Willowbrook South
Green Infrastructure Statement

23 September 2024

This **Green Infrastructure Statement** has been prepared by:

Based on the site layout designed by:

With Arboricultural input from:

And Ecology input from:

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Contents

01 Introduction

Tir Collective is instructed by Cardiff Living to prepare this **Green Infrastructure Statement** (GI Statement) which relates to the proposed residential development of an area of land south of Willowbrook Drive located in St. Mellons, Cardiff. The redline boundary of the site is shown on **Figure 1**.

This GI Statement has been prepared by a Landscape Architect and Chartered Landscape Architect at **Tir Collective**. A GI Statement is a mandatory requirement to accompany all planning applications in Wales, in accordance with Planning Policy Wales Edition 12 (PPW12), published February 2024.

This GI Statement should be read alongside the surveys, reports, and proposals that have been carried out as part of the development of the scheme, which accompany the planning application. They are as follows:

- Topsoil Resource Survey and Soil Resource Plan, Tim O'Hare Associates LLP, November 2020
- Preliminary Ecological Appraisal, Soltys Brewster Ecology, July 2022
- Stage 1 Habitats Regulations Assessment (HRA) Screening Report, Soltys Brewster Ecology, November 2023
- Tree Survey, Categorisation and Constraints Report, Steve Ambler and Sons Tree Specialists Ltd, June 2020
- The Landscape Strategy produced by Tir Collective, July 2024

The Site

The Site is located in the residential area of St. Mellons, situated to the northeast of Cardiff City Centre. The application boundary covers 1.11 hectares of land, and is encompassed by Willowbrook Drive which skirts the Site boundary to the north with Crickhowell Road skirting the east and southeast site boundary. The southern boundary is defined by existing residential development.

To the north of the site and Willowbrook Drive is the approved Willowbrook North residential development, which is due to start construction in 2024.

The site is comprised of various features and characteristics, such as grassland and vegetation, formal transient footpaths which connect the surrounding pockets of residential development, and a construction compound.

Figure 1: Site location

02 Policy Context

Wales Legislation

Well-being of Future Generations (Wales) Act 2015

The Act requires public bodies to carry out **sustainable development**. Sustainable development principle is "*the process of improving the economic, social, environmental and cultural well-being of Wales*." The principle is made up of five ways of working, including **looking to the long-term**; taking an **integrated approach**; involving a **diversity** of the population; **working collaboratively**; and **preventing issues**.

It sets out seven well-being goals including resilience and being globally responsible.

Environment (Wales) Act 2016

The Act is intended to work alongside the Well-being of Future Generations Act. It included a new biodiversity duty to **reverse the decline of biodiversity and to secure long-term resilience**.

Section 6 states *"A public authority **must seek to maintain and enhance biodiversity… and in so doing promote the resilience of ecosystems**". In relation to resilience of ecosystems, the following "must be taken into account:*

(a) diversity between and within ecosystems;

(b) the connections between and within ecosystems;

(c) the scale of ecosystems;

(d) the condition of ecosystems (including their structure and functioning);

(e) the adaptability of ecosystems."

The seven well-being goals from Well-being of Future Generations (Wales) Act, 2015

National Planning Policy

Future Wales: The National Plan

The plan provides a strategy for addressing key national priorities through the planning system, including achieving climate-resilience, developing strong ecosystems and improving the health and well-being of our communities. It also embeds the principles of the Well-being of Future Generations (Wales) Act 2015.

The key policy in relation biodiversity and green infrastructure is **Policy 9 – Resilient Ecological Networks and Green Infrastructure**. It states, "*action towards securing the maintenance and enhancement of biodiversity (to provide a net benefit), the resilience of ecosystems and green infrastructure assets must be demonstrated as part of development proposals through innovative, nature-based approaches to site planning and the design of the built environment*."

Planning policy Wales (PPW)

PPW aims to contribute towards the delivery of sustainable development, embedding the principles of the Well-being of Future Generations (Wales) Act 2015. PPW ingrains Placemaking Wales Charter and how sustainable development can be achieved through implementing placemaking.

Section 6.2 sets out **green infrastructure** should be given early consideration in development proposals and how it should be integrated into developments.

- **Paragraph 6.2.12** states " A **green infrastructure statement should be submitted with all planning applications**. This will be proportionate to the scale and nature of the development proposed and will describe how green infrastructure has been incorporated into the proposal… The green infrastructure statement will be an effective way of demonstrating **positive multi-functional outcomes** which are appropriate to the site in question and must be used for demonstrating how the **step-wise approach has been applied**."
- **Paragraph 6.2.14** states "Development proposals should be informed by the priorities identified in green infrastructure assessments and locally based planning guidance. The **Building with Nature standards** represent good practice and are an effective prompt for developers to **improve the quality of their schemes and demonstrate the sustainable management of natural resources**."

Section 6.4 describes **biodiversity and ecological networks** and provides a summary of the **Step-Wise Approach** and how it should be used to "**maintain and enhance biodiversity, build resilient ecological networks and deliver net benefits for biodiversity** by ensuring that any adverse environmental effects are firstly avoided, then minimised, mitigated, and as a last resort compensated for."[1] **Paragraph 6.4.12** states "providing evidence in the Green Infrastructure Statement that the step-wise approach has been followed, a scheme of enhancements must be provided to ensure a **net benefit for biodiversity**."

