Manchester University NHS Foundation Trust Green Spaces and Biodiversity Review of Estate

November 2023

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Executive Summary

Manchester University NHS Foundation (MFT) Trust has an abundance of green spaces within its estate. They have potential to support local biodiversity, provide therapy, absorb carbon dioxide, and moderate heat and flood risk. This report provides recommendations for improving ecology and green spaces across the MFT estate including enhancing hospital green infrastructure and its management and implementing new ways to connect hospital users with nature. By implementing these recommendations, the hospitals can create biodiverse and therapeutic environments that enhance the patient experience, improve overall well-being, and contribute to a more sustainable hospital environment.

Recommendations

1) Improve biodiversity across all sites by managing green spaces at specific times (e.g. 'No Mow May'), pruning selectively, avoiding chemical treatments and leaving decaying matter in place. Some areas can be improved by the addition of wildflowers and less cutting, which provides a taller sward for small mammals, amphibians, reptiles, and invertebrates.
2) Consider habitat connectivity as part of green space management. Aim to connect existing green spaces on site and consider linking with neighbouring habitats. Any new planting, areas of longer grass, and other habitats such as green roofs or ponds, should be strategically positioned to promote wildlife movement across the landscape, in turn increasing biodiversity.
3) Plant native trees and hedges across all sites. Trees provide nesting, roosting, shelter, and food resource for a wide range of birds, bats, mammals, and invertebrates. Try to preserve mature trees, as they provide more benefits to wildlife than younger specimens and do not provide an equal benefit to wildlife. Choose native species with wildlife value, such as birch, rowan, willow, and English oak and fruit/nut trees. Aim to create continuous canopy cover, where possible, limiting gaps. Aim not to manage immediate understory of all trees, leaving a more natural border. Avoid excessive lighting trees as this will deter bats from roosting.
4) Increase blue infrastructure such as ponds, rain gardens, bog gardens, and sustainable urban drainage systems across all sites where safe to do so for staff and patients. They provide vital habitats for amphibians, and a wide a variety of other species, especially in urban environments, where water sources are scarce.
5) Train estates and grounds maintenance staff involved in the management and development of green spaces to facilitate the recommendations of this study and embed these practices within business-as-usual working.
6) Amplify delivery of improvements by implementing a corporate volunteering programme across all sites. There is a large demand from corporates to find meaningful outdoor environmental volunteering opportunities. Groups of corporate volunteers could be tasked with

creating new therapeutic gardens, planting trees and hedges, and habitat creation. Volunteer days can be arranged and managed by environmental organisations with specialist expertise and experience in this sector. Corporates are sometimes able to provide a payment for well run and organised volunteer days.

7) Implement a Green Social Prescribing programme in partnership with environmental organisations, to enable patients to access green wellbeing activities as part of their recovery. There is an existing Greater Manchester NHS Green Social Prescribing programme and various other funded programmes operating in Manchester that provide resources, training, and funding for these activities.
8) Increase the health and wellbeing of all hospital users by implementing initiatives that improve access and signage to green spaces. For example, provide additional outdoor seating, allow access to restricted green spaces, such as courtyard areas. Where possible, encourage patients to access green spaces, e.g. through existing patient information systems such as Experiencia. The existing system (e.g. at ORC) covers hive, parking, visiting times and a map of the site only.
9) Develop innovative funding models to implement improvements using a combination of existing capital programmes, grant funding, NHS charity funding, and in-kind volunteering support.

Introduction

The purpose of this document is to assess the green space and biodiversity within the Manchester University NHS Foundation Trust (MFT) estate, and to outline opportunities for extension and/ or enhancement of that green space for biodiversity. The work was delivered by Sow the City (STC) in partnership with Terra Ecology LTD (TE).

The MFT Estate includes seven separate hospital sites, plus numerous community locations. Approximately 19% of the estate are green spaces. The Trust's Green Plan has committed to maximise the quality of 'green infrastructure' including on-site green spaces, identifying, and delivering schemes that address one or more of the following priorities: improving local biodiversity, supporting staff wellbeing and/or patient recovery, combating climate change, and providing opportunities for social prescribing.

Why are green space and biodiversity important?

The UK is one of the world's most nature-depleted countries - in the bottom 10% globally and last among the G7 group of nations. The UK has a Biodiversity International Index of 50% which means it has retained only half of its biodiversity, far below the global average of 75%. Globally, if current trends continue, one million animal and plant species will be threatened with extinction – more than at

any other point in human history, a crisis interpreted as 'The 'Sixth Mass Extinction' (Global Assessment Report on Biodiversity and Ecosystem Services,2019).

The Environment Act 2021 requires public authorities who operate in England to consider what they can do to conserve and enhance biodiversity. This is the strengthened 'biodiversity duty' that the Environment Act 2021 introduced. Hence, as a public authority, MFT must:

1. Increase the size of current wildlife sites.
2. Enhance and restore connections between or join up (wildlife) sites.
3. Explore opportunities to create new (wildlife) sites.
4. Improve the quality of current sites by better habitat management.
5. Reduce the pressures on wildlife by improving the wider environment.

MFT has significant potential to improve conditions for wildlife within its large estate and create improved connectivity with green 'stepping-stones' for a variety of species across an otherwise urban landscape. The opportunities are numerous – from quick wins for nature to providing the foundations for future urban greening.

Green spaces of any size bring advantages for wildlife through the provision of shelter, food, and water. They also play a crucial role in reducing surface water run-off, providing cooling, absorption of pollutants, and a buffer against the effects of extreme weather.

How can green space support staff wellbeing and patient recovery?

Hospitals tend to focus on the primary goals and objectives of the organisation (fast physical recovery), rather than emotional and mental health outcomes (Abdelaal & Soebarto, 2019; Murphy & Mansfield, 2017; Silverstein, 2009). This is particularly important for patients who are diagnosed with a chronic condition and are undergoing treatment, as many studies have confirmed that they may experience high levels of psychological discomfort, with many experiencing fatigue, anxiety or depression.

In 1984 environmental psychologist Roger Ulrich published a study demonstrating that patients in hospital recovering from surgery with a view of nature recovered quicker than patients looking at a brick building wall. This research showed that the natural environment shapes us as individuals to such a degree that simply viewing it benefits a person's health. There is now abundant evidence that exposure to green (publicly accessible areas with natural vegetation) and blue (water) spaces is associated with health benefits at both population level and in individuals (Hartig et al, 2014).

Natural environments elicit greater calming responses than urban environments and, in relation to their vision, there is a general reduction of physiological symptoms of stress (Berto et al, 2014). Exposure to natural environments has also been linked with multiple health benefits (Kuo, 2015; McSweeney, 2014), including: more favourable heart rate; vitamin D levels; pain reduction; less

medication; lower blood pressure; faster recoveries; and decreased all-cause mortality in general (Park & Mattson, 2009; Ulrich, 1984). Green space may also help to reduce the prevalence of type 2 diabetes (DEFRA, 2011). Furthermore, nature-based interventions are potentially equigenic, in that they disrupt the usual correlation of socioeconomic adversity to a greater risk of poor health, and health benefits can be greater for people with low socioeconomic status (Mitchel et al, 2015).

Gardens and gardening can improve the health and well-being for people with a range of social needs too. The benefits of gardens and gardening can be used as a 'green social prescription' for people with long-term conditions (LTCs) (Howarth et al, 2020). For example, food growing gardens can be created for social and therapeutic purposes, and the produce can be used in patient meals (DHSCP, 2020). Green spaces can also provide socializing opportunities for staff and visitors/ families through spatial arrangement of seating and gathering options.

The biophilia hypothesis holds that humans have an innate tendency to affiliate with other living organisms (Wilson, 1984). Biophilic design involves creation of built environments that promote connection between humans and nature. (Kellert et al., 2011; Kellert & Calabrese, 2015; Kellert & Wilson, 1993). Biophilic design can include active or passive elements. Active elements include direct experience of nature – actual contact with environmental features such as interactions with nature, air, plants, animals, and water. Passive experiences of nature include views of nature, natural materials, colours, shapes, and forms that evoke and mimic nature.

Methodology

Desk study

A desk study was undertaken in May 2023 to include pre-survey map preparations, access checks, and analysis of local strategic plans and policy. The review considered adjacent habitat where appropriate, and an appraisal of aerial photography for each site was undertaken to identify areas of green space within and adjacent to each hospital (Google Earth Imagery). Any identified adjacent habitats were then targeted for an initial biodiversity assessment during the site visit. CAD drawings were also obtained from MFT of all sites.

Assessment framework

A bespoke assessment framework was developed for this report, as there is no available international or nationally recognised framework to conduct assessment of green space in hospitals. The following assessment criteria was proposed and agreed with MFT to identify sites with opportunities for green space and ecological enhancements:

- Existing ecological value.
- Proposed enhancement(s).
- Biodiversity Net Gain (BNG).
- Green wellbeing.
- Resources (e.g. funding opportunities and volunteers).
- Notes (e.g. any other relevant considerations).

Recommendations for each hospital have been compiled into tables using the assessment framework (see Findings). In some cases, different options were suitable for a particular site, and these were grouped by small/medium/large interventions. Recommendations that applied to all hospitals were also compiled into an 'All Sites' recommendations table.

Existing ecological value

Field surveys of six hospital sites were conducted in June 2023, including Oxford Road Campus (ORC), North Manchester General Hospital (NMGH), Wythenshawe Hospital, Trafford General Hospital, Withington Community Hospital, and Altrincham Hospital. See photos from this study in appendix 1. This study excluded the Turner Dental Hospital within the University of Manchester campus. The timing of the survey was during the optimal time of year for an assessment of the habitats present.

The survey followed the methodologies as described in the '*Handbook for Phase 1 Habitat Survey – a technique for environmental audit*', Joint Nature Conservation Committee, 2004. During the walkovers, each of the distinct habitats within the site were classified and mapped, then later digitised using AutoCAD software. A habitat map was drawn up incorporating target notes used to highlight features of particular ecological interest. These habitat classifications were later transposed to standard UK Habitat Classification, to be assessed within the Biodiversity Net Gain metric.

The survey does not provide a detailed botanical survey, rather it categorises areas into broad habitat types, noting key and dominant species. The survey plans give a snapshot of the sites at the time of the survey and it should be noted that many of the sites are undergoing works. Any inaccessible or un-surveyed areas have been indicated on the Phase 1 plans.

See JNCC Handbook for Phase 1 habitat survey for habitat definitions.

Proposed enhancement(s)

Proposed enhancements included tree planting, hedge planting, wildflower meadows, healing gardens (passive), therapeutic gardens (designed for specific health needs), green roofs, green walls, health walks, and habitat improvements. These could benefit patients but also staff and visitors.

Enhancements have been suggested for their potential ecological and/or health benefits with comparable examples found in other GM locations. Further consideration will be required to assess the suitability of these proposals in relation to MFT health and safety requirements and development plans.

Biodiversity Net Gain (BNG)

Biodiversity Net Gain (BNG) is an approach to development or land management that aims to leave the natural environment in a measurably better state than it was before. The approach seeks to improve outcomes for biodiversity by creating or enhancing habitats on a site. BNG follows a standardised and quantitative assessment, providing a useful way to demonstrate the expected impacts of different habitat designs.

BNG sits within the Environment Act and, from January 2024, provides a legal requirement that any impact on biodiversity caused by development initiatives, where it cannot be avoided, will not only be compensated but will have to demonstrate a 10% biodiversity net gain that will be maintained for at least 30 years.

A BNG value is determined using a calculation tool, to score each habitat on site according to its relative value for biodiversity. These values are determined for both the existing site and the proposed development, allowing developers and landowners to ensure their project increases the overall biodiversity of a site.

The assessments used the Biodiversity Metric 4.0 issued by Defra and Natural England, a spreadsheet-based tool into which data can be entered to carry out biodiversity net gain calculations. For the purpose of this report, a brief methodology is given below - full methodology can be found in The Biodiversity Metric 4.0 – User Guide (Natural England Joint Publication JP039, 2023).

When considering the original baseline condition of a site, the metric takes account of several factors, each assigned a numerical value as a proxy for biodiversity:

- Habitat type;
- Habitat size (in Ha, calculated in GIS, with scattered tree canopy calculated with Street Tree Helper Tool);
- Distinctiveness (relative rarity) of habitat type;
- Condition and quality of the habitat, from poor to good. For some habitat types this is pre-determined, for others, standardised assessment criteria must be followed to determine quality (BNG Technical Annex 1, 2023);
- The diversity or rarity of the habitat and plant communities found;
- The strategic significance and local importance of the site; and
- The connectivity of the site and how the habitat is connected to other areas.

The number of biodiversity units provided by each habitat type within the site is calculated by multiplying the values for Distinctiveness, Condition, Connectivity, Strategic location, and the size of each habitat (or length of linear features such as hedgerows/rivers). This outcome represents the baseline condition of the site, in terms of biodiversity 'units'. The units can be classified as either habitat units, hedgerow units, or watercourse units

The site is then reassessed for the proposed site conditions that will be present after any landscape alterations are implemented. The number of biodiversity units provided by each habitat within the proposed development site is calculated in the same way as the baseline habitats, but with additional multipliers to account for the inherent difficulties of creating or enhancing certain habitats, and time taken for particular habitats/conditions to establish. These multipliers are pre-determined and built into the BNG tool.

