National benchmark for Green Infrastructure

A feasibility study

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EXECUTIVE SUMMARY

This research examines whether a market exists for a national benchmark for green infrastructure (GI) in England. It is funded through a Natural Environment Research Council Innovation Fund (Grant Reference: NE/N016971/1). This builds on a Knowledge Transfer Partnership between the University of the West of England (UWE) and Gloucestershire Wildlife Trust, a project which includes the development of a local benchmark for Gloucestershire and the West of England and which focusses, naturally, on local priorities.

This project sought to answer three main questions:

- What is the demand for a GI benchmark in the built environment sector?
- What types of GI and corresponding ecosystem services should the benchmark include?
- What is the most appropriate model to ensure the long-term success of the benchmark?

First, a desktop review of relevant assessment systems was conducted to examine a) if, and how, GI is incorporated into such systems and b) their overall operation to understand current practice within the built environment sector. The desktop review included 22 assessment systems, including benchmarks for green developments (building and community-scale) and other infrastructure, and audits, awards, guidance and tool kits that related more specifically to GI, green space or biodiversity.

Second, five Expert Symposia were held to test the findings of the review as well as the initial work completed in the KTP on experts from the built environment and GI professions. Thus, the five symposia were co-hosted by the Royal Institution of Chartered Surveyors (RICS), Landscape Institute, Royal Town Planning Institute (RTPI), The Royal Society of Wildlife Trusts (RSWT), and Town and Country Planning Association (TCPA). Whilst the first three of these were quite profession specific, the latter two included participants from a broader range of backgrounds. A total of 55 experts participated in the symposia.

Key Findings: What is the demand for a GI benchmark in the built environment sector?

The review suggested that assessment systems can be successful. With only one exception, those reviewed appear to have maintained their status over time and are certifying a large number of projects. The most established systems were focussed on the assessment of green developments (buildings and community-scale infrastructure). The review also suggested that whilst there were some audits and toolkits related to GI there was not a benchmark specifically dedicated to GI.

Symposia participants generally supported the creation of a national benchmark for GI, viewing it as a way of improving GI provision. However, this was caveated as being dependent on characteristics felt to be necessary for its success. These included careful planning and testing, surpassing a tick box exercise and being adaptable to the requirements of different locations. There was less certainty around the existence of sufficient commercial interest. It was felt that developers would need to be persuaded of the benefits of the benchmark compared to other assessment systems. The importance of buy-in from national and local politicians was also highlighted, as was the role of the general public

due to its influence on decision makers. A number of bodies that may be able to contribute to the success and delivery of the benchmark were suggested.

Participants suggested a wide range of uses that the benchmark could have, including, appraisal of developments sites, shaping local policy, drafting planning conditions and agreements, and facilitating discussions between developers, the general public and other stakeholders. Although it was also recognised that the benchmark, at least initially, should be focussed.

The study concludes that a GI benchmark would be helpful in improving consistency in the planning, design and management of GI. The benchmark will need to offer clear benefits to applicants, not offered by current, neighbouring systems.

Key Findings: What types of GI and corresponding ecosystem services should the benchmark include?

This question used the initial development of the local benchmark to test the approach with delegates. This includes three thematic areas of GI: water management, wildlife, and health and well-being, as well as underpinning features: meeting key definitions of GI, long-term management and maintenance. Generally, the symposia found that the approach taken so far is appropriate. The importance of ensuring the key aspects of the definitions of GI as a strategic multifunctional network operating at different spatial scales are recognised in the benchmark was highlighted. However, it was felt that additional elements important to GI including historic environment and resilience need to be explicit in the benchmark. It was agreed that the benchmark should assess the provision of GI to achieve desired outcomes, as well as more procedural elements such as management and maintenance. It was also recognised that the benchmark will not be able to include every aspect of GI, and the UWE team were advised to keep the benchmark focused.

Key Findings: What is the most appropriate model to ensure the long-term success of the benchmark?

The review provided valuable rationale for preliminary ideas about what form the benchmark should take. It informed initial judgements about the characteristics of the standards (or criteria) within the benchmark. It informed guiding principles for the benchmark such as transparency, user friendliness and appropriate provision of guidance. It also provided initial ideas about specific aspects of the benchmark such as the assessment process and benchmark fees.

The symposia further enhanced the findings from the review on the operational aspects of the benchmark. These included, for example, the types of development that could apply for the benchmark and the point in the process at which the benchmark could be awarded. So, whilst an initial assessment of the design of the GI was recognised as being important, it was felt that a further post-completion assessment of the GI was essential. Levels of award that could be earned were also discussed, with the benefits of having a gradation of four or five levels of award being highlighted. The identity and characteristics of suitable assessors were considered, as were potential costing structures and marketing for the benchmark, including the public promotion of developments that had performed well.

Next steps

The study outlines a series of actions in order to take the findings of the feasibility study forward. The end goal is the establishment of a national benchmark that builds upon the thinking of the local benchmark, with appropriate refinement in response to stakeholder and professional feedback. Three stages of work are suggested:

Stage one: 0 to 2 months

1. **Engage with planning teams across the UK about the potential for broadening the application of the GI benchmark.** The end goal of this activity would be to promote the benchmark with a view to embedding in policy making and practice.

Stage two: 2 to 6 months

2. **Refine the standards for the national GI benchmark in consultation with stakeholders**. The standards being developed for the local benchmark could be presented to national stakeholders and, if necessary, refined to ensure suitability for the national context. The participants who assisted with the symposia could be re-approached, with additional representation from developers, local planning authorities and relevant professionals (with particular emphasis on landscape architects, designers/master planners, planners and representatives from across the broader environmental consultancy sector).

3. **Consult, and provide confirmation, on the operational elements of the national benchmark, using the same stakeholders and professional teams as outlined above.** The intention here would be to seek refinement concerning:

   - *The grading of the benchmark:* e.g. Achieving; Excelling

   - *The assessment stages:* e.g. pre-application, commencement of development, to achieve 'candidate' status; post-completion to achieve 'awarded' status; addressing phased development.

   - *Maintenance of the benchmark:* e.g. review after 5 years, 10 years; funding for review; refining the standards.

   - *Nature and experience of the assessors:* e.g. the role of internal assessor and external assessors for verification, design review panel, their skills and experience.

4. **Prepare, and consult on, the technical guidance document.**

Stage three: 6 months to scheme completion

5. **The third stage of work would see the benchmark fully tested and launched through the following activities:**
   - Test the national benchmark for GI on demonstration projects.

   - Further refinement of the standards and technical guidance document.

   - Prepare, and consult on, promotional activities for the benchmark.

   - Develop, and consult on, a costings plan for administering the benchmark.

   - Develop long-term ownership model for the benchmark.

1. Introduction

Project history

The Centre for Sustainable Planning and Environments at the University of the West of England, Bristol was awarded an Innovation Fund from the Natural Environment Research Council (NERC) to undertake a feasibility study to test whether there is a market for a national benchmark for green infrastructure (GI). The project builds on the work of a Knowledge Transfer Partnership (KTP) that has been established between the Centre for Sustainable Planning and Environments (SPE) at the University of the West of England, Bristol (UWE) and the Gloucestershire Wildlife Trust (GWT) and funded by Innovate UK and NERC.

The KTP began in August 2015, partly in response to a green infrastructure workshop that had been held at the start of 2014. The event was well attended by developers, with the UK's most significant housebuilders being present. Delegates recognised the need for GI and its benefits in allowing new development to be successfully assimilated into the landscape, to enhance and protect local biodiversity, and to provide residents (new and existing) with a high quality of life. However, developers and planners highlighted their uncertainties of the good practice in the planning, management and delivery of GI. While the growing body of literature surrounding GI was acknowledged, there was also some confusion over the most appropriate guidance, and a need expressed across the sector for sign-posting to high quality guidance, support and evidence. The KTP was thus initiated to embed this knowledge and skills into GWT to allow their consultancy service to expand its services to meet this need.

The first phase of the KTP included intensive customer requirements testing in Gloucestershire and the West of England to identify the 'product/s' to be developed. This identified the requirement for a GI benchmark in the area. The KTP started in August 2015 so there had already been significant development of this benchmark before the symposia took place. Although this testing has helped to identify areas of consensus, and elements of concern, it has focussed on the needs of the local area so it was essential to test whether these are representative of the national situation.

Upon commencement of this feasibility study the local benchmark was envisaged as a process-orientated points-based benchmark for GI. It would use criteria that consider:

- Themes that underpin GI planning, delivery and management: multifunctional network, fit with strategic aims and objectives, long-term management, governance and funding;
- Themes based on the ecosystem services that GI can provide: nature conservation, water management, health and well-being, environmental quality, design quality.

