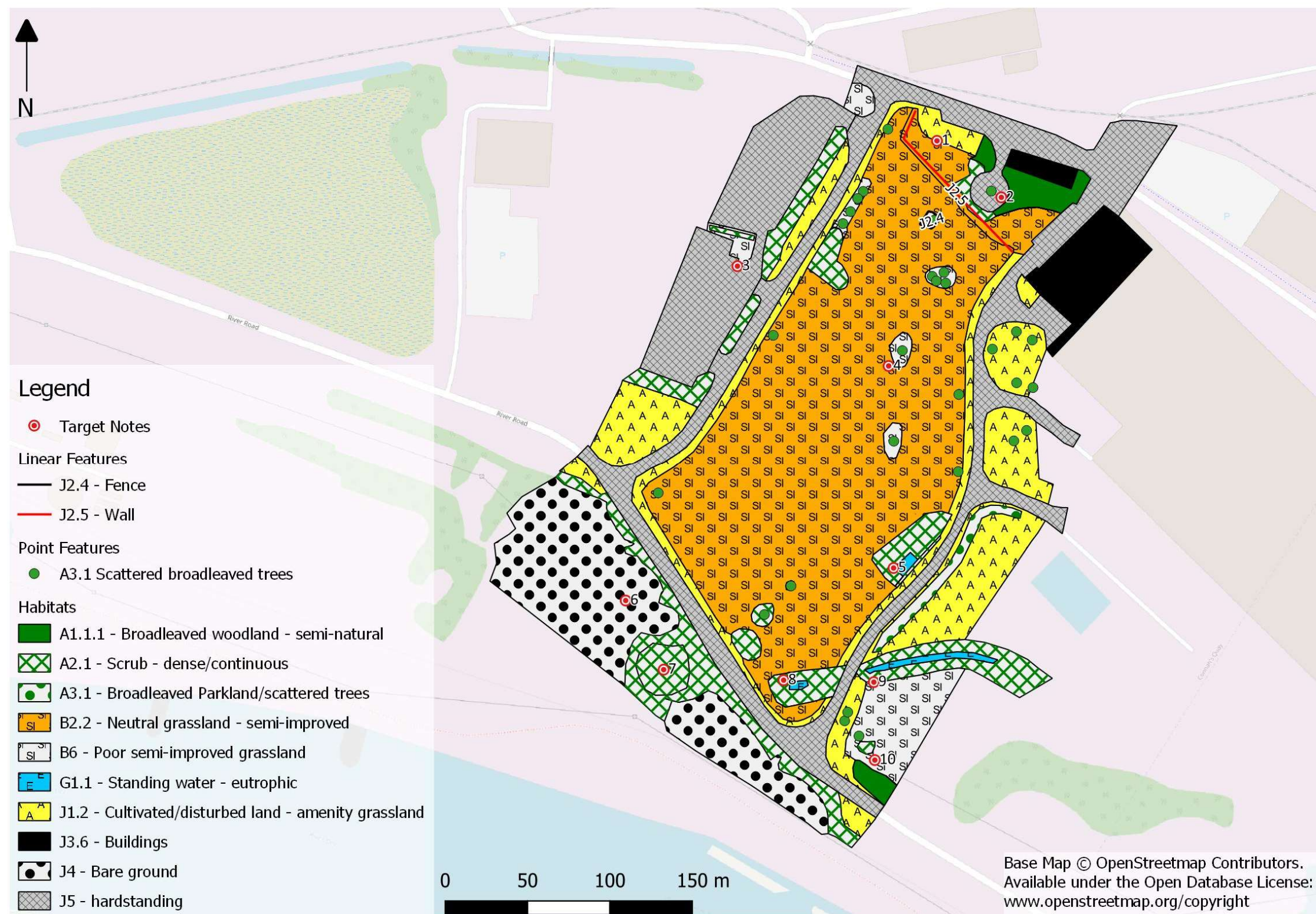


Figure 4-2 Phase 1 habitat Map of the North working area.

Table 4-2: Target Notes for the North working area

Target Note	Description	Picture
1	The margins of the central grassland were intensively managed, resulting in a strip of amenity grassland around the edge. This is most obvious in the north, pictured, where this strip is much wider. There was also some intrusion by buddleia and tall ruderals around a pipeline across the grassland.	
2	A large mature aspen (<i>Populus tremula</i>) stands in the centre of a circular hardstanding area. Obviously planted, the tree is the largest tree in the surveyed area and appears in good condition, and has no potential roosting features for bats. The surrounding scrub is dominated by buddleia and willow, with sun spurge (<i>Euphorbia helioscopia</i>) and prickly sow thistle.	
3	The westernmost areas of the site (west of the roadway) were under different ownership and not accessible. Viewed from the road, the majority of these areas was hardstanding with vegetated embankments, mostly dominated by dense, low bramble, but also with species poor (compared to the central meadow) amenity grassland. It is not thought likely that any features of ecological importance were missed.	
4	Several areas of grassland across the centre of the site were unmanaged, tall grassland, corresponding to the canopy area of several large trees, mostly sycamore, with birch and hawthorn. This grassland was dominated by grasses and notably species poorer than the surrounding areas, (though some forb species did occur).	

5	The northernmost 'pond' was a small concrete encased reservoir, netted to exclude birds, with no vegetation of any kind, save some bramble overhanging the sides. The concrete sides and netting make this inaccessible to most animal species.	
6	In the south of the site a large area is covered in soft sand, which could not be accessed safely. This area is the remains of a former lagoon, the sand contained no vegetation except isolated buddleia and thistles. The footprints of some birds could be seen, but no mammal tracks were apparent. The area apparently does not flood (pers. comm.) so something must be suppressing plant growth.	
7	An area of dense scrub beneath a pylon was dominated by dense broom (<i>Cytisus scoparius</i>), not found elsewhere on site. The dense scrub was not accessible. Animal trails led into the area but it is likely that these are due to rabbits, with frequent droppings and occasional burrows evident.	
8	The pond within dense scrub here could not be accessed and was only viewed obliquely, but was very dark, with no vegetation visible, and appeared shallow and silty. The pool is in a hollow approx. 1m deep, probably the southwestern end of a broad trench that trends northeast from this location.	

9	A disused badger sett was found at the southern edge of the scrub (SJ 30535 69969). There was only one entrance, clearly full of leaves and not currently in use, but large enough for badger and with some evidence of past digging, in a pile of soil outside the entrance. A fresh latrine was found about 2m to the south on the grassland, which had been recently used by badgers.	
10	Another potential badger sett was found to the north of the scrub here (SJ 30537 69927). This was also a single entrance of badger size, but which was blocked with leaves and partly collapsed, and probably somewhat older than that at TN 9, with no evidence of digging.	

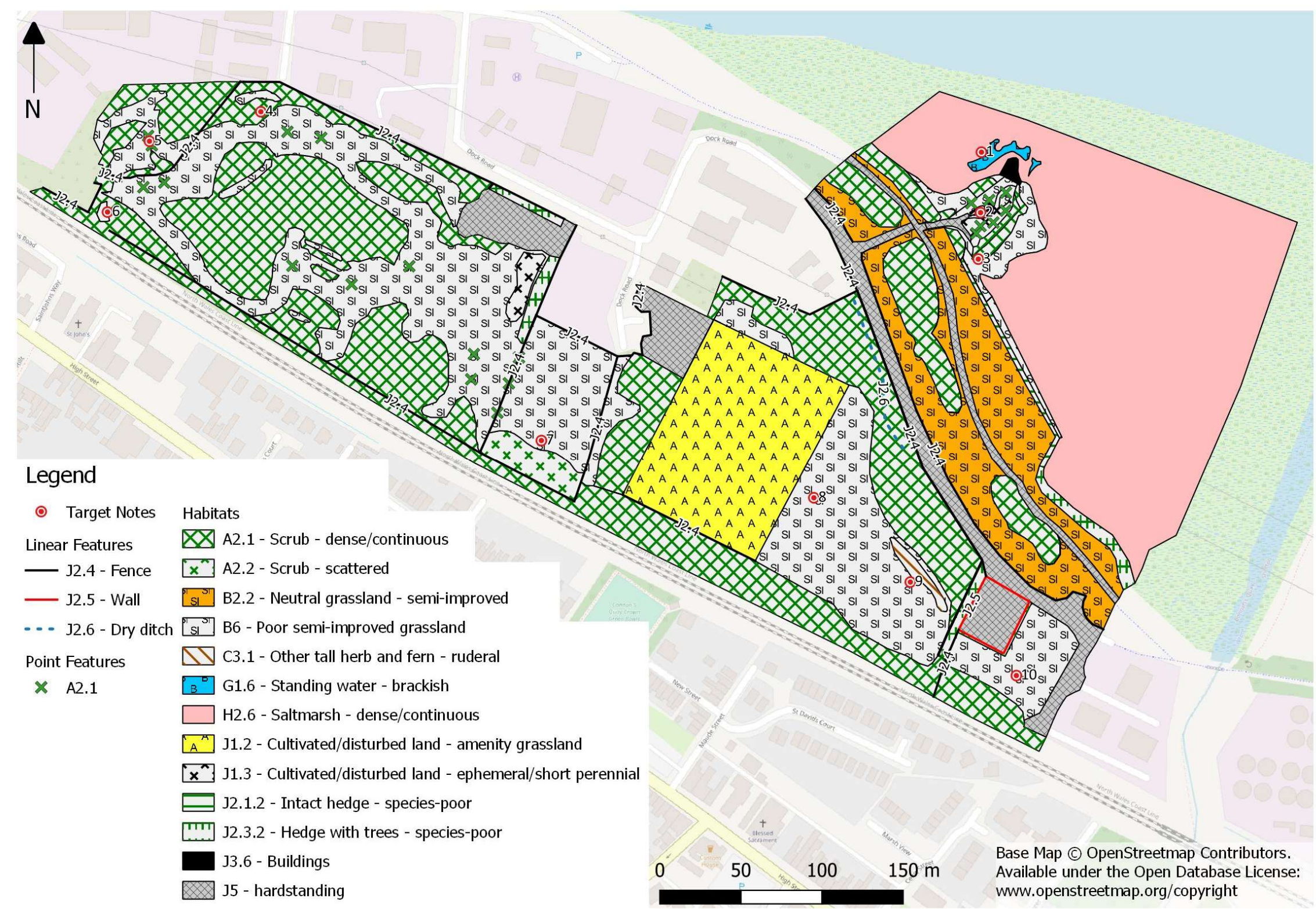


Figure 4-3 Phase 1 habitat Map of the South working area.

Table 4-3: Target Notes for the South (working area and enhancement area)

Target Note	Description	Picture
1	Two small pools within the saltmarsh were assumed to be brackish but contained dense stands of common club rush (<i>Schoenoplectus lacustris</i>) (found in freshwater). There was no other aquatic vegetation, but the surrounding vegetation contains salt tolerant species including sea aster and sea purslane, as well as terrestrial grasses.	
2	The proposed enhancement area is raised by about 1.5 to 2m above the saltmarsh surroundings. The area was originally infrastructure, and is underlaid by concrete and gravel, but is now being colonised by scrub, ruderals and grasses. Most scrub was buddleia, willowherbs were also common.	
3	A badger sett was present in the earth embankment on the south-eastern embankment of the elevated area (SJ 30106 69700). The sett had 3 entrances, one large (pictured) active entrance, with hairs, fresh footprints and spoil from recent excavation. The other two entrances were smaller, one under a large concrete block, and may represent excavation in progress. There were several obvious trails leading away from the set onto the embankment and along the hedgerow to the east, but no latrines were found.	

4	A recently used badger latrine and foraging evidence including snuffle holes and digging was found underneath birch scrub. Approximate OS Grid reference: SJ 29666 69778	
5	This area, beyond the fence, was inaccessible, being outside council ownership. It could be viewed from the south, and appeared to be a continuation of the grassland and scrub to the east. There were several piles of rubble, gravel and brash. The area appeared to contain excellent reptile habitat, with cover, open bare ground and grassland, and refugia in the rubble piles.	
6	A recently used badger latrine was found here, along with a heavily used trail leading under the scrub to the west, under the fence. Another trail ran to the southeast parallel to the railway line through the scrub.	
7	The field between the fences could not be accessed, but was fully visible from both east and west, and contained semi-improved grassland similar to that found to the west, though with continuous cover and no bare patches or scrub. The southern part of the field was completely dominated by dense but low growing bramble scrub.	

8	The proposed location for the works compound in the south was a large area of tall semi-improved grassland, dominated by grasses and relatively species poor.	
9	The area included some dense stands of tall ruderal vegetation, whereas over most of the site these species were present but distributed within the grassland. Rosebay willowherb (<i>Chamerion angustifolium</i>) was dominant, with great willowherb (<i>Epilobium hirsutum</i>), fat hen (<i>Chenopodium album</i>), hoary mustard (<i>Hirschfeldia incana</i>), green alkanet (<i>Pentaglottis sempervirens</i>), mugwort (<i>Artemisia vulgaris</i>), common nettle (<i>Urtica dioica</i>), toadflax (<i>Linaria vulgaris</i>), and Ragwort (<i>Senecio jacobaea</i>). Bramble was also abundant.	
10	The far eastern part of the site contained poor semi-improved grassland slightly more diverse than that around target note 8, with bird's foot trefoil (<i>Lotus corniculatus</i>), vetches and lady's bedstraw (<i>Galium verum</i>) as well as abundant bramble scrub, and frequent hedge bindweed (<i>Calystegia sepium</i>) and umbellifers. The southern part was being colonised by willow and birch scrub.	

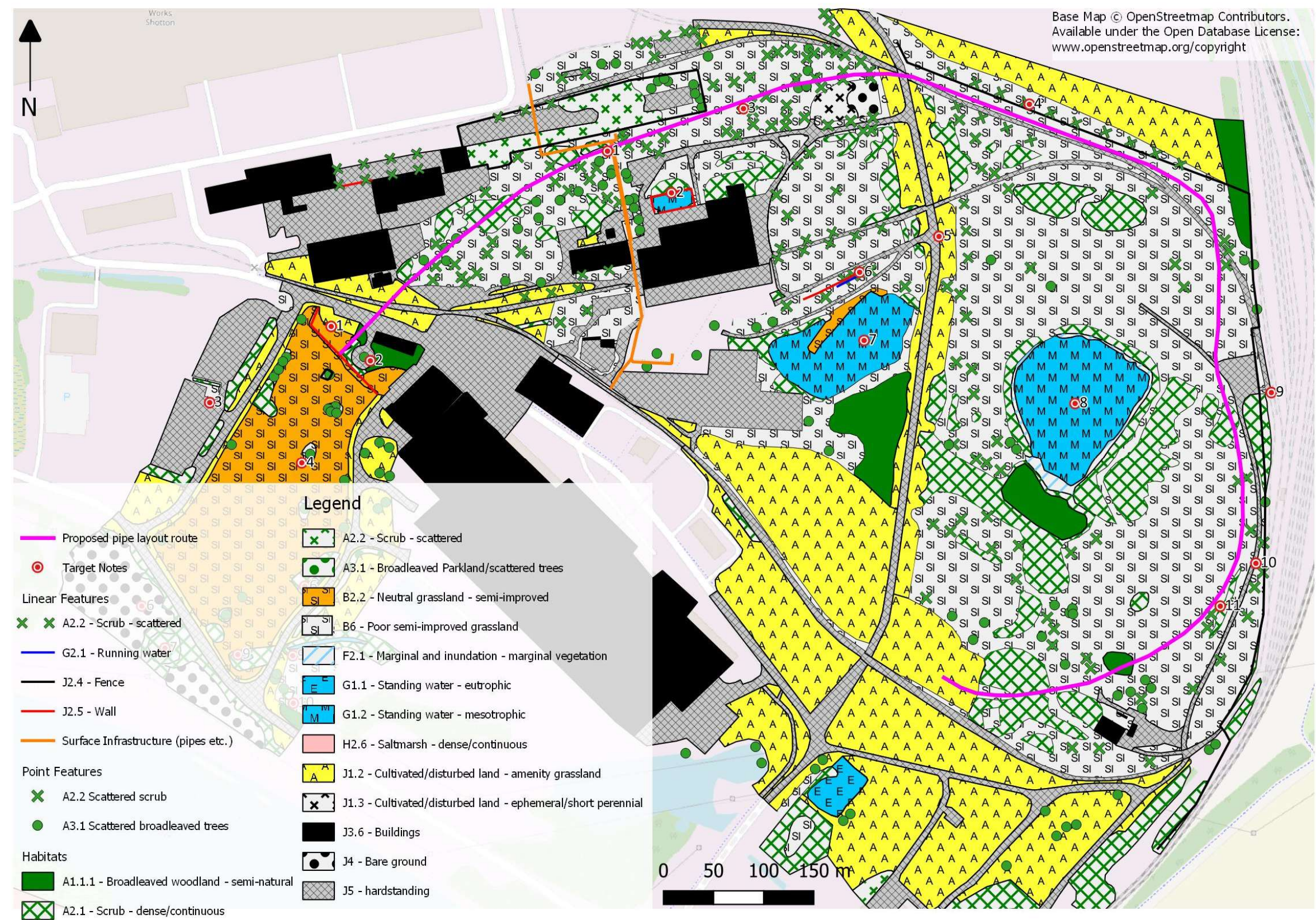


Figure 4-4 Phase 1 habitat map of the Pipe laydown area.

