ESTATES SERVICES

UNIVERSITY OF OXFORD

Landscaping and Grounds Maintenance

Design Guide

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Version 1.1 - expanded material in section 2.4.2 – Biodiversity Net Gain.

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Contents

1 - Introduction

1.1 - Purpose

The Government's National Planning Policy Framework makes clear that creating a high-quality environment is fundamental to what the development process should achieve.

Well-designed spaces improve our experience of life, work and leisure as we spend time in them, move around them, or simply pass by them. They have been shown to affect our health and well-being, our feelings of safety, security, inclusion and belonging, and our sense of community cohesion.

There are also specific issues that should be considered in designing and maintaining the spaces around buildings, within courtyards and, where relevant, attached to buildings, like green roofs or walls. These include access for all, personal safety, carbon footprint, biodiversity and biosecurity.

This document sets out what the University expects from the design, installation, reinstatement and maintenance of the landscaping around its buildings. It is intended primarily for consultants and contractors, to guide the creation of a high-quality green environment for the University of Oxford.

The University aims to provide a pleasant, healthy and inclusive environment for all staff, students and visitors. All new University buildings and major refurbishments must provide a landscape setting that befits the building in terms of appearance, amenity and sustainability, as well as facilitating access to, and use of, all services and facilities. This includes public buildings such as museums and galleries as well as departmental buildings.

In many cases in the past, value-engineering decisions intended to reduce a project's cost have ended up reducing the quality and complexity of the landscape setting, leaving a new facility looking uninspired relatively soon after handover.

This document should be included with tender documentation and form part of the tendering process. It highlights issues to which the design team should pay particular attention. It is not exhaustive and further feedback will be given as appropriate through regular consultation and through the stage review process.

1.2 - Standards and legal framework

The standards set out in this document reflect the University's philosophy in respect of the design, installation, reinstatement and maintenance of outdoor spaces. All work needs to comply with relevant legislation, including the Equality Act 2010; statutory regulations; and British Standards listed in Appendix 1.

It is the project team's responsibility to ensure that all landscape work complies with current legislation, regulations and standards, and to consider any imminent changes in legislation which may affect the project. No information given in this document or anywhere else is to override the responsibility for compliance.

1.3 - Liaison and communication

Within Estates Services, the University Parks team is responsible for the planting, reinstatement and maintenance of the University's grounds, ensuring that all landscaping is completed to a high standard.

The Parks team can quote for installation, establishment maintenance and post-project ongoing maintenance of all University landscaping projects, and should be considered as a potential sub-contractor to the project.

Where soft landscaping is carried out by a third party, University Parks will be deemed a stakeholder and will represent the University in specialist discussions relating to landscaping. The Parks representative will ensure that consultants and contractors understand the guidance set out in this document and how it applies to the project.

From the earliest stage of the project, the proposed treatment of pre-existing vegetation, especially trees, and the design of all landscaping elements must be discussed with the Parks team. Without exception, no work involving pre-existing soft landscaping may go ahead without the approval of either the Arboricultural Manager or the Parks Operations Manager.

It is expected that any significant landscaping projects, particularly around new buildings and major refurbishments, will be brought to the regular Stage Review meetings for the capital projects of which they form part. All proposals for design and future maintenance, as well as for the accommodation of a site compound or contractor parking and delivery areas, should be agreed with the Parks team, and detailed engagement should occur at project inception and ahead of each project gateway and stage review. Additional dedicated meetings to discuss landscaping may be needed at during the project.

The University Parks has the authority to carry out site inspections to assess the quality of work, either while it is in progress or immediately after completion. Site meetings will be set up with the project manager, design team and contractors if necessary to view progress. **Responsibility for compliance with this document, however, rests with the project team and not with the University Parks Service.**

1.4 – Developer agreements

The University has entered into developer-type agreements where it neither owns the construction of the building nor enters into contractual arrangements with the contractor. The University simply leases the asset upon its completion.

In these circumstances, the University is not able to insist on adherence to this Design Guide. However, while contracts and contact terms need to be acceptable to the funder, the requirements set out here are drawn from legislation, regulations and British standards, and development partners are encouraged to consult this Landscaping and Grounds Maintenance Design Guide when considering the design, installation and maintenance of outside areas to be used by the University community.