In relation to **trees, woodland and hedgerows, paragraph 6.4.37** sets out their importance for biodiversity and "connecting habitats for resilient ecological networks and

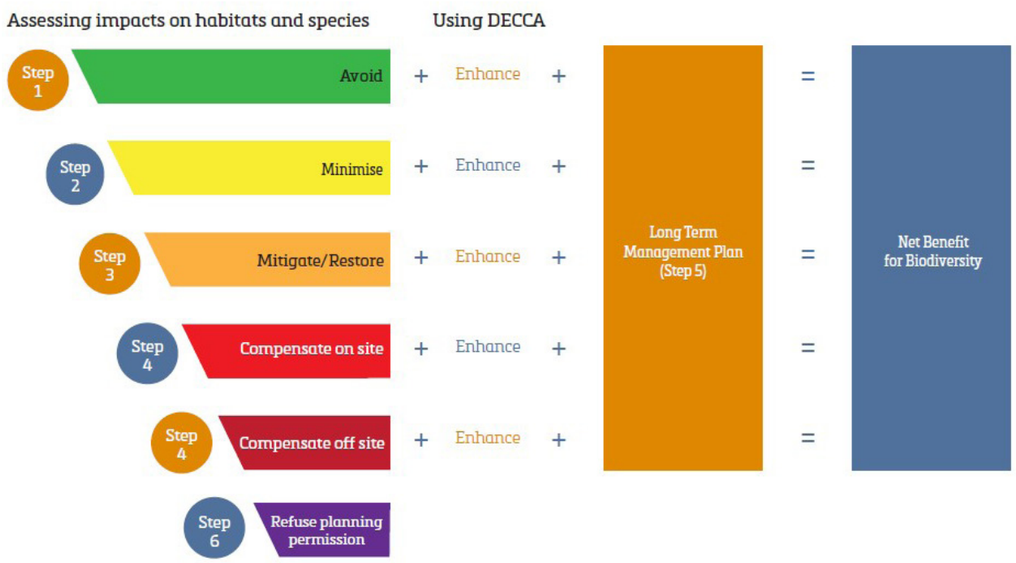
1 Paragraph 6.4.11, Planning Policy Wales Edition 12, February 2024

make an essential wider contribution to landscape character, culture, heritage and sense of place…"

The **planting of new trees, hedgerows, groups of trees and areas of woodland** should be promoted as part of new development. Existing trees/ groups of trees, hedgerows and areas of woodland must be protected "where they have ecological value, contribute to the character or amenity of a particular locality, or perform a beneficial green infrastructure function."[2]

In relation to the permanent removal of trees, woodland and hedgerows, it "will only be permitted where it would achieve significant and clearly defined public benefits."[3] The step-wise approach must also be followed. Where loss is unavoidable, PPW sets out the requirements of replacement planting, which "shall be at a ratio equivalent to the quality, environmental and ecological importance of the tree(s) lost and this must be preferably onsite, or immediately adjacent to the site, and at a minimum ratio of at least 3 trees of a similar type and compensatory size planted for every 1 lost."[4]

2 Paragraph 6.4.39 Planning Policy Wales Edition 12, February 2024
3 Paragraph 6.4.42 Planning Policy Wales Edition 12, February 2024
4 Paragraph 6.4.42 Planning Policy Wales Edition 12, February 2024



The Step-Wise Approach from PPW Edition 12, Chapter 6

Finally, in relation to **SuDS,** paragraph 6.6.18 states "The provision of SuDS must be considered as an **integral part of the design of new development** and considered at the earliest possible stage when formulating proposals for new development." Paragraph 6.6.19 goes on to state "Design for multiple benefits and green infrastructure should be secured wherever possible…"[5]

5 Paragraph 6.6.19 Planning Policy Wales Edition 12, February 2024

Local Planning Policy

Cardiff Local Development Plan 2006-2026

The Cardiff Local Development Plan was adopted in January 2016. In relation to **green infrastructure**, Policy KP16: Green Infrastructure states:

"Cardiff's distinctive natural heritage provides a network of **green infrastructure** which will be protected, enhanced and managed to ensure the integrity and connectivity of this multi-functional green resource is maintained.

… Proposed development should therefore demonstrate how green infrastructure has been considered and integrated into the proposals. **If development results in overall loss of green infrastructure, appropriate compensation will be required.**

Natural heritage assets that are key to Cardiff's character, value, distinctiveness, and sense of place. They include the City's:

[…]

iv. Biodiversity interests including designated sites and the connectivity of priority habitats and species (EN5, EN6 and EN7);

v. Trees (including street trees), woodlands and hedgerows (EN8);

vi. Strategic recreational routes, cycleways, and the public rights of way network (T5, T6 and T8);

vii. Parks, playing fields, green play areas and open spaces (C4 and C5); and

viii. Growing spaces including allotments, community orchards and larger gardens; and

ix. Holistic integrated surface water management systems (EN10)."