BNG applies to each habitat type that is present at the baseline. For example, a site with 100 area units, 20 hedgerow units and 40 watercourse units will need to provide 110 habitat units, 22 hedgerow units and 44 watercourse units to achieve a 10% BNG.

Limitations

As we are only using BNG to illustrate the value of creating new habitats or enhancing existing areas, the total area of some habitat types has been summed to give a total coverage for the site. For instance, across these built environments, there are many small units of amenity grass which have not been dealt with as individual units but summed for the entire hospital site. It should be noted that this is non-standard and should not be used for sites where a mandatory 10% increase in biodiversity units is required to satisfy planning applications. Where this is the case, each distinct area of habitat should be evaluated separately.

Other limitations of the BNG application to this specific project are the seemingly under-valuing of relatively small habitats. For instance, ponds score low on units within the metric. This is in part due to relative size in comparison to larger features (such as grassland) but is also due to those multipliers in the metric (outlined above) that account for potential difficulty of a development creating and maintaining a feature in a particular condition for a specific period of time. Therefore, it is important not to overlook valuable smaller habitats which provide unattractive low BNG scores, especially where those habitats are scarce across the MFT estate.

This also applies to those features that are not included in the metric, such as bird boxes and insect hotels. Anything not covered by the BNG metric has not been scored and has been marked as not applicable.

Green wellbeing

In addition to an ecological assessment the survey reviewed how patients, staff and visitors could benefit from green space improvements through active engagement (e.g. Therapeutic Horticulture sessions) or passive views of nature (e.g. views from hospital wards).

Green wellbeing is defined as improved wellbeing from access to nature, such as through active or passive interaction with blue and green infrastructure.

The green wellbeing benefits of each recommendation were scored using the following system:

Score	Category	Criteria
0	Negligible green wellbeing benefits.	Recommendations that have little or no impact on access to nature for hospital staff, patients or visitors.
1	Low green wellbeing benefits.	Improvements where a small number of hospital users have improved access to nature and/or the green space suggested is small scale.
2	High green wellbeing benefits.	Improvements where a large number of people have improved access to nature and/or the green space suggested is large scale.

Estimated Cost

The approximate cost of each intervention was classified in five categories: no cost, <£2k, <£10k, < £20k, <£50k, < £100k, >£100k. This estimation includes typical contractor costs and materials for green or blue space improvements, but does not include MFT staff time, any additional management fees the Trust may be exposed to when altering PFI sites, or any associated infrastructure works needed to make proposed enhancements accessible for staff or patients.

Resources

Resources available to aid the green space enhancements have been noted. MFT is able to access resources to help with implementation from a variety of sources including national funds such as the Greener Communities NHS Charities Together funding, NHS charitable funds, in-kind support (e.g. corporate volunteers and staff volunteers). There are also opportunities to get NHS green

space written into specifications for new capital build programmes and benefit from 'social value' commitments from contractors to access time and materials for new projects.

Notes

Additional notes were outlined for each enhancement, including other considerations and wider benefits, such as climate change adaptation and flood risk management.

Personnel and Quality Assurance

Ecological fieldwork was carried out in accordance with current best practice guidelines by senior ecologist, Georgina Kelly MSc, Terra Ecology Ltd. Georgina has sixteen years professional experience within ecology and conservation. She has a wealth of experience undertaking ecological and protected species surveys. Working within both consultancy and research, Georgina has supported a variety of projects, including large infrastructure projects, renewable energy, and nationally important nature reserves. Georgina holds numerous protected species licenses and provides survey training and guidance.

Jon Ross has a master's in environmental management and been an environmental professional for 20 years working in consultancy, the public sector and the voluntary sector. Whilst at WSP Environmental, he undertook a variety of ecological surveys, and more recently he was the lead person for biodiversity at Transport for Greater Manchester across their estate including overseeing ecological mitigation for Metrolink expansion. More recently, Jon led on the NHS England Green Social Prescribing Test and Learn programme for Manchester (2021-23). Jon has expertise in project management, green infrastructure, green social prescribing, community engagement, environmental psychology, and environmental management.

Catherine has over 10 years spent working in the nature conservation sector, initially starting work with the Yorkshire Wildlife Trust (YWT) supporting delivery of an urban food growing project and learning practical growing skills on a community farm. This was then followed by work with YWT on nature reserves and for the last 6 years delivering environmental education and visitor experience engagement with the RSPB to connect children and families with nature. Catherine has a BA (Hons) in Landscape Architecture and designs and delivers a variety of nature and urban agriculture projects for Sow the City.

Many people helped us in our efforts to gather the information presented in this document. We would like to thank the following people for taking their time to speak to us during the visit and providing follow up information:

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Chris Reynolds (Estates Manager, Trafford General Hospital)

Kate Ulrick (Patient, Surgical Ward 19, MRI/ Oxford Road Campus)

Findings – All Hospital Sites

Proposed enhancement	Green well-being	Est. Cost	Resources	Notes
Improving access Provide additional outdoor seating for use by patients, staff and visitors. This could include courtyard areas and underutilised sections of grass around the hospital sites. Provide additional indoor seating areas for use by patients, staff and visitors. For example, potential for more outdoor seating area near car park at A&E at ORC	2	<10k per hospital		Many wards have restricted visitor numbers (e.g. 2 max), hours (e.g. 2-4pm, 6-8pm) and in some cases children are prohibited from visiting. Communal and friendly spaces are important for patient, staff and visitor wellbeing and socialisation. At most sites hospital users were sitting on the ground or in corridors that weren't designed for this purpose.
Improving access Include hospital green areas and seating/ communal areas in patient and visitors guide. There is potential to signpost to local green spaces too e.g. Pankhurst Garden The existing system (e.g. at ORC) covers HIVE, parking, visiting times and a map of the site only. In addition, the map could include seating areas in the key.	2	Staff cost only	Existing Experiencia system	For some patients encouraging mobilisation is an effective way of reducing hospital stays and improving patient well-being. The existing Experiencia systems do not encourage patients to exercise or access natural areas for helping with their recovery.
Improving access One of the most effective ways to improve patient and staff access to green space would be to improve access to courtyard spaces across the MFT estate. Accessibility is unique to each site, but many of these areas are locked and largely underused and undervalued. To allow access for wildlife, it is recommended that any courtyard netting is removed.	2	<£50k per courtyard		These spaces could provide a natural sanctuary for both patients and staff, and where access is already available such as, Cystic Fibrosis Garden at Wythenshawe Hospital, it is clear these areas provide a much-needed resource.
Green Social Prescribing Prescribe nature walks and therapeutic gardening activities as part of treatment plans. Green social prescribing* (GSP*), builds on social prescribing and involves connecting people to nature-based activities and interventions to improve their health, wellbeing* and resilience	2	<2K per course	Sow the City and other environmental organisations have funding for Green Social Prescribing. Sow the City are currently running Social and Therapeutic Gardening sessions with Crumpsall Vale Intermediate Care Unit with patients.	Opportunity for Green Social Prescribing (patients prescribing nature-based activities and interventions to improve their mental and physical health). See NASP Green Social Prescribing Toolkit (in References) for more information.
Maintenance Low management regimes save on management costs and are an easy win for biodiversity. There are many ways to implement these changes that will balance benefitting wildlife with health and safety of visitors and the overall aesthetic of the hospital sites (discussed in separate recommendations for each habitat type). The general principles are to: • Manage green spaces less often • Manage at specific times • Prune selectively • Avoid chemical treatments, and • Leave some decaying matter in place	1	No cost		Where implemented, new signage may be appropriate for staff and patients to understand why some area of the site look different, and how this is benefiting biodiversity.

Habitat Connectivity Greening an urban landscape should focus on the principle connecting-up the green spaces on site, plus consider connectivity with neighbouring habitats. Any new planting, areas of longer grass, and other habitats such as green roofs or ponds, should be strategically positioned to allow for the movement of wildlife across the landscape. For instance, a tree line that links a pond with a wooded area will encourage birds to move between nesting sites and a water source. When planting new trees, grouping them or creating linear 'avenues' and boundaries within the site will enhance bat flight-lines and foraging routes. Hedgerows are better than fencing, but where fencing is required, this should allow for movement of wildlife such as hedgehogs and amphibians, with regular ground-level gaps of 13-15cm.	1	No cost	NHS Forest provide a variety of free native tree packs including thematic bundles ranging from 30 to 200 trees, and it is possible to request multiple bundles as may be required. City of Trees have funding for tree planting through the Trees for Climate funding. Sow the City has funding for tree planting through various corporate sponsors.	
Wildflower meadows All grassed areas have a value for wildlife, which can be improved by the addition of wildfowers and less cutting, which provides a taller sward for small mammals, amphibians, reptiles, and invertebrates. Increasing the number and diversity of insects provides increased prey for bats and birds. To improve biodiversity: • 'No Mow May' can be implemented across much of the site. This practice can be enhanced by varying grass heights, e.g. leave some areas long, whilst cutting a 1m border along path/road edges, which will create a purposeful impression rather than looking unkempt. Wavy paths cut through longer grass will also give a better aesthetic. Taller areas of grass should be left at the base of any hedgerows, or beneath trees. • In some areas, this can be taken further by refraining from cutting until late June – August when many grasses and flowers will have finished seeding. • Avoid fertiliser and pesticides.	1	No cost	Potential to engage staff or patient volunteer groups to plant bulbs or sow wildflowers.	Areas suitable for even less intensive management should be identified in a management plan and kept aside for a more specific wildflower meadow regime to be planted or re-seeded with a better wildflower mix.
Tree planting Trees provide nesting, roosting, shelter, and food resource for a wide range of birds, bats, mammals, and invertebrates. Try to preserve any mature trees as younger specimens do not provide an equal benefit to wildlife. It is recommended that tree health assessments are included in future estate management plans. Choose native species of known wildlife value, such as birch, rowan, willow, and English oak and fruit/nut trees. Aim to create continuous canopy cover, where possible, limiting gaps. Aim not to manage immediate understory of all trees, leaving a more natural border. Avoid up-lighting trees as this will deter bats from roosting.	1	Staff cost only - funding available for tree planting	NHS Forest provide a variety of free native tree packs including thematic bundles ranging from 30 to 200 trees, and it is possible to request multiple bundles as may be required. City of Trees have funding for tree planting through the Trees for Climate funding. Sow the City has funding for tree planting through various corporate sponsors.	

Planting Planting of British native shrubs and perennials is recommended. Existing non-native planting can be enhanced with the interspersion of native species and any new planting should favour British species. Allowing perennials to go to seed will provide food resource and shelter for wildlife. Deadwood and leaf litter should be left where safe to do so, as this provides an important habitat for many species.	1	No cost (include as part of regular maintenance/ replacement	Sow the City can access corporate volunteers for planting days	Choose flower-rich perennial planting that are pollinator friendly: • Mixtures of flowering plants, trees (including fruit trees) and shrubs, to encourage a diversity of insects that will support bats and other wildlife throughout the year. • Flowers that vary in colour, fragrance, shape, and time of flowering. • Add borage, bladder campion, cornflower, corn marigold, evening primrose, field scabious, foxglove, lavender, ox-eye daisy, salvia, viper's bugloss, and wild carrots to any ornamental areas. • Single or 'simple' flowers, which tend to be more accessible for native insects than multi-petaled 'double' varieties.
Green roofs There are a number of designs for green roofs but the 'extensive' type requires the least cost or maintenance, is not irrigated, and is most suitable for existing buildings. Typically, a thin substrate is used and is vegetated by low-lying plants such as mosses, succulents, herbs and grasses which are intended to be self-sustaining. This type of roof is not normally designed to be accessible, except for maintenance, and may be flat or sloping. Details about green roof designs are provided in the English Nature report, 'Green Roofs: their existing status and potential'.	1	<£50k per roof	Integrate green roofs as part of the design of new capital projects.	More information about green roof types and systems are available
Green walls / living walls There is an existing green wall on the Trafford site that has been achieved by simply allowing ivy to cover the façade of one building facing the main car park. This could be created on more buildings across the MFT estate. Choose south-facing aspect. Green walls can most simply be created by using climbing plants rooted in soil at ground level. Honeysuckle and ivy are both hugely beneficial plants that support a vast number of species, providing high levels of nectar through the summer and autumn. Ivy is a particularly important food source to prepare many insects for hibernation and produces berries with high fat content to birds in the winter. Both ivy and honeysuckle grow relatively quickly and can grow directly against the building fabric or be trained to grow up simple trellis structures/wires.	1	<£50k per wall	Integrate green walls as part of the design of new capital projects.	Green facades should be positioned within view of patients' wards to create a natural vista during recovery. They could also be used within courtyard areas to soften walls and give green views from higher floors.
Habitat creation Bird boxes should be secured 2 – 4 m up a tree or wall, favouring north and east aspects and ensuring there is a clear area in front of the entrance. Placement under eaves is also optimal for sparrows, starlings, and swifts. To attract a variety of bird species, a range of different box designs is recommended. It should be noted that many of the existing bird boxes are in sub-optimal positions, for instance NMGH has a single swift box low down in a tree at the edge of a wooded area - this location is unsuitable, and boxes should be positioned in groups near to building eaves. House sparrows also have preference for	1	<£2k	Local RSPB contacts sometimes run projects to raise funding for bird boxes. Speak to local RSPB officers.	Birdsong has been found to boost mental wellbeing.

nesting in groups. There are many BTO and RSPB resources for how and where to position boxes. Provision of bird tables and water baths will also increase foraging resources on site.				
Habitat creation Bat boxes should be positioned throughout the site, on both mature trees (most suitably, those to the west boundary), and buildings. Bat boxes should be mounted at least 4 – 6 m up a tree or wall, between the eastern and southern aspects - Buildings with sun exposure for at least 6hrs a day are good choices. Install all boxes away from artificial light sources and avoid placing above doors and windows.	1	<£2k	Include habitat creation as part of staff and corporate volunteering days.	Possibility to run bat walks with patients with ecologists at dusk in spring and late summer when it goes dark earlier. This was hugely popular at Prestwich Hospital for a Sow the City project.
Habitat creation Insect hotels should be included in courtyard spaces. General designs provide a multi-storey 'hotel' layered with natural materials (e.g. untreated wood, bamboo, pinecones, reeds), providing crawl spaces many invertebrate species, such as solitary bees, bumblebee, ladybirds and woodlice. Place in warm and sheltered locations across the site. Insect hotels and nesting materials will need to be refreshed periodically.	1	<£2k	Bug hotels could also be used in courtyard spaces. Creating these would be a nice activity for a volunteering day - there are numerous fun designs.	Potential to engage staff or patient volunteer groups to create insect hotels for hospital.
Lighting Urban lighting has a significant wildlife impact, particularly on nocturnal species, such as bats, insects, and some birds. Current lighting should be reviewed and reduced where possible, keeping in mind safety of staff and patients. Some pointers are to use the lowest level lighting possible and avoid bare bulbs and any up-lighting – on existing features, this can be achieved with shielding and baffles. Choose warm-coloured LEDs as they are less disruptive than cooler, white and blue-tinged lights. Artificial lighting should not directly illuminate hedgerows and tree lines.	0	No cost		Potential for improved sleep for patients from reduction in light pollution.