Table 4-4: Target Notes for the Pipe laydown area

Target Note	Description	Picture
1	The north western part of the area is crossed by numerous pipes, both above ground and buried, around which was significant evidence of digging, and numerous rabbit warrens. None of the digging was unambiguously badger, and no latrines were found. This area has the longest grass and most scrub species within the grassland. There are also several large rubble piles.	
2	A large pond has formed on the site of demolished fuel tanks, probably from rainwater. The pool was shallow (appearing under 0.4m) and had a concrete and stone base, where this was visible, and concrete walls, except to the southwest, where the water was accessible. The margins have been colonised by buddleia and cotoneaster, and a grass thought to be reed sweet-grass (<i>Glyceria maxima</i>). There was no aquatic vegetation.	
3	A pellet was found within the north-western grassland, containing the bones of small mammals. The pellet was relatively fresh. Based on its size, and location (outdoors) at the foot of a small tree this is likely to be Tawny owl (<i>Strix Aluco</i>).	
4	The areas north of the fence here are outside the ownership of TATA steel and so could not be accessed. Most of the area was visible from the fence, and comprised scattered scrub, mostly birch and hawthorn, and tree planting over a small dry ditch, with amenity grassland beyond. No evidence of badgers was seen and it is not likely that there is a sett within 30m.	

5	The site is divided in two by this central road, with very short mown amenity grassland to either side; this was species poor. The grassland to the west was much taller with more scrub scattered throughout, while areas to the east were shorter and generally open, with scrub confined to discrete stands.	
6	The two large ponds within the site are connected by an underground culvert (which apparently also connects to other waterbodies to the west). This is only visible and open to the surface at this location, and forms a steep, brick lined channel, shaded by dense scrub and with very shallow muddy water and no aquatic vegetation at the time of survey.	
7	A large pond, deep open water fringed with common reed and reedmace in dense stands. Around the edges was willow and birch scrub, plus stands of hoary mustard, meadowsweet, dense rosebay willowherb and buddleia, as well as dense bramble. No aquatic vegetation was present. This pond is stocked with fish (inc. carp) and is used as a fishing lake. No waterfowl were seen.	
8	A large pond, deep open water fringed with common reed and reedmace in dense stands. Around the edges was willow and birch scrub, with grassland species beneath. The pond has been stocked with fish (inc. carp) and is used as a fishing lake. The southern end merges into an area of very wet carr woodland to the south, dominated by birch and willow, with pools up to 0.5m deep beneath. Waterfowl were abundant, and passerine nests could be seen in several of the small trees.	

9	Immediately to the east of the site is an active railway line, which could not be accessed. (past the fence on the right in the picture). This was largely open with multiple lines, but did contain some areas of dense scrub, mostly gorse. Observed from the fence no evidence of protected species or foraging trails could be seen; the entire area within 30m of the route could not be checked. It is not thought likely that a sett is present but this cannot be definitely ruled out.	
10	The entire eastern boundary of the site, particularly by the fence but also within the grassland, contains numerous piles of rubble, brash, timber and other materials, which are good habitat for reptiles and many other small animals.	
11	The only definite evidence of badgers within the site was a single burrow (SJ 31465 70053) within a patch of scrub in the east of the site; a recently used latrine was found nearby. The burrow is large enough for badger and has a large spoil heap outside. It was also filled up with leaves and sticks (despite this not being obvious in the picture) and so did not appear to be currently active, but badgers clearly visit the area to use the latrine, and the burrow may represent an occasionally used outlier sett. The sett is in the southern end of broad strip of gorse and hawthorn scrub to the west of the road on the eastern boundary, which also contained a very large and dense stand of reed and rushes.	

3.4 GCN Survey Results

The HSI score for each pond was calculated using the ARGUK GCN HSI Calculator (Table 4-5). The HSI scores of the ponds ranged from average to poor, with the ponds with the highest suitability being the two Old No.3 Reservoirs.

Table 4-5: HSI calculation and summary scores

SI No	SI Description	Effluent Ditch - Tata Steel (1)	Fishing Lake - Tata Steel (2)	Old No.3 Res - TATA Steel (3)	INACCESSIBLE Old No.3 Res - TATA Steel (4)	Woodland Ditch - TATA steel (5)	Lagoon 34 tata Steel (6)	South Eastern Pond (7)
1	Geographic location	1	1	1	1	1	1	1
2	Pond area	0.3	0.8	0.2	0.2	0.3	0.9	0.2
3	Pond permanence	0.9	0.9	0.9	0.9	0.5	0.9	0.5
4	Water quality	0.01	0.67	1	1	0.67	0.33	0.67
5	Shade	0.6	1	1	1	0.2	1	1
6	Waterfowl	0.67	0.01	0.67	0.67	0.67	0.01	0.01
7	Fish presence	0.67	0.01	0.67	0.67	1	0.01	0.67
8	Pond density	1	1	1	1	1	1	1
9	Terrestrial habitat	0.33	0.33	0.33	0.33	0.67	0.33	0.67
10	Macrophyte cover	0.35	0.3	0.3	0.3	0.3	0.3	0.3
HSI Score		0.39	0.29	0.62	0.62	0.55	0.28	0.39
Suitability Category		Poor	Poor	Average	Average	Below Average	Poor	Poor

eDNA results are presented in Table 4-6.

Table 4-6: eDNA results

Pond	Result	Positive Replicates
Effluent Ditch – TATA Steel	Inconclusive*	0
Fishing Lake – TATA Steel	Negative	0
Old No.3 Res – TATA Steel	Negative	0
Woodland Ditch – TATA Steel	Negative	0
Lagoon 34 – TATA Steel	Negative	0
South East Pond	Negative	0

*The inconclusive result was due to inhibitors within the sample. The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. SureScreen Scientific advise that: inhibitors cannot always be removed, if the inhibition check fails, the sample should ideally be re-collected.

The ponds within 250 m of the site tested negative for GCN DNA, with the exception of the effluent ditch within the TATA Steel site which was inconclusive. The advice from the testing company is to re-sample this waterbody, however, the time period for sampling lapsed prior to the results being returned, but due to the low suitability of this waterbody to support GCN this is not considered to be a constraint to the overall assessment.

The HSI Scores for the ponds ranged from average to poor. There were two ponds which returned an “average” HSI score; these were the two Old No.3 Reservoirs. However, these ponds are lined with plastic with very steep sides and it is considered unlikely that GCN would be able to climb in or out of them easily.

In conclusion, GCN are currently considered absent from the site and surrounding area and are not considered to be a constraint to the project proposals. Should project proposals change significantly the eDNA survey results will be reviewed to determine if additional or repeat surveys are required. Similarly should project construction be delayed beyond 2022 consideration should be given for repeat survey; noting that it is unlikely (given their current use) that habitat suitability in the identified ponds will change in the short-term.

3.5 Results – Bat Transect Survey

The area surveyed comprised the south-eastern grassland area of the southern site, (around target notes 8 and 9; Figure 4-3) in order to investigate bat activity along the railway corridor scrub line, and in the general vicinity of the proposed working area, using a walked transect. Table 4-7, below, provides the timings and weather conditions during the survey.

Table 4-7: Weather conditions on 22nd September 2020

Sunset:	19:10	Start of Survey:	19:10	End of Survey:	21:10
Weather Conditions:	Dry with light breeze, 100% cloud cover. 16°C				

Common pipistrelle, soprano pipistrelle and *Myotis* species. were recorded during the transect survey. Most activity was from common and soprano pipistrelles (*Pipistrellus pipistrellus*, & *P. pygmaeus*), with two calls from *Myotis* sp. heard. The majority of the activity was concentrated along the southern boundary of the site, particularly within the south eastern corner. Table 4-8 shows the bats recorded during the transect. Figure 4-5 shows the route of the transect and the location of recorded bats.

Table 4-8: Bats recorded during the transect

Time	Species	Nearest Stop Location No.
19:23	Soprano pipistrelle	2
19:32	Common pipistrelle	4
19:35	Common pipistrelle	4
19:36	Common pipistrelle	5
19:40	<i>Myotis</i> sp.	6
19:41	Soprano pipistrelle	6
19:42	Common pipistrelle	6
19:44	Soprano pipistrelle	6
19:51	Common pipistrelle	8
20:29	<i>Myotis</i> sp.	1
20:33	Common pipistrelle	2
20:48	Common pipistrelle	5
20:58	Common pipistrelle	2
21:04	Common pipistrelle	1
21:05	Common pipistrelle	1



Figure 4-5 The bat survey transect route, including locations of stops and locations where bats were recorded.

3.6 Results – Wintering Birds Walkover Survey

The species recorded in the tables below follow the “British (English) vernacular name 2017” as described by the British Ornithologists Union (BOU 2017). A full list of the bird species named within this report and corresponding scientific names are presented in Appendix F.

3.6.1 Survey Results from Low tide / morning visit

The morning survey that covered low tide was conducted on 21st January 2021 between 0900 and 1130 hours, with low tide occurring at approximately 1057 hours. The surveyor noted that two instances of dogs off leads along the River Dee section of survey area caused disturbance to birds roosting along the riverbanks.

Table 4-9: Weather conditions during low tide / morning survey

Cloud cover	Wind	Temperature (°C)	Precipitation
0/8	4 WSW	0	N/A

Table 4-10: Birds recorded during low tide / morning survey

Species	Count of Number using the site	Count of number flying over site	Feature of the Dee Estuary SPA?
Enhancement Area			
Canada goose	120	0	No
Greylag goose	2	0	No
Carrion crow	3	0	No
Stonechat	3	0	No
Pied wagtail	2	0	No
Chaffinch	1	0	No
River Dee Area			
Canada goose	0	4	No
Mallard	87	13	No
Teal	33	0	Yes
Cormorant	8	0	Yes (named feature of the non-breeding waterbird assemblage)
Redshank	1	0	Yes
black-headed gull	148	0	No
Great black-backed gull	2	0	No
Herring gull	22	0	No
Carrion crow	41	0	No
Pied wagtail	1	0	No

3.6.2 Survey results from High tide / afternoon visit

The afternoon survey that covered high tide was conducted on 21st January 2021 between 1400 and 1630 hours, with high tide occurring at approximately 1653 hours. The surveyor noted that during the survey one instance of a dog off its lead along the River Dee section of survey area caused disturbance to birds roosting along the riverbanks.

Table 4-11: Birds recorded during high tide / afternoon survey within proposed enhancement area

Cloud cover	Wind	Temperature (°C)	Precipitation
2/8	2 W	2	N/A

Table 4-12: Birds recorded during high tide / afternoon survey

Species	Count of Number using the site	Count of number flying over site	Feature of the Dee Estuary SPA?
Enhancement Area			
Green sandpiper	1	0	No
Carrion crow	6	0	No
Stonechat	2	0	No
Grey wagtail	2	0	No
Pied wagtail	2	0	No
Chaffinch	17	0	No
Linnet	23	0	No
River Dee Area			
Canada goose	71	0	No
Mallard	62	11	No
Teal	28	0	Yes
Tufted duck	1	0	No
Little grebe	1	0	No
Grey heron	1	0	No
Cormorant	8	1	Yes (named feature of the non-breeding waterbird assemblage)
Redshank	2	0	Yes
black-headed gull	57	13	No
Great black-backed gull	1	0	No
Herring gull	13	6	No
Carrion crow	28	0	No
Pied wagtail	5	0	No

The survey results suggest that the proposed project site and immediately adjacent areas of the Dee Estuary, are located within a canalised and industrialised section of the estuary that does not support significant numbers of waterbirds. This is evidenced through the simple lack of literature citing known bird abundance within the area in comparison to the number of records closer to the mouth of the estuary, where the majority of the waterbirds associated with the Dee Estuary SPA are known to reside. The proposed enhancement area was found not to be of importance for any named feature of the Dee Estuary SPA. The proposed enhancement area was also largely devoid of bird species, with the only notable records being a mixed flock of naturalised greylag and Canada geese feeding on the saltmarsh, a small flock of mixed passerines likely on passage and a single green sandpiper roosting on the saltmarsh possibly displaced from the main estuary and tributaries due to a recent bout of heavy rain.

5. Discussion and Evaluation

Potential receptor types are discussed in turn within this report section. Table 6-1 summarises the recommended further ecological surveys and supervision, which have been incorporated into contractor method statements.

5.1 Designated sites

With the exception of the Enhancement area (proposed enhancement works by definition will seek to improve habitat) no parts of the site overlap directly with statutory protected sites. There will therefore be no direct impacts on statutory protected sites.

There is some overlap (on both sides of the river) with the Natural Resources Wales (NRW) priority area for saltmarsh habitat. The PEA surveys have confirmed that none of the working areas (or pipe laydown area) contain any saltmarsh habitat, which is limited to the area riverside of the flood defence embankment and this habitat will not be affected.

The Dee estuary itself is highly designated, with several national and international designations. A possible pathway for potential impact on the Dee estuary is via site runoff (including overland runoff), although there are large distances from intrusive works to the river covered with amenity and semi-improved grasslands as well as physical site barriers (e.g. Dock Road in the South) that make propagation of any overland runoff unlikely. Construction phase plans (e.g. Construction Risk Assessment Method Statement with measures to minimise silt laden runoff and hydrocarbon spills from working areas; and Waste Management Plan for drill arisings) should be put in place. There may be a small increase in noise or light pollution resulting from the works though this will be temporary, at a distance and there are no plans for 24 hour working.

The proposed enhancement area lies within several statutory and non-statutory protected sites (e.g. Figure 4-1). Any works here will require permission (such as SSSI consent) from NRW. The area itself is raised above the level of the saltmarsh and marine environments (the reason for the designations of the various protected sites) and it is likely that works here could be carried out without significant impact on any of the designated habitats. The proposals for this area in any case are for habitat enhancement only, which by its very nature if carried out properly would only enhance the area for biodiversity.