Cardiff Green Infrastructure SPG

The Cardiff Green Infrastructure Supplementary Planning Guidance (SPG) was published in November 2017 and provides further guidance to Policy KP16: Green infrastructure. The SPG comprises of 7 documents: The Cardiff Green Infrastructure SPG, and 6 Technical Guidance Notes on the individual elements that make up green infrastructure: Ecology and Biodiversity TGN; Protection and Provision of Public Open Space TGN; Public Rights of Way and Development TGN; River Corridors TGN; Soils and Development TGN; and Trees and Development TGN.

Figure 2 provides the definition for green Infrastructure: “Green infrastructure is a network of multi-functional, connected green spaces that make the best use of land and provide green open space for all, helping wildlife to flourish, and delivering a wide range of economic, health and community benefits.”

Section 2.1.5 states "Green Infrastructure Statement should take account of all of the elements of green infrastructure as set out in Policy KP16

[…]

• Green infrastructure should be considered in terms of the phasing of the development and in conjunction with adjacent developments to achieve connectivity”

Section 2.2.1 states “For all major developments, the existing green infrastructure resource in and around the site…must be described and assessed.” Section 2.3.1 goes on to state “The likely impact of the proposals upon green infrastructure features must be assessed. This should include a holistic assessment of all of the elements of green infrastructure, including the synergies and trade-offs between them.”

Section 3.1.1 states “Where the green infrastructure resource at a site has been identified, and the impacts of a proposed development have been assessed, the subsequent mitigation approach should take into account all relevant elements of green infrastructure.”

Guidance

Placemaking Wales Charter

The **Placemaking Wales Charter** has been developed by Welsh Government and the Design Commission for Wales in collaboration with the Placemaking Wales Partnership. The charter outlines six placemaking principles that cover the range of considerations that contribute to establishing and maintaining good places.

Well designed, maintained and connected green infrastructure is an essential component of good placemaking. The design of the proposed development should focus on well connected GI with multi-functionality to maximise the benefits to residents and the environment.

Landscape Institute Green Infrastructure: An integrated Approach, 2013

The document defines **Green Infrastructure** (GI) as “*the **network of natural and semi-natural features, green spaces**, rivers and lakes… It is a natural, service-providing infrastructure that is often more cost-effective, **more resilient and more capable of meeting** social, **environmental** and economic **objectives**…*”

The Landscape Institute recommends “*local authorities ensure that GI is a core requirement in their policy documents*” and “*developers be aware of an area’s strategic GI goals and appreciate how those goals contribute to mitigating the environmental impacts of new development and creating beautiful places.*”

Building with Nature Standards

The **Building with Nature Standards** Framework 2.0 involves twelve Standards, arranged across four groups. There are six Core Standards and three themes, Wellbeing, Water and Wildlife, containing two Standards in each.

The six Core Standards underpin the delivery of high-quality green infrastructure through design, planning and development. The Standards in the Wellbeing, Water and Wildlife themes build on this to target specific aspects:

CORE Standards

Standard 1 Optimises Multi functionality and Connectivity
Standard 2 Positively Responds to the Climate Emergency
Standard 3 Maximises Environmental Net Gains
Standard 4 Champions a Context Driven Approach
Standard 5 Creates Distinctive Places
Standard 6 Secures Effective Place-keeping

WELLBEING Standards

Standard 7 Brings Nature Closer to People
Standard 8 Supports Equitable and Inclusive Places

WATER Standards

Standard 9 Delivers Climate Resilient Water Management
Standard 10 Brings Water Closer to People

WILDLIFE Standards

Standard 11 Delivers Wildlife Enhancement
Standard 12 Underpins Nature’s Recovery

03 Existing Green Infrastructure

Desktop studies and field surveys have been carried out to confirm the green infrastructure elements on the site and within its surrounding context. The elements that are considered to form the existing Green Infrastructure of the Willowbrook South site and surrounding context are:

- Ecology
- Trees
- Soils
- Public access and open space

The green infrastructure elements are described in the following sections, identifying and assessing existing or potentially important habitat or species. This has been informed by the desktop studies, field surveys and specialist surveys / reports carried out others. It informs the Stepwise approach to **avoid** and **minimise**.

Ecology

A Preliminary Ecological Appraisal (PEA) was carried out by Soltys Brewster Ecology in July 2022, which included an Extended Phase 1 Habitat Survey that covered the site and area to the south and southwest. A Stage 1 Habitats Regulations Assessment (HRA) Screening Report was also conducted by Soltys Brewster Ecology in November 2023 which assessed the Sites potential to impact local designations.

Desk studies confirmed that the site is not covered by, or located adjacent to, statutory or non-statutory nature conservation designations. It confirmed that Cath Cobb Wood, a Site of Importance for Nature Conservation (SINC), also designated as an Ancient Semi Natural Woodland, is located 150m northwest of the site. Hendre Lake West SINC, Hendre Road SINC, and Gwent Levels (Rumney and Peterstone) Site of Special Scientific Interest are located within 1km of the site. The PEA confirmed that the proposed development is unlikely to have a direct impact on the designated sites due to the physical separation between the sites and intervening residential development in the surrounding area.

As highlighted in the HRA, the Severn Estuary, which is designated as a European Marine Site (protected as a SAC and SPA/RAMSAR collectively) is located 2.7km southeast of the application boundary. The findings from the HRA concluded that the proposed development would have no tangible effects, and the risk of any impacts would be considered negligible on the EMS (European Marine Site).