It allows an assessment of the process of GI creation, from policy, through to planning, design, delivery and long-term management, ensuring that current good practice has been adopted at all stages. The detailed criteria were being developed concurrently with this feasibility study and the findings from the expert symposia have already enabled us to refine the framework for the benchmark and the draft standards (as opposed to criteria) have now been developed.

Now developed, the draft standards are being tested through an iterative process with live projects and an expert advisory group.

Project aims and objectives

The feasibility study examines whether there is an identified need to extend the benchmark for Gloucestershire and the West of England into a national benchmark. Initially this is focussed on England but with the intention that, following testing it could apply to the UK. Specifically, the study seeks to answer the following questions:

- What is the demand for a GI benchmark in the built environment sector?
- What types of GI and corresponding ecosystem services should the benchmark include?
- What is the most appropriate model to ensure the long-term success of the benchmark?

As such, the study has been framed around the following objectives:

- To undertake a desk-based assessment of the current benchmarks available to the built environment sector to examine the models for benchmark delivery and long-term sustainability;
- To work with a range of end-users from planning, development, construction, public health, transport, engineering, nature conservation, community and urban forestry, urban design and landscape sectors to test the market for a national benchmark;
- To work with these end-users to examine the range of GI types and ecosystem services that should be included in the benchmark;
- To provide an assessment of the market for the benchmark, the scope of the benchmark, options for models of delivery and an analysis of the gaps in knowledge.

Methodological approach

The feasibility study comprises of two integrated packages of work. Both of these have run concurrently with the ongoing development of the benchmark for Gloucestershire and the West of England (hereafter known as the local benchmark).

The first work package consisted of a review of benchmarks, and other assessment systems, relevant to the planning, design and management of GI. The purpose of this was to examine whether the rationale for having a local benchmark applied nationally. Each system was reviewed to look at the extent to which it considered GI, as a system or in individual components (e.g. green spaces) and the types of criteria, standards or measures that are included to assess GI. In addition, the review also looked at the way in which projects are assessed and the mechanisms for their delivery and operation. It has not been possible to assess the performance of these various mechanisms but the review has helped to identify the principles and practices for any national benchmark for GI.

In the second work package the work undertaken towards the local benchmark and the findings from the review were tested in a series of symposiums that sought to gather the views of a range of stakeholders. These were held through March and April 2016 with over 50 participants. Each symposium was hosted by a different organisation; three by the professional bodies of the Royal Institution of Chartered Surveyors (RICS), Landscape Institute, Royal Town Planning Institute (RTPI)

aimed at their members and two aimed at a broader range of practitioners hosted by the Town and Country Planning Association and the Royal Society of Wildlife Trusts. All of these organisations are partners on the project, along with Public Health England and Forest Research. The symposia were designed to encourage as much debate as possible, with a series of specific questions posed after a brief summary of the findings. Collectively the discussions were extremely helpful in gauging the perceived need and demand for a national benchmark for GI, and its potential format, scope and operation.

Definitions

Box 1 provides some key definitions of 'green infrastructure' and 'benchmark'. This study adopts the Natural England definition of GI. Although there are many definitions, most are in agreement regarding a number of key principles: its relationship with strategic planning, the range of elements included (e.g. street trees, green roofs, parks) and the need for GI assets to be 'networked' and 'multifunctional'. There was some debate at one symposia as to whether the terms 'benchmark' and criteria' were appropriate in the context of this work, as a result 'benchmark' is retained but the use of 'standards' as opposed to 'criteria' has been adopted.

Box 1: Definition of key terms
Benchmark
'A level of quality that can be used as a standard when comparing other things' (noun)
    Cambridge Dictionaries Online (2016)

'A criterion by which to measure something; a standard; a reference point' (noun)
    Collins English Dictionary

'To measure the quality of something by comparing it with something else of an accepted standard' (verb)
    Cambridge Dictionaries Online (2016)

'A structured, collaborative, learning process for comparing practices, processes or performance outcomes. Its purpose is to identify comparative strengths and weaknesses, as a basis for developing improvements [in academic quality]. Benchmarking can also be defined as a quality process used to evaluate performance by comparing [institutional] practices to sector good practice'.
    TEQSA (n.d.), page 1.

Green Infrastructure
'Green Infrastructure is a strategically planned and delivered network comprising the broadest range of high quality green spaces and other environmental features. It should be designed and managed as a multifunctional resource capable of delivering those ecological services and quality of life benefits required by the communities it serves and needed to underpin sustainability. Its design and management should also respect and enhance the character and distinctiveness of an area with regard to habitats and landscape types.

Green Infrastructure includes established green spaces and new sites and should thread through and surround the built environment and connect the urban area to its wider rural hinterland. Consequently it needs to be delivered at all spatial scales from sub-regional to local neighbourhood levels, accommodating both accessible natural green spaces within local communities and often much larger sites in the urban fringe and wider countryside.'
    Natural England (2009), page 7.

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2. Desktop review of assessment systems

As the introduction explains, the first work package of the feasibility study comprised a review of a selection of benchmarks and other 'assessment systems'. Although the list is by no means definitive, they are felt to offer an overview of the systems currently, or recently, in place. The focus of the review has been orientated to scope and process; no attempt has been made to assess their effectiveness or to gauge views from potential assessors and users. The review has helped to create a list of delivery principles that are included at the end of the chapter. These were subsequently discussed at the symposia.

Systems reviewed

In total 22 systems were reviewed. They were selected to give a broad overview of the types of systems used in the built environment sector, at different scales and for different purposes. The aim was to examine a) if and how GI is considered in existing systems to determine the need for a specific benchmark and b) the approach, format and operation of existing systems to understand current practice and what is likely to be acceptable to the sector.

There were **twelve systems** relating either solely to buildings (both commercial and residential) or to buildings, neighbourhoods, and other infrastructure and land sites:

- BREEAM, managed by BRE, including the BREEAM Strategic Ecology Framework (BRE, 2016a, 2016b and 2016c);
- BREEAM Communities, managed by BRE (hereafter differentiated from BREEAM as BREEAM Communities) (BRE, 2016b);
- Building for Life 20, managed by CABE, the Home Builders' Federation (CABE, 2011);
- Building for Life 12, managed by Design Council CABE, the Home Builders' Federation and Design for Homes (Design Council, 2016);
- Code for Sustainable Homes, managed by Department for Communities and Local Government (now withdrawn) (Planning Portal, 2009);
- Global Sustainable Assessment System (GSAS), managed by Gulf Organisation for Research & Development (GORD) (GORD, 2016);
- Green Building Index, managed by PAM council (Green Building Index, 2013);
- Greenstar, managed by the Green Building Council, Australia (GBCA, 2016);
- LEED, managed by US Green Building Council (USGBC, 2016);
- LEED Canada, managed by Canada Green Building Council (CGBC, 2016);
- Lotus Sustainable Building Assessment System, managed by Vietnam Green Building Council (VGBC, 2016);
- An additional rating system applied to infrastructure of all kinds: Envision, managed by Institute for Sustainable Infrastructure (ISI, 2016).

There were **nine** systems relating to GI, biodiversity or greenspace more specifically:

- The Biodiversity Benchmark, managed by The Wildlife Trusts (The Wildlife Trusts, 2016);

- Biotope Area Factor (BAF), managed by Berlin's Senate Department for Urban Development and the Environment (this was added after the symposia on the advice of participants) (BSDUDE, 2016);

- Green Flag Award, managed by Keep Britain Tidy, under licence from the Department of Communities and Local Government (DCLG) (Green Flag Award, 2016);

- Green Infrastructure Audit: Best Practice Guide, developed for Victoria Business Improvement District (Victoria Business Improvement District, 2013);

- Green Infrastructure to Combat Climate Change, commissioned by North West Development agency (Community Forests Northwest, 2011);

- Harrogate Green Infrastructure Supplementary Planning Document (SPD) (HBC, 2014);

- Monmouthshire Green Infrastructure Supplementary Planning Document (SPD) (MCC, 2015);

- Sustainable Sites Initiative (SITES) managed by GBCI (the certification body for the LEED green building program) (Sustainable Sites Initiative, 2016a, 2016b);

- In addition, there were a collection of worksheets reviewed giving technical advice for Ecotowns: Ecotown technical advice worksheets, managed by TCPA (supported by DCLG) (TCPA, 2008).

There was **one** system relating to sustainability more generally:

- Green Leaf Eco Standard (GLES), particularly focused on tourism accommodation (Green Leaf Eco Standard, 2016).