Findings – North Manchester General

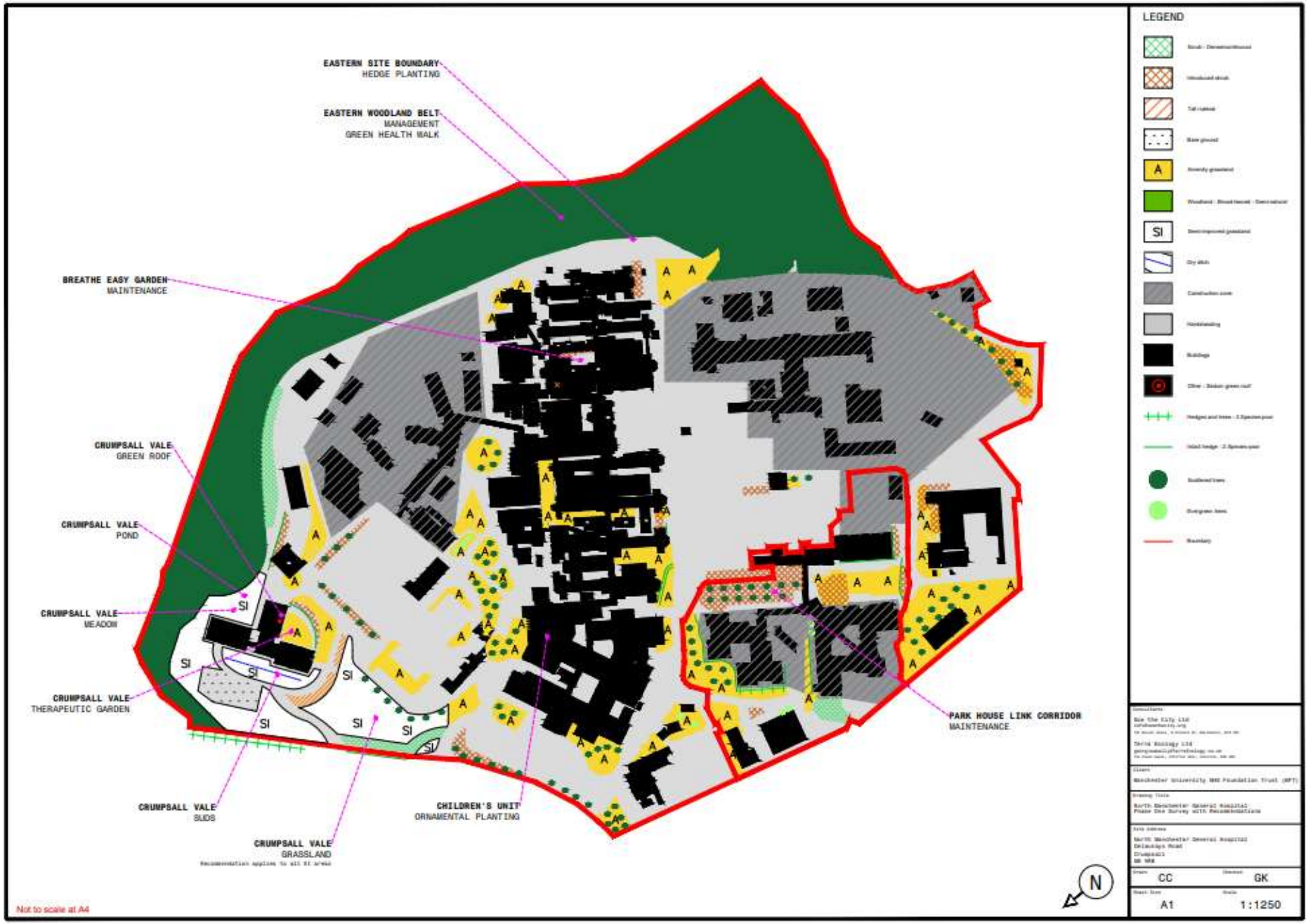
Site name	Existing ecological value	Proposed enhancement	BNG	Green well-being	Est. cost	Resources	Notes
EASTERN WOODLAND BELT	Semi-mature (c50 years) mixed broadleaved woodland on site has high value to wildlife but is currently in poor condition (BNG condition assessment). Dominated by ash, English oak, sycamore, hybrid poplar species, amongst others. Ground flora contains woodland indicators such as wood avens, herb robert and fern species. Two invasive species are restricting the understory throughout all accessed areas - Japanese knotweed and Himalayan balsam. Ash Dieback disease is also present, at least at the northern end.	**Woodland management** Enhancing the woodland condition from 'Poor' to 'Moderate' requires a strategy for long-term management, including the following: Implement an annual plan to control Japanese knotweed and Himalayan balsam to allow native woodland ground flora to establish. Some of these cleared areas can be planted with additional woody species - the aim is for a diversity >5 native woody species across the entire woodland. Create 'temporary open areas' or glades across 10-20% of the woodland. Wetting at least one area by creating a bog garden, in a naturally low position, would provide further habitat diversity here. Aim for at least 25% of the woodland to have standing deadwood, large dead branches / stems and stumps.	44.89 Habitat Units	0	<20k	Opportunity to apply to NHS Charities Together Greener Communities Funding (£30k-£200k) to fund or part fund this project.	Ash Dieback management: See guidance from the Forestry Commission (Chalara manual – 2. Managing ash trees and woodland, including logs and firewood). BNG calculated on enhancement from poor - moderate condition over a target time of ten years. NB: limited access available for initial condition assessment, though assessed areas appear to be representative
CRUMPSALL VALE INTERMEDIATE CARE UNIT (CVICU) - GRASSLAND	The northern edge of the site has semi-improved grassland, with encroaching scrub along the margin adject to Delaunays Road. This is in poor-moderate condition (BNG condition assessment), the sward is dense and around 30cm high. Moderate diversity, dominated by Yorkshire fog, meadow foxtail, cock's-foot; with tufted vetch, red clover, white clover, meadow buttercup, meadow cranesbill, creeping thistle, ribwort plantain, dock, and dandelion species.	**Grassland** These areas of semi-improved grassland should be retained, enhanced and managed as wildflower meadows / neutral grassland: 1) Sward heights should vary, creating microclimates to provide habitat for insects, birds and small mammals to live and breed. 2) Prevent further succession of encroachment of scrub (including the bramble) and maintain at a proportion of <5% of grassland. 3) Maintain cover of bare ground 1-5% of area. 4) Prevent encroachment of invasive species from the adjacent woodland (Japanese knotweed and Himalayan balsam). 5) Where required, cut once or twice a year from late summer to the end of winter.	11.29 Habitat Units	1	<20k	Could be funded through NHS Charities Together Greener Communities Funding or similar etc. and be supported by volunteer days with staff/ corporate volunteers.	Good views of this area from Crumpsall Vale Intermediate Care Unit, Delaunays Road and Crumpsall Way. The grassland areas can also be enjoyed by pedestrians walking from the main car park of Delaunays Road.

SITE WIDE	Amenity Grassland across the site has been intensively managed and has a short, dense swards, >10 cm high. This habitat is in overall poor condition (BNG condition assessment), with a low diversity of species, dominated by Yorkshire fog, Bent species, red fescue and cock's foot. Flower species are largely limited to white clover, creeping buttercup and lesser trefoil.	**Grassland** Amenity Grassland requires a new management regime and planting. Amenity Grassland is found throughout the site, covering a total of 25,000 m2 and providing the majority of green space coverage amongst the ground's built landscape. Implement the 'No Mow May' initiative and enhance some areas further by not cutting until late June-August to allow plants to flower and encourage greater diversity of species. Vary grass heights, e.g. leave some areas long, whilst cutting a 1 m border along path/road edges, (this will create a purposeful impression, rather than looking unkempt). Leave longer circular sections around the base of trees and longer borders where no access is required. Avoid fertiliser and pesticides. For BNG calculation, we have used 10,000 m2 of the grassed areas as an example for the additional enhancements (beyond No Mow May), taking the condition from poor to moderate (BNG condition assessment).	4.13 Habitat Units	1	No cost	Potential to reduce grounds maintenance costs.	Put up signs to explain that the shaggy grass is a type of gardening for the benefit of wildlife
CVICU - SUDS	Limited value for wildlife due to short sward within wider area of poor semi-improved grass.	**Sustainable drainage** SUDs, Bioswale, Rain Garden (see appendix 2) There is an existing ditch cut alongside this unit which is in a strategic position to be used as a Sustainable Drainage System (SuDS), Bioswale or rain garden. These can be made by creating a depression in the ground and filling with free-draining material, then planting to slow surface water runoff and improve water quality. Planting will need to consider the alternating waterlogged and dry conditions due to the amount of runoff available as storm water will fill the depression before draining. Many native perennials will do well in rain gardens, including wildflowers, grasses, ferns, and even some shrubs and small trees. Drought-tolerate plants should be used towards the edges.	0.15 Habitat Units	1	<20k	There is a small reduction in water rates through the United Utilities Sustainable Drainage incentive. A reduction in chargeable area of 80% will apply to the area of the site drained via the sustainable drainage system. The new surface water band is allocated based on the applicable chargeable area for surface water drainage	SuDS are an excellent way to enhance biodiversity while managing stormwater runoff from buildings and surfaces in an urban setting. SuDS make interesting features for visitors and only require a small area.
CVICU - POND	None - lack of standing water on site	**Blue infrastructure** There is room here and suitable location for a pond, rain/bog garden, or both. Position within existing grassed area - do not remove any scrub vegetation to achieve this - position away from trees to reduce leaf litter. The pond should be suitably large (around 100 sq mts); around 50 cm deep; have different levels and at least one gently sloped side for safe wildlife access; and be stocked with native aquatic and marginal plants (see Freshwater Habitats Trust - Creating ponds for amphibians and reptiles). A rain or bog garden should be created nearby by	0.1 Habitat Units	1	<5k	Sow the City may be able to access funding through the NHS Charities Together Greener Communities Fund for this project. Potential for Sow the City managed corporate volunteering day with 20 people for 1 day to create smaller pond if preferred. Site contact: Catherine Morgan, Ward Manager, MLCO	Ponds, rain gardens and bog gardens all provide fantastic habitats for amphibians, and a wide a variety of other species, especially in urban environments, where water sources are scarce. Bog gardens are a fantastic alternative to ponds but are most effective for wildlife when used to enhance an existing pond by being positioned nearby, providing refuge for amphibians.

		excavating around 30 cm depth and laying a pond liner with drainage slits. Then add a layer of grit/gravel before re-filling the area with the excavated soil – the aim is for damp but not water-logged. Plant to achieve a range of flowers throughout the year: water forget-me-not, marsh marigold, ragged robin, water avens, marsh woundwort, hemp agrimony. Avoid vigorous pendulous sedge and gunnera as these may take over. Choose either an existing soggy area or start from scratch.					This would be a nice place to position a seating bench for staff, patients and visitors. Ponds make attractive features and will be visited by birds, amphibians, and charismatic insects such as dragonflies. Patients will be able to passively view the pond including birds and other visiting wildlife. CVICU lounge overlooks the site as well as large number of hospital rooms who will benefit from (indirect) connection with nature. Poor access to this area up steep embankment from west wing of Care Unit.
EASTERN SITE BOUNDARY	None - fencing	**Hedge planting** Except for some species-poor hedging to the northwest corner of the site, there are few lengths of hedging present. Species-rich native hedging is recommended along the eastern boundary of the site, replacing the existing fencing between the lane/car park and the woodland belt. Around 200m or more of this boundary is suitable for hedgerow planting To provide year-round foliage and food, use a variety of native species including hawthorn, hazel, elder, field maple, honeysuckle, guelder rose, dogwood and spindle. This will provide a corridor along the wooded boundary and enhance the foraging suitability of the woodland edge for bats. In addition, it will provide a nesting site and food for birds, nectar source for insects and shelter for a variety of creatures, including hedgehogs.	1.8 Hedgerow Units (based on 200 m)	1	<10k	Funding for native hedging available through NHS Forest and Sow the City can access corporate volunteers for planting days. Potential to engage staff or patient volunteer groups to create new hedging.	Hedgerows are a priority species which offer high ecological benefits to a site. They are included in the Biodiversity Action plans for both the UK and Greater Manchester, with targets to increase the cover of new hedgerows across the county. Where possible, native species-rich hedgerows should be established across the MFT estate. This can be achieved both by planting new hedgerows and improving any existing 'species poor' hedgerows on the sites.
EASTERN WOODLAND BELT	See above	**Green health walk** Access into woodland by creating footpath, walking trails or more restricted access into clearings/glades. A wide woodland belt runs along the entire eastern boundary of the site and providing pedestrian access into this fantastic resource should be considered. Should longer footpaths through the length of the woodland be envisioned for a future plan, accessible clearings could be made in the shorter term, which could balance both the woodland condition enhancements (outlined above) and provision of 'Forest Bathing' opportunities for patients, staff and visitors.	N/A	2	>100k	Opportunity to apply to NHS Charities Together Greener Communities Funding (£30k-£200k) to fund or part fund this project.	Any impacts on existing habitat will need to be reviewed - such as lighting, hardstanding, clearing, etc. Walking/cycle trails would also provide exercise opportunities. Connecting a woodland walk to the River Irk would require significant investment but could be considered for future green development.