The PEA field surveys identified a limited range of habitats, including: amenity grassland that is regularly cut; dense/continuous scrub with occasional mature trees; and a dry-ditch that runs through the dense scrub that is heavily overgrown.

In relation to species, the dense scrub and trees were considered likely to support a small number of locally commuting and foraging bat species. The survey also identified 5no. trees within the survey area with a low potential to support roosting bats.

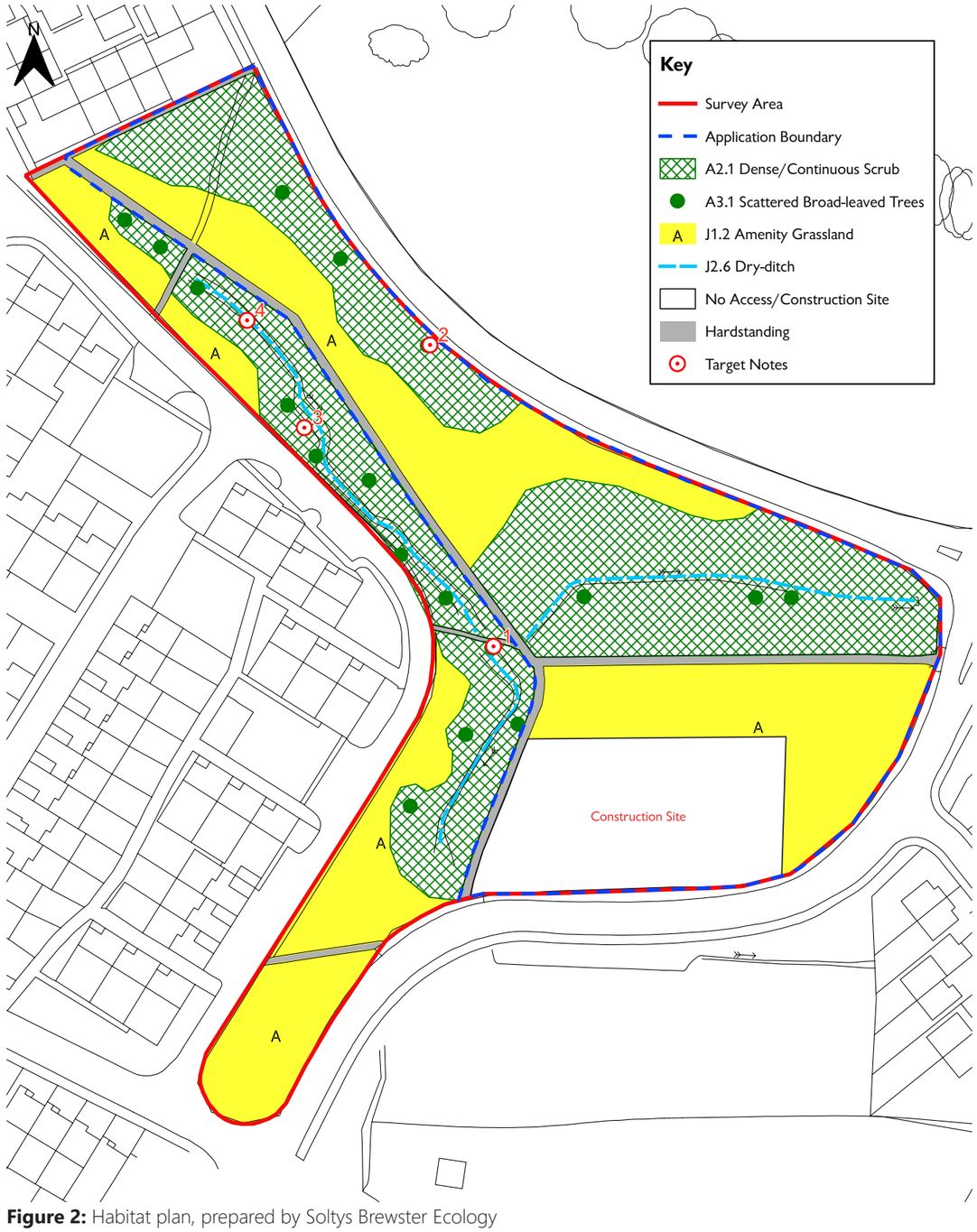


Figure 2: Habitat plan, prepared by Soltys Brewster Ecology

A small number of birds were seen/heard at the site during the survey. The habitats at the site (i.e. dense scrub and trees) are likely to support a number of foraging and nesting bird species. The grassland and scrub habitats at the site were also considered likely to provide foraging opportunities for other priority mammals such as Hedgehog.

Trees

A Tree Survey, Categorisation and Constraints Report was carried out by Steve Ambler and Sons Tree Specialists Ltd in June 2020. The survey followed the methodology as set out in the British Standard 5837:2012 (items 4.2, 4.4, and 4.6).

The survey identified 5no. Category B groups of trees consisting of Pedunculate Oak, Hawthorn, Hazel, Dogwood, Field Maple, and Alder among other species. 8no. individual Category B trees were also surveyed comprising Pedunculate Oak, and Horse Chestnut species. It should also be noted that all the Category B groups and individual trees in the south-western part of the site are covered by Tree Preservation Orders (TPO).

2no. Groups of category C trees were identified within the site, consisting of White Willow, Dogwood, Hawthorn, and Holly. 3no. individual category C trees were also surveyed, species include White Willow and Ash.