It should be noted that the documents produced by Monmouthshire and Harrogate are two of a whole series of GI-focussed documents provided by local planning authorities. Both of these have been advanced as 'supplementary planning documents' in order to provide additional guidance and elaboration to GI policy included in a local plan. While neither of these documents are classified as benchmarks or assessment systems, they allow an assessment as to the type of guidance that planning authorities have prepared as a way of determining the need for a benchmark. Table 1 overleaf illustrates some of the key features of each assessment tool.

Ownership, geographical coverage, longevity and adoption of systems

All of the systems relating more specifically to GI, biodiversity, ecology or greenspace were situated in the UK, except for *Biotope Area Factor* (Germany) and *Sustainable Sites Initiative* (US). Three of the systems were benchmarks or awards: *Biodiversity Benchmark*, *Sustainable Sites Initiative* and *Green Flag Awards*. Of the remaining systems two were Local Authority Supplementary Planning Documents (SPDs), from Monmouthshire and Harrogate. The Monmouthshire guidance included GI context plans, a GI checklist and a GI opportunities plan. Another of the systems, developed by Victoria Business improvement district was a *Green Infrastructure Audit* that could be applied to local (initially London) areas. The *Biotope Area Factor (BAF)* was a Berlin based auditing system for green space in a defined area. *A Green Infrastructure Toolkit*, developed for the North West Development Agency, was also examined.

Of the systems relating to developments and infrastructure, some were national in scope. For example, *LOTUS* was based in Vietnam and the *Code for Sustainable Homes* was based in the UK. While located in specific countries the remainder are global in scope.

Table 1. Summary of the benchmarks, assessment systems and tool reviewed

Name of programme	Managing authority	Type	Geographical coverage	Dates	Scale of programme	Costs	Target applicant
Biodiversity Benchmark	The Wildlife Trusts	Benchmark	National (UK)	2007-	54 sites; 17 organisations	Initial: £3350 per site Ongoing: £875 pa per site	Organisation
BREEAM Communities	Building Research Establishment	Assessment system with standards	Global	2008- (streamlined 2012)	8 projects certified; 18 registered (2014)	Initial: £125 to £500 (2008) Interim: £625 to £2500 Final: £500 to £2000	Developers; Local Authorities
BREEAM	Building Research Establishment	Assessment system with standards	Global	1990-	539,214 projects certified	Unknown	Developers; Engineers; Planners; Local Authorities
Building for Life	CABE, Home builders Federation.	Standards	National (England)	2003-2015 (replaced)			
Building for Life 12	Design Council CABE, The Home Builders Federation and Design for Homes	Standards	National (England)	2015-		Assessment: £630 per scheme Licence: 0.0002% of value of each dwelling	Developers; Local Authorities; Community groups
Code for Sustainable Homes	Department for Communities and Local Government	Standards	National (England)	2006-2015			Developers
LEED	US Green Building Council	Assessment system with standards	Global	2000-	94,930 projects certified	Registration: $1,200+ Subsequent: $2,500 to $25,000+	Developers; Engineers
LEED Canada	Canada Green Building Council	Assessment system with standards	Global			Registration: £300 to £6,500 Certification: £1,600 to £17,000	
Global Sustainability Assessment System (GSAS)	Gulf Organisation for Research and Development	Assessment system with standards	Global	2009-		Unknown	Developers; Local Authorities
Green Star	Green Building Council Australia	Assessment system with standards	National (Australia)	2003-	7,200,000 m2 of certified projects	Certification: $50,000 per 'communities' project Multiple additional fees	Building owner, operator or occupant
Green Building Index	PAM council	Rating tool	Malaysia	2009-		Registration: £822 to £7400 per building Renewal: £822 to £2500	Developers

Name of programme	Managing authority	Type	Geographical coverage	Dates	Scale of programme	Costs	Target applicant
Lotus Sustainable Building Assessment System	Vietnam Green Building Council (VGBC)	Rating tool	Vietnam	2010-		Registration: £344 per project Certification: £2725 to £10,000+	Developers
Envision	Institute for Sustainable Infrastructure	Rating system	National (US and Canada)	2011-	140 Envision qualified companies	Registration: £687 Certification: variable	Infrastructure; Community groups; Design teams
Sustainable sites initiative (SITES)	GBCI	Benchmark	National (US)	2007-		Registration and certification: £6500	
Green Flag Awards	Keep Britain Tidy under licence from DCLG.	Award/Benchmark	National (UK; piloted in other countries)	1996-	1400 green spaces (2015)	XXXX	Green space owners, managers
Green Infrastructure Audit: Best practice guide	Victoria Business Improvement District.	Audit	London	2010-	12+ BIDs	Typical cost: £15,000	Business Improvement Districts
Green Leaf Eco Standard (GLES)	Wilderness Foundation	Assessment system with standards	Global (primarily Africa)	2007-	60 locations; 7 organisations.		Organisations
Green infrastructure to combat climate change	Commissioned by NWDA	Green infrastructure toolkit	North West England				Developers
Green infrastructure supplementary planning guidance	Monmouthshire County Council	Planning guidance	Local (Monmouthshire County Council)	2015-			Developers; Local Authority; Local communities
Green infrastructure supplementary planning document	Harrogate Borough Council	Planning guidance	Local (Harrogate Borough Council)				Developers; Local Authority; Local communities
Ecotown technical advice worksheets	TCPA (supported by DCLG)	Guidance, checklists	National	2007			Ecotown developers, planners, local authorities
Biotope Area Factor (BAF)	Berlin's Senate Department for Urban Development and the Environment	Ratio of soft surface	Berlin	1994-	Applied in various areas across Berlin		Developers

One indicator of the success of the systems reviewed is whether they are still running and how long this has been the case. Of the systems requiring ongoing management (i.e. not simple checklists) the following are still running (date programme started): The *Biodiversity Benchmark* (n.d.), *BREEAM* (1990), *BREEAM Communities* (2008 with revisions in 2012), *LEED* (n.d.)*, Sustainable Sites Initiative* (2007), *Green Star* (2003), *LEED Canada* (n.d.)*, Green Flag Awards* (1996), *Green Building Index* (2009), *Lotus Sustainable Building Assessment System* (2010), *Envision* (2011), *Global Sustainable Assessment System* (2009), *Biotope Area Factor* (1994) and *Green Leaf Eco Standard* (2007). The *Building for Life* benchmark started in 2003 and is still running but changed from a 20 to a 12 question structure in 2015. The *Code for Sustainable Homes* is an exception in being discontinued, in 2016. The longevity of the systems reviewed (5 to 26 years) suggests that there is an appetite for, and acceptance of, such systems in the sector. Of course there is a bias in that systems that are no longer operational will be less visible and therefore have not come to the attention of the reviewers.

Another indicator of success is the number of projects that have been certified. Of course this indicator will mean that benchmarks that are easier to pass will appear more successful than more stringent benchmarks. Nevertheless the numbers do give an indication of the degree to which the systems have been adopted by the sector. The building-scale systems particularly have reported the certification of a large number of projects. For example, *BREEAM* report issuing over 500,000 certificates for over 2 million buildings and *LEED* report that 72,000 projects were participating, representing a total area of over 1.2 billion square metres.

Adoption of the GI and biodiversity-focused systems was more modest: *Green Flag* reported the number of award winners growing from seven in 1997 to 1,400 in 2015. The *Green Infrastructure Audit* for the Victoria BID had been used by at least twelve other authorities in London and the *Biodiversity Benchmark* had been awarded to 54 sites, covering an area of over 9,000 ha.

There is clearly an acceptance of the value of such systems for the sector. All are voluntary in the UK yet developers, local authorities and other groups are choosing to certify their schemes in substantial numbers. However, the number of systems available suggests that the market may be crowded with well-established brands so any new benchmark for GI would need to demonstrate that it provides added value to customers and is complimentary to existing systems. The geographic reach of the systems, particularly those not specific to GI also suggests that there is an acceptance that criteria and standards can and have been developed to be applicable to different countries, regions and localities.

Consideration of GI in the systems

A number of the building and infrastructure systems included an assessment of elements relevant to GI. For example, *BREEAM* and *Code for Sustainable Homes* include a category on ecology, *Building for Life 12* includes a checklist relating to quality of place-making and *Envision*, a benchmark for general infrastructure, included credited sections on 'encouraging alternative modes of transport', 'enhancing public space', 'preserving prime habitat', 'protecting wetlands and surface water' and 'preserving species biodiversity' (Bertera, 2012). The *Global Sustainability Assessment System* included measurements of ecological value of land, greenery and shade, rainwater runoff, heat island effects and landscape management (GORD, 2016). The *Ecotown Technical Advice Worksheets* included checklists for GI.