2 - Design philosophy

2.1 - Quality

Value for money is a measure of quality that assesses the monetary cost of a product or service against its lifetime benefits. While budgets are one of the primary limiting factors in project management, designing an appropriate landscape scheme and procuring the right plants and hard landscaping materials is not about achieving the lowest price but about realising the optimum combination of whole-life costs and benefits.

2.1.1 - Specifying plants

Specifying the smallest available plants rarely represents value for money. Inadequately developed plants are more likely to fail when planted out. As a rule of thumb, a minimum pot size of 3L is desirable for herbaceous plants, perennials and most shrubs. Larger specimens are useful for greater impact in planting schemes and to provide screening or prevent walking in beds and borders.

The specification of other characteristics tends to be standard: a well-balanced plant with even growth, well-rooted but not pot-bound, with a minimum number of buds. The plants delivered need to be inspected to ensure that they meet this specification. Too often, the plants that arrive are either poorly rooted or pot-bound, and pressures of completion and handover mean that they are accepted. Stock must be inspected and signed off that the quality is satisfactory prior to planting.

While many landscape consultants specify large tree sizes for instant impact, larger trees are very costly, suffer transplant shock, are expensive to install, and require significant irrigation to establish. There is at least anecdotal evidence that when smaller trees are transplanted, they are better able to adapt to a new environment and establish quicker than transplanted larger tree stock. While the canopy size of newly planted trees can make a difference in biodiversity net gain (BNG) calculations for planning purposes, Oxford City Council's Technical Advice Note (TAN) 9 looks for canopy cover gains over 25 years. Therefore, larger trees for BNG should not drive the specification of trees for landscaping projects. The project needs suitably specified trees, and BNG needs to be secured by ecologically valid means. For these reasons we would expect most tree planting to be specified as 14-16cm or 16-18cm girth trees, which is the maximum size that can be manually handled safely by two operatives.

2.1.2 - Biosecurity

Movement of live plant material through the horticultural trade is a pathway for introducing and spreading pests and diseases. An accreditation scheme underpinned by best biosecurity practice helps to mitigate this risk. The provenance of all plants purchased must be traceable, with plant passport numbers recorded where relevant, and suppliers at every point in the chain adhering to a clear biosecurity policy.

Where possible, plants should be sourced from UK growers. A case must be made for purchasing from European suppliers, and this needs to be approved by the University Parks Service.

2.1.3 - Specifying ground preparation

Ground preparation is key to any planting. The depth of topsoil spread should not normally exceed 300mm. Topsoil must be screened, weed-free and compliant with *BS3882: 2007.* Suitable loosened subsoil (as *BS8601: 2013*) should provide the remainder of the minimum rooting depth, normally:

- 450mm for grass;
- 600mm for shrubs; and
- 900mm for trees.

Prior to spreading topsoil, the receiving area should be de-compacted to increase permeability. Timetabling should allow time for the ground to settle adequately before final preparation and planting.

Planting areas should be over a permeable base. Concrete footings and haunchings should not simply be covered with topsoil in the hope that plants will grow. Wall footings and path edgings must be designed to take account of future landscaping requirements. Renovated borders should be methodically dug over. In all cases, large amounts of organic material should be incorporated into the topsoil before planting.

Topsoil is easily damaged by mishandling. Where ground is to be stripped, topsoil and subsoil should be stored separately. On larger sites, a detailed stripping plan should be supplied, showing soil units to be removed, haul routes and storage plans. Topsoil should be stripped when dry, and spoil heaps should not exceed 3m in height. The soil must be used within 12 months of first removal.

Detailed design consideration should also apply to the interface between different materials. For example, a transition from gravel to lawn requires a solid edge in steel or concrete to allow for a sharp margin and to prevent loose material from encroaching on to the lawn. Similarly, border and lawn should be separated with a stone or brick edging to allow mowing right up to the border.

2.1.4 - Specifying planting

Project timetables should ensure that no planting – of grass, borders or trees – is done in summer, as the irrigation requirements are excessive and plants become stressed.

Turf

Turf is best laid in mid-autumn or early spring, whenever the soil is neither too wet nor too frosty. Grass seed is best sown in early autumn and mid-spring, when it is a little warmer.