One single White Willow category U tree was identified in the site, which should be removed on safety grounds. It has also been recommended that group G2 requires felling of dying specimens on the same grounds as above.

No category A trees were identified within site.

Figure 3: Tree constraints plan, prepared by Steve Ambler & Sons Tree Specialists Ltd

Soils

A Topsoil Resource Survey and Soil Resource Plan was carried out by Tim O'Hare Associates LLP in November 2020 to assess the quality of the site's topsoil and to advise on it's suitability for re-use for the proposed landscape scheme, together with advice on its management.

Desktop surveys were undertaken for the site, which confirmed that the soils within the survey area are 'Unsurveyed (Urban)'.

A Ground Investigation Report, produced by Terrafirma confirmed the ground conditions and range of topsoil depths. Soil samples were also taken and sent for testing, which confirmed the majority of samples were below their retrospective human health threshold levels. A positive asbestos result was recorded, but it could not be confirmed whether the asbestos was isolated or a site wide issue.

A site visit was undertaken where soils were assessed based on planting environments indicated by a indicative design layout provided by Wates, including: tree planting; native tree planting; ornamental hedge planting; residential back gardens; and amenity grass areas.

Summarising the findings of the soil resource survey, it was found that the existing topsoil is of a clay loam nature containing moderate stone content, with available depth averaging around 260mm. Two representative samples of topsoil were also submitted for laboratory testing, which confirmed the topsoil samples fell into the Clay Loam texture class. Shards of glass up to 20mm were encountered within the topsoil as well as observations of glass bottles, fragments of ceramics, lengths of plastic and metal and general household litter.

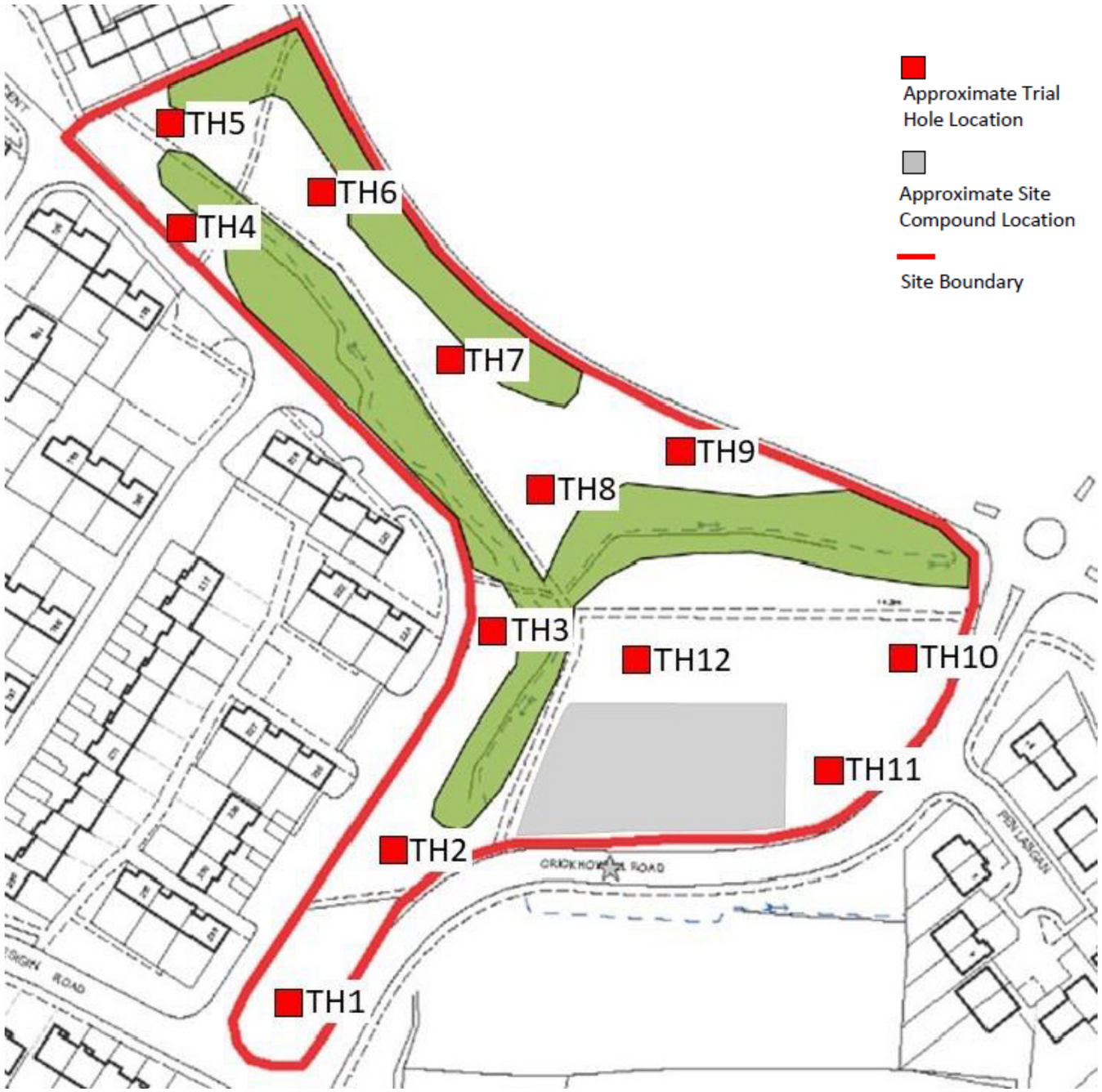


Figure 4: Soil resource survey plan, prepared by Tim O'Hare Associates LLP

Public access and open space

The site does not contain any formal (definitive) public rights of way and is not a formal area of public open space. The site, however, does contain paths that are publicly accessible: one along the west, southern and northwest boundaries, and another in the central area of the site heading in a west to east direction. A pavement along Willowbrook Drive also transects the most northern part of the site.