5.2 Habitats

The habitats across the entire site are generally common within the surrounding area, comprising predominantly semi-improved grassland and scrub. Few rare or notable habitats¹ were present within the surveyed areas, the exceptions being:

- The large semi-improved grassland area in the centre of the north working area, which appears to be lightly managed as a meadow, being cut infrequently. It is currently dominated by agricultural grasses but has the potential to be enhanced into a species rich meadow if managed to this end.
- The neutral grassland north of dock road (which is in the River Dee LWS) is semi-improved, but could be considered lowland meadow grassland, a priority habitat under the Section 7 of the Environment Wales Act.
- The site contains a few stretches of hedgerow (particularly the south working area) which are all dominated by hawthorn and not species rich (hedgerows listed under Section 7 of the Environment Wales Act).
- Open mosaic habitats on previously developed land are also listed under section 7 of the Environment Wales Act. The mosaic of scrub, grassland, and open ground in the “Crump’s Yard” (western section of the South working area) is arguably this, the area was previously used as a landfill site; however much of the bare ground here results from relatively recent clearance, and most of the area is dominated by either grassland or dense scrub. It is likely that this area would have been closer to open mosaic habitat a few years ago when the scrub was not as dominant, and there were more, well established open areas which have grassed over; it is no longer considered a particularly good example of open mosaic habitat. This area is also the site of a proposed solar PV array by Flintshire County Council and outside of any likely project activity.
- The two large ponds, within the loop formed by the proposed pipe laydown area, offer distinct habitat, atypical of the area. The ponds are fringed by common reed, willow and birch scrub and are stocked with fish being used by the local angling club.
- Mature trees are intermittent across the site and they will be easily avoided by the proposed works (no works to take place under canopy cover). The large trees in the centre of the north working area are mostly sycamore and of relatively low value (though the view of sycamore has been revised in recent years; it supports aphids in large numbers which are a food supply for invertebrates including predatory beetles and produce honeydew for butterflies (and other species) and is associated with diverse lichen cover).

The entire south working area (and a small section of the north working area), Figure 4-1, intersects with the NRW designated priority habitat area for saltmarsh. The delineation of this particular habitat boundary is crude, not closely reflecting the actual habitat distribution at a local scale. No direct works are proposed to the saltmarsh area (with exception of

¹ Including Habitats of Principal Biological Importance (Section 7 of the Environment (Wales) Act) 2016; Important habitats based on IEEM 2006; Priority Habitats on the former national biodiversity Action Plan (UK BAP 2007) or local Biodiversity Action Plan (BAP)

enhancement works). Notably, the upper saltmarsh habitat near the embankment appeared somewhat degraded, drying out and being colonised by terrestrial grasses.

The works as proposed are unlikely to have a detrimental impact on biodiversity within the area.

The proposed Enhancement area offers potential for habitat enhancement (NB care must be taken to avoid disturbance of the sett in this area c.f. Section 5.4.1). This area is at higher elevation and is drier than the adjacent saltmarsh tidal floodplain; the most beneficial enhancement to the area is considered to be the creation of additional wildflower meadow to complement the neutral grassland to the south, noting that salt tolerant species would be required.

However, given the somewhat degraded state of the adjacent saltmarsh habitats, and also the presence of a large area of managed neutral grassland north of Dock road, greater biodiversity enhancement, (depending on the requirements of the scheme) could potentially be achieved by putting resources into improvements to the saltmarsh and grassland areas (particularly as some management is already taking place here). This could be enhanced using the existing structures in place and would require working with the landowners and land managers of these areas.

5.3 Flora

In general floral diversity across the site was relatively low, to be expected given the dominance of managed grassland and brownfield land uses. Where areas had a lighter cutting regime e.g. the central grassland of the north working area, the flora was more diverse than surrounding amenity grassland. The grassland north of Dock road (south of the river) was more diverse, reflecting its management as a local wildlife site, though not exceptionally so. The temporary loss of a portion of the semi-improved neutral grasslands (North and South working areas) will not have a significant negative impact on biodiversity in the area. The grassland lost to intrusive footprint will be reinstated following the works through appropriate seeding (and associated management), but providing this is done, there should be no lasting negative impacts of the works. If desired, with careful management post works there is potential to enhance the neutral grassland within the North Working area for a relatively straightforward biodiversity enhancement; a diverse grassland could be created and some of the species diversity required is already present to colonise the area. A much larger area than the immediate works footprint is available and could be managed similarly to the newly created grassland to further diversify the main grassland area. The area is already managed to an extent as a meadow.

None of the species recorded during the survey are protected by the Wildlife and Countryside Act 1981 (as amended), Section 7 of the Environment (Wales) Act, 2016 or are included in the UK Post-2010 Biodiversity Framework. In addition, no nationally or locally rare species were recorded.

No invasive non-native plants were recorded; save cotoneaster at a small pond in the pipe laydown area, which is away from the proposed laydown route.

5.4 Fauna

5.4.1 Badger

Evidence of badger activity was found in each of the survey areas:

- **North working area:** two disused setts were found in the far southeast of this area beyond the ring of enclosing hardstanding (Target Notes 9 and 10 - Table 4-2 & Figure 4-2; Grid Refs SJ 30535 69969 and SJ 30537 69927 respectively). Although it is possible that either sett could become active prior to works starting (or a new one be established), neither was in use at the time of the survey, and it is not likely that any other setts are present within the area; suitable areas for sett building were largely limited to the scrub areas which could be searched thoroughly. There are not likely to be setts within 30m of potential works areas and therefore badgers are not considered likely to be a constraint to works in this area of the site.
- **South working area:** A partially used badger sett is present in the north of the site within the raised embankment adjacent to the proposed enhancement area (Target Note 3 - Table 4-3 & Figure 4-3; Grid Ref SJ 30106 69700). It was most recently visited on 11th January 2021 when it was established that it is currently being used by fox *Vulpes vulpes*. This sett should be surveyed again a minimum of two months to the start of works to establish if it is in use. If this sett is active (or cannot be definitely shown to be disused) then any works within 30m of the sett using heavy machinery may require a licence from NRW in order to proceed. This would depend on the nature of the proposed works within the enhancement area, and it may be possible to carry out planting works without machinery. However, the area does contain significant amounts of concrete and gravel which is anticipated will require removal as part of the enhancement proposals.

No other setts were found in the southern part of the site, although it was not possible to search all of the scrub in this area as most of it was extremely dense and inaccessible (particularly along the southern railway corridor). However, the densely vegetated areas were over 30m from proposed excavations and so badgers are not considered likely to be a constraint to works in this part of the site.

- **Pipe laydown area:** A sett was identified in the southeast of this area (Target Note 11 - Table 4-4 & Figure 4-4; Grid Ref SJ 31465 70053); this did not appear to be in use at the time of survey, but the relative freshness of the digging and presence of a latrine indicates that it may have been used recently. It is not thought that any other setts are present within the area. It is possible that the sett could become active prior to works starting, and it would be within 30m of the pipe laydown route at the time of draft reporting. The level of impact from the works would therefore depend on the precise nature of the work; but it will almost certainly involve heavy plant movement, plus potentially welding and other noise generating techniques, and so may require a licence if the sett is active, or a new one is established. It is therefore recommended that if the pipe is laid out within 30m of the location of the identified sett entrance, a pre-works badger survey is carried out. *Note that at time of v3 Final report version of this document, the pipe laydown route has been adjusted to be >30m distant to this sett.*

The licensing period for badgers is 1st July to 30th November inclusive. It usually takes a minimum of 30 working days for a licence application to be processed (and licence applications can only be processed once any relevant planning applications, demolition notices, or other permissions are granted; if relevant). It is therefore

recommended that a pre-works badger survey is carried out at least 2 months ahead of the licensing period (if it aligns with the start of works) to allow enough time to obtain licences for the works to proceed. The period of most active sett building is usually late winter/ early spring, so completion of the pre-works badger survey in April/ May is recommended.

Badgers almost certainly access the whole area and so should be assumed to be present during the works. Suitable mitigation measures should therefore be implemented during the works to ensure that no badgers are harmed if they access the works area. The pipe may also act as a barrier temporarily preventing badgers accessing foraging grounds (unless they walk the long way around it), so it is recommended that ramps are installed over the pipe at regular intervals to avoid this issue for badgers (and other wildlife).

It is also recommended that clearance of any dense vegetation (outside of main grassland areas) in any part of the site should be carried out under a watching brief from an ecologist, who will then be able to access the cleared areas and determine if setts are present.

5.4.2 *Bats*

No trees with potential roosting features for bats were found across the entire site and it is unlikely that works will directly affect roosting bats. While every tree within all areas could not be comprehensively searched, most were small and unlikely to be suitable. All suitable trees and those closest to proposed intrusive works were checked, with no suitable roosting features found.

The area is generally considered to be good habitat for foraging bats, and bats should be assumed to be in the area during the works. Particularly good habitat for foraging bats was identified along the scrub line associated with the railway corridor (to the south of the South working area). The bat transect survey confirmed use of this line by at least three species of bat, though activity was not exceptionally high. There is no intention to clear scrub in this area of the site. There was very limited bat activity away from this southern corridor in the survey.

The main potential impacts are likely to be lighting from the works compound. Lighting for the scheme should be designed to be directed into the compound away from trees and scrub. Proposed working hours are in the region of 12 hours a day minimising potential disruption to bats.

5.4.3 *Nesting Birds*

All of the trees, scrub and taller vegetation across the site should be considered potential nesting habitat, and if removal of vegetation is required (e.g. to clear the pipe laydown route), this should be done either outside the active bird nesting season (so outside the period March-August), or subject to a nesting bird survey by an ecologist immediately prior to the works. If nests are present all works will be delayed until the chicks have fledged. The proposed works are unlikely to have a negative impact on bird populations in the local area.

5.4.4 Wintering Birds

The walkover survey was completed to support desk-based assumptions of the enhancement area. The survey confirmed that the site and the immediately adjacent areas of the Dee Estuary, are located within a canalised and industrialised section of the estuary that does not support significant numbers of waterbirds.

Only three species were recorded which are named features of the Dee Estuary SPA; teal, cormorant and redshank. Teal and cormorant were recorded in small groups primarily roosting on or around a number of old pier structures and groins, which are commonly found along this stretch of the River Dee. A peak count of two redshank were found roosting along the riverbank. Of the three designated features of the Dee Estuary SPA recorded during these surveys none were recorded in numbers of significance, commonly defined as any species recorded with a count reaching 1% of the SPA citation population. Therefore, even in the event that the proposed works were to be the cause of any disturbance events there is only a limited pathway to such receptors and any potential resulting impact would be considered unlikely or negligible to the features of the Dee Estuary SPA, which is not significant when assessing potential impacts.

5.4.5 Reptiles and amphibians

The site does contain some areas of suitable habitat for reptile species, although these are mainly associated with the marginal areas (e.g. adjacent to the railway line in the south) away from the central grassland portions of the North and South working areas where works will take place. Additional reptile surveys are not proposed but Reasonable Avoidance Measures (RAMS) should be followed as best practice.

The waterbodies within the site have limited potential for use by amphibians, but the site has abundant terrestrial habitat for amphibians and it is likely that common amphibians may be found on site during the works. Suitable RAMS as implemented for reptile species will also serve to protect any common amphibians, if present.

Environmental DNA (eDNA) surveys for great crested newt (*Triturus cristatus*; GCN) were undertaken in June 2020 at accessible ponds within 250 m of the north and south working areas. None of the water samples showed evidence of GCN DNA. Analysis of one sample was inconclusive; however, given the habitat suitability of the TATA Steel 'Effluent Ditch' (HIS score of 0.39 i.e. Poor) it is considered unlikely that GCN are present at this location. GCN are not currently considered to be a constraint to the project proposals at the River Dee Crossing site.

The principal RAMS recommended with regards reptiles and amphibians is, respectful vegetation clearance. Vegetation clearance should be done during the active reptile season (March-October during agreeable weather) to prevent disturbing overwintering animals which are unlikely to survive if disturbed. Vegetation clearance will temporarily discourage reptiles from entering the working area during the active reptile season. RAMS dictate that vegetation should be carefully trimmed to 10-15cm and then left for at least a week, to allow reptiles using the area to leave due to the loss of cover. Vegetation may then be trimmed to ground

level, removing any remaining cover and deterring reptiles from entering the area while works are ongoing. Vegetation clearance should be undertaken under the supervision of the ECoW. Where features such as brash, log or rubble piles require removal, this should ideally be performed by hand and under the supervision of an ecologist/ECoW.

All the planned project works are temporary and there will be no long-term presence on the site, vegetation will regrow and there will be no long term loss of habitat.

5.4.6 Other species

No other protected species are likely to be present and no additional surveys are recommended. The general site RAMS as recommended will contain measures to reduce the likelihood of harming any other species, in the unlikely event any are present.

6. Mitigation, Compensation and Enhancement

6.1 Mitigation

The recommendations in this section may be revised following any further monitoring work carried out. Table 6-1 contains a summary of recommended further work, with timings and the conditions under which surveys are required.

6.1.1 Habitats

All grassland areas removed during the works (for the creation of compounds, access roads, drill pits, etc) should be restored using an appropriate, locally sourced neutral meadow seed mix, and appropriately managed to ensure the recreation of neutral grassland. It is not appropriate to use standard pasture or amenity grassland seed mixtures, particularly in the North working area, where the works area will be sited on semi-improved neutral grassland.

The species lists in Appendix D of this report provide information on the grassland species currently present. However, rather than simply recreating the existing grassland, the areas damaged by construction could be enhanced into species rich grassland. In the North working area which is part of the TATA site and is currently in active management, a low-maintenance seed mix such as Boston Seeds 20% wildflower mix BS1M *Traditional Wildflower Meadow Seed* or BS12M *Low Growing Wildflower Meadow Seed* would be appropriate. A programme of regular cutting and weed removal is recommended for these mixes, but this is likely to take place as part of TATA's site management regime in any case.

In the Southern working area where ongoing operational constraints aren't applicable, Boston Seeds 100% wildflower mix BS1P *Traditional Wildflower Seed* or BSRE *Restore & Enrich Wildflower Seed* would help increase grassland diversity. Both of these mixes require a regular programme of cutting and weed removal to maintain diversity, particularly in the first two years, which would need to be accounted for in the ongoing project costs.

The enhancement area could be seeded with a diverse neutral salt-tolerant grassland seed mix such as Boston Seeds 100% wildflower mix BS10P *Coastal Areas Wildflower Seed*. Again, this mix requires a regular programme of cutting and weed removal to maintain diversity, particularly in the first two years, which would need to be accounted for in the ongoing project costs.

Any large mature trees present should be protected, including the root zones unless absolutely necessary, by avoidance of works beneath the canopy extent (indicative of root zone).

Vegetation removal, particularly scrub clearance should wherever possible take care to preserve the integrity of any lines of trees and scrub (e.g. line of scrub along the border with the railway in the Southern working area).

Pollution prevention measures should be put in place as part of the contractor method statements to ensure that pollutants or runoff from the works are contained (providing additional reassurance of no potential for effect on the River Dee corridor and its various designated sites).

6.1.2 *Arboricultural Survey*

It is intended and anticipated that all mature trees will be avoided. Should any breaking ground activities (including compound construction) be necessary under tree canopy cover (which is taken to be indicative of the root zone area), then an arboricultural survey to BS5837 standard should be carried out. This assessment will be used to inform further management of the site/specific mitigation, but should also be carried out to determine if there are any safety implications for people using the site.

6.1.3 *Birds*

A variety of bird species are likely to be breed within the vegetation on site. From the nature of the habitats present it is considered unlikely, but possible, that any are subject to special protection. Any shrub removal should ideally be timed to avoid the bird breeding season which runs from March to August (inclusive) to avoid damaging/disturbing any nests present. If it proves necessary to clear vegetation during the breeding season then a survey must be carried out immediately prior to works starting to ensure that no active nests will be affected. If active nests are found then work must be delayed until all chicks had fledged.

Although the area has been confirmed as not supporting significant overwintering birds, good practice dictates that the enhancement area improvement works be completed outside of the wintering birds period (Nov to Feb).