Remove any new weeds that have germinated, firm and level the surface by treading the entire area in all directions, and then rake several times in different directions. Fertilise.

Designers should specify a turf suitable for both the conditions and proposed use of the grass. The entire batch of turf needs to be weed free, consistently green and the same thickness. Turf should be laid within 24 hours of delivery. Anything not laid immediately should be unrolled flat and irrigated.
Once laid, new lawns need to be watered well and protected by fencing until they are well rooted.

Borders

Most landscape specifications include the average number of plants per square metre, irrespective of the size at maturity of different plants in the mix. While even planting may look tidy at the point of handover, as plants mature, the scheme starts looking crowded in some areas and sparse in others. We recommend that plant schedules include the average height and spread of plants in three and ten years from planting. This should help landscaping teams without a good knowledge of plants to better set them out, and reduce the future requirements to thin out or gap up planting, improving sustainability and reducing long-term costs.

Where planting beds interrupt a potential desire line, they need to be defended against people walking across or stepping into them. This includes planting in and around parking areas.

Shrub and mixed beds and borders should be mulched to a depth of 100mm.

Any newly planted borders and shrubberies should include an establishment plan that prescribes the maintenance regime for one year post planting, including:

- Drench twice weekly during the growing season (April to October), and three times a week in very hot, dry periods
- Weed as required
- Re-mulch before handover

If a plant fails, it should be replaced by the contractor with a new one that meets the original specification until it has established successfully.

For details about maintenance, see the Maintenance Philosophy below.

Trees

The specification of tree planting in hard landscaping is situation-specific. Advice can be sought from the Parks Arboricultural Manager.

It is easier to offer a standard specification for tree planting in soft ground:

- Tree size: 14-16 (or whatever is specified), rootballed or containerised
- Tree pit to be dug square, 4x volume of the rootball, to the depth of the rootball
- If a root barrier is required, line the pit only on the side/s facing the paving/road that is to be protected with heavy-duty PVC; do not line any part of the base of the pit
- Plant with irrigation tubing wound around and on top of the rootball
- Quadruple-stake, with hessian wrap cradling the tree from each stake; allow some light stem movement
- Backfill with a mix of compost and the soil removed from the hole (or approved screened topsoil), and firm; ensure the top of the soil is no higher than the original soil level
- Irrigate
- Lay mulch 75-100mm deep of organic material (compost, shredded leaves or woodchip) in a 1000mm radius circle around the new tree

Aftercare: for a minimum of three years post planting (and five years for larger stock):

- Drench weekly during the growing season (April to October), and twice weekly in very hot, dry periods
- Check staking annually
- Weed as required and mulch annually

All new planting will be inspected by the University Parks Arboricultural Team and any trees planted not conforming to *BS8545: 2014* will require replacement until it is deemed that this standard is met. Newly planted trees should include an establishment plan indicating a minimum of three years' worth of watering, mulching, removal of stakes etc. If the tree fails in the first five years of its life, it should be replaced by the contractor until it establishes for at least five years.

For details about maintenance, see the Maintenance Philosophy below.

2.2 - Accessibility

Outdoor spaces must comply with the Equality Act 2010 and with the University's Accessibility Design Philosophy Document. The main features of the requirements as they relate to outdoor space are summarised below, but these must not be viewed as exhaustive.

Accessible, inclusive routes and spaces should form a 'natural' part of the design as much as possible, to avoid the subliminal message that they are a special accommodation for a different type of person.

Outdoor spaces must provide level access wherever possible. Ideally there should be a level route from the accessible parking bays to the building's main entrance. If this is not possible, avoid excessive slopes and ensure that there is a level area directly in front of the entrance. Avoid creating routes that cross a slope creating a cross fall, as this will be problematic for many people with disabilities. Dropped kerbs must be incorporated where necessary to aid access. Appropriate tactile paving must also be used where relevant to provide information for people with visual impairments.

Shared spaces – shared by vehicles, bicycles and pedestrians – without demarcated pedestrian routes and crossing points are highly problematic for many disabled people, particularly those with a visual impairment. If shared spaces are being considered, then accessibility must be part of their design. The University's Accessibility Advisor must be consulted if shared spaces are being considered.