CVICU - GREEN ROOF	This intensive green roof is around 250 m2, consisting of sedum species. Suitable for foraging pollinators but overall poor diversity. Currently poor condition due to lack of species diversity (BNG condition assessment).	**Maintenance** Need to ensure regular removal of grass on sedum green roof. Unwanted grass and moss can cause significant damage to the roof if they are allowed to get established.	N/A	0	0k	Sow the City managed corporate volunteering day with 10 people for 1 day to remove weeds and restore green roof. Site contact: Catherine Morgan, Ward Manager, MLCO	Improved entrance to ward for patients/ staff visitors.
CVICU - THERAPEUTIC GARDEN	Fruit trees and ornamental planting	**Therapeutic garden** Potential to use planters for low maintenance ornamental and edible plants and use them for therapeutic gardening activities with patients.	N/A	2	0k	Sow the City has funding for Green Social Prescribing and is running Social and Therapeutic Gardening sessions with patients in October 2023.	Potential for space to be used as a therapeutic garden for patients to reduce stress, reduce pain, and improve physical and mental health. Sustainable food distributed to patients/ staff. These planters were built by Sow the City in 2018 with patients from the Acacia Unit (Park House)
BREATHE EASY GARDEN	Ornamental planting including roses and ferns	**Maintenance** Potential for existing planters and borders to be improved with additional top soil/ compost added and garden tidied up. Garden was initially established in partnership with Lung UK and uses white 'Princess Diana' rose variety (she was Patron of this charity).	N/A	1	<2k	Sow the City managed corporate volunteering day with 10 people for 1 day to add compost/ top soil and make garden more welcoming and productive. Existing member of staff Anna Webster (Community Nurse) is co-ordinating the garden project.	Garden provides useful space in main hospital for patient but also staff wellbeing. Many use this area to have lunch/ have informal meetings here.
CHILDREN'S UNIT POSTNATAL GARDEN	Negligible	**Ornamental planting** Add more planters into courtyard. Location already contains several but they are unused.	N/A	1	<2k	Potential for corporate volunteering day.	Improved views of nature from surrounding rooms. Poor access into this rooftop garden through another hospital room.
PARK HOUSE LINK CORRIDOR	Area of introduced shrub - cherry laurel, cotoneaster and Japanese barberry with birch saplings.	**Maintenance** This is an 'unloved' and abandoned garden area with broken seating and invasive non-native planting. This would be suitable for native orchard planting or planting with other nut/fruit baring trees, with new seating, bird feeders and bird boxes. Birds are already using this garden so this would be improving an existing favoured site. There is also current boundary hedging between this area and the car park which could be enhanced by retaining the elder and rosa sp. and substituting the non-natives with native species to provide natural food sources and nesting sites.	N/A	1	<20k	Could be improved with support from Sow the City volunteer days with staff/ corporate volunteers.	This would benefit staff, patients and visitors to this area of the hospital, in particular those at G3 Sir Sidney Hamburger and Park House. It is a relatively secluded site which gives the impression of being cocooned from the otherwise grey landscape and expansive car park.

GENERAL	N/A	**Access** There is a lack of outdoor seating. Speaking with staff members during the survey, additional seating is desirable. The northwest of block G8 and opposite entrance to A&E would be good locations to position picnic benches.	N/A	1	<5k		Speaking with staff, people often come to these grassed areas to sit on their breaks.
CVICU - MEADOW	Regularly maintained grounds tend to remove all debris and detritus that are valuable to wildlife. As such, the site is largely lacking in features that can be used as food, shelter and hibernation sites, though there are many areas where these can be placed that will not look unappealing to people using the site.	**Habitat creation** Refuge piles and hibernaculas (see appendix 2) are low cost, simple ways to provide habitats for a wide range of wildlife, especially invertebrates, amphibians, reptiles, and hedgehogs by providing a refuge for breeding and hibernating. They can be created in numerous ways by stacking natural materials found on site, such as logs, rotting wood, and rocks. They should be around 2m long and 0.5m high, be positioned within shady wooded areas, scrubby margins and nearby any ponds/rain gardens, before being covered with topsoil to protect from disturbance. They should then remain untouched. Nearby the woodland area beside CVICU (and recommended pond), within the Semi-improved grassland adjacent to Delauneys Road and amongst the trees to the west of the Estates office would all be ideal locations.	N/A	0	<5k	Sow the City can access corporate volunteers for habitat creation days. To reduce costs piles of woodchip, trimmings and leaves left over from grounds maintenance can be positioned in wooded and scrub boundaries.	
			Overall Gain for Habitat Units =29% (from 60.56 units) for Hedgerow units = 73% - (from 1.8 units)				


EASTERN SITE BOUNDARY
HEDGE PLANTING
EASTERN WOODLAND BELT
MANAGEMENT
GREEN HEALTH WALK
BREATHE EASY GARDEN
MAINTENANCE
CRUMPSALL VALE
GREEN ROOF
CRUMPSALL VALE
POND
CRUMPSALL VALE
MEADOW
CRUMPSALL VALE
THERAPEUTIC GARDEN
CRUMPSALL VALE
SUDS
CRUMPSALL VALE
GRASSLAND
CHILDREN'S UNIT
ORNAMENTAL PLANTING
PARK HOUSE LINK CORRIDOR
MAINTENANCE
LEGEND
N
Not to scale at A4
CC
GK
A1
1:1250

Findings – Oxford Road Campus

Site name	Existing ecological value	Proposed enhancement	BNG	Green well-being	Est. cost	Resources	Notes
SITE WIDE	All grassed areas on site are in poor ecological condition (BNG condition assessment) due to regular cutting. Vegetative diversity is low.	**Wildflower meadows** Grassland enhancement requires a new management regime and planting. Adhere to the 'No Mow May' initiative across as much of the site as possible. Allocate at least 50% of overall grassed area cover to be enhanced further by not cutting until late June-August. Vary grass heights, e.g. leave some areas long, whilst cutting a 1m border along path/road edges, which will create a purposeful impression rather than looking unkempt. Leave longer circular sections around the base of trees and longer borders where no access is required. Avoid fertiliser and pesticides. BNG calculations made on 0.6 Ha of total grassland being enhanced from poor condition to moderate, following the above advice.	2.04 Habitat Units	1	No cost		Overall, less costly for site maintenance. Less regular cutting allows for grasses and flowers across the site to finish seeding, which provides additional food for birds and other species. Improving grassland for insects will increase the prey availability for foraging bats.
MAIN BOULIVARD GRASSED AREA	Poor condition amenity grass with no additional planting. Existing sparse treeline of Pin Oaks in very poor condition - possibly due to chlorosis (iron deficiency in the leaf), which can point to soil being too alkaline for this species.	**Tree planting** This is a large and unwelcoming grassed area which is crying out for additional planting and would be a good place for interesting feature trees or an orchard. Trees could be planted to replace the existing immature pin oaks that are in poor health, along the pavement margin to the grassed area to create a wildlife 'corridor' which would link up with the hedging that is recommended to the opposite side of the Boulevard. Additional native perennial planting at the base of trees would further enhance this area. Plant 350 m tree line in a tighter line than the existing trees to create a true 'corridor' for birds, bats, insects. A soil pH test is recommended given the problem with existing trees. Avoid single-species stands as this limits biodiversity. Alkaline-tolerant species would include hornbeam, beech, hazel, English oak, maples, limes (tilia spp.). To satisfy moderate condition assessment for net gain - use native species; try to achieve continuous tree canopy, with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide; and maintain at least 95% healthy condition.	0.19 Habitat Units	1	<20k	Various grants available for tree planting including through Sow the City, City of Trees, and NHS Forest.	Improved environment for patients and visitors in the largest green space on the hospital site.

HATHERSAGE ROAD CAR PARK	Poor - highly manicured amenity grass.	**Sustainable urban drainage** There is an existing Sustainable Drainage System (SuDS) outside City Labs 2.0 building. It is recommended that a second 'rain garden' SuDS be installed. Made by creating a depression or dip in the ground and filling with free-draining material, then planting to slow surface water runoff and improve water quality. Planting will need to consider the alternating waterlogged and dry conditions due to the amount of runoff available as storm water will fill the depression before draining. Many native perennials will do well in rain gardens, including wildflowers, grasses, ferns, and even some shrubs and small trees. Use more drought-tolerate plants towards the edges. Position in full-partial sun, ideally on a gentle incline. There are many available design guides, but a suitable position could be along the eastern side of the Hathersage Road car park to intercept runoff from the multistorey downpipes and surrounding paved surfaces.	0.05 Habitat Units	1	<20k	There is a small reduction in water rates through the United Utilities Sustainable Drainage incentive. A reduction in chargeable area of 80% will apply to the area of the site drained via the sustainable drainage system. The new surface water band is allocated based on the applicable chargeable area for surface water drainage.	SuDS make interesting features for visitors and only require a small area. They are an excellent way to enhance habitat while managing stormwater runoff from buildings and surfaces in an urban setting.
MAIN BOULIVARD HEDGING	Very poor condition: All existing hedging to both sides of this Boulevard has been regularly cut to a height and width of <0.5 m. Negligible suitability for birds and small mammals and not considered a 'Hedgerow' due to severe management practices.	**Hedge planting** There are many sections of hedging along the Boulevard and replacing these with species-rich native hedging would have one of the largest impacts on wildlife for this hospital site, providing a continuous habitat to connect some of the fragmented green space. Replace the existing low level Redclaws (Escallonia) under the trees at the rear of the large grassed area with 90 m species rich hedging, and an additional sections (around 100 m length) along the amenity grass beside the Clinical Sciences Building. It is recommended that a new cutting regime be implemented across the site to allow for a height and width of at least 1.5 m, where possible, avoid pruning during bird-breeding season (March-August), and reduce the cutting of ground flora to the base of hedgerows, leaving a less manicured border.	1.46 Hedgerow Units	1	<10k	Sow the City has access to corporate funding for hedging plants and corporate volunteers for hedge planting.	Potential to engage staff or patient volunteer groups to create new hedging.
WESTERN BOUNDARY - UPPER BROOK ST	Except for one short length, all hedging on site is species-poor non-native laurel.	**Hedge planting** Increase hedging along western boundary by adding 150 m of species-rich native hedging alongside the brick wall, parallel with the line of immature broad-leaved trees. To provide year-round foliage and food, use a variety of native species including hawthorn, hazel, elder, field maple, honeysuckle, guelder rose, dogwood and spindle. This will provide connectivity between on-site and off-site habitats, enhance the existing tree-line, a better buffer to the busy Upper Brook Street, a foraging feature	1.45 Hedgerow Units	1	<10k	Sow the City has access to corporate funding for hedging plants and corporate volunteers for hedge planting.	Hedgerows are a priority species which offer high ecological benefits to a site. They are included in the Biodiversity Action plans for both the UK and Greater Manchester, with targets to increase the cover of new hedgerows across the county. Where possible, native species-rich hedgerows should be established across the MFT estate. This can be achieved both by planting new hedgerows and improving any existing 'species poor' hedgerows on the sites.