6.1.4 *Bats*

Note that 24hour working is not planned for these works, however the measures recommended here are proposed for good practice. To reduce the potential impact of any light spillage from the compounds, (particularly the south but this applies equally to the North working area) on commuting bats during the construction and post construction phases of the development, the lighting scheme design should seek to minimise the levels of light spillage

outside the compound. The following recommendations should be used when forming the lighting plan for the proposed development (Bat Conservation Trust (2009) and Stone, E.L. (2013)):

Reducing Light Spillage

- Light should be directed to where it is needed and away from the sensitive areas such as boundaries and areas with trees and vegetation, accessories such as hoods, cowls, louvres and shields should be used to direct the light within the development and away from the surrounding areas.
- Lights should be placed as far apart as possible to minimise the illuminated area.

Timing of Lighting

- Where appropriate, lights should be fitted with movement sensors which turn the light on when the sensor is triggered.
- The times during which the lighting is on should be limited to provide some dark periods during the night (note 24 hour working is not planned).

6.1.5 Badgers

Badgers are known to be present across the site and surveys have identified the location of setts. The only sett within 30m of planned works is the sett located in the embankment of the proposed enhancement area (Section 5.4.1), noting that during the January 2021 survey it was established as being used by fox *Vulpes Vulpes*. This sett should be surveyed again a minimum of two months to the start of works to establish if it is in use. If this sett is active (or cannot be definitely shown to be disused) then the enhancement works may require a licence from NRW in order to proceed. It would almost certainly be disproportionate to relocate the sett (a significant disturbance to a protected species) away from the proposed enhancement area in order to provide biodiversity net gain, but it will still be possible to work here under the conditions of a licence if this is required.

As badgers almost certainly forage across the majority of the site, suitable measures will be built into the general RAMS to protect any that do enter the works area.

6.1.6 Reptiles and Amphibians

The principal RAMS recommended with regards reptiles and amphibians is, respectful vegetation clearance. Vegetation clearance should be done during the active reptile season (March-October) to prevent disturbing overwintering animals which are unlikely to survive if disturbed and during agreeable weather when reptiles are active. Vegetation clearance will temporarily discourage reptiles from entering the working area during the active reptile season. Vegetation should be carefully strimmed to 10-15cm and then left for at least a week, to allow reptiles using the area to leave due to the loss of cover. Vegetation may then be strimmed to ground level, removing any remaining cover and deterring reptiles from entering the area while works are ongoing. Vegetation clearance should be undertaken under the supervision of the ECoW.

Where features such as brash, log or rubble piles require removal, this should ideally be performed by hand and under the supervision of an ecologist/ECOW.

6.1.7 *Site General*

The following further RAMS should be implemented:

- Active working areas (compounds, excavations etc) should be kept to the minimum footprint required.
- Should it be necessary to have any excavation left open a suitable ramp (such as a plank or branch) must be provided to allow badgers, otters and other animals to escape the pit. Ramps could be created by grading the slope at the edges or using scaffold boards.
- Trenches must be checked each morning (by site operatives) prior to works commencing to ensure that amphibians/reptiles etc. are not present.
- Storage of fuel must follow best practice. Potential pollutants should be restricted to site compounds and hardstanding areas, well away from the ditches and field drains, so that runoff can be prevented.
- If at any point a birds nest is found all works in that area must cease. If the nest is active then work will be postponed in the area surrounding the nest until all chicks have fledged. If an empty nest or half-built nest is found during March – September, a nesting bird check should be carried out by an ecologist to determine if the nest is in the process of being built and used.
- At the end of works each day, the site should be inspected by a responsible individual to ensure that the above protocols are being complied with.
- If at any point in the works a reptile or amphibian is found within the active working areas all works in the vicinity of the sighting must immediately cease. Common species may be moved from the working area by site workers (wearing gloves) and placed in a part of the site not subject to works.
- Any terrestrial mammals, for example badgers, seen must be allowed to leave the area on their own. If this is not possible e.g. the animal is injured or trapped then an ecologist must be called.

6.2 Compensation and Enhancement

6.2.1 *Compensation*

All grassland areas removed during the works (for the creation of compounds, access roads, drill pits, etc, should be restored using an appropriate, locally sourced neutral meadow seed mix, and appropriately managed to ensure the recreation of neutral grassland. It is not appropriate to use standard pasture or amenity grassland seed mixtures, particularly in the North working area. Suggested seed mixes and further discussions are provided in Section 6.1.1. Some ongoing management of the grassland will then be required to ensure effectiveness.

Re-establishment of scrub and trees will depend on the final nature of the works and what is removed, but is not thought likely to be necessary. Provided the canopy lines of scrub (e.g. along the southern border along the railway) are maintained then the creation of some clearings may be beneficial, otherwise if left to its own devices scrub will naturally regenerate almost as fast as it would if artificially recreated.

Any large trees should be protected if at all possible and therefore should not require remedial action.

Provided that the grasslands removed for the compounds, drilling pits etc are reseeded with appropriate meadow grassland seed mixes, and properly managed to restore the existing grassland then the overall impact of the works, long term, will be minimal and require little compensatory works.

6.2.2 *Enhancement*

Overview

DCWW would like to incorporate habitat enhancements into the project, with biodiversity net gain demonstrated using the Natural England Biodiversity Metric. To that end, notes have been taken allowing the habitats present to be classified under the UK Habitat Classification scheme (UKHab; UK Habitat Classification Working Group (2018)), allowing the use of the metric to calculate the overall biodiversity units for the sites and facilitate the design of enhancements and or habitat creation to achieve biodiversity net gain (BNG).

Whilst we have not been commissioned to undertake the BNG assessment, habitats have been classified according to the UKHab classification process (in addition to Phase 1) to aid any future BNG assessment. UKHab data is provided in Appendix G.

The small area set aside as the “Enhancement area” (Figure 1-1; orange boundary) has been proposed as a location for specific habitat enhancement. There are opportunities here; the area is currently a mixture of species poor grassland, short perennials and buddleia scrub, all regeneration vegetation on a raised embankment with old infrastructure, the site is underlain by gravel and concrete hardstanding. The area is raised at least a metre above the saltmarsh floodplain surrounding it, and could be replanted with meadow grassland or trees. Gains here could be used to offset works at both the North and South working areas, and this is indeed the most appropriate place for habitat creation ‘from scratch’ within the area, (albeit complicated by the presence of a badger sett). The area appeared to be currently unused by people, relatively species poor (and slowly succeeding into scrub, meaning the diversity here will decline in future). Most other areas in the immediate vicinity are in use, however a second option might be the unused eastern end of the “Crumps Yard” area not required for the solar PV site, but this would require acquisition of the land.

There is also the potential for significant enhancement to the habitats already present within the site. In the North working area the compound sits on existing meadow grassland which is managed lightly, but could be enhanced into species rich grassland. This is considered the best option for direct enhancement of the North working area. In the Southern working area there are large areas of semi-improved neutral grassland and saltmarsh which could also be

enhanced by improved management and probably some planting. The saltmarsh is degraded, but part of several protected sites and a NRW priority habitat. The advantage of this approach is the significantly larger areas which could be enhanced, and avoidance of working near a badger sett; the disadvantages are that this approach requires engagement with other landowners and long-term management commitments.

The suggestions in this report are intended as options. A full site enhancement plan or management plan is outside the scope of this report however, the sites have been assessed for their enhancement potential, and recommendations made.

Enhancement Area

The proposed Enhancement area could be enhanced by removal of the existing scrub and the creation of new species rich grassland habitat. This would require the removal of some areas of hardstanding and gravel, and being close to a badger sett may require a licence, unless the sett is confirmed to be inactive or the works can all be done by hand. This might be possible if the concrete areas were left, but would be labour intensive. The exact approach to works in the enhancement area will be confirmed by the project ecologist once the updated badger survey has been completed in spring 2022.

The best future use of the site is considered to be the creation of a wildflower meadow with species rich neutral grassland – details provided in Section 6.1.1. Other scrub species such as common broom *Cytisus scoparius* could also be planted in the area. It may be possible to arrange ongoing management of the site with the managers of the neutral grassland to the south, which would secure the habitat in the longer term.

Other Areas

Significant enhancement of the wider areas of existing habitat could also be used to create net gain. It is recommended that this approach is used, at minimum, on the reseeded grassland when the works areas restoration is complete. Rather than simply recreating the existing grassland the areas could be enhanced into species rich neutral grassland. This is particularly appropriate in the North working area, and existing site managers (TATA) may be able to take over the sites.

Management of the grassland areas in both North and South working areas could be improved to promote a diverse flora and achieve a biodiversity gain. Good management is essential to prevent the crowding out of diverse grassland plants by dominant grasses and weeds, and this is achieved through nutrient poor conditions and by cutting, however this cutting needs to be carried out at appropriate times of year in order to prevent the loss of seed heads and ensure that a seed bank builds up in the soil.

Large areas of land are also available in the pipe laydown area, which is under the ownership of TATA, and any enhancement works here would be subject to their approval and maintenance.

It is also recommended that if possible some enhancement of the saltmarsh surrounding the site is included; significant net gains could be made by restoration of this degraded habitat. This is best done following the advice of a specialist in saltmarsh habitat/coastal habitat creation.

Fauna

A variety of bird species are likely to breed within the vegetation on site. From the nature of the habitats present it is considered unlikely, but possible, that any are subject to special protection. No trees observed had potential bat roosting features in cracks, knot holes or other crevices. There is scope for simple enhancements of the site using bat and bird boxes.

- Bat boxes could be erected on trees within the site. Boxes should be placed on mature trees and be designed either for crevice dwelling bats (*pipistrellus* and *Myotis*) or larger species such as noctule (*Nyctalus noctula*).
- Bird boxes could be erected throughout the scrub on taller trees, using a variety of sizes suitable for woodland birds. We recommend a set of boxes including 32mm opening (sparrow boxes), 25mm opening (smaller birds), 45mm opening (Starling boxes) and open fronted (Robin, which should be placed in cover such as Ivy).
- Tawny Owl boxes could be attached to mature trees/buildings in the area, and potentially a Barn owl box on a pole.
- We strongly recommend woodstone or Ecostyrocete – (not wood)- boxes for longevity as they require little to no maintenance. Note that these are heavy and need to be securely attached with appropriate fittings.
- Hibernacula and refugia for reptiles could be installed around the site to further enhance habitat and shelter opportunities for reptile species.

6.3 Recommended Further Ecological Works

Table 6-1 contains a summary of recommended further work, with timings and the conditions under which surveys are required. N.B “Pre-construction” means prior to the works phase beginning on site, whereas “Immediately prior to clearance” means during the works, but prior (ideally within 24 hrs) to that particular operation (e.g. vegetation clearance) beginning.

Table 6-1: Summary of recommended further ecological surveys and supervision.

Species	Type	Condition	Work Stage	Location	When?
Birds	Targeted wintering bird survey	Repeat walkover survey of enhancement area before any works start, if enhancement works planned Nov-Feb	Prior to works	Enhancement area	Nov – Feb
Badgers	Pre-works badger survey	Resurvey to establish use of setts prior to works. To be completed 2-3 months before works at identified setts.	Prior to works	SJ 30106 69700 (Enhancement area). Also SJ 31465 70053 (pipe laydown) if final pipe is <30m.	April/May
Nesting Birds	Nesting bird surveys during active nesting season	Nesting bird survey immediately prior to clearance works (e.g. shrub clearance) if vegetation clearance takes place March – August inclusive.	Immediately prior to clearance	Any scrub, tree, or tall vegetation clearance	March - August
All	Toolbox Talks	Toolbox talks will be provided to the contractor teams at the following stages of works: 1) site preparation/ enabling; 2) main works; and 3) demobilisation. As contractor teams are likely to be different in the North and South working areas, separate Toolbox talks are recommended to these teams. Toolbox talks will cover all relevant ecological constraints and considerations appropriate to the location and project stage. A separate Toolbox talk will be given for the works in the enhancement area.	All	All Sites	All year
Trees	Tree inspections where breaking ground	Arboricultural Survey (BS5837) where works could impact mature trees including root zones.	Pre-construction	All trees where breaking ground activities (including shallow compound excavations) are planned beneath canopy cover (i.e. within indicative root zone area).*	All year

Table notes: *Breaking ground activities are unlikely to be required beneath canopy cover, but will depend on micro-siting of working compound areas etc, as sporadic mature trees are located in the north working area in particular.

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Appendix A: Layout drawing



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BG-DR-CA-DD2002-F

Appendix B: Photographs

North working area



Photo. 1. Central grassland area looking south.



Photo. 2. Scrub and taller vegetation at the grassland margins



Photo. 3. Amenity grassland margins



Photo. 4. Scrub and sand at the southern lagoon



Photo. 5. Southern Amenity grassland



Photo. 6. Tree line on the eastern side



Photo. 7. Scrub and amenity grassland looking west from the east of the site



Photo. 8. Trees within the neutral grassland



Photo. 9. Example of hardstanding and grassland on the western site edge



Photo. 10. Northern woodland



Photo. 11. Watercourse under the scrub in the southeast

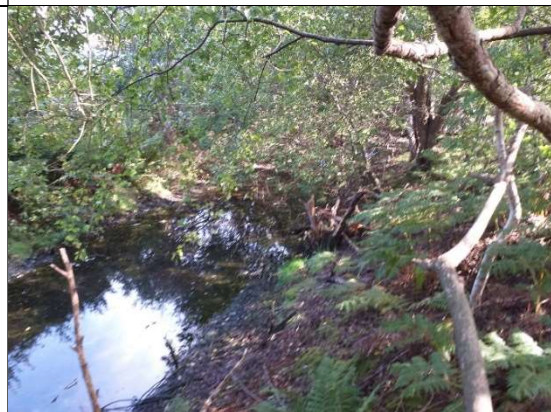


Photo. 12. Watercourse in a hollow in the southeast.

South working area



Photo. 13. "Crumps Yard" western area looking west.



Photo. 14. Mixed grassland in the west of the site.



Photo. 15. Dense low scrub in the centre of the western section.



Photo. 16. Scrub and grassland ride at the north western margin



Photo. 17. Scrub and brash piles.



Photo. 18. Scrub and cleared ground along southern boundary, looking east.



Photo. 19. Scrub and piles of stone prevalent across the west of the site.



Photo. 20. Looking east into inaccessible central area (c.f. Target Note 7; Table 4-3)



Photo. 21. South-eastern grassland looking towards sports pitches.



Photo. 22. Short amenity grassland sports pitches.



Photo. 23. Scrub and fence west of the sports pitches.



Photo. 24. Dense scrub along the railway corridor.



Photo. 25. Scrub and grassland in the southeast of the site.



Photo. 26. Neutral 'meadow' grassland north of dock road.



Photo. 27. Neutral grassland and dense scrub north of dock road.



Photo. 28. The River Dee and saltmarsh from the southern site



Photo. 29. Looking northeast over the saltmarsh.



Photo. 30. The hedgerow and flood embankment from the south.



Photo. 31. Gravel and scrub regeneration in the proposed enhancement area.



Photo. 32. Grassland and ruderals in the proposed enhancement area



Photo. 33. Tall ruderals on the enhancement area.



Photo. 34. Scrub and meadow grassland beside the Wales coast path.

Pipe laydown Area



Photo. 35. Amenity Grassland where pipe route joins the North working area site



Photo. 36. Semi-improved grassland and scrub in the northwest of the route



Photo. 37. Scrub and grassland in the northwest



Photo. 38. Rabbit grazing and diggings around above ground steam pipe



Photo. 39. Grassland on route west of the central road.



Photo. 40. Piles of rubble and other material, plus bare ground and scrub west of the road.



Photo. 41. The central road running north-south across the site.



Photo. 42. Typical example of concrete roads present, with SI grassland.