The use of uneven materials such as contoured cobbles, setts, or riven paving slabs should be avoided as this will be difficult for many people with a range of disabilities to access. Larger paving slabs are preferred; smaller slabs are uncomfortable for wheelchair users. Resin-bonded gravel should be considered as an alternative to paving wherever possible because it is highly accessible for wheelchair users. Avoid loose stones and chippings which are problematic for users of manual wheelchairs.

The principle of inclusive design must extend to outdoor amenity areas. The preference is for level access. In gardens with benches, at least some benches must have backrests. If there are informal seating areas, these should be accessible with suitable furniture and pathways.

Roof terraces should be accessible with level access over the threshold.

Signage must be clear, and placed where it is easy to see.

2.3 - Safety

Outdoor spaces must comply with the University's Crime Prevention Design Guide. The main features of the requirements as they relate to outdoor space are summarised below, but these are not to be viewed as exhaustive.

Making users of the site feel secure is as important as making crime and anti-social behaviour more difficult to commit. Creating an easily legible sense of place where staff, students and visitors are able to go about their daily routine and business at all times of day and night without undue fear of crime is a key element in creating safe academic environments.

The landscape strategy should be developed at an early stage of the design process and considered together with the CCTV and lighting strategies to avoid future conflict between these three elements. The University's Crime Prevention Design Advisor and the University Parks team should review the strategy before an application for Planning permission is submitted.

The location of outdoor meeting, seating and socialising areas provided for the use of staff, students and visitors must be planned as carefully as that of buildings. Such amenity space should be within view of overlooking buildings that are likely to be occupied. Recreational spaces may encourage trespass outside of normal business hours, requiring additional security measures, including but not limited to either effective securing, or appropriate lighting and open sight lines for observation.

Pedestrian and cycle routes should be clearly open to view across a site, and kept clear of planting that screens sections of the route. This does not prevent planting, but will influence the choice of species and the density of planting.

Planting should not impede the opportunity for natural surveillance and must avoid the creation of potential hiding places. Shrubs in front of a window should be maintainable at a height of no more than one metre and tree canopies should be lifted to at least two metres from the ground. Species selection of trees and shrubs should take account of their future maintenance, as poor maintenance can impact on site security. It is recommended that the University Parks team is consulted about these matters.

Defensive planting can be used to protect areas from antisocial behaviour, although good design can often achieve the same result. For example, the selective use of spiny or thorny shrubs can help prevent graffiti, deter loitering and casual approaches to the external face of a building, and create or enhance perimeter security. But the dense planting of woody plants or climbing plants that cover walls, or open-branched and columnar trees, can achieve similar results. In other words, defensive planting is not just about prickly shrubs; it is about selecting the right type of plant for the right aspect and environment.

The object is to make a site feel safe, open and welcoming rather than defended.

2.4 - Sustainability

The University takes seriously its responsibility for best practice in sustainable management. In particular, its landscapes should be specified and maintained so as to maximise their habitat value for wildlife. Informed by recent research, the Parks Service has taken the view that practising horticulture for wildlife does not mean using exclusively organic methods, or planting only native species under the belief that they always have greater biodiversity value, or seeking to create 'wildness' in every case.

However, there are more and less sustainable ways of designing landscapes, and the University aspires to have spaces around its buildings that are wildlife-rich and ecologically functional, as well as being welcoming and beautiful places. In general, therefore, planting should support biodiversity, quite apart from any mandatory requirement for biodiversity net gain.

2.4.1 - Biodiversity

Although still a relatively young field of research, there is mounting evidence that a conventional garden can be as attractive to wildlife as a wild garden. High levels of biodiversity are not necessarily dependent on how wild a garden is, and formal gardens may also be good for some species. It appears that a garden's wildlife value can be greatly increased by making small changes.

In particular, the following factors appear to improve biodiversity:

- the height of vegetation, especially canopy over 2m high (trees and large shrubs);
- the number of trees;
- the amount of leafage;
- the number and range of different flowering varieties (a mix of flower types (flat, tubular, night-scented), long flowering periods, and seasonal variety are important as nectar sources for invertebrate diversity)

The provenance of plants does not appear to be a particularly important factor in supporting wildlife, because many herbivores select species within a genus or family, regardless of original provenance.