		for bats, nesting site and food for birds, nectar source for insects and shelter for a variety of creatures.					Potential to engage staff or patient volunteer groups to create new hedging.
RMCH ROOF GARDEN	Limited ornamental planting - low	**Therapeutic garden/ green roof** Option 1 (low intervention) - installation of several new raised planters with irrigation system/ self-watering. Planted with perennial sensory planting, tolerant of exposed situation. Non-toxic plants due to nature of the space. Option 2 (high intervention): installation of a roof garden with irrigation system in a section of the outdoor school play area. Potential to utilise rainwater runoff from downpipes within scheme to increase sustainability credentials.	N/A	1	<50k	Potential staff volunteering opportunity or facilitated corporate volunteer day to prep and plant existing in ground area.	Improved planting would benefit children's health and wellbeing, offer new informal learning opportunities and provide a restorative space within the existing play area if provided a dedicated garden space. Potential for rainwater harvesting.
STROKE REHAB UNIT INTERNAL QUAD	Limited ornamental planting - low	**Therapeutic garden** Potential to improve existing in-ground planting area with visually interesting species of shrub, small trees and perennials as demonstrated in some of the hospital's other internal courtyards.	N/A	1	<2k	Potential staff volunteering opportunity or facilitated corporate volunteer day to prep and plant existing in ground area. Soil to be improved with the addition of compost/ woodchip	Passive views of green space from wards on floors 1 and 2 and limited view from waiting area on ground floor. Accessible for staff and patients with some green prescribing activities on an ad hoc basis led by staff.
GREENHOUSE QUAD	Limited ornamental planting/ specimen trees - low	**Ornamental planting** Planting into existing in-ground growing areas which are unused, bare soil. Species with dry shade tolerance to be specified.	N/A	1	<2k	Potential staff volunteering opportunity or facilitated corporate volunteer day to prep and plant existing in ground area.	No access at present. Water access points. Two double door access points on ground floor. Passive views of green space from wards on floor 3 and ground floor ultrasound clinic waiting room and nuclear medicine.
PETER MOUNT QUAD	Limited ornamental planting/ specimen trees - low	**Therapeutic garden** Potential for therapeutic garden: ground cover planting, include species with sensory properties such as mentha spp. Possibility to incorporate raised planters on parts of the existing hard standing to allow access to gardening opportunities for individuals with low mobility. Potential to investigate harvesting rainwater for the garden from the existing downpipe.	N/A	2	<10k	Potential to access funding for development of garden and running therapeutic horticulture sessions (e.g. through Greener Communities Fund)	Floors 1 and 2 currently being refurbished and will include a specialist ward for sexual assault Active space, possibility to use for social prescribing and improving wellbeing due to its connection to the LIME arts building which is accessed via the courtyard.

CHILDREN'S WARD ROOF GARDEN	Limited ornamental planting - low	Option 1 (low intervention) - installation of several new raised planters with irrigation system/ self-watering. Planted with perennial sensory planting, tolerant of exposed situation. Non-toxic plants due to nature of the space. Option 2 (high intervention): installation of a roof garden with irrigation system in a section of the outdoor school play area. Potential to utilise rainwater ru off from downpipes within scheme to increase sustainability credentials.	N/A	1	<50k	Potential staff volunteering opportunity or facilitated corporate volunteer day to prep and plant existing in ground area.	Improved planting would benefit children's health and wellbeing, offer new informal learning opportunities and provide a restorative space within the existing play area if provided a dedicated garden space. Potential for rainwater harvesting.
			Overall Gain for Habitat Units = 16.22% (from 2.28 units) for Hedgerow Units = 184.8% (from 2.91 units)				


WESTERN BOUNDARY UPPER BROOK ST
GREENHOUSE QUAD
HATHERSAGE ROAD CAR-PARK
INTERNAL QUAD
MAIN BLVD GRASSED AREA
MAIN BLVD HEDGING
CHILDREN'S WARD ROOF GARDEN
PETER MOUNT QUAD
Not to scale at A4
LEGEND
N
CC
GK
A1
1:1000

Findings – Withington General Hospital

Site name	Existing ecological value	Proposed enhancement	BNG	Green well-being	Est. cost	Resources	Notes
SITE WIDE	Scattered individual trees are in moderate general condition for biodiversity (not necessarily tree health, which appears to be reasonable). The BNG condition assessment could be enhanced in places to improve movement across the site, wildlife corridors and shelter for many species.	**Maintenance** At least one third of the trees on site could be enhanced to 'good' condition for biodiversity by the following regime, where the location is feasible, such as site margins: Reducing pruning regime, so the trees retain >75% of expected canopy for their age range and height. Allow canopies to over-sail any vegetation underneath. Encouraging a continuous canopy, with gaps in cover making up <10% of total area and no individual gap being >5 m wide (this may require additional planting, depending on location of existing stands). Management regime to encourage micro habitat sites for birds, mammals and insects e.g. presence of deadwood, cavities or loose bark etc.	2.26 Habitat Units	0	No cost (or potential new planting cost, depending on canopy cover, as per notes)		Improved green space for patients to see, with increase in nesting birds, roosting bats, and overall connectivity. BNG calculated on 30% of existing tree canopy (approximately 2000 m2 canopy).
GENERAL	Amenity Grassland across the site has all been intensively managed and has a short, dense sward of less than 10 cm high. This habitat is in overall poor condition (BNG condition assessment), will a low diversity of species, dominated by Yorkshire fog, Bent species, red fescue and cock's foot. Flower species are largely limited to white clover, creeping buttercup and lesser trefoil.	**No Mow May** Amenity grassland enhancement requires a new management regime and planting. Amenity Grassland is found throughout the site, covering a total area of 6000 m2 and providing the majority of green space coverage amongst the built landscape of the grounds. Implement the 'No Mow May' initiative and enhance some areas further by not cutting until late June-August to allow plants to flower and encourage greater diversity of species. Vary grass heights, e.g. leave some areas long, whilst cutting a 1 m border along path/road edges, which will create a purposeful impression rather than looking unkempt. Leave longer circular sections around the base of trees and longer borders where no access is required. Avoid fertiliser and pesticides.	1.43 Habitat Units	1	No cost		Refraining from cutting grass until late June – August will allow for grasses and flowers across the site to finish seeding, which provides additional food for birds and other species. Improving this area for insects will increase the prey availability for foraging bats that may use the western wooded boundary as a foraging feature. Paths can be cut through longer grass to gain access to picnic tables and to create an attractive walk route through the field, and beside any pond/rain garden area that may be created here. For BNG calculation, we have allocated half of the grassed areas (0.3 Ha) for the above enhancements, taking the condition from poor to good (BNG condition assessment).

GRASSLAND AROUND BUCCLEUCH LODGE	Semi-improved neutral grassland that appears to have recently been enhanced by less intensive management practices compared with the rest of the site. Currently in moderate condition near the woodland and poor condition near the roadside entrance (BNG condition assessment). Mossy, woodland edge grassland, appears to be dominated by bent sp (recently cut), wild strawberry, birdsfoot trefoil, eyebright, wood aven, self heal, sweetand red clover, meadow buttercup, plantains and common mouse ear.	**Wildflower meadow** These grassed areas should be retained and earmarked for further enhancement with a more specific meadow management. Recommended that this be extended to the poor improved grassy patch beside the Elizabeth Slinger Road Entrance to Brian Hore Unit. This additional area has been left uncut recently and is dominated by couch grass, Yorkshire fog and creeping buttercup. Improvement could extend to Elizabeth Slinger Road Entrance to Brian Hore Unit.	0.76 Habitat Units	1	<10k	Could be funded through NHS Charities funding or similar etc. and be supported by volunteer days with staff/ corporate volunteers.	BNG Calculation made on both semi-improved and improved areas (see Phase 1 drawing), to enhance from poor-moderate to good (BNG condition assessment).
REAR OF BUCCLEUCH LODGE	None - lack of standing water on site.	**Blue infrastructure** There is room here and suitable location for a pond or rain garden, or both. Position within existing poor semi-improved grassed area, away from trees to reduce leaf litter. The pond should be suitably large for the area; around 50 cm deep; have different levels and at least one gently sloped side for safe wildlife access; and be stocked with native aquatic and marginal plants (see Freshwater Habitats Trust - Creating ponds for amphibians and reptiles). Alternatively, a rain or bog garden could be created by excavating an area along the south western boundary to the existing field to around 30 cm depth and laying a pond liner with drainage slits. Then add a layer of grit/gravel before re-filling the area with the excavated soil – the aim is for damp but not water-logged. Plant to achieve a range of flowers throughout the year: water forget-me-not, marsh marigold, ragged robin, water avens, marsh woundwort, hemp agrimony. Avoid vigorous pendulous sedge and gunnera as these may take over.	0.1 Habitat Units	1	<10k	Sow the City can access corporate volunteers for creation of the pond/ wetland. Materials costs would need to be provided by MFT e.g. pond liner and planting.	Ponds, rain gardens and bog gardens all provide fantastic habitats for amphibians, and a wide a variety of other species, especially in urban environments, where water sources are scarce. Bog gardens are a fantastic alternative to ponds but are most effective for wildlife when used to enhance an existing pond by being positioned nearby, providing refuge for amphibians. This would be a nice place to position a seating bench for staff, patients and visitors. Ponds make attractive features and will be visited by birds, amphibians, and charismatic insects such as dragonflies. For the BNG calculation we have allocated 50 m2 each for a pond and a rain garden.

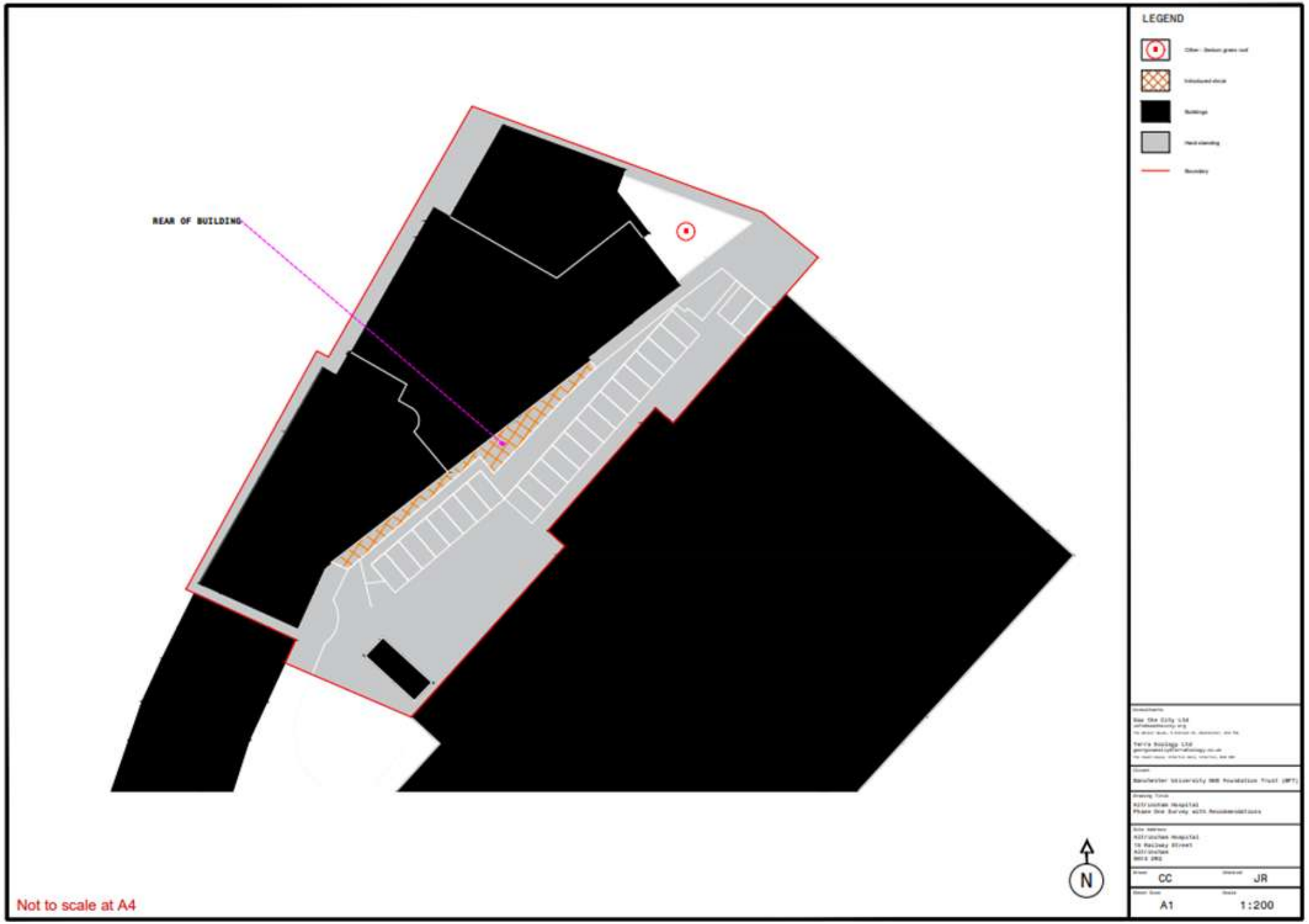
MAIN HOSPITAL BUILDING - SOUTH-EASTERN ASPECT	Introduced shrubbery planting along external hospital wall (largely hebes and mahonia). This currently looks un-managed, and the front edge has become 'scrubby' with bramble and sycamore saplings and a ground flora of woodland species such as pendulous sedge, wood aven and herb Robert. Overall fair variety of species but looks unpurposeful and unattractive for visitors.	**Sustainable urban drainage** This location would be suitable for a 200 m2 sustainable drainage system, or 'SuDS', to be installed. Made by creating a depression or dip in the ground and filling with free-draining material, then planting to slow surface water run-off and improve water quality. Planting will need to consider the alternating waterlogged and dry conditions due to the amount of runoff available as storm water will fill the depression before draining. Many native perennials will do well in rain gardens, including wildflowers, grasses, ferns, and even some shrubs and small trees. Use more drought-tolerate plants towards the edges. There are many available design guides, but this would be a good location to assist with runoff from the building and walkways and provide a feature with interest for pedestrians.	0.07 Habitat Units	1	<20k	There is a small reduction in water rates through the United Utilities Sustainable Drainage incentive. A reduction in chargeable area of 80% will apply to the area of the site drained via the sustainable drainage system. The new surface water band is allocated based on the applicable chargeable area for surface water drainage	SuDS are an excellent way to enhance habitat while managing stormwater runoff from buildings and surfaces in an urban setting. SuDS make interesting features for visitors and only require a small area.
NORTHWEST CORNER OF CAR PARK (ELIZABETH SLINGER ROAD and NELL LANE)	Defunct and gappy hedging along Elizabeth Slinger Road and sparse line of sycamore stands along Nell Lane.	**Hedge planting** 100 m of species-rich native hedging recommended around the north-western boundary of the site to create boundary between the car park and adjacent roads. There is some gappy old hedging to the western side and no existing hedging to the northern boundary of this car park area. Any new hedging to incorporate the existing trees/shrubs.To provide year-round foliage and food, use a variety of native species including hawthorn, hazel, elder, field maple, honeysuckle, guelder rose, dogwood and spindle.This will provide a continuous green habitat around the entire site. It will provide a foraging feature for bats, nesting site and food for birds, nectar source for insects and shelter for a variety of creatures.	0.97 Hedge Units	1	<5k	Funding for native hedging available through NHS Forest or Sow the City and Sow the City can access corporate volunteers for planting days.	Hedgerows are a priority species which offer high ecological benefits to a site. They are included in the Biodiversity Action plans for both the UK and Greater Manchester, with targets to increase the cover of new hedgerows across the county. Where possible, native species-rich hedgerows should be established across the MFT estate. This can be achieved both by planting new hedgerows and improving any existing 'species poor' hedgerows on the sites. Provides additional screening of the car park areas for local residents.
CAFÉ QUAD 1	Limited planting, mostly ornamental planting such as small shrubs and tree.	**Ornamental planting** Introduction of groundcover layer with a mix of evergreen and flowering perennial species. Installation of seating areas to provide outdoor café option.	N/ A	2	<20k	Opportunity for Sow the City managed corporate volunteering days to deliver proposed improvements.	Improved green space for patients to eat and meet families. This is a relatively small hospital; staff suggested the site is usually quite quiet in terms of patient numbers. All quads are netted.