Photo. 43. Shorter grassland area east of the central road.



Photo. 44. Shorter grassland area east of the central road.



Photo. 45. Scrub and fence outside northern site boundary.



Photo. 46. Grassland and scrub by the central pond.



Photo. 47. Reed and grass by the eastern boundary.



Photo. 48. Short amenity grassland in the south.



Photo. 49. Grassland and scrub mix in the south.



Photo. 50. Pylon at the southern end of the route.



Photo. 51. Road and railway south of the route.



Photo. 52. Bridge over wet woodland south of the central pond.

Appendix C: Detailed Preliminary Ecological Appraisal walkover

notes

Detailed PEA walkover notes are provided in this Appendix. Notes may be cross referenced with the PEA maps and target notes provided in the main report (Section 3.3).

North working area walkover notes

Habitats

Grassland

The North working area was dominated by a large expanse of open grassland comprising the centre of the site and most of the proposed works area. The large main grassland area is managed to a degree as a meadow (as reported by Tata Staff), being cut once in late summer; the last being done shortly before the survey, however the arisings are not removed. The sward was approx. 10cm in length and covered in the arisings from the cut grassland. The result is a semi-improved neutral grassland which is reasonably diverse but dominated by species typical of amenity/pasture grassland including perennial rye (*Lolium perenne*), Cock's foot (*Dactylis glomerata*) and red fescue (*Festuca rubra*). Other grasses including crested Dog's tail (*Cynosurus cristatus*) were also occasionally present. Abundant forbs included common ragwort (*Senecio jacobea*), yarrow (*Achillea millefolium*), ribwort plantain (*Plantago lanceolata*), common vetch (*Vicia sativa*) and red and white clover (*Trifolium pratense*, *Trifolium repens*), and, notably, bulbous buttercup (*Ranunculus bulbosus*). Wildflowers including field forget-me-not (*Myosotis arvensis*), tansy (*Tanacetum vulgare*), scarlet pimpernel (*Lysimachia arvensis*), hop trefoil (*Trifolium campestre*), and common storksbill (*Erodium cicutarium*) were occasional throughout the area.

Some smaller areas of the grassland, particularly towards the margins were somewhat taller and included prickly sow thistle (*Sonchus asper*), prickly lettuce (*Lactuca serriola*), pignut (*Conopodium majus*), yellow toadflax (*Linaria vulgaris*), mugwort (*Artemisia vulgaris*) and evening primrose (*Oenothera biennis*), among others, these are likely found throughout the area but may not have been seen due to the recent cutting. Winter heliotrope (*Petasites fragrans*) is also established in some marginal areas. Several areas under the canopy of larger broadleaved trees scattered across the grassland were unmanaged and therefore tall (up to 1m). These areas are mapped as species poor semi improved grassland and despite shading were dominated by grasses to the exclusion of most other species.

The surrounding grassland areas are intensively managed as amenity grassland, being frequently cut and consequently very short (approx. 5cm). This includes a margin of approx. 2m wide around the perimeter of the central meadow area which is also considered amenity grassland (though of slightly higher diversity). The surrounding amenity grassland was of much lower diversity and dominated by grasses, ribwort plantain, thistles and clover.

Trees and Scrub

The site contained several areas of dense scrub, including along a watercourse in the southeast, and along the southern margins, as well as smaller areas within the central grassland. A few areas consistently over 5m in height are mapped as woodland. The scrub areas within the grassland were largely dominated by willows (*Salix sp.*), hawthorn (*Crataegus monogyna*) and cherry (*Prunus sp.*) with elder (*Sambucus nigra*), field rose (*Rosa arvensis*), and occasional oak (*Quercus petraea*) often around large sycamore (*Acer pseudoplatanus*). Most of the scrub is very dense and the ground flora is bare or limited to ivy (*Hedera helix*). The band of scrub along the south of the site was similar, on an embankment following the edge of a large former lagoon, now dry (see target note 6, Section 3.3) but contained abundant gorse (*Ulex europaeus*) and buddleia (*Buddleia sp.*), and some (potentially planted) apple (*Malus pumila*).

Towards the southwest large areas of scrub follow linear depressions in the ground (one of which contains water), these areas included abundant silver birch (*Betula pendula*), and had a ground flora including dogs' mercury (*Mercurialis perennis*), wood sage (*Teucrium scorodonia*) and common polypody (*Polypodium vulgare*) in the more open areas, indicating they have probably been established for some time. The centre of the scrub areas was very dark, the ground bare and covered in leaf litter, which has created a deep bed of silt in the base of the hollows. The northern area contained water (to a depth of a few centimetres) which was heavily shaded, this contained no vegetation. Rosebay willowherb (*Chamerion angustifolium*) and bracken (*Pteridium aquilinum*) was also abundant around the margins.

In the north of the site a small band of woodland was dominated by birch, willow, and hawthorn, with a line of planted cypress' (*Cupressus sp.*), parts of this area was buddleia scrub colonising hardstanding, particularly around an above ground pipeline crossing the site east-west, grading into the grassland to the south.

The scrub areas along the west of the site were low lying and dominated by dense bramble (*Rubus fruticosus*) covering earth embankments at the edge of the roads and car parks. A line of ash (*Fraxinus excelsior*) and cherry trees runs down part of the eastern site boundary.

Other Habitats

The southern end of the surveyed area comprised a large area of exposed soft sand, the dried remnant of a former lagoon. This area could not be safely accessed due to the very soft sand, but was largely devoid of vegetation.

The area contains three areas of open water, (see target notes, Section 3.3): of these, the two in the south were completely surrounded by dense scrub and so very shaded, shallow, and with no aquatic or marginal vegetation at all. The substrate was deep silt from leaf litter build up. The southernmost pool could not be accessed at all due to the dense scrub surrounding it. The northernmost pool was surrounded by concrete casing and netted over to keep birds out, with no vegetation of any kind.

The area also contains a lot of hardstanding, mostly asphalt, which is maintained and generally in good condition with no vegetation.

Invasive non- native species

No invasive non-native species were recorded anywhere within the North working area. At this time of year the plants would still be evident above ground and would be expected to be

seen if present. The Aderyn search recorded no records of invasive species within or near the site.

There was no evidence of non-native animal species for example mink (*Neovison vison*), and no records of such.

Fauna

Amphibians

The three waterbodies within the site have limited potential for use by amphibians. The concrete lined pool at target note 5 (Section 3.3) would be largely inaccessible. The other pools were stagnant, but very shaded and shallow, there was no aquatic or emergent vegetation for egg laying or deep water for displaying, making it unlikely that the pools are used by the great crested newt (*Triturus cristatus*), or other newts. The use of these pools by common amphibians cannot be ruled out but they are considered marginal. The site has abundant terrestrial habitat for amphibians in the longer grass and scrub, both around the margins and in the central grassland, when not cut short, so it is likely that common amphibians visit the area. There were only three records of amphibians near to the site, all south of the Dee and from the 20th century. eDNA samples were taken during summer 2020 to investigate presence of Great Crested Newt (GCN); results for 'Old No.3 Res' (x2) and 'Woodland Ditch' returned negative results (Section 3.4); habitat suitability of 0.62 and 0.55.

Badger

Evidence of badger (*Meles meles*) activity was limited to the southwest of the site, where two old setts were found (at target notes 9 and 10, Section 3.3). Neither appeared to be in use at the time of survey but the presence of a fresh latrine in the grassland nearby shows that badger do visit the area, including recently. No other setts were seen and most of the site was not optimal for sett building, being flat and exposed. It is likely that any sett building in the area is restricted to the south western scrub areas where there are suitable embankments, the edge of the lagoon in the south may be too soft, though rabbits were using it, and no evidence of badgers was present here. The area contains good foraging habitat for badgers on the many grassland and scrub areas and it is likely they are active over the entire area. Aderyn found multiple records of badger from across the wider area, the closest roadkill on the A548 to the north, but mostly south of the Dee.

Bats

No trees with potential roosting features for bats were found within the survey area. This is not as surprising as it first appears, as while numerous trees are present, all were generally small, with thin trunks and branches and relatively young without cracks or crevices. The largest trees within the area are the large sycamore dotted across the centre of the neutral grassland area, and a large aspen at target note 2 (Section 3.3), but no suitable cracks or crevices were observed.

The area is considered to be good habitat for foraging bats, with numerous tree/scrub lines forming linear features which would be of use for bats for commuting and foraging, and it is likely that bats visit the area. Aderyn returned 5 records of several bat species from the surrounding area, the closest over 1km away.

The buildings around the edge of the surveyed area were not assessed for bats as they were not part of the site and will not be affected by the works.

Nesting Birds

All of the trees, scrub and taller vegetation across the site was suitable for nest building, and should be considered likely nesting habitat within the breeding season. No nests or evidence of nesting specifically was seen, but the survey took place after the nesting season.

There were a great many bird records (over 4,000) from throughout the search area, (though this is not unusual) for a site of this size and nature, including ground nesting species such as Lapwings (*Vanellus vanellus*). A large number of records are recorded to the OS grid square covering the site, including Kingfisher (*Alcedo atthis*) and peregrine (*Falco peregrinus*).

There are records of Barn owl (*Tyto alba*) within fields northwest of the Tata site in 2010.

Reptiles

The site does contain some areas of good habitat for reptile species, containing rubble, brash and scrub for cover and possible refugia, and open grassland for basking. The best habitat being in the south, and around the scrub and taller grassland in the north and east of the neutral grassland area. These northern areas are however, small and isolated, being surrounded by built up areas or open, short amenity grassland. The main neutral grassland area is marginally suitable when uncut.

The scrub and open sand on the margins of the lagoon in the south are considered very good habitat for reptiles, with cover and open ground, and connectivity to further similar habitat along the river corridor, and it is possible that reptiles are found here. The presence of reptiles probably depends on the degree of isolation from other populations.

Aderyn have records of three reptile species within the search area, adder (*Vipera berus*), grass snake (*Natrix helvetica*) and common lizard (*Zootoca vivipara*). Most of the reptile records are to the south of the Dee, but grass snake was recorded within the Tata Steel site 1.4km to the northeast, near a series of ponds.

Other Protected Species

There were no signs of any other protected species on site. The river corridor to the south may be used by otters (*Lutra lutra*). There are three Aderyn records of otter on the Dee, and so it is possible that they might visit the site, particularly the south. The waterbodies present are not suitable for water vole (*Arvicola amphibius*), though there are records of this species from ditches within the TATA site 600m to the north. The neutral grassland meadow area is suitable for brown hare (*Lepus europaeus*) and there is one record of this species within the Tata site 200m to the north, but this species is very unlikely to be present due to the relative isolation of the grassland area and the lack of refuges when the area is cut, as at the time of the survey. Hedgehog (*Erinaceus europaeus*) may use the scrub and grassland areas, and there are potential hibernation sites within the dense scrub, though hedgehogs are not recorded within the Tata site.

South working area walkover notes

Habitats

Semi-improved grassland

The South working area contains two main areas of grassland, which is the primary open habitat within the area; a broad swathe of grassland forming the main east/west axis of the site, 1; between the railway corridor and dock road, this grassland is relatively species poor and almost completely surrounded by areas of dense scrub, and 2; north of dock road a managed meadow grassland area which is relatively species rich, and managed by Flintshire county council.

The grassland south of Dock road generally of very similar species composition throughout but, very broadly, was more diverse to the west, becoming more 'improved' to the east. In the northwest, the habitat is a matrix of grasses, ruderal and scrub all mixed together, the result of successional regeneration on a brownfield site. Over most of the area grasses are dominant enough that the habitat is best classified as semi improved grassland, (though some more open parts were considered ephemeral/short perennial) it results from regeneration rather than agricultural improvement, and there were significant amounts of tall ruderals and woody species scattered throughout; there are also frequent small areas of bare ground and scattered scrub. Part of the area has recently been cleared by Flintshire council as part of works to install a solar PV facility, accounting for many of the bare ground areas, and there were numerous piles of wood chippings resulting from scrub clearance here.

The sward was dominated by a few species of tall grasses including cocks foot (*Dactylis glomerata*), rough meadow grass (*Poa trivialis*) Yorkshire fog (*Holcus lanatus*), creeping bent (*Agrostis stolonifera*), Perennial rye (*Lolium perenne*), red fescue (*Festuca rubra*), wall barley (*Hordeum murinum*) and couch grass (*Elytrigia repens*). Black knapweed (*Centaurea nigra*) was abundant, along with hedge mustard (*Sisymbrium officinale*), willowherbs, yellow toadflax (*Linaria vulgaris*), mugwort (*Artemisia vulgaris*), tufted vetch (*Vicia cracca*), teasel (*Dipsacus fullonum*), hogweed (*Heracleum sphondylium*) and black knapweed (*Centaurea nigra*).

In more open areas surrounded by the grassland, for example around rides through the scrub or patches of bare ground, there was low ground cover including areas with weld (*Reseda luteola*), black medick (*Medicago lupulina*), common birds foot trefoil (*Lotus corniculatus*) creeping cinquefoil (*Potentilla reptans*), pignut (*Conopodium majus*), perforate St John's wort (*Hypericum perforatum*) and hedge bindweed (*Calystegia sepium*), plus abundant bramble (*Rubus fruticosus* agg).

The area was intermingled with scrub regeneration, including a dense area in the centre of the area which was completely impenetrable, dominated by buddleia (*Buddleja davidii*), and willows (*Salix* sp.) with frequent field rose (*Rosa arvensis*), elder (*Sambucus nigra*), silver birch (*Betula pendula*), and patches of dense, low growing bramble.

The grassland forms a continuum across the site but became progressively more grass dominated and less species rich towards the southeast. In the far southeast (around target note 9, Section 3.3), the site of the proposed compound, was an open area of apparently unmanaged semi-improved grassland. This area had a similar composition to the north-western grassland, but with significantly less ruderal vegetation, being completely dominated

by grasses, with frequent hogweed, yarrow (*Achillea millefolium*), ribwort plantain (*Plantago lanceolata*), creeping thistle (*Cirsium arvense*) and occasional tufted vetch.

A rectangular area comprising football pitches has been mown very short (and has painted lines), this area, mapped as amenity grassland, is even more dominated by grasses with forbs less abundant through the sward, resulting in a species poor sward dominated by perennial rye, with red fescue, creeping buttercup, dandelion and rough hawkbit (*Leontodon hispidus*).

Semi-improved neutral grassland

North of dock road is an area of managed grassland, approx. 0.5m in height, running alongside the wales coast path (hardstanding). This was relatively species rich compared to the south-eastern grassland, containing almost all the species found to the south, abundant species included wall barley, knapweed, pignut, common birds foot trefoil, yarrow, docks (*Rumex* sp.), teasel, lady's bedstraw (*Galium verum*), perforate St Johns wort, creeping buttercup (*Ranunculus repens*) and common vetch, with oxeye daisy (*Leucanthemum vulgare*), white fumitory (*Fumaria capreolata*), hairy tare (*Vicia hirsuta*), poppies (*Papaver rhoeas*), mint (*Mentha arvensis*) and scarlet pimpernel (*Anagallis arvensis*), though still classified as semi-improved grassland, this area appears to be managed as a meadow.

Trees and Scrub

The southern grassland areas are largely surrounded by a belt of dense scrub, mostly comprising semi mature trees between 2.5 and 5m in height. An almost continuous line of scrub runs along the South working area boundary with the North Wales coast railway line behind, while separate stands lie to the north along dock road. Across the whole area the scrub was dominated by silver birch (*Betula pendula*), with abundant willows (*Salix* sp.), hawthorn (*Crataegus monogyna*), and cherry (*Prunus* sp. (mostly wild cherry *P. avium*). The main exception to this is the scrub across the centre of the western 'Crumps yard' area, which as noted was dominated by willow and buddleia. Other tree species, particularly on the southern scrub line, included sycamore (*Acer pseudoplatanus*), field maple (*Acer campestre*), ash (*Fraxinus excelsior*) and occasionally oak (*Quercus petraea*). There were very few large mature trees. The scrub was dense and generally had limited ground flora, some grasses near the edges and dense ivy (*Hedera helix*) being present.