As far as possible, new and renovated landscaping should be designed and maintained as a mosaic of different habitats to support different species, including the installation of wildlife features such as bat and bird boxes, log piles, and stones. Also, where possible, implement sustainable water management practices such as rain gardens and water features to provide water sources for urban wildlife.

The primary negative factors for biodiversity are hard surfaces and extreme tidiness.

Based on these arguments, designs should maximise the opportunity for biodiversity, irrespective of whether plants are native or non-native.

2.4.2 - Biodiversity Net Gain

Biodiversity net gain (BNG) is a government strategy to contribute to the recovery of nature as part of the process of developing land. The intention is to ensure that the habitat for wildlife is measurably in a

better state than it was before development. BNG proposals must comply with the University's Sustainability Design Guide. The main features of the requirements are summarised below, but these are not to be viewed as exhaustive.

The University's Environmental Sustainability Strategy sets a target to achieve 20% biodiversity net gain for all development projects on its land by 2035. Most direct biodiversity impacts relate to the management and development of the estate, and these can be mitigated through commitments to increasing biodiversity elsewhere on the University managed estate. Where on-site improvements are insufficient to meet targets, the Parks Service together with the Environmental Sustainability team will help identify opportunities to enhance biodiversity elsewhere on University-owned land. When landscaping and maintaining sites, the Oxford-developed framework known as the Mitigation and Conservation Hierarchy should be used:

- Refrain from actions that damage biodiversity
- Reduce the damage any remaining actions create
- Restore biodiversity that has been damaged
- Renew and enhance nature

The University expects developers to avoid the loss of viable habitat on any land on which development takes place.

In addition, any development on University-owned land needs to deliver measurable improvements for flora and fauna by creating or enhancing habitats in association with the development, preferably on site, but alternatively either off site or through a combination of on- and off-site measures. As a minimum, the extent of gain and the period over which improvements are secured must comply with legislative requirements, although the University aims to exceed mandated minima, so that every project can be viewed as exemplary.

The development process should also take account of how people value, see and use the land to be enhanced. Consultation with all stakeholders is essential to securing long-term BNG either on or off site.

Calculation of the baseline data, the number of biodiversity units to be achieved, the likely loss of biodiversity as a result of the development and the gain to be achieved by BNG proposals must be carried out by an appropriately qualified ecologist at an early stage in the process. The 30-year maintenance plan also needs to be drafted by the ecologist.

The University Parks and the Environmental Sustainability teams should be consulted at an early stage in the development proposals, as well as on the maintenance plan.

2.4.3 - Sustainable Urban Drainage Systems

Incorporate SUDs into landscaping design and maintenance by utilising permeable materials and features to allow water to infiltrate into the ground, reducing run-off, improving water quality and managing storm water. See the University's Sustainability Design Guide for more details.

2.4.4 - Sustainable resource use and waste

The University has a commitment to reducing the biodiversity and climate impacts of its supply chain, increasing the recycling rate, and minimising waste. New projects need to consider waste reduction by promoting recycling and reusing landscaping materials where possible. The sustainability of materials sourced, used, and disposed of in landscaping and maintaining University-owned land should be made explicit in proposals for new and renovated landscapes.

2.4.5 - Climate change

The design of outdoor spaces needs to take a holistic approach to issues of climate change. The object is to inform design by the latest research and accepted best practice to achieve the minimum carbon footprint over the lifetime of the project. It is not possible to prescribe in advance the optimum solution to all landscaping trade-offs, particularly as new products and processes are being designed. The response to the design brief needs to include a section setting out the approach to lifetime sustainability, including product manufacture, installation, maintenance, recycling and disposal.

Attention also needs to be paid to the landscape scheme's resilience to climate change, to the role played by the soft landscaping in providing attenuation, and in the management of water permeability in hard landscaped areas.

2.5 – Water supply

Consideration needs to be given to an external water supply for all new and renovated buildings. All new landscaping will require irrigation, and should be able to be irrigated easily without the need to bring in water on bowsers. Capturing and using rainwater or recycling water used for other purposes may be considered, but any grey water system needs to be capable of being cleaned and serviced. As a minimum, every project that includes landscaping must provide an external water point for irrigation.