QUAD 2	Limited planting, mostly ornamental planting such as small shrubs and trees.	**Therapeutic garden** Potential for use as a green social prescribing space. Accessible from the corridor. Improvements could include planting of woodland style groundcover under trees.	N/ A	2	<20k	Opportunity for Sow the City managed corporate volunteering days to deliver proposed improvements.	
QUADS 3 and 4	Limited planting, mostly ornamental planting such as small shrubs and trees.	**Therapeutic garden** Potential for use as a green social prescribing space.	N/ A	2	<20k per quad	Opportunity for Sow the City managed corporate volunteering days to deliver proposed improvements.	
MAIN CAR PARK - SEATING AREA	Amenity grass - poor ecological value due to regular cutting to provide a seating area.	**Ornamental planting** There is a small thin strip of amenity grass with two picnic tables close to the hospital main entrance. This is featureless and could easily be enhanced by creating a border of native perennial planting plus bulb planting to give colour and interest in the spring and to provide a nectar source for a number of emerging invertebrate species.	N/ A	1	<5k	Sow the City can access corporate volunteers for planting days. Costs of plants/ materials provided by MFT.	Improved green space visible by visitors to hospital.
			Overall Gain for Habitat Units = 12% (from 4.62 units) for Hedgerow units = 28% (from 0.97 units)				


MAIN HOSPITAL S/E ASPECT
SUDS
QUAD 2
THERAPEUTIC GARDEN
QUADS 3 & 4
THERAPEUTIC
GARDEN
CAFE QUAD 1
ORNAMENTAL PLANTING
MAIN CAR-PARK SEATING AREA
ORNAMENTAL PLANTING
NORTH-WEST CORNER CAR-PARK
HEDGE PLANTING
GRASSLAND BUCCLEUCH LODGE
WILDFLOWER MEADOW
REAR BUCCLEUCH LODGE
BLUE INFRASTRUCTURE
LEGEND
Not to scale at A4
N
CC
GK
A1
1:500

Findings – Altrincham General Hospital

Site name	Existing ecological value	Proposed enhancement	BNG	Green well-being	Est. cost	Resources	Notes
REAR OF BUILDING	Poorly maintained area of planting - has become scrubby, with bramble and buddleia. Has poor-moderate potential for insects given condition, location and size. Japanese knotweed present.	**Sustainable drainage systems** The poorly maintained strip of planting to the rear of the site is in a strategic position to be used as a Sustainable Drainage System (SuDS, Bioswale or Rain Garden), with existing downpipes in place. This would be the best use of this area to increase biodiversity with less regular requirement for maintenance due to being 'self-watering'. Made by creating a depression or dip in the ground and filling with free-draining material, then planting to slow surface water runoff and improve water quality. Planting will need to consider the alternating waterlogged and dry conditions due to the amount of runoff available as storm water will fill the depression before draining. Many native perennials will do well in rain gardens, including wildflowers, grasses, ferns, and even some shrubs and small trees. Use more drought-tolerate plants towards the edges.	N/A	1	<10k	There is a small reduction in water rates through the United Utilities Sustainable Drainage incentive. A reduction in chargeable area of 80% will apply to the area of the site drained via the sustainable drainage system. The new surface water band is allocated based on the applicable chargeable area for surface water drainage.	Though there are only limited views of this green space from windows at the rear of the building, SuDS make interesting features for visitors and only require a small area. SuDS are an excellent way to enhance small habitats while managing stormwater runoff from buildings and surfaces in an urban setting.


REAR OF BUILDING
LEGEND
N
Not to scale at A4
CC
JR
A1
1:200

Findings – Wythenshawe Hospital

Site name	Existing ecological value	Proposed enhancement	BNG	Green well-being	Est. cost	Resources	Notes
JURASSIC CAR PARK - GRASSLAND	Poor semi-improved grassland with bare areas and patches of scattered scrub and invasive Japanese knotweed.	**Wildflower meadow** This 1 Ha of semi-improved grassland should be retained, enhanced from moderate to good condition (BNG condition assessment) and managed as wildflower meadows/neutral grassland: 1) Sward heights should vary, creating microclimates to provide habitat for insects, birds and small mammals to live and breed. 2) Prevent further succession of encroachment of the scattered scrub (including the bramble) and maintain at a proportion of <5% of grassland. 3) Reduce the cover of bare ground 1-5% of area. 4) Implement management plan of the Japanese knotweed in this area. 5) Where required, cut once or twice a year from late summer to the end of winter.	11.41 Habitat Units	1	<5k	Support and advice available on how to establish wildflower meadows from the National Wildflower Centre and Wildlife Trusts.	The best time to sow wildflowers is either in the autumn (between August and October) or the spring (between February and May). Generally, autumn is preferred because there are fewer risks from weeds.
SITE-WIDE	Scattered individual trees are in fairly poor general condition for biodiversity (not necessarily tree health, which appears to be reasonable), especially poor where there are single lines of trees within amenity grassed areas. The BNG condition assessment could be enhanced in places to improve movement across the site, wildlife corridors and shelter for a many species.	**Tree condition for biodiversity** At least one quarter of the scattered trees on site could be enhanced to 'moderate' condition for biodiversity by the following regime. Initial focus should be on those sparse lines of trees within the site, especially where they stand within amenity grassland. Reducing pruning regime, so the trees retain >75% of expected canopy for their age range and height. Allow canopies to over-sail any vegetation underneath. Encouraging a continuous canopy, with gaps in cover making up <10% of total area and no individual gap being >5 m wide (this may require additional planting, depending on location of existing stands).	4.13 Habitat Units	0	No cost (or potential new planting cost, depending on canopy cover, as per notes)		Improved green space for patients to see, with increase in nesting birds, roosting bats and overall connectivity. Example BNG calculated on 6,000 m2 of existing tree canopy (around one quarter of total estimated canopy of 23,000 m2).

		Management regime to encourage micro habitat sites for birds, mammals and insects e.g. presence of deadwood, cavities or loose bark etc.					
SITE-WIDE	All amenity grassed areas on site are in poor ecological condition (BNG condition assessment) due to regular cutting. Vegetative diversity is low.	**Amenity Grass** Grassland enhancement requires a new management regime, and potentially further planting to diversify species. Adhere to the 'No Mow May' initiative across as much of the site as possible. Allocate at least 30% of overall grassed area cover to be enhanced further by not cutting until late June-August. Vary grass heights, e.g. leave some areas long, whilst cutting a 1m border along path/road edges, which will create a purposeful impression rather than looking unkempt. Leave longer circular sections around the base of trees and longer borders where no access is required. Avoid fertiliser and pesticides.	3.74 Habitat Units	0	No cost		Overall, less costly for site maintenance. Less regular cutting allows for grasses and flowers across the site to finish seeding, which provides additional food for birds and other species. Improving grassland for insects will increase the prey availability for foraging bats. BNG calculations made on 1 Ha of total 3 Ha of amenity grass being enhanced from poor condition to moderate, following the above advice.
JURASSIC CAR PARK - GRASSLAND	Poor semi-improved grassland with bare areas and patches of scattered scrub and invasive Japanese knotweed. Lack of standing water in location nor across entire site.	**Blue infrastructure** There is space here, and existing habitat suitability, to create an expansive flower meadow with a cluster of small-medium size ponds (at least 100 m2), plus at least one rain/bog garden, that would vastly improve the site for amphibians, reptiles, birds, and bats (amongst others). There is a notable lack of water bodies / blue infrastructure in the surrounding landscape so ponds would have a huge ecological impact. Dig ponds to around 50 cm deep; have different levels and at least one gently sloped side for safe wildlife access; and be stocked with native aquatic and marginal plants.	0.39 Habitat Unts	1	<20k	There is a small reduction in water rates through the United Utilities Sustainable Drainage incentive. A reduction in chargeable area of 80% will apply to the area of the site drained via the sustainable drainage system. The new surface water band is allocated based on the applicable chargeable area for surface water drainage.	A walk-way could lead visitors from the 'Jurassic' car park though this area, and potentially create a route to link up with one of the hospital entrances off Floats Road. There are opportunities to incorporate seating and signage, where people can enjoy the space and look out over the neighbouring pasture fields to the south. This can be achieved both by planting new hedgerows and improving any existing 'species poor' hedgerows on the sites. For the BNG calculation, we have allocated 3x 100 m2 ponds and a rain garden of 100 m2.

		Position away from trees to reduce leaf litter. (see Freshwater Habitats Trust - Creating ponds for amphibians and reptiles). A rain or bog garden should be created nearby by excavating around 30 cm depth and laying a pond liner with drainage slits. Then add a layer of grit/gravel before re-filling the area with the excavated soil – the aim is for damp but not water-logged. Plant to achieve a range of flowers throughout the year: water forget-me-not, marsh marigold, ragged robin, water avens, marsh woundwort, hemp agrimony. Avoid vigorous pendulous sedge and gunnera as these may take over. Choose either an existing soggy area or start from scratch.					
GENERAL	None - no existing green roofs	**Green roofs** There are a number of designs for green roofs, but the 'extensive' type requires the least cost or maintenance, is not irrigated, and is most suitable for existing buildings. This is a large site, with 75 % of total footprint covered by impervious buildings, car parks and hardstanding. Introducing green roofs would help to create green stepping-stones across an otherwise grey landscape. Typically, a thin substrate is used and is vegetated by low-lying plants such as mosses, succulents, herbs and grasses which are intended to be self-sustaining. This type of roof is not normally designed to be accessible, except for maintenance, and may be flat or sloping. For the BNG calculation, we have allocated two green roofs, each 250 m2, as an example. Details about green roof designs	0.28 Habitat Units	0	<50k	Could be included as part of new capital projects.	Green roofs help with thermal regulation of buildings and have a cooling effect = reduced energy demand. They also reduce provide filtration of run-off and overall reduce the amount of run-off created by the built environment. If green roofs are installed, it is advised to adapt some of the design for the Black Redstart bird. This is a priority BAP species for Greater Manchester, and is associated with urban roof sites, requiring crushed aggregate area for nesting. See https://www.blackredstarts.org.uk/pages/greenroof.html

		are provided in the English Nature report, 'Green Roofs: their existing status and potential'.					
SITE WIDE	Not applicable - no existing SuDS on site.	**Sustainable urban drainage** This is a large site with multiple opportunities to include sustainable drainage systems, or 'SuDS' to assist with run-off from buildings and other sealed surfaces, whilst providing varied planting to benefit a wide variety of species. Made by creating a depression or dip in the ground and filling with free-draining material, then planting to slow surface water runoff and improve water quality. Planting will need to consider the alternating waterlogged and dry conditions due to the amount of runoff available as storm water will fill the depression before draining. Many native perennials will do well in rain gardens, including wildflowers, grasses, ferns, and even some shrubs and small trees. Use more drought-tolerate plants towards the edges. For the calculation, we have allocated two SuDS, each 250 m2, in good condition.	0.19 Habitat Units	0	<10k	There is a small reduction in water rates through the United Utilities Sustainable Drainage incentive. A reduction in chargeable area of 80% will apply to the area of the site drained via the sustainable drainage system. The new surface water band is allocated based on the applicable chargeable area for surface water drainage	There appears to be an old 'rain garden' ditch to the east of Laureate House car park. This site could be enhanced to become a functioning SuDS. A second location might be at the boundary of the main hospital car park, to capture tarmac run-off. SuDS make interesting features for visitors and only require a small area.