In addition BRE have developed a *Strategic Ecological Framework*, (BREEAM, 2016b) in order to inform and refine the criteria used for ecology in *BREEAM,* making them understandable to designers, constructors, ecologists and other professionals. The aim of the framework is to encourage the consideration of ecology and landscape quality throughout the life cycle of a development. The process of development is similar to that of this feasibility study, including focus groups with industry stakeholders.

BREEAM Communities contains a more detailed focus on GI than the broader BREEAM system. This includes credits given for GI according to the running of appropriate consultations, satisfying action points from these consultations, creation of a GI plan, suitable walking distances to the GI, achievement of ANGSt standards, and existence of a management strategy.

The *Sustainable Sites Initiative*, whilst addressing sustainability in general, is particularly relevant to GI in that it aims to encourage the harmonisation of developments (and land use) with preserving and improving ecosystems, and human health benefits. It thus seeks to bring together healthy ecosystems and everyday human life, by improving space and place. It addresses water demand, storm water runoff, wildlife habitat, carbon, energy and air quality as well as people's health and leisure. The system includes an emphasis on restoration and recovery of ecosystems (Sustainable Sites Initiative, 2016a).

The review demonstrated that the existing systems available do not provide a comprehensive assessment or benchmark for GI. Of the building and infrastructure systems *BREEAM Communities* included the most detailed criteria relating to GI, although these still remain quite basic. Generally, the systems either include land use elements of GI (e.g. green spaces, SuDS) or they consider only one service provided by GI (e.g. biodiversity, place making). There is therefore a gap in the market for a benchmark that assesses GI as a multifunctional network made up of different features and elements.

Nature of applicants and types of projects

Many of the systems were aimed at developer applicants. However, they could also be used by local authorities, community groups, land owners and managers or other decision makers. For example, of the systems focused on GI and biodiversity: *Green Flag Awards* are for bodies associated with green spaces and parks, *A Green Infrastructure Audit* is aimed at London business improvement districts, Monmouthshire's supplementary planning guidance is intended in part to give reference points to decision makers within the local authority and also to local communities, and *Ecotown Technical Advice Worksheets* were intended not only for eco-town developers, but also those managing the new settlements and those working with the new communities. These worksheets were also intended to support the emergence of GI networks beyond the boundary of the development. *Sustainable Sites Initiative* is applicable to a range of users, including 'landscape architects, designers, engineers, architects, developers (and) policy-makers' (Sustainable Sites Initiative, 2016a). *Sustainable Sites Initiative* aims to be valuable to organisations who are not experienced in protecting sustainable landscapes and provides foundational guidance and a systematic basis for approaching sustainability.

As examples from the wider built environment systems: *Building for Life* is available for use by anyone with an interest in new homes and neighbourhoods, including communities and local authorities. *Green Star* is available for use by building owners, operators and occupiers. Several development and

infrastructure systems included applicants who were responsible for retrofitting buildings. *Envision* is aimed at infrastructure owners, designers, community groups, environmental professionals, constructors, and policy makers. The *Green Leaf Eco Standard* has mainly been awarded to hotel groups and retailers. It is clear that the systems examined did not address developer applicants only; many addressed a diverse group of users.

Most of the development and infrastructure systems can be used for a wide range of projects including different types/purposes of buildings. For example, The *Global Sustainability Assessment System* aims to be adaptable to any project of any scale.

Amongst the systems focusing on GI and biodiversity more specifically, the *Biodiversity Benchmark* had certified a number of the landholdings of businesses from different sectors. The *Sustainable Sites Initiative* covered 'open spaces, streetscapes and plazas, commercial areas, residential areas and educational/institutional areas', but not the individual buildings on these sites (Sustainable Sites Initiative, 2016b). *Green Flag* awards are only applied to green spaces. *The Green Infrastructure to Combat Climate Change Toolkit* addresses and quantifies GI features such as green roofs, open soil and trees. The *Biotope Area Factor* quantifies the amount of green surfaces in an urban area. The *Green Infrastructure Audit* similarly quantifies the amount of GI assets in a given area.

The existing systems are marketed to a varied customer base and have been developed to be suitable for a range of project scales and types. This suggests that systems can be developed to be attractive to different types of customer, and there is acceptance in the sector that systems should be flexible enough to be used across a range of projects. However, most are primarily marketed towards developers.

Operation and management of the systems

In terms of undertaking assessments, some of the more established development and infrastructure assessment systems include extensive support and training. This includes manuals, technical guidance, online learning materials and support as well as more formal training opportunities. *BREEAM*, for example, is supported by briefing papers, *LEED* by reference guides and *Envision* by a guidance manual. Online materials include, for example, online e-learning courses for *Green Star* and videos for *BREEAM*. Several of the systems' websites provide opportunities for applicants to ask questions and The *Green Building Index*, for example, offers fortnightly consultation sessions. At least two of the systems offer training and support events such as masterclasses, conferences and conventions, some of which result in a formal qualification. For example, assessors can take exams to become a 'LEED Green Associate' and Envision requires one person in the applicant company to be trained in a self-assessing role. Several systems, for example the *Global Sustainability Assessment System*, include access to online networking.

In case of GI-specific systems, the *Green Infrastructure to Combat Climate Change Toolkit* includes relevant information and links, evidence about GI and guidance for assessing projects in terms of GI. The *Ecotowns Technical Advice Worksheets* provide a lot of information and guidance, including links to funding models for green space establishment and land restoration. The *Biodiversity Benchmark* offers introductory workshops. *Sustainable Sites Initiative* provides the opportunity to ask technical questions and in the future will offer the option to achieve a professional credential.

The person conducting the assessment varies between the systems. Of the systems relating to developments and infrastructure there was a stress on the independent nature of assessors. Seven of the systems referred to assessors being independent or third-party. One of these systems is self-assessed, but as a final stage, the project is submitted to the managing body as a final certification. Another common feature of the assessors in these systems are that they are referred to as 'expert'; *Building for Life 12* also refers to 'local' experts who would be able to have sensitivity to local context.

Of the systems relating solely to GI, biodiversity and green space, the *Biodiversity Benchmark* was carried out by the personnel from the Wildlife Trusts, the managing authority, although findings are also checked by an independent quality assurance assessor. The *Green Flag Award* is judged by a peer group of judges, mostly from local authorities and the *North West Green Infrastructure Toolkit* seems to operate by means of a self-assessment process. Whilst the *Green Infrastructure Audit* from Victoria Business Improvement District, is less of an assessment than a fact finding mission, the audit is likely to be delivered by an external consultant with the necessary GI and GIS skills. The Monmouthshire and Harrogate *Green Infrastructure Supplementary Planning Documents* were not assessments. Local planning authority officers would be involved in GI planning but more in terms of offering guidance and critique to developer teams.

Turning to the cost of conducting the assessment, in the development and infrastructure systems, fees range greatly, according to size of project. For example, *LEED Canada* registration fees range from £300-£6,500, and certification fees from £1,600-£17,000, and *Lotus* has registration fees of £344/project and certification fees ranging from £2725 to £10,000, depending on size of buildings. Often for the large benchmarks there are complex fee structures, with multiple separate charges. For instance in the case of *LEED*, charges are disaggregated for registration, certification, expedited review, initial stage reviews, subsequent stage review, and volume program fees. *Green Star* has a similarly complex structure including fees for certification of individual credits.

The costs for the GI-specific systems are generally more straightforward. The *Biodiversity Benchmark* charges £3350 for a single site, with an annual cost of £875 to maintain certification and discounts for two to four sites and four to eight sites. With regards to the Green Flag Award, advertised costs seek to cover administrative processes and are calculated on the basis of a site's size and location. In England, a site of between 0 and 19.9ha costs £312 and £363 for a site of 20 ha and over. *Sustainable Sites Initiative* has a combinable registration and certification of £6,500. The *Green Infrastructure Audit*, while not an award, would usually cost around £15,000 for a consultant to carry out. However, The Greater London Authority provided £100,000 to fund and catalyse the implementation of projects identified in the audits.

It is clear that after the system is developed and launched considerable thought and resource needs to be provided to ensure its long-term success. This includes, at a minimum, a web presence with technical documentation, user guides and ongoing support for assessors. All of these, as well as the system, need to be kept up to date and have designated resource to provide support, training and certification to assessors in some form. Hence detailed costings must also be provided for those wishing to secure the accreditation and the varied size and nature of built environment projects needs to be reflected in these.

Nature and timing of assessment

A theme amongst the largescale development and infrastructure systems is that the assessment tends to be broken down into five to fifteen themes or categories. Sometimes, as in the case of *Green Star* and *Green Building Index*, different tools are applied to projects falling under the different themes (e.g. Greenstar has different tools for community scale projects and building interior projects). The themes are often subdivided into specific criteria. In some cases, these different categories are weighted; for example *Global Sustainability Assessment System* weights categories according to their impact on sustainability. Some of these systems, such as the *Code for Sustainable Homes* for example, provide the option of developers being able to choose which, and how many, standards they implement.