Where an irrigation system is included, at the point when maintenance commences, control of the system should be fully handed over to the service carrying out maintenance work.

2.6 - Practicality

Designs must take future maintenance requirements into account. Long lengths of formal hedging and small discrete areas of grass are time-consuming and therefore expensive to maintain. A maintenance plan should accompany all landscape proposals, and should be discussed with the Parks team before a scheme is approved.

High planting, like climbers, that require regular maintenance should be so designed that they grow to a maintainable level, not exceeding 2m. Early discussions with the Parks Service should occur if anything higher is required, due to maintenance implications.

Small planting boxes attract litter and require additional irrigation in dry weather, and should be avoided. Larger raised planters can be of benefit is some situations where the soil is shallow, and their design needs to be discussed with the Parks Service so that the long-term survival of the planting is assured.

Avoid locating cycle racks under trees. While there is visual amenity value in screening cycle parking in this way, lines of cycle racks trap leaves in autumn, which are difficult to clear when bikes are locked to them, and bird fouling is a nuisance for cyclists.

Locating cycle racks on grass should also be avoided.

2.7 – Tree protection

Where trees are present:

During a feasibility stage, when trees are present (either within the red line boundary or where any of the development activities such as access roads or off-site cycle storage would affect them above or below ground) a project arboriculturalist should be appointed and a *BS5837: 2012* compliant tree survey should be undertaken.

The following will be required:

- An Arboricultural Implications Assessment (AIA) should assess the impacts of the development on these trees
- A Tree Constraints Plan (TCP) should accompany the AIA.
- An Arboricultural Method Statement (AMS) should consider these constraints, identify where trees require removal, and explain the location of any protection measures.
- A Canopy Cover Assessment (CCA) should be produced alongside the tree survey following the City Council's Technical Advice Note (TAN) 9 (p10). This should inform how any canopy loss from the development will be converted to a canopy gain over 25 years.

A copy of these documents should be sent to the University Parks Arboricultural Manager at the earliest opportunity.

If advised in the AMS, arboricultural monitoring – in the form of an Arboricultural Watching Brief – should be undertaken to the method and frequency prescribed. The results of the Arboricultural Monitoring should be reported to the Parks Arboricultural Manager.

2.8 - Handover and soft landings

It is essential that the Estates Parks team are consulted in good time to ensure a smooth handover of the project. The project needs to comply with the University's Soft Landing Strategy to ensure that the project delivery and user experience are aligned.

3 - Maintenance philosophy

Both long-term plant health and the pleasure that users of a site receive are directly related to successful and sustained maintenance. A maintenance plan must accompany the proposed landscape design, and will form part of the project. This will need to be costed by the contractor/s installing both hard and soft landscaping.

The Parks Team should be represented at the snagging inspections at both Practical Completion and when the site is handed over for the University to maintain. These meetings need to be documented.

Handover of landscaping to the University for maintenance will occur after Practical or Sectional Completion:

- After 12 months for grass, beds and borders, and hard landscaping
- After 24 months for trees up to size 18-20cm
- After 60 months for larger trees

The contractor must replace any plants that fail during these defects periods for any reason other than evidenced vandalism.

Good maintenance practice, as defined and described in British Standards Grounds Maintenance (*BS 7370*), must be applied. The summary below and Appendix 2 contain examples of the maintenance standards expected.

3.1 - Cleanliness

During the maintenance prior to handover, the entire site must be kept free of litter and graffiti. All areas of the site will be litter-picked by maintenance teams every time they visit. Graffiti will be cleaned as quickly as possible after being reported: graffiti involving racial or sexual abuse or obscenities will be completely removed within 24 hours; all other types of graffiti will be removed within five working days.

3.2 - Irrigation

Irrigation will be necessary for all new landscaping schemes, and wherever planting is later renovated or refreshed. See above for requirements for on-site water points.

3.3 - Grass maintenance

The overarching objective is to produce a smooth, even and hard-wearing sward, with the appropriate ground cover of acceptable species, and adequate control of weeds, pests and diseases, as defined in the *BS7370 Part 3* for each type of grass area.