North of the road the grassland surrounds several discrete stands of dense scrub. These were also dominated by dense birch, hawthorn and cherry with frequent rowan (*Sorbus aucuparia*), and had limited ground flora, being generally so dense that the interior was inaccessible. There were no large mature trees in this area, but some individual grey willow (*Salix cinerea*) are also found north of the path.

Flood defence embankment and saltmarsh

The neutral grassland sits on top of a steep earth flood embankment, which drops about 2m down to a broad expanse of saltmarsh reaching to the river Dee to the north. The embankment is lined with a broad hedgerow comprising mostly hawthorn, willow, birch, oak, and occasionally hazel. There was also blackthorn (*Prunus spinosa*) in one small area, to the north, and a few emergent trees.

Below the embankment was a broad expanse of saltmarsh beside the Dee. This was drying out in its upper reaches (towards the south), and included saltmarsh grass (*Puccinellia*

maritima), Cord grass (*Spartina anglica*), sea purslane (*Halimione portulacoides*), and sea aster (*Tripolium pannonicum*). As reported in the earlier survey (Ellis 2017) the upper reaches are becoming dominated by red fescue and other terrestrial grasses. The area is periodically grazed by cattle, though not frequently. Some small standing water pools were found in the northwest, with some dense stands of common cub rush (*Schoenoplectus lacustris*).

Perennial/Ruderal vegetation

In the northwest (the proposed enhancement area, around Target note 2, Section 3.3) is a small area of hardstanding and disused plant, now being overtaken by regenerating vegetation. The edges of the area are broad earth embankments covered by species poor grassland (almost entirely grasses) and dense bramble scrub, while the main bulk of the area is surfaced with gravel. This is covered with a mix of vegetation including buddleia scrub, and tall herbs including mugwort, groundsel (*Senecio vulgaris*), bristly ox tongue (*Picris echioides*), thistles, curled dock (*Rumex crispus*), fat hen (*Chenopodium album*), redshank (*Persicaria maculosa*), willowherbs and burdock (*Arctium* sp.). There remains some bare gravel around the taller plants, while much of the western side has reverted to grassland including, as with other grassland areas nearby; grasses, red clover (*Trifolium pratense*), lady's bedstraw, tufted vetch, black medick and perforate St. Johns wort.

Other Habitats

The South working area also contains a lot of hardstanding, mostly asphalt or concrete, frequently in poor condition; hoary mustard (*Hirschfeldia incana*) was widespread, with groundsel, sun spurge (*Euphorbia helioscopia*), poppies, fat hen, redshank and white fumitory frequently found on and around pavements and broken ground throughout the site. There are numerous fences and walls (generally covered in ivy and hedge bindweed).

Invasive non-native species

No invasive non-native species were recorded anywhere within the South working area. At this time of year the plants would still be evident above ground and would be expected to be seen if present. The Aderyn search recorded no records of invasive species within or near the site.

There was no evidence of non-native animal species for example mink (*Neovison vison*), and no records of such.

Fauna

Amphibians

The only waterbodies within the site were the pools within the saltmarsh in the north of the site, these were brackish (and surrounded by salt tolerant plant species in an area which occasionally experiences tidal flooding) and therefore likely have limited potential for use by amphibians. The pools were very shallow, but there was some emergent vegetation for egg laying. Due to this, and the relative isolation of the pools in a saltmarsh area it is unlikely that the pools are used by the great crested newt (*Triturus cristatus*), or other amphibians.

The site has abundant terrestrial habitat for amphibians, essentially across the entire site in the long grass and scrub, and there were numerous small brash or wood piles throughout, so

it is likely that common amphibians visit the area. There were large numbers of records of amphibians near to the site, but with one exception all are from over 1km away. The exception, and nearest record is a smooth newt (*Lissotriton vulgaris*), recorded approx. 100m east of the eastern end of the site in 1999, in grassland above the Dee embankment. eDNA samples were taken during summer 2020 to investigate potential presence of Great Crested Newt (GCN) and returned negative results (Section 3.4).

Badger

A sett was found at target note 2 (Section 3.3), on the embankment to the side of the proposed enhancement area in the north of the site. One of the three entrances here was active, with signs including fresh digging, footprints and hairs, and trails leading to the entrance through surrounding vegetation. From the small size this sett is likely to be an outlier to a main sett located elsewhere. Evidence of badger was also found in the extreme west of the site, with latrines in two locations (target notes 4 and 6, Section 3.3), and trails leading into surrounding vegetation. There were also trails within the scrub in the north of the site into some of the areas of impenetrable scrub.

Almost the entire site area is suitable for foraging by badgers, and there are several areas which appeared suitable for sett building, including the flood defence embankment, under much of the scrub, and on the scrub running along the railway in the south, where there were several earth embankments sloping towards the railway. No other setts were found, but much of the scrub was inaccessible, particularly along the railway. The scrub was more accessible in the southeast of the site, most of the understorey here could at least be viewed, and it is not thought that there is a sett in the area south of target notes 8 and 9 (Section 3.3), though this cannot be ruled out.

Aderyn found multiple records of badger from across the wider area, including throughout Connah's Quay to the south. The closest record just under 400m away.

From this is apparent that badgers use the area and, in addition to the sett in the north are likely to forage throughout the area, particularly in the west and north.

Bats

No trees with potential roosting features for bats were found within the survey area. As with the North working area this is not as surprising as it first appears, as while there are very numerous trees within the area (and no systematic search of every tree was possible), all were small, with thin trunks and branches and relatively young without cracks or crevices. The largest trees within the area are the occasional larger ash within the hedgerows, and even these were generally under 5m tall.

The area is considered to be good habitat for foraging bats, with numerous tree/scrub lines forming linear features throughout the site, and generally running in the same northwest-southeast direction. The long scrub line running along the railway corridor along the South working area boundary is a particularly long unbroken feature with good connectivity to surrounding areas and is particularly suitable. Features such as tree and scrub lines are used by bats for commuting and foraging, and it is likely that bats visit the area. Aderyn returned 22 records of several bat species from the surrounding area, the closest 300m to the south, almost all the records are sightings or roosts within the town to the south.

As the area was considered particularly suitable for bat use; in order to investigate bat activity along the railway corridor scrub line, (particularly as this passes very close to the proposed southern compound location, approximately at target note 8, Section 3.3) a bat transect survey was carried out in the southeast of the site (three species of bat were recorded with activity concentrated on the southern boundary of the site – see Section 3.5)

The buildings around the edge of the surveyed area were not assessed for bats as they were not part of the site and will not be affected by the works.

Nesting Birds

All of the trees, scrub and taller vegetation across the site was suitable for nest building, and all taller vegetation on the site should be considered likely nesting habitat within the breeding season. It is possible that ground nesting birds may use open areas of the scrub/grassland in the northwest of the site, but this area has been subject to disturbance through scrub clearing. No nests or evidence of nesting specifically was seen, but the survey took place after the nesting season.

There were 3,397 bird records from throughout the search area, This is not unusual for a site of this size and nature and includes ground nesting species such as Lapwings. A large number of records are recorded to the OS grid square covering the site. The closest records are house martin (*Delichon urbicum*) and swallow (*Hirundo rustica*) records from Connah's Quay, 120m to the south,

There are records of Barn owl from the area, but the closest of these records is over 1.5km from the site.

Reptiles

Most of the site contains good reptile habitat, with areas of scrub and longer grassland for cover and foraging, plus open areas for basking found over all of the grassland areas, and the saltmarsh. The best habitat was in the northwest, where there were frequent small open areas, as well as large numbers of small piles of rubble, brash, logs and wood chippings. This area also has good connectivity to the railway corridor immediately to the south, which was also highly suitable for reptiles (where visible), and with good connectivity to the wider surrounding area along the railway. The proposed enhancement area around target note 2 (Section 3.3) was also highly suitable; this area was more isolated from the railway corridor but the southern edge of the saltmarsh and embankment also provide some connectivity. The scrub and neutral grassland meadow in the north centre of the site are the least suitable areas, with limited open ground that wasn't hardstanding, but appeared useable.

Aderyn have nine records of reptile species within the search area, of which five are within 1km; these are all records of common lizard (*Zootoca vivipara*), including two records from the railway corridor immediately south of the site (though from 1999), and a 2013 record in grassland 300m east of the eastern end of the site. Adder (*Vipera berus*) and grass snake (*Natrix helvetica*) were recorded over 1km to the south in Connah's Quay in 2000??-2001.

With abundant good habitat and records of common lizard from the railway very close to the site (even if old), it is very likely that common lizard, and possibly other reptile species) are found on the site, particularly along the southern boundary and in the west.

Other Protected Species

There were no signs of any other protected species on site. The river corridor to the north is likely to be used by otters as there are three Aderyn records of otter on the Dee, and so it is possible that they might visit the site, particularly the saltmarsh area. The waterbodies present are not suitable for water vole, and the area is too enclosed and not suitable for brown hare. Hedgehog may use the scrub and grassland areas, and there are potential hibernation sites within the dense scrub. There are several records of hedgehogs in Connah's Quay to the south.

Pipe Laydown Area walkover notes

Habitats

Grassland

The proposed pipe laydown area covers a large area to the north and east of the North working area, and is also part of the TATA steel complex, the majority of the area is urban grassland managed by occasional mowing, with frequent patches of dense or scattered scrub. Various sward lengths were present, with some very short and frequently cut areas adjacent to roads and buildings (mapped as amenity grassland), however most of the grass was between 10 and 30cm long, (with some areas up to 50cm) particularly in the east and so was probably cut in late autumn or early winter 2020 prior to the survey.

The surveyed area can be roughly divided into two parts based on the north-south road which runs across the centre of the area (See target note 5, Section 3.3), particularly in terms of the grassland. The grassland in the north western part of the route was longer, and probably infrequently managed with significant scrub encroachment, while to the east of this line the grass was shorter, probably more frequently cut, and with much less scrub within the sward, the scrub being more concentrated into dense stands, though there were some isolated shrubs and small trees.

The grassland was, in general, much less species rich than the North working area and had a generally similar species composition across the entire area. The lower species diversity recorded is likely partially due to the time of the survey (January), but areas of high diversity would have been apparent. The grassland was species poor semi-improved neutral grassland dominated by grasses including perennial rye (*Lolium perenne*), Cock's foot (*Dactylis glomerata*) – almost all the tall grass stems were *Dactylis* - and red fescue (*Festuca rubra*); other grasses were almost certainly present but inconspicuous and without seed heads. Other species included creeping buttercup, yarrow, ribwort plantain, common vetch, red and white clover, hop trefoil, and occasionally birds foot trefoil and soft rush (*Juncus effusus*) and mosses in wet areas.

The grassland around the buildings north-east of the road was the tallest (up to 0.5m) and, in places, wet underfoot, with occasional stands of yellow flag iris (*Iris pseudacorus*), and abundant mosses. The sward also contained frequent tall rosebay willowherb, curled dock, foxglove (*Digitalis purpurea*) hogweed, and the remains of other umbellifers. To the south of the pipe route some tall earth embankments were slightly more diverse, with teasel, common field speedwell, creeping cinquefoil, thistles and horsetail (*Equisetum Arvense*) but also significant scrub cover. The North-eastern grassland contained scrub regeneration

throughout, from individual small trees and patches of bramble, up to large patches of impenetrable scrub. Much of this was buddleia, with individual shrubs dotted throughout the area, plus individual and stands of roses (including *Rosa canina*) birch, gorse, willow, and hawthorn. Some small trees have been planted (with tree guards and supports) along the northern edge of the surveyed area. Bramble was also frequent throughout. Rabbit warrens were very common throughout this area, with frequent signs of digging.

To the east of the road the sward was generally shorter, but of similar composition with much less scrub and taller forbs, which have been cut. Species included hoary mustard (*Hirschfeldia incana*), spear thistle, common field speedwell, scarlet pimpernel, rough hawkbit (*Leontodon hispidus*) and *Chenopodium album*. Large areas in the south of the site were mown very short (under 10cm) and classed as amenity grassland. This was of very low diversity and dominated by grasses, daisy (*Bellis perennis*) ribwort plantain, thistles and clover.

Trees and Scrub

Scattered scrub of individual small trees and shrubs was found throughout the site, though much more prevalent west of the central road, where management is much less intense. This was primarily buddleia, with hawthorn, roses, gorse and willow, while almost all of the trees were silver birch; under 4m in height, with occasional ash, taller hawthorn and willow.

East of the road there were large stands of scrub within the grassland; much of this was low (up to 1m in height) and dominated by bramble and gorse, while in the south and along the site boundaries there were stands of small trees, dominated by birch and hawthorn saplings.

A few small areas contained large enough trees to be considered semi-natural woodland; a block to the south of the eastern pond was, similar to the scrub, dominated by birch, with hawthorn and ash. This area was very wet and had very shaded understorey with limited ground flora, dominated by ivy and bramble in drier areas, but often bare ground or standing water. South of the western pond was a block of tall trees over 5m, again dominated by birch, with grey willow, ash, and occasional scots pine (*Pinus sylvestris*). There was little ground flora, dominated by moss and leaf litter, with some bramble.

Other Habitats

Habitats other than grassland, trees and scrub were rare. The site is criss-crossed by both road and railway lines, the hardstanding is generally in good condition and well used, with limited vegetation; likewise, the railways (which are likely treated with herbicide), though grassland plants are colonising some of the lines.

In the centre of the site was a large open area used as a rubbish tip, - this had large piles of rubble, metal sheeting and other material, and an open area of bare ground with sparse vegetation of mosses and grass. The eastern site boundary along the railway in particular, but also around the rubbish tip and close to buildings, featured large piles of rubble, brash and timber, which was highly suitable for reptiles or other small animals.

There were two large ponds, fringed by common reed (See target notes, Section 3.3), which were stocked with fish (Pers. Com, TATA staff) – being used by the local angling club, and fringed with willow and birch scrub. A smaller, very shallow pond in the north has formed over concrete on the site of demolished fuel tanks, this was shallow, appearing less than 0.4m deep (with a concrete bed), and fringed with buddleia, reed, and grasses.

Invasive non- native species

No invasive non-native species were recorded anywhere within the pipe layout area. The desk study recorded no records of invasive species within the site, the nearest over 200m to the east across the railway lines.

There was no evidence of non-native animal species, and no records of such.

Fauna

Amphibians

The three waterbodies within the site have limited potential for breeding amphibians. The two large ponds are known to be stocked with fish (large carp) which will predate amphibian eggs. These ponds are otherwise considered suitable, with deep open water and emergent vegetation for shelter and laying, and so it is possible that common amphibians are present; however the fish make it unlikely that the pools are used by the great crested newt (*Triturus cristatus*), or other amphibians, for breeding. The culvert had very little water and is likely very variable, as well as mostly underground. It is doubtful if amphibians could easily access the water due to the steep concrete sides and so a breeding population of any species is thought unlikely.

The site has abundant terrestrial habitat for amphibians in the longer grass and scrub, both around the margins and in the central grassland, when not cut short, so it is likely that common amphibians visit the area. There were only three records of (common) amphibians near to the site, all south of the Dee and from the 20th century.

Badger

Unequivocal evidence of badger (*Meles meles*) activity was present in scrub areas to the southeast of the site (at target note 11, Section 3.3), where a latrine and sett were found, though the sett did not appear active at the time of the survey as the entrance was blocked with leaf litter and sticks. The rest of the site has a large rabbit population, including numerous warrens (particularly west of the central road) with associated digging, some of which could be badger, but no specific evidence, or burrows of sufficient size was found.