A feature of some of the systems relating to GI is that they seek quantitative measures of GI elements. These include the *Victoria Business Improvement District, Biotope Area Factor (BAF) and the North West Development Agency Green Infrastructure Toolkit*. For example, BAF requires a measure of the amount of green surfaces (including green walls/roofs etc.) in relation to land area in an urban area. These are compared against target ratios for the amount of green surface area there should be to achieve desired impacts on microclimate, heat island effects, drainage, habitat and human living environment. It gives weightings to different kinds of green surface, according to their ecological value, and takes account of different land uses in the minimum targets it sets. However, it does not consider qualitative aspects of the landscape, although it does form part of a wider landscape programme.

Some of the systems, including *Sustainable Sites Initiative* and *BREEAM Communities*, have a scoring system containing prerequisites or mandatory standards (achievements that must be met in order to gain certification) and other credits for which an overall score has to be achieved.

The customer requirements testing in the KTP found that practitioners are concerned that often planned GI is not delivered or maintained adequately in the long-term so it is important that the benchmark is awarded at the right point in the development process. Of the development and infrastructure benchmarks, eight mention assessing buildings and neighbourhoods at multiple stages of development and completion. For example, in the *Green Building Index* the assessments occur between design and construction and then within twelve months of completion. Another recommends the certification being planned as early as possible.

Of the systems relating to GI, the *Biodiversity Benchmark* includes an initial assessment and then a main assessment within six months. Similarly, the *Green Flag Award* involves an initial assessment of each application followed by a judge visiting the site on announced and unannounced visits. *Sustainable Sites Initiative* has two paths for assessment: one where the entire application is submitted at the same time, and another where part of the application is submitted at the end of the design phase and the rest, at the end of construction.

There is then some variation in the systems in terms of the nature and timing of the awards. However, most appear to break the standards or criteria down into themes or categories and offer some flexibility in which are targeted meaning that applicants can specialise as appropriate for their situation without risking failure. That being said some systems also had a series of mandatory standards across the spectrum of sustainable development that need to be met. It also appears that there is acceptance within the sector of assessment taking place at different stages of the

development process, including post-completion which is very important given the concerns raised in the customer requirements testing for the KTP.

Format and communication of the award

A number of the systems use multiple levels of award. These might be in the form of numbers or stars. The *Code for Sustainable Homes*, for example, has a six-star rating system, where one star is the entry level. Other systems use verbal ratings. For instance, *BREEAM* gives 'pass, good, very good, excellent and outstanding' ratings (BREEAM, 2016a). Some of the systems use traffic light ratings. *Building for Life 12* is an example, where nine of out twelve green lights results in achievement of the 'built for life' accreditation, and twelve out of twelve results in an 'outstanding' rating. The use of silver, gold, platinum ratings are employed by five of the systems. These ratings are derived from a more detailed score, for example, out of 20 or 100. Some of the rating systems start with the lowest grade which in some cases was negative. For instance, the *Global Sustainable Assessment System* has five levels, from -1 to 3 where -1 does not meet baseline requirements. In this, and other systems, if the project fails, no certificate is given. The *Green Flag Award* is an exception in seeming to have only one tier of the award, a pass or fail.

Information regarding how long an award is valid was only found in relation to some of the systems. The *Green Building Index* and *Lotus Sustainable Building Assessment System* give awards that are valid for three years only *whilst GLES* certificates are valid for two years. In the case of the *Green Building Index* buildings can then be reassessed to maintain the rating. The *Green Flag Award* is only for one year but some parks have won the award seven years in a row. The *Biodiversity Benchmark* charges an annual fee to maintain certification. So a number of the awards were given for a fixed duration only, although often there is a way for the certification to be renewed.

A number of the systems supply formal certificates to successful projects, for example *Green Star* and the *Biodiversity Benchmark*. *Green Flag Award* requires that the certificate be displayed, in order to explain to park users the purpose of the award. Winners of this award are also encouraged to use a 'Green Flag Award' logo on stationery and promotional literature and to have a green flag flying in the green space.

Some systems also provide information as to which schemes have achieved the award or accreditation. For example, the *Green Building Index* is available on a website in order for the public to check and verify that buildings have the award. A similar service is provided for projects passing the BREEAM Communities standard. The *Building for Life 12* system also has a website with information about developments that have won the award. It is also suggested that developers use the accreditation in their promotional materials; *GLES* suggests that the award could be showcased through logos, improving brand image. *Building for Life 12* similarly suggests that it provides a quality mark that can be used by developers during sales and marketing activity and hosts events at which developments achieving an 'outstanding' rating are recognised.

This suggests that there is an expectation in the built environment sector that there is some flexibility in such systems so that applicants can select the level they wish to aim for and what the focus should be. However, there is also some pragmatism in the systems so that accreditation is not always given in perpetuity acknowledging that for some aspects of development it is important to ensure that

standards are maintained in the long-term. As previously covered most of the systems are marketed at developers in the first instance so their ability to use the accreditation in marketing and to demonstrate corporate social responsibility will be important.

Summary and key principles

The review demonstrates that there is some variation between the systems but also areas of commonality. The key characteristics of the systems are summarised in Table 2. This, together with the local customer requirements testing in the KTP, has enabled the UWE team to devise a list of principles for a benchmark for GI. These are:

- Rationale for the benchmark needs to be clearly articulated;
- Standards to be organised in three to five thematic areas;
- Standards must be evidenced with appropriate links and/or summaries of supporting evidence;
- Standards should be simple and clear in their construction and overlap wherever possible with those in existing standards, systems or policies;
- Number of standards should be kept to the minimum necessary to achieve the desired outcomes;
- Overall benchmark should be flexible enough to be applicable to all development projects;
- Clear points of contact and clear lead authority for administering the benchmark;
- Benchmarking process on development projects should be developer-led;
- Commitment to transparency and openness to encourage broader involvement and understanding (by the community and other stakeholders);
- Supporting guidance available in alternative formats and in varying degrees of detail to respond to the needs of different audiences;
- Guidance to be kept up-to-date and subjected to regular review;
- Assessments to be undertaken by informed and suitably educated and experienced assessors;
- Achievement to be graded with (at least) two levels of award possible;
- Assessments to be objective, transparent and fully documented with judgements appropriately justified with detailed scoring and, if necessary, recommended actions clearly outlined;
- Assessment to be staged: initial (grant of full planning permission/submission of reserved matters), completion/ongoing maintenance (developer declaration);
- Fee payable to be split into two to reflect two stage process (c. 70%/30%);
- Opportunity for discounted fees for developers submitting multiple sites or variable fees; and
- Successful projects to be publicised (both on site and through a benchmark website).

These principles were presented at the symposia and informed the questions posed to participants.

Table 2. Summary of the key characteristics of the benchmarks, assessment systems and tool reviewed.

Name of programme	Relevance to green infrastructure	Award differentiation	Training and support	Stage at which assessment is undertaken	Nature of assessors	Categories of award	Duration of award
Biodiversity Benchmark	Awards businesses for improvements in biodiversity	None	Introductory workshop, access to learning events	Initial assessment then another within 6 months	The Wildlife Trusts, verified by independent assessor	Awarded	1 year
BREEAM Communities	Credits awarded for elements related to GI e.g. strategy; ecology; greenspace; SuDS	Moderate to large mixed-use and single-use developments	Trained assessors, technical manual, online support	3 stages: developer shows suitability; people movement and building location; detailed design stage	Independent third party assessors	Unclassified to outstanding; some mandatory standards	Indefinite
BREEAM	Credits awarded for elements related to GI e.g. ecology; green roofs/walls; SuDS	Masterplanning; new construction; refurbishment and fit-out; in-use	Trained assessors, technical manual, briefing papers and videos	Assesses a number of lifecycle stages	Independent licensed assessors; third-party certification	Pass to outstanding; some mandatory standards	Indefinite
Building for Life	Twenty questions, some related to GI e.g. parks, placemaking	None; targeted at residential-led development	Technical manual	All stages of the development process	Building for Life forums of experts local to the scheme	Silver: 14,15/20 Gold: 16+/20	Indefinite
Building for Life 12	Twelve questions, some related to GI e.g. parks, placemaking, wildlife	None; targeted at residential-led development	Technical manual	All stages of the development process	Building for Life forums of experts local to the scheme	Pass: 9,10,11/12 Outstanding: 12/12	Indefinite
Code for Sustainable Homes	Nine themes, some criteria related to GI e.g. SuDS, ecology	Residential	Technical manual	2 stages: design stage assessment and post-completion checks	Accredited independent assessors	1 to 6 levels; some mandatory criteria	Indefinite
LEED/LEED Canada	Credits awarded for elements related to GI e.g. open space, ecology, SuDS	Various, including neighbourhood development	Extensive customer service, training, reference guides, online support	All stages of the development process	Includes review of application by a third party organisation.	Four levels: certified to platinum	Indefinite
Sustainable sites initiative (SITES)	Site context, water, soil and vegetation, and human health and well-being	Various, including open spaces, streetscapes	Technical questions can be presented to managing body	New construction and existing sites; 1 or 2 stage process		Four levels: certified to platinum; some mandatory standards	Indefinite