Some amenity grass areas of the site are also publicly accessible.

Site photos

1	1- View from the southeast of the site just outside boundary, looking northwest
2	2- View from the southeast boundary of site, looking west
3	3- View from the existing path within the central area site of the site, looking east

4	5
6	7
8	

4- View from Willowbrook Drive the site just outside boundary to the northeast, looking southwest
5- View from the east boundary of site, looking southwest

6 & 7- Views from the existing path in the southwest area site of the site, looking west

8- Views from the existing path on the southwest corner site of the site, looking northeast

04 Site layout

Site layout

A site plan has been prepared by Spring Design Consultancy with input from the project team of consultants that includes planners, drainage engineers, ecologists, agriculturalists, and landscape architects. The project team remains the same as the team that is currently working on the approved Willowbrook North residential scheme on the north side of Willowbrook Drive.

The proposed development is for a total of 35 two storey residential dwellings. These comprise of a mix of terrace and semi-detached properties and apartment blocks, 18 of which are social housing and 17 for private sale.

The development comprises two residential areas: one in the north and the other in the south of the site, which are bisected by an area of retained trees and vegetation, see Figure 5. The south part of the proposed development would comprise semi-detached flat and houses with private/ shared rear gardens and parking. The development would be accessed via a Crickhowell Road in the south. Two attenuation ponds are included in the northeast and northwest with a larger rain garden along the southern boundary as part of the SuDs strategy.

The area in the north of the site would be occupied by terraced, semi-detached units and an coach house each with private rear gardens and parking. The development would be accessed via tow points along Willowbrook Drive to parking courts. Public open space would mainly comprise raingardens as part of the SuDs strategy.

Figure 5: Proposed site plan showing ground floor plan, prepared by Spring design

05 Landscape Strategy

Key

Site boundary

Existing features

Retained trees and Root Protection areas (black dashed line)

Removed trees / ecotone (red cloud lines)

Drainage easement (orange hatch)

Proposed soft landscape

Proposed tree

Proposed trees in SuDs features, subject to Drainage Engineer's design

Proposed trees in rear gardens

Proposed shrubs

Proposed planting in SuDs features

Proposed grassland planting in rain gardens that is suitable for drought and inundation condtions

Proposed ornamental specimen shrubs. To include Cornus and Viburnum species

Proposed native specimen shrubs. Corylus avellana, Crataegous monogyna, Salix caprea, Salix fragilis, Viburnum opulus

Proposed native plant mix. To include Corylus avellana, Crataegous monogyna, Ilex aquifolium, Sambucus nigra, Viburnum opulus

Wetland grassland mix in attenuation pond

Amenity grass / species rich grassland. Species rich grass to be used in public spaces

Rear gardens

Figure 6: Landscape Strategy, prepared by Tir Collective

Soft Landscape

A key feature of the site is the existing trees and associated scrub vegetation that forms an ecotone to the trees and green corridor. Where possible, existing trees and vegetation are to be retained and protected.

Proposed planting

Proposals for the soft landscape areas is influenced by the drainage strategy for the site. All the proposed trees, except one and those proposed in rear gardens, are to be located in raingardens or attenuation features. Proposed tree species include native and ornamental species that would provide seasonal and biodiversity interest with flowers and berries.

Planting in soft landscape areas is influenced by the retained trees and the proposed drainage strategy. Native shrub planting is proposed adjacent to retained trees, where space allows. Where there are existing constraints, such as easements, species-rich grass is proposed where there is existing amenity grass to provide some biodiversity enhancement. In relation to the proposed drainage strategy, the larger attenuation ponds are to be planted with some native shrub species that are suitable for wet conditions and are to be managed as a coppice. Wetland grasses are also proposed as part of the mitigation for the loss of some ecotone areas on the site and to provide botanical and biodiversity interest. The planting of raingardens would include a mix of grasses, shrubs and herbaceous plants that would provide year-round visual and biodiversity interest.

The small private soft landscape areas would be planted with a mix of shrub and herbaceous species for seasonal interest.

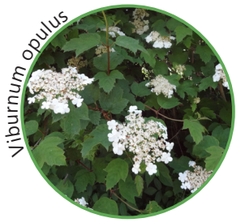
Trees and vegetation in the northeast of the site, alongside the retained path, to be retained and protected

Trees and vegetation in the south of the site, alongside the retained footpath, to be retained and protected

Trees

Trees in SuDs features

Specimen native shrubs



Specimen ornamental shrubs

Shrub planting: General Planting Mix and Front Garden Mix (selection)

Raingarden Mix (selection)

06 Green Infrastructure

The landscape approach to the design of the proposed development identified the importance of Green Infrastructure in a stepwise approach by **Identifying and assessing** existing features to ensure the retention of existing GI was a priority wherever possible to **avoid** and **respond and design**. This statement provides a description of the effects of mitigation of the individual green infrastructure components, which forms the **mitigation** with a view to minimising any negative impacts on biodiversity as far as possible.