GENERAL	None - no existing green facades	**Green walls / living walls** There is an existing green wall on the Trafford site that has been achieved by simply allowing ivy to cover the façade of one building facing the main car park. This could be created on multiple buildings within the Wythenshawe site. Choose south-facing aspect. Green walls can most simply be created by using climbing plants rooted in soil at ground level. Honeysuckle and ivy are both hugely beneficial plants that support a vast number of species, providing high levels of nectar through the summer and autumn. Ivy is a particularly important food source to prepare many insects for hibernation and produces berries with high fat content to birds in the winter. Both ivy and honeysuckle grow relatively quickly and can grow directly against the building fabric or be trained to grow up simple trellis structures/wires.	0.18 Habitat Units	1	<20k	Green facades should be positioned within view of patients' wards to create a natural vista during recovery. They could also be used within courtyard areas to soften walls and give green views from higher floors.	Green walls offer a creative solution to add natural habitats to sites dominated by buildings and sealed surfaces, providing homes for various plant species, insects and, once established, even nesting birds and roosting bats. Additional benefits are aesthetics – green walls have a visual appeal for visitors, and they also provide thermal regulation by cooling buildings. For the BNG calculation, we have allocated two ground-based green walls, each covering a 250 m2 facade, as an example.
LAUREATE HOUSE	Limited ornamental planting/ specimen trees - low	**Tree planting** Quad Garden: Potential to improve existing in-ground planting area with visually interesting species of shrub, small trees and perennials. Therapeutic garden: Potential to plant native broadleaf trees or heritage fruit tree standards (approx.20 trees). Could include greenhouse and planters for growing fruit and vegetables. Potential to improve existing in-ground planting area with more visually interesting species. For the calculation, we have allocated approx. 500 m2 of new tree canopy, to achieve moderate BNG condition over the next 30 years.	0.17 Habitat Units	2	<10k	Potential staff volunteering opportunity or facilitated corporate volunteer day to prep and plant existing in ground area. Staff contact at site is Adam Morris (Service Manager, GMMH) but other members of staff e.g. Occupational Therapists, Nurses are also interested in supporting project. Could be funded through NHS Charities Together Greener Communities Funding or similar etc. and be supported by volunteer days with staff/ corporate volunteers. Either option could be co-designed in consultation with service users and staff.	Option 1: Quad garden could be used as part of treatment for service users experiencing mental ill health. Accessed by mixed acute ward and female ward predominately and used by OTs for therapy. Possibility to encourage more use of space. Option 2: Unusual access through physio room. Garden has potential to be used by a variety of patient groups including mothers and children and older people's wards. Other benefits: climate change adaptation, biodiversity, sustainable food.

F BLOCK	Lawn	**Tree planting** Potential for existing lawns to be planted with spring bulbs and approx. 75 x native broadleaf standard trees e.g. (rowan, hazel, elder, birch, cherry) spaced 3-4m apart. For the calculation, we have allocated approx. 400 m2 of new tree canopy, to achieve moderate BNG condition over the next 30 years.	0.13 Habitat Units	1	<20k	Potential staff volunteering opportunity or facilitated corporate volunteer day to prep and plant. Potential to access funding for tree planting (e.g. through corporate sponsorship)	Passive views of green space from adjacent wards e.g. surgical wards. Other benefits: climate change adaptation
JURASSIC CAR PARK - GRASSLAND	Defunct hedgerow running along the southern boundary of the semi-improved grassland. Some sparse remaining stands remain but in very poor condition and too gappy to currently be considered a 'hedgerow'.	**Hedge planting** Incorporate additional native woody species planting to restore previous hedgerow length of 150 m. To provide year-round foliage and food, use a variety of native species including hawthorn, hazel, elder, field maple, honeysuckle, guelder rose, dogwood and spindle. To improve the condition of this habitat, maintain a minimum height and width of 1.5 m, avoid pruning during bird-breeding season (March-August), and reduce the cutting of ground flora to the base of hedgerows, leaving a less manicured border.	1.35 Hedgerow Units	1	<10k	Funding for native hedging available through NHS Forest or Sow the City and Sow the City can access corporate volunteers for planting days.	Hedgerows are a priority species which offer high ecological benefits to a site. They are included in the Biodiversity Action plans for both the UK and Greater Manchester, with targets to increase the cover of new hedgerows across the county. Where possible, native species-rich hedgerows should be established across the MFT estate. This can be achieved both by planting new hedgerows and improving any existing 'species poor' hedgerows on the sites.
FLOATS ROAD	Species-poor hedging with native hawthorn and sycamore. In general, poor condition (BNG condition assessment) due to limited number of woody species, overcutting, and lack of understorey.	**Hedge planting** There are some species-rich hedgerows to the south perimeter of the hospital grounds but otherwise the site is lacking in these highly beneficial linear features. To improve connectivity to off-site habitats and create a wildlife corridor, it is recommended that the 150 m species-poor hedging along Floats Road to the Northwest of the site be enhanced with additional native woody species planting. To provide year-round foliage and food, use a variety of native species including hawthorn, hazel, elder, field maple, honeysuckle, guelder rose, dogwood and spindle.	0.89 Hedgerow Units	0	<20k	Funding for native hedging available through NHS Forest or Sow the City and Sow the City can access corporate volunteers for planting days.	This improvement will provide connectivity to the off-site Fairywell Woods beyond the NW side of the hospital and become a parallel hedge to the existing hedgerow along Floats Road. Parallel hedgerows offer fantastic connecting features for birds and foraging corridors for bats.

		To improve the condition of this habitat, maintain a minimum height and width of 1.5 m, avoid pruning during bird-breeding season (March-August), and reduce the cutting of ground flora to the base of hedgerows, leaving a less manicured border.					
COSTA	Negligible	**Tree planting** Potential for trees in pots to provide shade for people using the courtyard (e.g. bay, mulberry). Possibility of growing herbs e.g. rosemary, oregano etc. for use in the café.	Negligible	1	<5k	Potential staff volunteering opportunity or facilitated corporate volunteer day. Potential support from Costa including feeding plants with used coffee grounds.	Active use of garden by hospital users visiting the café. Passive views of green space from adjacent wards and corridors. Other benefits: climate change adaptation, and sustainable food.
JURASSIC CAR PARK (Nearby the recommended ponds)	Regularly maintained grounds tend to remove all debris and detritus that are valuable to wildlife. As such, the site is largely lacking in features that can be used as food, shelter and hibernation sites, though there are many areas where these can be placed that will not look unappealing to people using the site.	**Habitat creation** Refuge piles and hibernaculas are low cost, simple ways to provide habitats for a wide range of wildlife, especially invertebrates, amphibians, reptiles, and hedgehogs by providing a refuge for breeding and hibernating. They can be created in numerous ways by stacking natural materials found on site, such as logs, rotting wood, and rocks. They should be around 2m long and 0.5m high, be positioned within shady wooded areas, scrubby margins and nearby any ponds/rain gardens, before being covered with topsoil to protect from disturbance. They should then remain untouched.	N/ A	0	<5k	Sow the City can access corporate volunteers for habitat creation days. To reduce costs piles of woodchip, trimmings and leaves left over from grounds maintenance can be positioned in wooded and scrub boundaries.	
			Overall Gain for Habitat Units = 14.31% (from 20.62 units) for Hedgerow units = 28.19% (from 2.24 units)				


LAUREATE HOUSE
A BLOCK
COSTA
FLOATS ROAD
V BLOCK
JURASSIC CAR-PARK GRASSLAND
BLUE INFRASTRUCTURE
WILDFLOWER MEADOW
HABITAT CREATION
JURASSIC CAR-PARK GRASSLAND
HEDGE PLANTING
LEGEND
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Not to scale at A4

Findings – Trafford General Hospital

Site name	Existing ecological value	Proposed enhancement	BNG	Green well-being	Est. cost	Resources	Notes
LARGE AMENITY GRASSLAND TO WEST OF SITE	Large green space that has been seasonally left unmown due to No Mow May initiative. Offering good habitat for insects during current low maintenance period, with food provision and connectivity to wooded/scrub margin. Good bat foraging habitat.	Grassed areas management Continue with 'No Mow May' where possible across the site but enhance the large grassland to the west of the site further by not cutting until late June-August. The aim is to improve the condition from poor to moderate, following these practices: Vary grass heights, e.g. leave some areas long, whilst cutting a 1m border along path/road edges, which will create a purposeful impression rather than looking unkempt. Leave a taller border along the western tree boundary. Avoid fertiliser and pesticides. This is a large plot and an area could be allocated for further enhancement and meadow creation by re-seeding and adopting more specific meadow management. For BNG calculation, we have allowed 0.25 Ha for lowland meadow creation, in good condition.	4.51 Habitat Units, when including additional meadow	1	No cost		Refraining from cutting grass until late June – August will allow for grasses and flowers across the site to finish seeding, which provides additional food for birds and other species. Improving this area for insects will increase the prey availability for foraging bats that may use the western wooded boundary as a foraging feature. Paths can be cut through longer grass to gain access to picnic tables and to create an attractive walk route through the field, and beside any pond/rain garden area that may be created here.
CAR PARKS	None - Car parks are particularly lacking in vegetation at this site	**Tree planting** Include tree planting in car parks, using native trees. These will provide shelter, food and stepping-stones for birds and insects across the site. Choose native species of known wildlife value, such as birch, rowan, willow, and English oak and fruit/nut trees. Avoid up-lighting trees as this will deter bats from foraging and roosting. 0.25 Ha additional tree canopy cover used to calculate BNG Habitat Units.	0.88 Habitat Units	1	<20k	NHS Forest provide a variety of free native tree 'whip' packs including thematic bundles ranging from 30 to 200 trees, and it is possible to request multiple bundles as may be required. Sow the City has funding for tree planting through various corporate sponsors including the potential to supply and plant some 'standards'.	Car park trees provide cooling shade for vehicles. Potential to engage staff or patient volunteer groups to plant trees

LARGE AMENITY GRASSLAND TO WEST OF SITE	None - lack of standing water on site.	**Blue infrastructure** There is room here and suitable location for a pond, rain/bog garden, or both. Position within existing grassed area - do not remove any scrub vegetation to achieve this - Position away from trees to reduce leaf litter. The pond should be suitably large (at least 100 m2); around 50 cm deep; have different levels and at least one gently sloped side for safe wildlife access; and be stocked with native aquatic and marginal plants (see Freshwater Habitats Trust - Creating ponds for amphibians and reptiles). A rain or bog garden should be created nearby by excavating around 30 cm depth and laying a pond liner with drainage slits. Then add a layer of grit/gravel before re-filling the area with the excavated soil – the aim is for damp but not water-logged. Plant to achieve a range of flowers throughout the year: water forget-me-not, marsh marigold, ragged robin, water avens, marsh woundwort, hemp agrimony. Avoid vigorous pendulous sedge and gunnera as these may take over. Choose either an existing soggy area or start from scratch	0.12 Habitat Units	1	<5k	Opportunity for Sow the City managed volunteering days to dig and create the pond	Ponds, rain gardens and bog gardens all provide fantastic habitats for amphibians, and a wide a variety of other species, especially in urban environments, where water sources are scarce. Bog gardens are a fantastic alternative to ponds but are most effective for wildlife when used to enhance an existing pond by being positioned nearby, providing refuge for amphibians. This would be a nice place to position a seating bench for staff, patients and visitors. Ponds make attractive features and will be visited by birds, amphibians and charismatic insects such as dragonflies.
SOUTHERN AND EASTERN BOUNDARY HEDGING	Limited - non-native, largely species-poor hedgerow (thorny olive to south, and leylandii and Portuguese laurel to east boundary). In very poor condition with extensive mildew and dying sections.	**Hedge planting** Replace 250 m of hedging with species-rich native hedging. Retain any standard trees and native Beech from existing hedging. To improve the condition of this habitat, maintain a minimum height and width of 1.5 m, avoid pruning during bird-breeding season (March-August), and reduce the cutting of ground flora to the base of hedgerows, leaving a less manicured border.	2.42 Hedge Units	1	<10k	Sow the City has access to corporate funding for hedging plants and corporate volunteers for hedge planting.	Potential to engage staff or patient volunteer groups to create new hedging.