Name of programme	Relevance to green infrastructure	Award differentiation	Training and support	Stage at which assessment is undertaken	Nature of assessors	Categories of award	Duration of award
Green Star	Credits awarded for elements related to GI e.g. ecological value; urban heat island	Various, including communities and operational	Technical guidance, training	All stages of the development process	Submissions reviewed by an independent panel experts	1 to 6 stars	Indefinite
Green Building Index	Criteria related to GI include sustainable site planning; management	14 types of project with emphasis on different criteria	Consultation sessions, conferences	2 stages: design; completion and verification	Certifiers are 'experienced professionals'	Four levels: certified to platinum	3 years
Lotus Sustainable Building Assessment System	Criteria related to GI include water management; ecology	Various, including multi-family residential	Training	3 stages: design; as-built; operational	Assessment committee	Three levels: certified to gold	3 years
Global Sustainability Assessment System (GSAS)	Criteria related to GI include ecology, landscape, water management	Commercial districts	Training, technical guidance, online support	All stages of development process, including renovation	Random verification of projects	1 to 6 stars	Indefinite
Green Leaf Eco Standard (GLES)	Modules that assess the general sustainability of businesses	Sectors including tourism and retail	Training	Business accreditation as opposed to development	Third party verified	One level: Certified	2 years
Green Flag Awards	Criteria include welcoming place, safety and security, maintenance	Green spaces and parks		2 stages: preliminary application; judge visit	Peer group of judges	Pass: 66%+	1 year
Envision	Credits for elements related to GI e.g. public space, habitat, species biodiversity	Infrastructure projects	Training for applicants, case studies, technical manual	All stages of project life cycle: planning to demolition	Largely self-assessed; independent third-party verification	Four levels: bronze, to platinum	Indefinite

3. Expert symposia

Overview of the symposia programme

The review of assessment systems was helpful in identifying the state of the existing market, and the principles that a new benchmark for GI could adopt. However, as the initial customer requirements testing had only been carried out in Gloucestershire and the West of England it was necessary to further develop this and test the findings from the review with a wider group of potential users. This was achieved through a series of five symposia held during March and April 2016. Table 3 summarises the events that a total of 55 participants attended. The symposia were hosted by the project partners Table 3). The professional bodies targeted their members that they knew had expertise in GI and thus these symposia had representatives from the development surveying, landscape architecture and planning professions. The final two targeted a broader range of participants with expertise in GI, again with the invite list primarily selected by the host organisation. The team prepared an invitation, programme (Appendix A) and information note (Appendix B) for host organisations to send to their contacts. The symposia were held in London, with the exception of one in Sheffield, hosted by the Royal Society of Wildlife Trusts. There was no specific intention to ensure a good geographical spread of participants but the Sheffield event was offered to make it easier for those not wishing to travel to London. Although many of the participants were based in London, the majority had experiences of working across the UK. If invitees were interested but not able to attend the symposia they were initially invited to they were offered alternative dates.

Table 3. Summary of symposia.

Date	Project partner	Number of participants
22 March 2016	Royal Institution of Chartered Surveyors (RICS)	5
23 March 2016	Landscape Institute (LI)	10
29 March 2016	Royal Town Planning Institute (RTPI)	4
5 April 2016	The Royal Society of Wildlife Trusts	15
6 April 2016	Town and Country Planning Association (TCPA)	21

The symposia programme was designed to answer the three underlying questions of the feasibility study, namely:

- What is the demand for a GI benchmark in the built environment sector?
- What types of GI and corresponding ecosystem services should the benchmark include?
- What is the most appropriate model to ensure the long-term success of the benchmark?

The findings have also been invaluable in informing the parallel development of the local benchmark as part of the KTP. Each of the symposia were organised around a three-hour block, with lunch providing a break at a mid-point (Table 4). The programme was designed to be as interactive as possible, with short presentations from the UWE team being followed by structured discussion.

Each of the sessions were attended by two or three members of the UWE team, with each taking their own notes of the discussion, unattributed to the individual participants. These notes were then synthesised around the questions posed and the key themes emerging from the symposia.

Table 4. Programme for the expert symposia

11:00	Brief welcome and participants introduce themselves
11:10	Introduction to the feasibility project and ethics
11:20	Key aims for the symposium and format of the symposium
11:30	Preliminary findings: opportunities for a national benchmark for GI
11:40	Facilitated discussion of the findings
12:00	Preliminary findings: potential scope of the national benchmark
12:10	Facilitated discussion of the findings
12:40	Lunch
13:10	Preliminary findings: potential models for benchmark delivery
13:20	Facilitated discussion of the findings
13:50	Summary and next steps
14:00	Close

Each symposium had the same presentation (Appendix C) split into six integrated parts:

- An initial **introduction** allowed the UWE team and participants to introduce themselves and explain the study ethics, in terms of informed consent, anonymity, data storage and study withdrawal (Appendix D).

- This was followed by a **contextual summary** that outlined the progress of the KTP, the rationale for the local benchmark and the purpose of the feasibility study.

- The **proposed scope** of the local benchmark including the types of development and GI scheme it could be used for, the key ecosystem services provided by GI that would be considered (e.g. water management, recreation, air quality improvement, shade provision, noise abatement, quality of life), the mandatory outcomes that the benchmark would be seeking to ensure (multi-functional networks, net gain in biodiversity, high quality and inclusive environments, long-term governance, funding and management) and the thematic areas that the standards would be organised by (wildlife, water management, health and well-being, design quality and environmental quality). This was followed by a discussion framed by questions below:
  - Are the types of GI and ecosystem services appropriate?
  - Is the whole life approach appropriate? How flexible should this be?
  - Is it pitched at the right level?

- Next the findings from the review of the **potential market** for a benchmark for GI were presented, this included an overview of the benchmarks and other systems already on the market and a summary of how GI (or elements of GI) are considered within these, ending with the

suggestion that perhaps a gap in the market did exist for a benchmark exclusively focussed on GI. This was followed by a further discussion framed by the questions:

- Is a national benchmark for GI needed? What would its purpose be? Who would use it?

- What are your experiences of using benchmarks? What are their pros and cons?

- What are barriers to uptake? What lessons can we learn?

- The findings from the review on the **operation and delivery** of a potential benchmark were then presented including the 18 key principles (p. 14). These principles were premised on the basis of how the reviewed assessment systems operate, the customer requirements testing in the KTP, and the professional judgement and experiences of the UWE team. This was followed by a final discussion framed by the questions:

    - Do these principles accord with your experiences? Particularly those related to guidance, training and operation?

    - What are your experiences of different certification and pricing structures?

    - What is the most appropriate time to be certified? How frequent?

- Finally, the next steps for the feasibility study were outlined as well as longer-term aspirations for the benchmark and participants thanked for their engagement.

Although the discussion generally followed the structure outlined above, where the conversation strayed into other sections this was not curtailed. This meant that some discussion questions, particularly those related to the operational aspects were covered earlier than planned. Where this happened participants were still offered the opportunity to revisit this discussion after hearing the findings from the review. The summary of the discussion is presented in the same order as the symposia programme (i.e. the market for a benchmark; its scope; its operation and delivery) and organised thematically within this as opposed to answering each question individually so as to accommodate additional points of discussion.

Where follow-up correspondence was received from participants after the symposia this was included in this report.

The summary provided here gives equal weight to the discussion points. In the final chapter these are consolidated with customer requirements testing from the KTP and the review, to form a series of key findings and recommendations.

The assessment systems that were included in the review were generally felt to be appropriate, although some additional examples were recommended and have been incorporated into the review (e.g. *Biotope Area Factor* and *Envision*).

The market for a national benchmark for GI

Need

The concept for having some kind of national benchmark for GI was generally supported. Participants felt it could provide a device for ensuring an uplift in the quality of GI provision and for delivering greater consistency in the planning, design and management of GI. The complexity surrounding GI meant that the benchmark would need to be carefully developed and tested, but there was a feeling that this effort would be worthwhile. There was consensus that the benchmark should be meaningful,

going beyond a simple tick-box assessment that would be unable to achieve the necessary level of rigour and, as a result, fail to achieve the level of credibility needed to ensure the long-term sustainability of the benchmark.