In summary, ornamental lawns will be cut weekly in the growing season, with a cylinder mower set to 15mm and arisings removed immediately. Other operations, performed at the frequency specified in the

standard, are scarification; aeration; fertilisation; irrigation; weed, pest and disease control; maintenance of turf edges; light rolling; top dressing; and over seeding.

Where there are naturalised bulbs in the grass, mowing will be delayed until six weeks after flowering of the bulbs has finished. After this, the grass will be maintained as ornamental lawn.

3.4 - Beds and borders

The quality of the flower beds and borders is highly visible, and it is important for the overall appearance of the site that these areas are in good condition.

The overarching objective is to provide visual interest and variety, and to maintain beds and borders to a high standard of horticultural excellence. The garden as a whole must display a seasonal succession of interest, although this does not necessarily apply to each individual bed or border.

In addition, maintenance is not simply a matter of keeping the site clean and tidy and the plants healthy; it is retaining and developing the intended character and 'sense of place'. An understanding of the principles guiding the planting design is important to achieving this objective.

The recommended maintenance programme for each category of soft landscape is set out in *BS7370, Part 4*, pp. 64-83, 87). More detailed notes on general operations are set out in Appendix 2.

3.5 - Hedges

Hedges must be maintained in a manner conducive to their active growth, consistent with uniformity and sufficient light penetration. Formal hedges need to have sharp outlines and no large gaps in foliage.

Evergreen hedges should be cut annually in summer (checking first that there are no nesting birds). Deciduous hedges can be cut in late autumn/early winter. Fast-growing hedges will need to be cut twice annually, after the first flush of growth in late May and then again in autumn.

3.6 - Hard surfaces

The overarching objective is to maintain clean, even, consistent surfaces, safe for use by normal traffic in all conditions.

Areas that have been designed for light traffic should be prohibited to heavy vehicles in order to avoid damage to driveways, paths, road verges and planting.

Hard surface areas should be kept free from the following:

- litter, including autumn leaf fall
- dust and accumulated grit
- stains, eg oil or paint spillage
- graffiti

- weeds, moss and algae
- standing water

In terms of *BS7370*, the maintenance objectives for all University sites should be those of very high quality Category A areas where a prestige environment is essential.

Appendix 2 should be regarded as a checklist for inspection and maintenance of hard areas. All 'general' operations apply to all types of hard surface; only modifications to the general procedures are listed in subsequent rows.

Defects should be reported and dealt with as they arise.

Cleanliness is important, and any staining must be treated with an approved appropriate product.

3.7 - Furniture

The objectives of maintenance are to:

- Ensure that the furniture fulfils the functions for which it is provided
- Extend the furniture's life
- Maintain it in a safe condition
- Keep it clean, free of graffiti and clear of moss and other vegetative growth

Furniture should be cleaned by washing with water and weak detergent, unless the suppliers' instructions recommend otherwise (*BS 7370, Part 2*, p.10). The cleaning of seats, plant containers, signs and notice boards should be included in the overall cleaning programme for the area.

Broken seats and bins should be repaired as soon as possible, or, if necessary, removed.

4 - Maintenance funding

Successful and sustained maintenance needs to be resourced. The addition to the University's functional estate of new sites for maintenance needs to be anticipated, so that funding for any required increase in capacity can be planned and phased.

No development involving new or significantly changed landscaping will be added to the functional estate for the University Parks Service to manage and tend without a costed annual maintenance plan that includes:

- establishment maintenance, as described in Section 2.1 above
- ongoing day-to-day management and maintenance as set out in Section 3 above and Appendix 2 below, to include all materials, labour, fleet, equipment, waste disposal, and management
- tree inspections and maintenance
- maintenance of all BNG initiatives related to the project for at least 30 years
- an allocation for regular plant replacement

Appendix 1 – British Standards

BS 8545:2014 gives recommendations for transplanting young trees, with a view to achieving their eventual independence in any landscape.

BS 5837:2012 on trees in infrastructure design, demolition, and construction provides recommendations relating to tree care, with a view to achieving a harmonious and sustainable relationship between new construction/existing structures and their surrounding trees.

BS3936 is a multi-part standard providing the specification for nursery stock, including trees and shrubs (Part 1), roses (Part 2), bulbs, corms and tubers (Part 9) and ground cover plants (Part 10).