No other setts were seen. Much of the scrub in the area was suitable for sett building, but the only completely inaccessible areas were low scrub in the east of the site, and there were no obvious trails leading into them and it is not thought likely that any setts were missed. It is possible that there may be setts in the inaccessible areas to the east and north of the site boundary, but it is not thought likely that any are within 30m of the working area, as most of these areas were open and visible from the site, except some of the dense scrub on the railway.

The area contains good foraging habitat for badgers on the many grassland and scrub areas and it is likely they are active over the entire area. There were multiple records of badger from across the wider area, but all over 200m away and mostly south of the Dee.

Bats

No trees with potential roosting features for bats were found within the survey area. As with the North working area this is not as surprising as all were generally small, with thin trunks and branches and relatively young without cracks or crevices. The largest trees are in the woodland south of the west pond, or outside the boundary to the east, no particular features were seen. There were some larger trees in the amenity grassland to the south of the route, - no specific features were seen here though these trees were not assessed in detail as they are some distance from the works area. The buildings around the edge of the surveyed area were not directly assessed for bats; Some of the buildings within the area do likely have limited bat potential, but it is not anticipated that the works will affect any buildings.

The area is considered to be good habitat for foraging bats, with numerous tree/scrub lines forming linear features which would be of use for bats for commuting and foraging, and it is likely that bats visit the area. The desk study returned records of several bat species from the surrounding area, the closest over 500m to the east.

Nesting Birds

All of the trees, scrub and taller vegetation across the site are suitable for nest building, and should be considered likely nesting habitat within the breeding season. No nests or evidence of nesting specifically was seen (except some old nests on trees adjacent to the large central pond), but the survey took place after the nesting season.

There were a great many bird records (over 4,000) from throughout the search area, though this is not unusual for a site of this size and nature. A large number of records are recorded to the OS grid square covering the site.

There are records of Barn owl (*Tyto alba*) within fields northwest of the Tata site in 2010. An owl pellet was found during the survey in the northwest of the site (see target note 3, Section 3.3), but this was consistent with tawny owl (*Strix aluco*); it is possible that both owls visit the site.

Reptiles

Most of the area (with the exception of the short amenity grassland areas) was considered good habitat for reptile species, with numerous piles of rubble and brash, and scrub for cover and possible refugia, and open grassland for basking.

The scrub and open sand on the margins of the lagoon in the south are considered very good habitat for reptiles, with cover and open ground, and connectivity to further similar habitat along the river corridor, so it is possible that reptiles are found here. The presence of reptiles probably depends on the degree of isolation from other populations.

Aderyn have records of three reptile species within the search area, adder (*Vipera berus*), grass snake (*Natrix helvetica*) and common lizard (*Zootoca vivipara*). Most of the reptile records are to the south of the Dee, but grass snake was recorded within the Tata Steel site 1.4km to the northeast, near a series of ponds.

Other Protected Species

There were no signs of any other protected species on site. This area is further from the river corridor to the south, and without linear watercourses (above ground at least) it is unlikely to

be used by otters or water vole. The grassland is suitable for brown hare and there is one record of this species within the Tata site only 50m to the north, so this species may well visit the site when not recently cut. Hedgehog (*Erinaceus europaeus*) may use the scrub and grassland areas, and there are potential hibernation sites within the dense scrub, though hedgehogs are not recorded within the Tata site.

Appendix D: Plant species lists

(This list is Not Exhaustive). No invasive, protected or notably rare species were found. The columns to the right indicate which Habitat within the sites the plant was observed at; many species were present at both. All Scientific names as Stace (2019) 4th edition.

SI = Semi improved grassland, (includes the SI/ruderal and Scrub matrix in the west of the site and the enhancement area), and the grassland in the pipe layout area.

NG = Neutral Grassland.

DS/Trees = All Scrub and trees including dominant ground flora where present

Other = Hardstanding and bare ground areas

There was no aquatic vegetation except in the saltmarsh area.

Scientific name	Common Name	North Working area and Pipe Laydown			South working area				
		SI	NG	DS/Trees	SI	NG	DS/Trees	Saltmarsh	Other
<i>Acer campestre</i>	Field Maple						x		
<i>Acer pseudoplatanus</i>	Sycamore			x			x		
<i>Achillea millefolium</i>	Yarrow	x	x		x	x		x	x
<i>Agrostis stolonifera</i>	Creeping Bent				x	x			
<i>Anagallis arvensis</i>	Scarlet Pimpernel		x			x			x
<i>Arctium sp.</i>	A burdock								x
<i>Artemisia vulgaris</i>	Mugwort	x	x		x	x			x
<i>Betula pendula</i>	Silver Birch			x			x		
<i>Buddleja davidii</i>	Butterfly-bush			x			x		x
<i>Calystegia sepium</i>	Hedge Bindweed			x	x	x			x
<i>Centaurea nigra</i>	Common Knapweed	x	x		x	x			
<i>Chamaecyparis lawsoniana</i>	Lawson's Cypress			x					

Scientific name	Common Name	North Working area and Pipe Laydown			South working area				
		SI	NG	DS/Trees	SI	NG	DS/Trees	Saltmarsh	Other
<i>Chamerion angustifolium</i>	Rosebay Willowherb	x		x	x		x		x
<i>Chenopodium album</i>	Fat-hen				x				x
<i>Cirsium arvense</i>	Creeping Thistle	x	x		x	x			x
<i>Cirsium vulgare</i>	Spear Thistle	x	x		x	x			x
<i>Conopodium majus</i>	Pignut		x			x			
<i>Corylus avellana</i>	Hazel						x		
<i>Crataegus monogyna</i>	Hawthorn			x			x		
<i>Cupressus macrocarpa</i> x <i>Xanthocyparis nootkatensis</i> = X <i>Cuprocyparis leylandii</i>	Leyland Cypress			x					
<i>Cynosurus cristatus</i>	Crested Dog's-tail	X	x						
<i>Cytisus scoparius</i>	Broom			x					
<i>Dactylis glomerata</i>	Cock's-foot	X	x		x	x		x	
<i>Dipsacus fullonum</i>	Teasel	X			x	x			
<i>Dryopteris filix-mas</i>	Male Fern						x		
<i>Elytrigia repens</i>	Common Couch	X			x				
<i>Epilobium hirsutum</i>	Great Willowherb	X	x		x				
<i>Erodium cicutarium</i>	Common Stork's-bill		x						
<i>Euphorbia helioscopia</i>	Sun Spurge			x	x				x
<i>Festuca rubra</i>	Red Fescue	X	x		x	x		x	x
<i>Fraxinus excelsior</i>	Ash			x			x		
<i>Fumaria capreolata</i>	White Ramping-fumitory				x	x			x

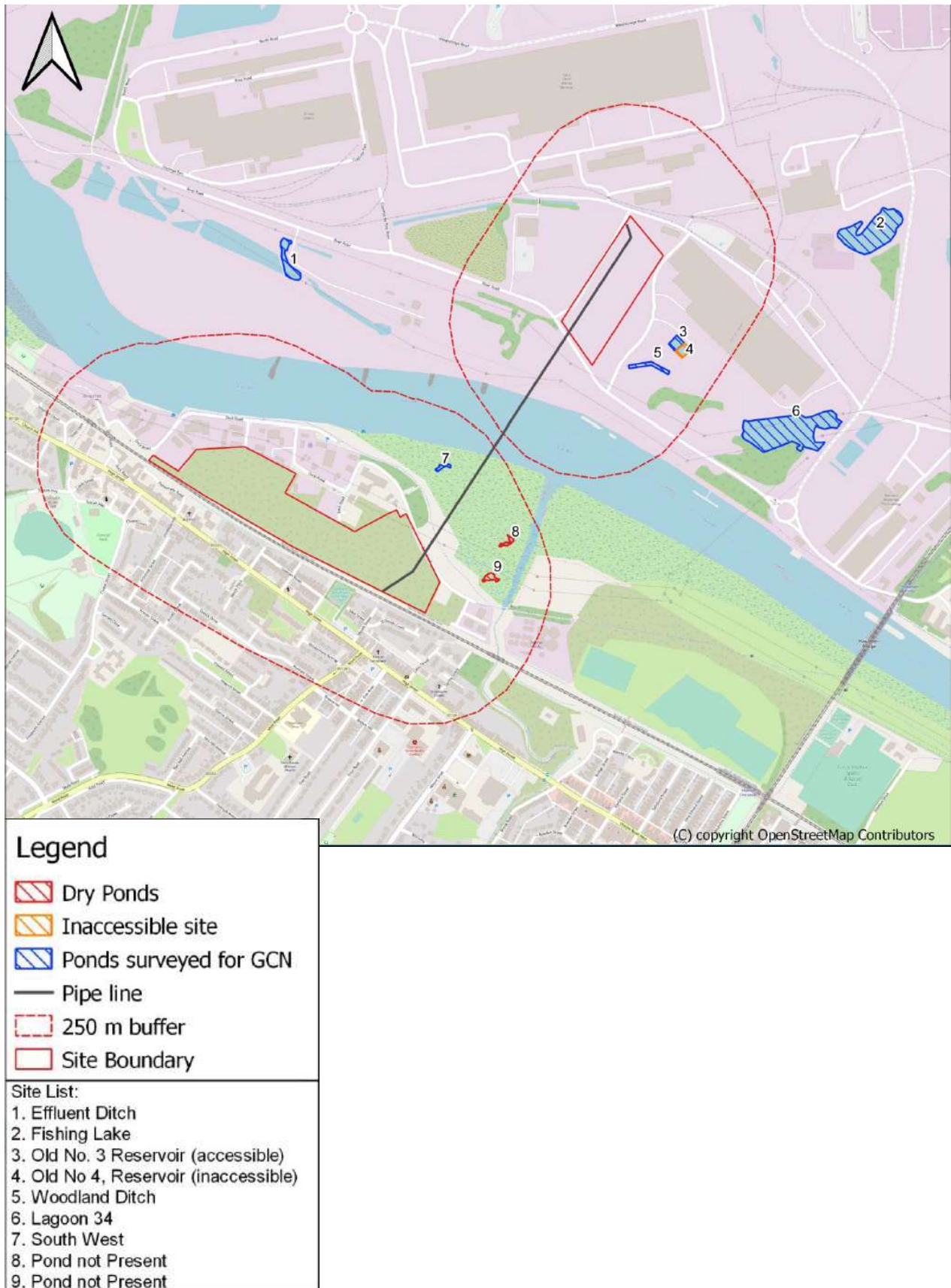
Scientific name	Common Name	North Working area and Pipe Laydown			South working area				
		SI	NG	DS/Trees	SI	NG	DS/Trees	Saltmarsh	Other
<i>Galium verum</i>	Lady's Bedstraw	X				x			
<i>Geranium pyrenaicum</i>	Hedgerow Crane's-bill				x				x
<i>Geranium robertianum</i>	Herb-Robert				x				x
<i>Halimione portulacoides</i>	sea purslane							x	
<i>Hedera helix</i>	Common Ivy			x			x		x
<i>Heracleum sphondylium</i>	Hogweed	x	x		x	x			
<i>Hirschfeldia incana</i>	Hoary Mustard	x							x
<i>Holcus lanatus</i>	Yorkshire-fog	x	x		x	x		x	
<i>Hordeum murinum</i>	Wall Barley				x	x			
<i>Lactuca serriola</i>	Prickly Lettuce		x						
<i>Lamium purpureum</i>	Red Dead-nettle			x		x			
<i>Lathyrus latifolius</i>	Broad-leaved Everlasting-pea			x					
<i>Leontodon hispidus</i>	Rough Hawkbit			x	x				x
<i>Leucanthemum vulgare</i>	Oxeye Daisy					x			
<i>Linaria vulgaris</i>	Common Toadflax		x		x	x			
<i>Lolium perenne</i>	Perennial Rye-grass	x	x		x	x		x	
<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	x	x		x	x			
<i>Malus pumila</i>	Apple			x			x		
<i>Medicago lupulina</i>	Black Medick	x			x	x			
<i>Mentha arvensis</i>	Corn Mint					x			
<i>Mercurialis perennis</i>	Dog's Mercury			x					

Scientific name	Common Name	North Working area and Pipe Laydown			South working area				
		SI	NG	DS/Trees	SI	NG	DS/Trees	Saltmarsh	Other
<i>Myosotis arvensis</i>	Field Forget-me-not		x						
<i>Oenothera biennis</i>	Common Evening-primrose		x	x					
<i>Papaver rhoeas</i>	Poppy					x			x
<i>Pentaglottis sempervirens</i>	Green Alkanet				x				
<i>Perforate St John's-wort</i>	Hypericum perforatum		x		x	x			
<i>Persicaria maculosa</i>	Redshank				x				x
<i>Petasites fragrans</i>	Winter Heliotrope	x	x						x
<i>Picris echioides</i>	Bristly Oxtongue				x				x
<i>Plantago lanceolata</i>	Ribwort Plantain	x	x		x	x			x
<i>Poa trivialis</i>	Rough Meadow-grass				x				
<i>Polypodium vulgare</i>	Polypody			x					
<i>Potentilla reptans</i>	Creeping Cinquefoil				x	x			
<i>Potentilla sterilis</i>	Barren Strawberry				x				
<i>Prunus avium</i>	Wild Cherry			x			x		
<i>Prunus sp.</i>	cherry			x			x		
<i>Prunus spinosa</i>	Blackthorn						x		
<i>Pteridium aquilinum</i>	Bracken			x					
<i>Puccinellia maritima</i>	saltmarsh grass							x	
<i>Quercus petraea</i>	Oak						x		
<i>Ranunculus bulbosus</i>	Bulbous Buttercup		x						

Scientific name	Common Name	North Working area and Pipe Laydown			South working area				
		SI	NG	DS/Trees	SI	NG	DS/Trees	Saltmarsh	Other
<i>Ranunculus repens</i>	Creeping Buttercup				x	x			
<i>Reseda luteola</i>	Weld				x				
<i>Rosa arvensis</i>	Field-rose			x			x		
<i>Rosa canina</i>	Dog rose			x					
<i>Rubus fruticosus</i> agg.	Bramble	x	x	x	x	x	x	x	x
<i>Rumex crispus</i>	Curled Dock		x		x	x			x
<i>Salix cinerea</i> subsp. <i>cinerea</i>	Grey Willow						x		
<i>Salix</i> sp.	Willows			x			x		
<i>Sambucus nigra</i>	Elder			x			x		
<i>Schoenoplectus lacustris</i>	Common Club-rush							x	
<i>Senecio jacobaea</i>	Common Ragwort								
<i>Senecio vulgaris</i>	groundsel								x
<i>Sisymbrium officinale</i>	Hedge Mustard		x		x				
<i>Sonchus asper</i>	Prickly Sow-thistle		x						
<i>Sorbus acuparia</i>	Rowan						x		
<i>Spartina anglica</i>	Cord Grass							x	
<i>Stachys sylvatica</i>	Hedge Woundwort		x						
<i>Stellaria holostea</i>	Greater Stitchwort						x		x
<i>Tanacetum vulgare</i>	Tansy		x		x	x			
<i>Teucrium scorodonia</i>	Wood Sage			x					
<i>Trifolium campestre</i>	Hop Trefoil		x						
<i>Trifolium pratense</i>	Red Clover	x	x						

Scientific name	Common Name	North Working area and Pipe Laydown			South working area				
		SI	NG	DS/Trees	SI	NG	DS/Trees	Saltmarsh	Other
<i>Trifolium repens</i>	White Clover	x	x						
<i>Tripolium pannonicum</i>	sea aster							x	
<i>Ulex europaeus</i>	Gorse			x					
<i>Urtica dioica</i>	Common nettle			x	x		x		x
<i>Veronica hederifolia</i>	Ivy-leaved Speedwell		x						x
<i>Veronica persica</i>	Common Field-speedwell	x	x			x			
<i>Vicia cracca</i>	Tufted Vetch	x			x	x			x
<i>Vicia hirsuta</i>	Hairy tare					x			
<i>Vicia sativa subsp. segetalis</i>	Common Vetch	x	x						
<i>Hirschfeldia incana</i>	Hoary Mustard	x							
<i>Iris pseudocorus</i>	Yellow Iris	x							
<i>Equisetum arvense</i>	Horsetail	x							

Appendix E: GCN survey pond locations and photographs





Photograph 1 – Effluent Ditch



Photograph 2 – Fishing Lake



Photograph 3 – Lagoon 34



Photograph 4 – Woodland Ditch



Photograph 5 – Old No.3 Res (accessible)



Photograph 6 – Old No.3 Res (inaccessible)

Appendix F: Scientific names of birds included in this report

The table below lists the names of birds used throughout this report and the scientific names of those birds. The bird species names that have been used are those that are in common use amongst English ornithologists. This corresponds to the “British (English) vernacular name 2017” identified by the British Ornithologists Union (BOU, 2017). The corresponding scientific names are those also listed in that BOU publication.