Ecology

The Extended Phase 1 Habitat Survey identified a limited range of habitats on site. The main impacts of the proposed development on habitats would be the loss of amenity grass and some areas of dense scrub.

In relation to bats, of the 5no. trees identified as having low potential for supporting roosting bats, 1no. tree is to be removed. A soft-felling approach is recommended, where tree limbs are section cut and carefully lowered to the ground and left overnight to allow any roosting bats present time to leave.

The site was also considered to support a low number of locally commuting and foraging bats. It is recommended that the proposed lighting for the scheme should aim to minimise artificial lighting spill. The proposals should also include provision for the inclusion of bat boxes onto retained trees and residential units.

The site was also considered to support nesting birds, therefore any vegetation clearance should be undertaken outside the bird nesting season (September-February). The proposed development design should also include bird boxes on new residential units and retained trees.

It is also recommended that creation of 130mm x 130mm gap at the of garden and boundary fencing to allow for continued connectivity for Hedgehog and other small mammals through the development.

Proposed mitigation planting, as illustrated on Figure 6, includes the planting native shrubs and some grassland mixes to provide mitigation for the loss of some dense scrub areas. Proposals also include the planting of trees and other shrub mixes that would host invertebrate species and attract flying insects. The proposed wetland grassland and species-rich grass would increase botanical diversity.

The proposed rain gardens throughout the site would enhance the habitats on site with the planting of some native species and other plants that would attract pollinators.

The proposals reflect Stepwise Mitigate / Compensate and has considered the potential for Enhancement at each stage in accordance with the **DECCA Framework**.

Trees

Existing trees at the site contribute to the placemaking and setting of the area. During the design development of the project, consideration was given to retaining the existing trees and vegetation (ecotone), where possible, including ensuring that the proposed development and associated hard landscape does not impact on Root Protection Areas (RPAs).

All Category B trees and groups that are located just beyond the site, which are also covered by TPOs, are to be retained and protected. 2no Category C trees located just beyond the site are also to be retained and protected.

Within the site, the Category B groups and 3no. trees are also to be retained and protected. 1no Category C group and tree is to be removed in the north of the site and the west extent on another Category C group is to be removed to accommodate the proposed development. The groups are noted to contain scrub vegetation that provide habitat connectivity, which was also confirmed in the ecology surveys and site walk over, see site photos.

The proposals for the site include tree and native shrub mitigation planting. The planting of trees is influenced by the retained trees and the proposed drainage strategy, but where space allows, new tree planting is included. The tree species diversity on the site would be increased.

Native shrub planting is also proposed around attenuation ponds and in locations, where space allows, alongside retained tree groups.

Soils

The Ground Investigation Report, by Terrafirma, concluded that remediation work will be required to address the asbestos issue within the site.

The SRS confirmed that the presence of sharp materials within the topsoil presents a health and safety risk for end users and as such, would limit places where they maybe used safely. Should the proposals use site won topsoil, it is recommended that a 150mm cap of 'sharps free' soil is used particularly in areas where end-users would come into contact.

Provided that the recommendation above and others within the report are followed, the existing topsoil would be suitable for tree planting (above 16cm girth), amenity grassland (including residential back gardens) so long as the topsoil and subsoil are adequately structured, uncompacted, aerated and drained. The topsoil may also be suitable for tree planting under 16cm girth provided that the soil is in optimum condition and additional soil management / improvement measures have been implemented as recommended within the report.

However, the proposed development includes a number of SuDs features, which would require the use of filter medium and not conventional topsoil and subsoil. The soils for areas of the site where SuDs features are proposed would be removed.

Public access and open space

All the existing paths (informal) within the site would be retained. The pavement in the north of the site, along Willowbrook Drive would also be retained.

The proposals for the site also seek to improve pedestrian connections both within the site and to adjacent areas. A new pavement along the east and south-eastern edge of the site is to be created, alongside Crickhowell Road to connect to an join existing pavements.

A new path within the central area of the site is also to be created, which will connect the retained path in the southwest of the site to the pavement along Willowbrook Drive to the north.

The proposed development also includes some areas of public open space, such as raingardens and attenuation ponds, and other small planted areas. These areas reflect the approved Willowbrook North residential development on the north side of Willowbrook Drive, and may provide opportunities for some interaction with nature.

Multi-functionality of Green Infrastructure

This section identifies the multi-functionality of each green infrastructure element: trees, habitat, and public access. These elements reflect the overarching principle of **enhance** by applying the principles of good placemaking and green infrastructure.

The multi-functionality of green infrastructure is described as "GI functions are the roles that assets can play if planned, designed and managed in a way that is sensitive to, and includes provision for, natural features and ecosystem services. They may have obvious primary functions, but each asset can perform different functions simultaneously". The Landscape Strategy sets outs the GI functions, the benefits of the proposals are listed in Figure 7 against the list below:

- Contribution to Placemaking
- Flood Mitigation
- Cooling and Shade
- Food
- Exercise
- Health and Wellbeing
- Calming and Inspiring
- Nutrient Cycling
- Wildlife Habitat
- Wind break
- Cleaning Water and Air

Figure 7: lists the landscape assets, its green infrastructure element, and the functions of each landscape asset while signposting against the Building with Nature Standards.