BS3882:2015 is intended for use for topsoils that are imported or traded

BS8601:2013 specifies requirements for subsoils that are moved or traded for creating soil profiles to support plant growth

BS 7370-1:1991 is the first part of a multi-series standard that covers grounds maintenance, enabling the development of protocols for the maintenance of grounds, ensuring the safety, cleanliness and conservation of the environment.

BS 7370-2:1994 gives recommendations for dealing with general maintenance and minor repairs to hard areas. *BS 7370-2* also covers reinstatements after disturbance.

BS 7370-3:1991 is a standard that covers the maintenance of amenity and functional turf.

BS 7370-4:1993 is a standard for the maintenance of soft landscape (other than amenity turf).

BS 7370-5:1998 gives recommendations for grounds maintenance relating to water areas that are within or adjacent to the grounds.

BS ISO 14055-1:2017 is a standard for environmental management, providing guidelines for establishing good practices for combatting land degradation and desertification.

BS EN 16853:2017 European Standard specifies the process of decision-making, planning and implementing the conservation of tangible cultural heritage, such as individual objects, collections, the built environment, historic sites, archaeological sites and cultural landscapes.

Appendix 2 – Maintenance operations and key performance standards

Operation	Service detail and key performance standards
Mowing fine lawns	Mow weekly between April and October with a cylinder mower set to a maximum of 25mm. Remove all arisings.
Mowing other ornamental lawns	Mow weekly between April and October with a pedestrian roller mower set to a maximum of 40mm. Remove all arisings.
Mowing amenity lawns (for activities)	Mow fortnightly between April and October with a rotary mower set to a maximum of 100mm. Remove arisings, unless otherwise agreed.
Cutting meadows	Flail or strim annually in autumn. In flower meadows, remove arisings. In conservation grass, leave arisings on site.
Strimming edges and obstacles	Carefully strim along all grass edges & around obstacles such as trees
Lawn edge trimming	Trim lawn edges monthly in prominent areas, and annually elsewhere
Spiking and slitting of lawns	Spike and slit fine lawns annually in autumn or spring
Lawn scarification	Scarify fine lawns in autumn
Lawn feeding	Apply an autumn/winter feed twice between October and March and spring/summer feed twice more between April and August
Hand weeding and edge trimming of borders and beds	Control weed growth monthly, removing weeds by hand. Remove litter and redefine border edges when needed
Mulching	Mulch annually in late winter
Hedge cutting	Cut formal hedges twice a year between August and February, outside growth and bird nesting seasons. Trim informal hedges in winter.
Shrub pruning	Remove damaged, dead, diseased and old woody growth to maintain health, vigour, size and shape, as required.
Herbaceous plant care	Cut perennial growth back to ground level annually, usually in winter. Support plants if needed, and deadhead during the flowering season.
Climbing plants	Prune climbing plants annually in winter, including cutting back growth that is obstructing or obscuring windows, doorways, signs or CCTV
Mechanical sweeping and raking (January to September)	Mechanically sweep to remove leaves and other detritus from main access areas including frontages and concourses fortnightly
Mechanical sweeping and raking (October to December)	Mechanically sweep to remove fallen leaves from heavily used areas including frontages, concourses and main access routes every week in autumn and early winter. Manually rake leaves and detritus from lawns and ornamental borders monthly as needed.
Litter collection	Remove litter during mechanical sweeping service, and by hand as a matter of course on all routine visits
Mechanical scrubbing	Mechanically scrub low-use hard surface areas that are prone to moss and detritus build up as needed.
Weed control on hard surfaces	Where possible use mechanical methods to control weed growth, although herbicide treatment may be necessary on hard surfaces where weed infestation is severe.

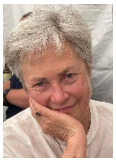
These standards are not exhaustive, but provide a guide as to an acceptable level of care. Refer to the relevant British Standards for more details.

Appendix 3 - Consultees

The following were consulted in the drafting of this Design Guide:

Isobel Hughes, Director of Operations
Richard Jones, Head of Capital Projects
Heather Needham, Biodiversity Manager, Environmental Sustainability

Appendix 4 – Key contacts



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