British (English) Vernacular Name	Scientific Name
Canada goose	<i>Branta canadensis</i>
Greylag goose	<i>Anser anser</i>
Mallard	<i>Anas platyrhynchos</i>
Tufted duck	<i>Aythya fuligula</i>
Teal	<i>Anas crecca</i>
Little grebe	<i>Tachybaptus ruficollis</i>
Grey heron	<i>Ardea cinerea</i>
Cormorant	<i>Phalacrocorax carbo</i>
Green sandpiper	<i>Tringa ochropus</i>
Redshank	<i>Tringa totanus</i>
black-headed gull	<i>Chroicocephalus ridibundus</i>
Great black-backed gull	<i>Larus marinus</i>
Herring gull	<i>Larus argentatus</i>
Carrion crow	<i>Corvus corone</i>
Stonechat	<i>Saxicola rubicola</i>
Grey wagtail	<i>Motacilla cinerea</i>
Pied wagtail	<i>Motacilla alba</i>
Chaffinch	<i>Fringilla coelebs</i>
Linnet	<i>Linaria cannabina</i>

Appendix G: UKHab classification data

In order to facilitate assessment of the scheme under the Natural England (NE) Biodiversity Net Gain Calculator 2.0, the habitats on the site have also been classified under the UK Habitat classification scheme (referred to as UKHab).

This scheme does not directly translate from Phase 1 habitats in all cases; Phase 1 habitat assessment has much broader categories, and UKHab has a minimum mappable unit of 25m², or larger on an area of the size of the Dee Crossing site. Nevertheless, the table below provides a summary of the habitats within the site and their UKHab classifications. Habitat conditions and distinctiveness (in the final two columns) have been assessed as per the Defra standard condition assessment sheets used by the NE Biodiversity Metric 2.0.

Phase 1 Habitat Type	UKHab Habitat Type	Primary UKHab Habitat Code	Secondary UKHab Codes ¹	Areas Applied to/Notes	Condition	Distinctiveness
Semi improved Neutral Grassland	Neutral grassland	g3c6	117, (99 – south working area only)	Covers the better grassland assessed as g3c6, <i>Lolium</i> dominant. <i>Marked as Semi-improved neutral grassland on the Phase 1 maps of the site.</i>	2	Low
Semi improved Neutral Grassland	Lowland Neutral grassland	g3a	99, 117	The nature reserve area north of Dock road is marginal g3a/g3c but should be assessed as g3a.	2	Medium
Grassland matrix in the west of the South working area	Neutral grassland	g3c6	10	Much of the southern “Crumps Yard” area is considered to also be g3c6 neutral grassland under UKHab, while still considered semi improved grassland under Phase 1.	2	Low

Phase 1 Habitat Type	UKHab Habitat Type	Primary UKHab Habitat Code	Secondary UKHab Codes ¹	Areas Applied to/Notes	Condition	Distinctive ness
Poor semi improved grassland (B6) - rest of site	Neutral grassland	g3c	11, 64, 20	Species poor semi-improved grassland covering large areas of the sites, excluding the crumps yard area. This is too diverse to be considered g4, but overall species poor.	2	Low
Semi-improved grassland, Amenity grassland	Modified grassland	g4	66, 10, 20	The amenity grassland found across the entire site, particularly the mown margins.	1	Very low
Ephemeral Short perennial. Including the “enhancement area”	Mosaic of developed/ natural surface	u1d	10, 17	Insufficient area to qualify as “Open mosaic habitats on previously developed land”. Regeneration vegetation on gravel and bare ground – vegetation is covered by secondary codes.	3	Medium
Saltmarsh	Continuous saltmarsh	t2a	30	Coastal saltmarsh areas. t2a only as it is degraded. Priority Habitat.	2	High ²
Scrub (all scrub on both North and South working areas)	Dense continuous scrub	h3h h3f h3d	117	Dense Scrub. Most is generic h3h (mixed scrub), or occasional h3f (hawthorn scrub), some areas of bramble scrub are h3d, bramble scrub.	2	Low
Dense continuous	Continuous scrub	h3f		Scrub adjacent to large ponds in the pipe laydown area was low, bramble dominated.	1	Low

Phase 1 Habitat Type	UKHab Habitat Type	Primary UKHab Habitat Code	Secondary UKHab Codes ¹	Areas Applied to/Notes	Condition	Distinctive ness
scrub by ponds						
Semi Natural Broadleaved woodland	Lowland Broadleaved woodland	w1h5, w1f	38, 117	Woodland areas around the sites with the exception of the wet woodland area immediately south of the pond (cf. Target note 8)	2	Medium
Semi Natural Broadleaved woodland	Lowland Broadleaved woodland	w1g	38, 120	Woodland area immediately south of the pond (cf. Target note 8) was very wet	2	Medium
Bare ground areas	J4 bare ground	s	73	S – sparsely vegetated areas. Open sand on drained lagoons in south of North working area.	1	Low
Other habitats	J5 - hardstanding	u1e, u1b1 u1b5	-	u1e built linear features, u1b5, buildings. U1b developed land sealed surface.	1	Very low
Water	r1	r1b	39	r1b standing open water.	2	Low
Water	r1	r1b	39	Concrete lined ponds in North.	1	Low
Freshwater Marginal Vegetation	Reedbeds	f2e	-	Pond margins, comprising reedbeds, in pipe laydown area.	3	Medium
Trees	Trees	As underlying grassland	20	Scattered trees are almost exclusively on g3c and g4 habitats	2	Medium
Hedgerows	All hedgerows	h2b	47	All hedgerows on site are h2b – other hedgerows. None were species rich. Most were unmanaged (sec. code 80).	2	Medium

Phase 1 Habitat Type	UKHab Habitat Type	Primary UKHab Habitat Code	Secondary UKHab Codes ¹	Areas Applied to/Notes	Condition	Distinctive ness
				<u>All</u> hedgerows present were over 1m wide and so treated as h2 polygons – no linear features need be considered.		
Walls, fences J2.4, J2.5.	Boundary features – wall. fence	As underlying habitat	68, 69	u1e built linear features. However none were wider than 1m, and so should be treated as the adjacent primary habitat with sec codes: 68 (mortared wall) or 69 (fence).	1	Very low
Wet ditch	r1	r1	191	Very shaded and unvegetated concrete culvert	1	Very low

¹Secondary codes are only given here if they apply to the majority or whole areas in question. More secondary code information is provided in 'Areas Applied to/Notes' if needed.

²We believe this has to be rated high as a Priority Habitat, but is somewhat degraded.

Figures G1 and G2 below show the UKHab Classification primary habitats for the North working area and pipe laydown route, and South working areas of the site, respectively. The figures show primary habitats using the official UKHab display files from UKHab Ltd. Secondary codes are generally not shown. Target notes are as per the Phase 1 maps (Figure 4-2 and Figure 4-3)

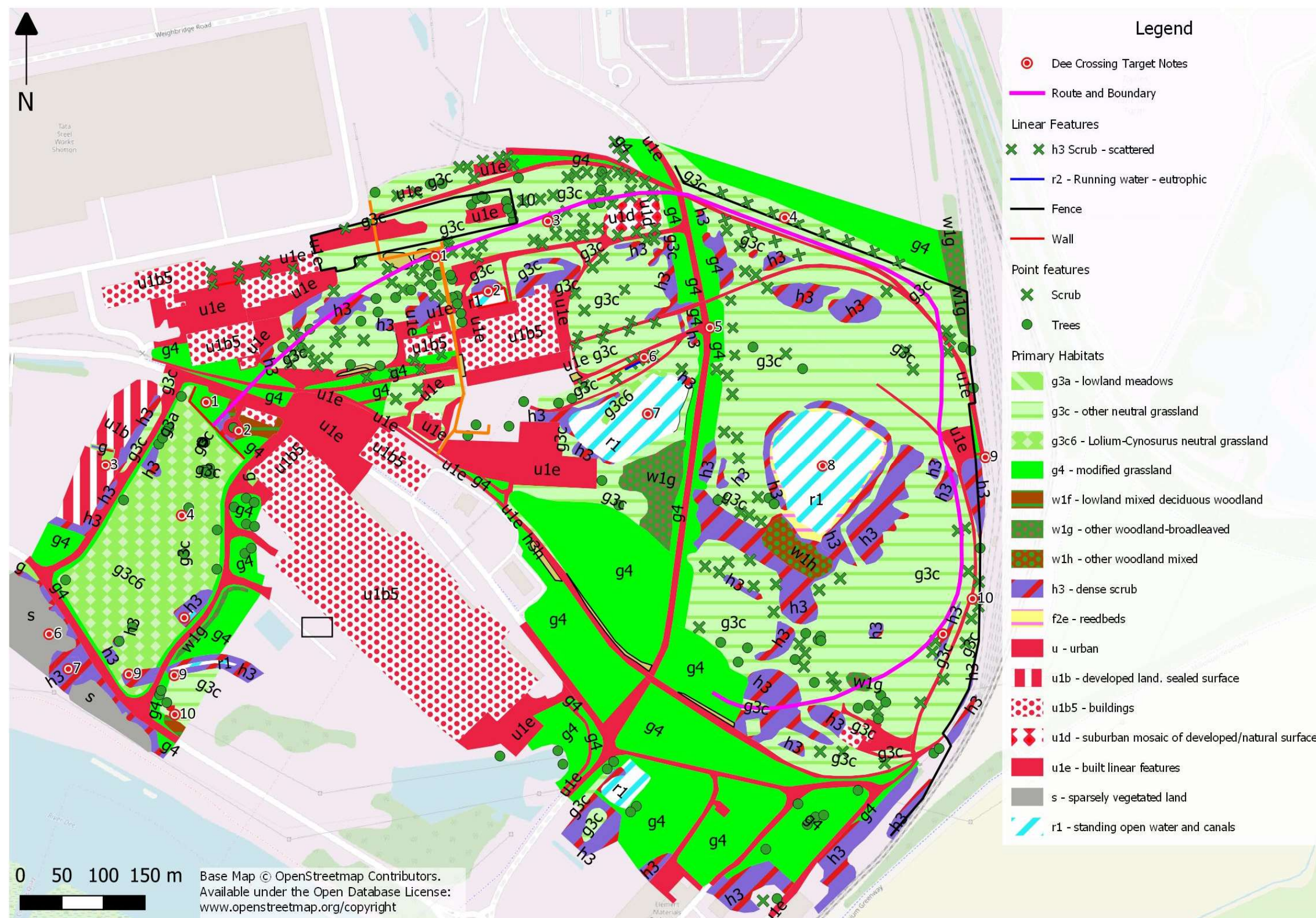


Figure G1 UKHab Primary Habitat Map of the North working area and pipe laydown route. Selected secondary codes only shown.

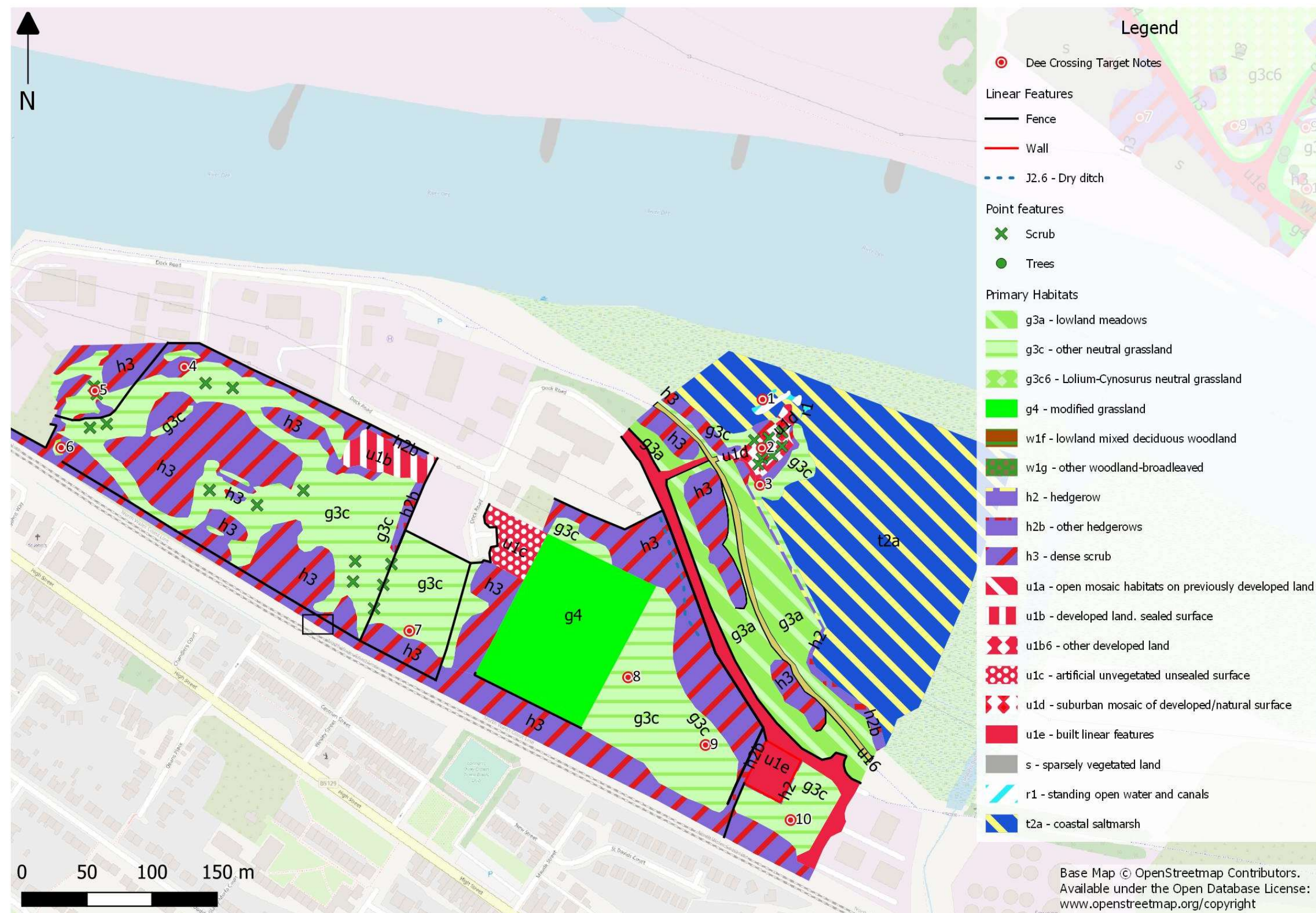


Figure G2 UKHab Primary Habitat Map of the South working area.