Landscape asset	Green infrastructure element	Functions	Building with Nature Standards
Retained trees and scrub vegetation (ecotone)	Trees / vegetation	• **Wildlife Habitat** • Contribution to Placemaking • Cooling and Shade • Calming and Inspiring • Health and Wellbeing • Nutrient Cycling • Wind break • Cleaning Water and Air	1 - Optimises Multi functionality and Connectivity 2 - Positively Responds to the Climate Emergency 4 - Champions a Context Driven Approach 5 - Creates Distinctive Places 6 - Secures Effective Place-keeping 7 - Brings Nature Closer to People
New tree planting	Trees / vegetation	• **Wildlife Habitat** • Contribution to Placemaking • Cooling and Shade • Calming and Inspiring • Health and Wellbeing • Nutrient Cycling • Cleaning Water and Air	1 - Optimises Multi functionality and Connectivity 2 - Positively Responds to the Climate Emergency 3 - Maximises Environmental Net Gains 5 - Creates Distinctive Places 7 - Brings Nature Closer to People 11 - Delivers Wildlife Enhancement 12 - Underpins Nature's Recovery
Proposed shrub planting	Trees / vegetation	• **Contribution to Placemaking** • Food • Exercise • Health and Wellbeing • Calming and Inspiring	1 - Optimises Multi functionality and Connectivity 2 - Positively Responds to the Climate Emergency 3 - Maximises Environmental Net Gains 5 - Creates Distinctive Places 7 - Brings Nature Closer to People
Proposed planted SuDS features	Sustainable Drainage	• **Cleaning Water and Air** • Flood Mitigation • Contribution to Placemaking • Calming and Inspiring • Nutrient Cycling • Wildlife Habitat • Cleaning Water and Air	1 - Optimises Multi functionality and Connectivity 2 - Positively Responds to the Climate Emergency 3 - Maximises Environmental Net Gains 5 - Creates Distinctive Places 7 - Brings Nature Closer to People 9 - Delivers Climate Resilient Water Management 10 - Brings Water Closer to People
Proposed grassland mixes	Grassland	• **Wildlife Habitat** • Calming and Inspiring • Health and well-being • Nutrient Cycling	1 - Optimises Multi functionality and Connectivity 2 - Positively Responds to the Climate Emergency 3 - Maximises Environmental Net Gains 7 - Brings Nature Closer to People 11 - Delivers Wildlife Enhancement 12 - Underpins Nature's Recovery
Proposed bird and bat boxes	Habitat	• **Wildlife Habitat** • Calming and Inspiring	1 - Optimises Multi functionality and Connectivity 3 - Maximises Environmental Net Gains 7 - Brings Nature Closer to People 11 - Delivers Wildlife Enhancement 12 - Underpins Nature's Recovery

07 Conclusions

Resilience of Ecosystems

The Environment (Wales) Act 2016 provides a duty upon public bodies such as Cardiff Council to promote the resilience of ecosystems[1].

The proposed green infrastructure strategy would comprise a range of species, both native and non-native species to enhance biodiversity and botanical diversity. The species selected are adaptable to wet and dry conditions, including lengthy dry spells. The range of both tree and plant species proposed would enhance the biodiversity, increase species diversity, the age diversity of vegetation and improve habitat resilience to climate change.

The proposed green infrastructure strategy has considered the existing green infrastructure features within and beyond the site boundary, as recommended by the Stepwise approach. The proposed features would increase the biodiversity, species diversity, and habitat structure on the site whilst contributing to the multi-functionality of the green infrastructure elements.

1 Paragraph 2.4.4 Cardiff Green Infrastructure Supplementary Planning Guidance (SPG), November 2017

Conclusion

The landscape strategy for the site is based on a Stepwise Approach. The strategy aimed to avoid and retain wherever possible. Where green infrastructure elements have been lost the design seeks to provide mitigation and/or compensation for the loss with the aim to enhance the green infrastructure overall.

Proposals for the site would retain and protect existing trees and vegetation within the site, where possible. Where removal of trees and vegetation is unavoidable, proposals aim to mitigate for the loss. Although the landscape proposals have been influenced by the drainage strategy for the site, new tree, native shrub and grassland planting has been incorporated. The botanical diversity on the site would be increased, which would also attract and host invertebrate species and would benefit foraging species on site.

Other enhancements for the site include the provision of bat and bird boxes.

With regards to the **Placemaking Wales Charter** the landscape proposals make a good contribution towards the six placemaking principles, which cover the range of considerations that contribute to establishing and maintaining good places.

The proposals also contribute to the **12 Standards of Building with Nature**, creating well connected, multifunctional green infrastructure.

The proposed development would have some impact to existing green infrastructure elements. The coordinated landscape proposals seek to provide mitigation tree, native shrub, and species-rich grassland planting. Other new green infrastructure elements would be created, such as SuDS features that would be multi-functional.

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LANDSCAPE ARCHITECTS

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