The need for a benchmark was generally thought to be area-specific and dependent on the policy requirements of the local development plan and the knowledge and demands of specific planning teams.

Level of commercial interest

Although there was general consensus surrounding need, from a policy and practice perspective, there was less certainty about whether there would be sufficient commercial interest. Cleary, this concern is dependent upon the degree of compulsion with which the benchmark could be applied, but it was recognised that developers would need to accommodate the majority of costs. Consequently, if participation with the benchmark arose from developers voluntarily opting-in, involvement would inevitably depend on its perceived benefits compared with other assessment mechanisms currently available. Participants noted that the market for assessment systems was already quite congested, as indicated by the review, so concern was expressed that developers might not want to adopt a new system. There was some discussion as to whether existing systems could be refined to incorporate GI. For example, BREEAM/BREEAM Communities were suggested, but there were contrasting views about their use, and their ability to assess landscape and ecology. Generally, participants highlighted the limitations of existing systems in assessing GI, suggesting that a specific benchmark would be better equipped for this role. Participants were supportive of the desire to ensure that the benchmark for GI could work alongside existing systems.

There were suggestions that a national benchmark would be of interest to a range of bodies and organisations, such as the Association of British Insurers (particularly given the role of GI flood risk management), horticultural professionals, the construction industry, water companies, and public and private health, leisure and recreation providers. It was suggested that these bodies could be asked to contribute to the success and delivery of the benchmark.

Terminology

Discussions on the rationale for a benchmark for GI focussed on two key points. First, whether a benchmark was necessary or whether a toolkit or package of guidance would better suit the needs of the sector akin to the 'technical guidance document' that would support the benchmark. There was suggestion that this guidance would be useful for those wishing to ensure that GI was good quality without necessarily having to apply for a benchmark (for example, development management officers, and councillors seeking to impose planning conditions). Second, there was some discussion about whether the terms 'benchmark' and 'criteria' were appropriate. Some participants expressed differing views about what a benchmark typically entailed, and how such tools were usually deployed (hence the change to use 'standards' instead of criteria explained on p. 9). Others suggested that an 'award' could be a more attractive proposition for developers, whilst others noted that the sector already offers a number of awards from different organisations and that something different was required. In particular, a benchmark was seen as being more robust and applied more widely, with an element of compulsion, rather than to a select, and possibly quite unique, range of projects. Collectively, these

discussions outlined the importance of the benchmark and its purpose being properly defined and differentiated from the other assessment systems on the market.

A number of the participants spoke about the relationship between the proposed benchmark and existing award schemes (such as those operated by the Royal Town Planning Institute and the Landscape Institute). While it was felt that award programmes are effective at identifying, and celebrating innovation and best practice, their premise on identifying 'winners' inevitably makes the schemes highly selective (with decisions often being quite subjective). In addition, participation in these awards is voluntary, with little expectation that projects (in a broad sense) be included. In contrast, a benchmark could be applied with an element of compulsion with the proposed use of standards providing greater opportunities for consistency and objectivity. It was noted that projects featuring high quality GI are represented across many awards already, both in terms of outcome and the process followed.

Political influence

There was a view that politics would probably have a significant influence in terms of whether a benchmark for GI would succeed. While national government would have a role in determining whether the benchmark would become a mandatory requirement, the views of local politicians would also be important in terms of defining the importance of GI and whether resources should be directed to help develop the GI evidence base, to develop local GI strategies, and promote the use of any benchmark. It was noted that currently support for GI is often quite variable amongst local authorities and is often dependent on the perceived ability of GI to contribute towards the vision for the area. For instance, a local emphasis on jobs and investment could lead to contrasting outcomes concerning GI. On the one hand, such a position could lead to GI assets being compromised in order to facilitate new development and the generation of jobs or politicians could also see GI as an important element in helping to shape local distinctiveness as way of encouraging investment and a skilled workforce.

The audience

The key audiences for the benchmark were discussed. These were generally felt to be developers and those working on their behalf and local authority planners, although as mentioned above the benefit to developers in adopting the benchmark in their schemes needs to be clearly articulated. Other audiences were also discussed, linked to specific types of project, including infrastructure and mineral extraction companies, neighbourhood planning groups and regeneration organisations. Encouraging public demand for GI was also felt to be important since this interest would help to encourage developers and other parties (including councillors) to engage with the benchmark.

It was acknowledged that amongst some of the intended audiences for the benchmark, understanding of GI is mixed. It was felt that more could be done to communicate the financial value of GI to investors or individual property owners. For example, achieving the benchmark could be encouraged by communities if the resulting scheme enabled property to either maintain, or enhance its value, as a result of GI investment through the life of a development. Similarly, for the general public playing to more tangible agendas (such as protecting woodlands or hedgerows, or health and well-being) would be more likely to resonate.

There was general agreement that to begin with the focus should be narrow, for example towards developers and local authority planners, with material developed for a wider audience incrementally.

The role of evidence

The requirements for the use of evidence in the benchmark was discussed in three contexts. First, it was suggested that evidence (including from this feasibility study) would be valuable in defining the need for a benchmark. Second, it was felt that the evidence base for the standards should be clearly articulated in the supporting technical guidance. In addition, this guidance should also set out the evidence that would be required in applications to demonstrate that the standards have been achieved. Finally, related to all of these there was discussion on the nature and availability of these various forms of evidence and the challenges that this poses. This was particularly emphasised for those aspects that remain under-researched, for example, where there is not strong or robust evidence for the relationship between GI and beneficial outcomes where it is difficult to investigate causality and, as highlighted above, where the data may not exist in certain local authorities.

Participants also felt that it was important that the benchmark is regularly reviewed so that it is a mechanism by which new evidence can be incorporated into the benchmark, standards and supporting technical guidance.

Scope of a national benchmark for GI

Elements, types, benefits and ecosystem services of GI included in the benchmark

Generally, the broad themes that the standards would assess in the benchmark were felt to be appropriate and reflective of the complexity and diversity associated with GI. The participants agreed that the definition of GI provided by Natural England (Box 1) is a sensible starting point.

Participants agreed that the benchmark should assess both procedural elements that have been shown to facilitate the planning, design and management of GI (e.g. effective consultation, long-term governance and funding) and the benefits or ecosystem services that GI could be expected to provide (e.g. flood water management, biodiversity). Looking first at the underpinning standards (e.g. fit with strategic objectives, long-term management) these were generally felt to be appropriate. However, there was some debate over the inclusion of assessment of aspects such as the use of local materials and waste management; although the general feeling was that the standards should be as focussed as possible. It was suggested that standards related to species provenance, climate change resilience, pesticide and fertiliser use could be included in the underpinning standards. Participants strongly agreed that the benchmark should include assessment of mechanisms in place for long term governance, management, maintenance and funding, although the challenges of assessing how this is implemented were acknowledged by participants (see p. 34).

In terms of the benefits or ecosystem services provided by GI (e.g. for wildlife, water management, health and well-being), again these were generally felt to be appropriate. However, there were some suggestions for increasing the prominence of specific benefits or at least some clarification that these would be included in the standards and technical guidance. For example, some participants felt that benefits related to climate change adaptation and air quality improvement should be more prominent instead of being embedded within 'water management' and 'environmental quality' themes. Similarly,

participants wanted reassurance that the relationship between GI and the historic environment, active travel and psychological well-being would be included. Again, this was caveated that the priority should also be to ensure that the benchmark is clear and concise.

The importance of local context and scale

There was a consensus that the benchmark should be flexible enough that it could be tailored to the local context in order to ensure that assessment was based on local priorities, policy and guidance (and the evidence upon which these are based). Participants suggested that this local dimension should include, for example, the characteristics of the place (from physical to socio-economic). It was noted that the significance attached to certain GI assets could vary on the basis of this local context. For example, the importance attached to street trees could be varied between locations based on their contribution to the individual character of a place. Equally, need for green spaces should be based on local provision which may be different in areas where it is constrained.

This would mean that instead of, for example, specifying that particular types of GI, or outcomes should be expected, the standards should be constructed in such a way that these would be based on local need as expressed in policy and strategy documents. It was suggested that the technical guidance should provide a list of the types of documents and evidence that could be used to demonstrate need (or absence of need).

There was also agreement that the benchmark should consider GI at the landscape scale. This was seen as one of the major limitations in the way in which GI is addressed in other assessment systems. It was felt that focusing on smaller sites in isolation runs contrary to the definition of GI as being a multifunctional strategic network. The need for this strategic approach was felt to be particularly critical in project, such as high speed rail, that extend across a range of geographies.