NORTHERN BOUNDARY FENCE	None - fence line	**Hedge planting** 150 m of species-rich native hedging recommended along the northern boundary of the site, in front of the existing wooden fence. To provide year-round foliage and food, use a variety of native species including hawthorn, hazel, elder, field maple, honeysuckle, guelder rose, dogwood and spindle. This will provide connectivity to the wooded western boundary and small wooded area to the north-east corner of the site. It will provide a foraging feature for bats, nesting site and food for birds, nectar source for insects and shelter for a variety of creatures.	1.35 Hedge Units	1	<5k	Sow the City has access to corporate funding for hedging plants and corporate volunteers for hedge planting.	Hedgerows are a priority species which offer high ecological benefits to a site. They are included in the Biodiversity Action plans for both the UK and Greater Manchester, with targets to increase the cover of new hedgerows across the county. Where possible, native species-rich hedgerows should be established across the MFT estate. This can be achieved both by planting new hedgerows and improving any existing 'species poor' hedgerows on the sites. Potential to engage staff or patient volunteer groups to create new hedging.
STAFF GARDEN	Limited ecological value. Some ornamental flowering plants in containers and majority of quad laid to lawn.	**Therapeutic garden** Improvements to existing space to provide increased benefits for biodiversity and restorative effects for staff. Proposal of raised beds with plants for pollinators to provide valuable nectar and pollen source for pollinating insects and reduce water use of existing planting in small pots. Planting of herbs in raised beds to support staff wellbeing.	Negligible	2	<2k	Opportunity for Sow the City managed corporate volunteering days to deliver proposed improvements and a staff wellbeing activity to improve planting.	Staff garden already has rainwater collection barrel installed from a down pipe, compost bin and adequate sunlight due to single storey buildings surrounding space. Improvements to space would benefit staff wellbeing, acting as a restorative garden. Any in-ground planting would require investigation into soil depth. Garden already appears to be well used, with small planted pots and garden seating, and could benefit from in kind support in the form of a corporate volunteer day.
LARGE QUAD	Limited ecological value. Non-native trees and ornamental evergreen shrubs. Hard standing and lawn coverage approx. 50/50.	**Therapeutic garden** Potential to use as an accessible quad for staff and patients. Space would benefit from installation of seating areas to enable patients/staff to utilise as a restorative garden. Recommendation that seating is located in groups and encapsulated by sensory planting. Planting to include flowering species beneficial to pollinating insects and ground cover layer to improve existing soft landscaping.	N/A	2	<10k	Opportunity for Sow the City managed corporate volunteering days to deliver proposed improvements.	Large quad with good accessibility and existing lighting in situ. Access possible from ward 11 [stroke ward] and staff room.

STROKE WARD GARDEN	Ornamental planting, grassed areas and cherry trees. Flowering plants in pots and nest boxes installed.	**Therapeutic garden** Low intervention improvements could include: accessible raised beds, installed on existing hard standing, for adjoining stroke ward. Mini meadow, seeded with an annual wildflower mix, proposed for existing mounded grass area.	N/A	2	<2k	Opportunity for Sow the City managed corporate volunteering days to deliver proposed improvements.	Half of the space is well used by the adjoining ward, the second half is more shaded (due to tree cover. Raised beds in the garden could be used by the stoke ward for rehabilitation and improved visual interest in the space.
DAY LOUNGE QUAD	Ornamental planting (shrubs and tree), small, grassed area and hard standing.	**Therapeutic garden** Quad accessed from day lounge, has the potential to be an outdoor extension to the lounge area by installing seating and integrated planting for pollinators.	N/A	1	<2k	Opportunity for Sow the City managed corporate volunteering days to deliver proposed improvements.	Access to outdoor seating would enable patients/ staff to utilise space more often
OVERGROWN QUAD	Ornamental planting in quad, mainly shrubs. Very dense vegetation, suitable for variety of birds and insects.	**Habitat creation** Quad currently has no access and very overgrown. Did appear to have some value for wildlife due to presence of bird and invertebrate life using vegetation for food and shelter. Improvements to space could involve thinning the vegetation to allow light and improve access to space for general maintenance. Low interventions for improving space for wildlife could include installing nest boxes for birds.	N/A	1	<2k	Opportunity for Sow the City managed corporate volunteering days to deliver proposed improvements and clear existing overgrown areas.	Improvements to space would benefit its visual impact and potentially provide further nesting opportunities for breeding birds.
OVERGROWN QUAD	Ornamental planting in quad, mainly shrubs. Very dense vegetation, suitable for variety of birds and insects.	**Habitat creation** Quad currently has no access and very overgrown. Did appear to have some value for wildlife due to presence of bird and invertebrate life using vegetation for food and shelter. Improvements to space could involve thinning the vegetation to allow light and improve access to space for general maintenance. Low interventions for improving space for wildlife could include installing nest boxes for birds.	N/A	1	<2k	Opportunity for Sow the City managed corporate volunteering days to deliver proposed improvements and clear existing overgrown areas.	Improvements to space would benefit its visual impact and potentially provide further nesting opportunities for breeding birds.
BEVAN'S RESTAURANT COURTYARD	Limited value for wildlife, some ornamental flowering plants in containers.	**Ornamental planting** Introduction of drought-tolerant planting (including flowering species) in large containers to improve the space visually for hospital users and for invertebrates such as pollinators.	N/A	1	<10k		Quad appears to have no direct access from the café, would benefit from installation of access doors or better signage to navigate to existing access points.
LARGE AMENITY GRASSLAND TO WEST OF SITE	Poor - regularly maintained grounds	**Habitat creation** Refuge piles and hibernaculas are low cost, simple ways to provide habitats for a wide range of wildlife, especially invertebrates, amphibians, reptiles, and hedgehogs by providing a refuge for breeding and hibernating. They can be	Not included in metric	0	No cost	Sow the City can access corporate volunteers for habitat creation days. To reduce costs piles of woodchip, trimmings and leaves left over from grounds maintenance can be positioned in wooded and scrub boundaries.	

		created in numerous ways by stacking natural materials found on site, such as logs, rotting wood, and rocks. They should around 2m long and 0.5m high, be positioned within shady wooded areas, scrubby margins and nearby any ponds/rain gardens, before being covered with topsoil to protect from disturbance. They should then remain untouched.Alongside the scrubby area would be most suitable. A second area could be created in the north-easterly corner of the site.					
			Overall Gain for Habitat Units = 25% (from 5.51 units) for Hedgerow units = 373% (from 3.77 units)				


STROKE WARD GARDEN
OVERGROWN QUAD
SOUTHERN & EASTERN BOUNDARY HEDGING
LARGE QUAD
BEVAN'S RESTAURANT COURTYARD
STAFF GARDEN
NORTHERN BOUNDARY FENCE
HEDGE PLANTING
LARGE AMENITY GRASSLAND
MANAGEMENT
BLUE INFRASTRUCTURE
HABITAT CREATION
DAY LOUNGE QUAD
N
LEGEND
CC
GK
A1
1:750
Not to scale at A4

Patient Interview

An inpatient at the Manchester Royal Infirmary (MRI) Surgical Ward was interviewed for this report. She was in hospital for 13 days during July / Aug 2023.

"Throughout my hospital stay I was advised to mobilise regularly, to support gut motility after my surgery and to build strength. This meant I spent a lot of time walking hospital corridors. Overall, I found this experience demoralising and dull. It was deeply frustrating to encounter multiple courtyards around the MRI - some with interesting features, attractive plants and sunshine - that were shut off from use.

My young daughter was not allowed onto my ward due to infection prevention, so when my family came to visit, we were obliged to find other spaces in the hospital grounds to meet. The atriums of the Eye hospital, the Maternity hospital and the Children's hospital were reasonably pleasant, providing airy spaces with natural light. The Children's hospital garden was a nice place to share with my daughter, with herbs to smell and paths to run down - although I felt exposed in my pyjamas on the busy Boulevard Road. I was absolutely delighted to find the beautiful, peaceful Pankhurst Centre Garden. However, I was connected to a drip, so accessibility was not easy – I carried my drip stand over uneven paving and pebbled ground to reach a bench. The alternative was to join the many smokers at the MRI entrance to lean on the brickwork, feel the sun on our faces, and share some 'fresh air'.

From the corridor windows I did notice some fleeting wildlife – a blackbird feeding chicks behind an air-conditioning duct; and goldfinches alighting in one of the closed off courtyards. The freedom and beauty of these birds gave me a small thrill as I was feeling trapped in the hospital's care.

I know many people are not well enough to leave their beds, let alone the hospital ward, so window views are really important. I would love to see an MRI that provided uplifting views for patients, and plenty of outdoor green spaces for staff and visitors to meet"

Kate Ulrick
August 2023

Glossary

Biodiversity/Biodiversity Net Gain: the variety of life found in a particular space, including plants, animals, bacteria, and fungi. Generally, a high level of biodiversity denotes a healthy ecosystem. Biodiversity Net Gain is an approach to development which seeks to enhance the biodiversity of an area.
Co-benefit: the positive effects that a policy or measure aimed at one objective might have on other objectives, e.g. Active travel reduces air pollution and benefits health and wellbeing.
Extensive green roof: have a deeper growing medium, a modest roof load, limited plant diversity, minimal watering requirements, and are often not accessible.
Glade: open area, often a grassy meadow under a canopy of deciduous trees.
Green infrastructure: planned natural or seminatural areas which enhance the environment by improving water quality, air quality, climate change mitigation and adaptation, biodiversity, as well as providing space for recreation/leisure.
Green roof: A roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane.
Green wall: vertical wall intentionally covered with vegetation that may or may not be rooted in soil.
Green wellbeing: improved wellbeing from access to nature (e.g. through active or passive interaction with blue and green infrastructure)
Hibernacula: protective case, covering or structure which supplies shelter for a sheltering dormant animals over the winter.
Intensive green roof: deeper growing medium, a heavier roof load, a more diverse plant selection, higher watering requirements and can function as gardens or landscapes
Living wall: vertical structure consisting of living plants rooted in a growing medium and attached to a wall or other vertical surface.
Natural capital: stocks of natural assets which include geology, soil, water, air and all living things. It is from natural capital than humans derive a wider range of services, often called ecosystem services, which make life possible.
Sward: surface layer of ground containing a mat of grass and grass roots
Sustainable Urban Drainage systems (SuDs): a collection of water management practices that aim to align modern drainage systems with natural water processes, they mimic natural drainage and encourage its infiltration, attenuation and passive treatment. SuDs improve the local area for people and the environment by dealing with surface water with a nature-based solution.
Swale: linear grass covered depressions which lead surface water overland from the drained surface to a storage or discharge system, typically using road verges. Unlike a conventional ditch, a swale is shallow and relatively wide. It provides temporary storage for storm water and reduces peak flows.
Understory: underlying layer of vegetation in a forest or wooded area, especially the trees and shrubs growing between the forest canopy and the forest floor. Plants in the understory comprise an assortment of seedlings and saplings of canopy trees together with specialist understory shrubs and herbs.

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Appendix 1 - Photos and Examples from Field Surveys

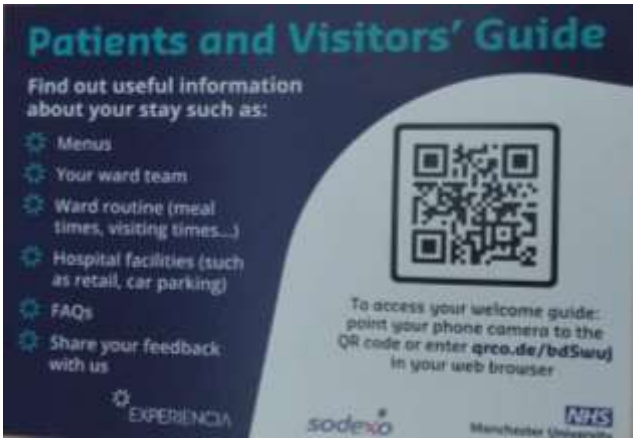

Figure 1: Sticker next to bed at surgical ward in ORC. Opportunity to use the existing Sodexo Experencia system signpost patients and visitors to green spaces in and around the hospitals.

Figure 2: Nature imagery in Block F at Wythenshawe Hospital. Researchers have found that simply viewing nature images can reduce patient stress, and improve physical and psychological well-being.

Figure 3: Example of locked quad in Block A at Wythenshawe Hospital. Allowing access to restricted green spaces, such as courtyard areas would provide benefits for staff, patients and visitors.

Figure 4: View towards Crumpsall Vale Intermediate Care Unit at North Manchester General. There is room here and suitable location for a pond, rain/bog garden, or both. Patients will be able to passively view the pond including birds and other visiting wildlife.

Figure 5: Northern boundary of Trafford General Hospital has potential for native species-rich hedgerows. Hedges provide nesting, roosting, shelter, and ecological connectivity for a wide range of birds, bats, mammals, and invertebrates.

Figure 6: Corporate volunteering day at Crumpsall Vale Intermediate Care Unit in July 23. Groups of corporate volunteers could be tasked with creating new therapeutic gardens, planting trees and hedges, and habitat creation.

Appendix 2 - Examples of Best Practice Green Infrastructure

Figure 5: *Extensive sedum green roof at Altrincham General Hospital*

Figure 6 Green wall on a building in Switzerland. Photo shown demonstrates a conventional approach to green walls using climbers such as ivy, russian vine and virginia creeper. Other systems use a modular irrigated system that is fixed to the side of the building.

Figure 7: *Rain Garden in Maryland, United States, collecting and storing rainwater as a Sustainable Urban Drainage system (SUDs)*

Figure 8: *Bioswale acting as a channel designed to convey and concentrate storm water runoff, recharging groundwater.*

Figure 9: Hibernacula providing hibernation place for amphibians, reptiles, and hedgehogs.

Figure 10: Hospital therapeutic garden (Chase Farm hospital, London).. One of the gardens supports dementia patients, while the other supports stroke and rehabilitation patients.