Application of the benchmark to different projects

There were two areas of discussion related to the scope of the benchmark in terms of the projects that it could be used for. One focussed on the type of the project and the other on the size of project. Looking at the type of project first, there was strong support for the benchmark to be applied to a range of projects; being equally relevant to residential, industrial, commercial and infrastructure-based projects. There was support for using the benchmark to develop, and assess the performance of, policies and strategies relating to GI. However, there was concern that the standards and associated technical guidance would need to be quite different from those produced for assessing new development. It was suggested that the benchmark could be structured in a way to allow for this variation, with the benchmark taking different approaches depending on the type of project being assessed. Such a differentiation, which was compared to the different types of vehicle test under the MOT system, was felt to be particularly important when considering the time points at which assessment would take place (see p. 34). Other types of project that the benchmark could be applied to were also discussed including national-scale linear infrastructure and retrofitting either specific estates (e.g. social housing) or as part of area-wide improvements (e.g. city centre or regeneration). Here it was suggested that the benchmark would be better focused, in the first instance, towards new development and specific GI policies and frameworks until this was refined with a view to rolling out to other types of project in the future.

Turning to the discussion of the size of project, it was generally felt that the benchmark should apply to projects whatever their size. However, it was suggested that this could cause confusion in practice; for instance if a small development that provided a green roof (although forming part of a strategic network extending beyond the boundaries of the site) was awarded the same benchmark as a large scale urban extension providing a strategic landscape-scale network of GI. This could be detrimental to the credibility of the benchmark particularly to the general public. That being said, ensuring fairness in the application of the benchmark was also felt to be important so that smaller developments were not excluded from the opportunity to apply. One suggestion was that smaller projects could be awarded the benchmark to demonstrate their contribution to the local authority-level GI, if, for example the local GI policy or framework had achieved the benchmark. Another was that smaller GI projects might be grouped together and assessed as a single entity, although differences in ownership were considered to be potentially problematic.

There was also suggestion of limiting the benchmark, at least initially, to projects falling within the 'major developments' category. This has the benefit of being defined by legislation, although there is some variation across the UK. In England 'major development' is defined by the Town and Country Planning (Development Management Procedure) (England) Order 2015 as involving any one or more of the following:

a)   'the winning and working of minerals or the use of land for mineral-working deposits;
b)   waste development;
c)   the provision of dwelling houses where
    i. the number of dwelling houses to be provided is 10 or more; or
    ii. the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);
d)   the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
e)   development carried out on a site having an area of 1 hectare or more'.

Another suggestion was that the benchmark could initially be focused on the 'large scale major development' with a roll out to 'small scale major developments' in the future. Department of Communities and Local Government (2014) defines 'small scale major development' and 'large scale major development' as follows:

- 'Largescale Major Developments: For dwellings, a largescale major development is one where the number of residential units to be constructed is 200 or more. Where the number of residential units to be constructed is not given in the application a site area of 4 hectares or more should be used as the definition of a largescale major development. For all other uses a largescale major development is one where the floor space to be built is 10,000 square metres or more, or where the site area is 2 hectares or more'.

- 'Smallscale Major Developments: For dwellings, a smallscale major development is one where the number of residential units to be constructed is between 10 and 199 (inclusive). Where the number of dwellings to be constructed is not given in the application a site area of 0.5 hectare and less than 4 hectares should be used as the definition of a smallscale major development. For all other uses a smallscale major development is one where the floor space to be built is 1,000 square metres and up to 9,999 square metres or where the site area is 1 hectare and less than 2 hectares'.

In summary, it was felt that the initial development and testing of the benchmark could be targeted at a narrower range of projects in terms of type and size with a view to including a broader range in the future. While less ambitious than a full roll-out, the suggestion was that such an approach would help to direct resources to the provision of guidance and support to benchmark users.

Nature of the standards

There was general agreement on the need to have simple standards (or criteria) that could be easily interpreted. Grouping standards by theme, and using existing criteria wherever possible, were also seen as sensible goals.

As highlighted in the discussions on scope, the suggestion was to keep the benchmark, and the standards, as focused as possible. Credibility and engagement could be adversely affected if the scope of the standards extend too far and start to stray from the aims and objectives of the benchmark.

There was agreement on the proposed use of a mix mandatory and non-mandatory standards. It was generally felt that including a set of minimum criteria would be useful in encouraging greater uptake of the benchmark, although this was also highlighted as a risk as users could decide to remain at this level. The level at which the mandatory versus non-mandatory standards were set was seen as important in ensuring this was not to the detriment of the aims of the benchmark.

There was broad support that the level of the standards should be set so that projects already achieving a high quality of GI would be able to secure the benchmark (i.e. schemes wouldn't be expected to do any more than current best practice) but that the 'gold standard' would only be achieved by exemplary schemes. Related to this, there was general agreement that the standards should evolve over time so that as practices improve the standards still reflect best and exemplary practice.

There was some discussion regarding the form of the standards. There was agreement on the need to focus on quality, rather than the size and amount of GI being provided. In addition, it was felt that the standards should be constructed in such ways to avoid simple 'yes' or 'no' type responses. Rather, for the benchmark to be useful, there was agreement that those applying for the benchmark should need to provide evidence to demonstrate that they were achieving the required standard. As already mentioned, suggestions as to the type and form of evidence that would be required should be outlined in the technical guidance. Related to this, there was general agreement that the standards should rely on a mix of qualitative and quantitative forms of evidence to demonstrate performance. It was acknowledged that the subjective nature of the former might make it more difficult to obtain but that it was key to assessing the quality of GI. There was some discussion about using different scales and measures to turn qualitative data into quantitative measures as opposed to having more discursive evidence in applications. The possibility of weighting standards to encourage particularly desirable aspects, such as multifunctionality (and the interactivity between functions) was also discussed.

It was felt that the standards should focus on outcomes as much as possible. This was important given some of the gaps between what is planned and what is delivered and the impact that has on outcomes, for example on intended benefits to biodiversity. However, whilst it was generally accepted that there should be post-completion assessment (see p. 34), it would not be realistic to measure

outcomes post-completion (e.g. physical activity levels) but that evidence-based standards that rely on relationships between aspects of GI and outcomes (e.g. accessibility of green spaces) would be achievable. There was also some discussion about whether the standards should recognise attempts to move in a positive direction (for example, *Green Flag Award* rewards reductions in pesticide use) especially if there is reassessment over time to maintain the benchmark (see p. 34).

Operation and delivery of a national benchmark for GI

Level of compulsion

There was a discussion on the extent to which the benchmark would be mandatory. While concerns were raised about the cost of applying the benchmark to all developments, there was also unease about adopting the benchmark on a less comprehensive basis. In particular, there was concern over whether the benchmark would be limited to high-value projects occurring in prosperous areas. The inference being that less prosperous areas may have lower quality GI provision as part of new development, despite them being potentially where it is most needed. There was general acceptance that the benchmark would need to be properly tested to minimise 'blind-spots' from appearing. Related to this there was broad support for the approach being taken in the KTP where the benchmark will be tested on a small number of front runner projects in Gloucestershire and the West of England.

There was recognition that at the present there is no desire for mandatory systems from central government. There was discussion about the benchmark's relationship with planning policy (see below).

Association with national planning policy

As indicated in the review, the success of assessment systems is closely related to their adoption in planning policy. Consequently, ensuring suitable policy support from the national planning system was seen by participants as being important for the success and sustainability of the benchmark.

Critically, and as mentioned above, it was acknowledged that a mandatory benchmark would sit somewhat uncomfortably with the rhetoric of the UK government which is focussed on streamlining and simplifying planning processes. There was a concern amongst the participants that the benchmark could be resisted if it was perceived as introducing additional costs or delays into the planning system. Conversely, it was also recognised that this might not be the case if the benchmark enabled more effective cooperation, increased the quality of developments, and as a result, eased the passage through the planning system.

While it was acknowledged that there is variation between the planning systems in the UK, the rationale for the benchmark was felt to be in tune with the key national planning documents; the *National Planning Policy Framework (NPPF)* (England) (CLG, 2012), *Planning Policy Wales* (Welsh Government, 2016), *Planning Policy Scotland* (Scottish Government, 2014) and relevant Planning Policy Statements of Northern Ireland (various). Although the initial focus on England in this feasibility study was thought to be sensible.

In England the NPPF was seen as providing leverage for GI, particularly paragraphs 99 and 114. The updated text in Planning Practice Guidance (PPG) was seen as offering further support. Furthermore, despite ambitions for streamlining planning activity in England, it was also felt that the NPPF also offers support for the use of standards. For instance, it was noted that the NPPF provides scope for standards to be introduced for the purposes of encouraging a transition towards a low carbon future, as long as they were consistent with the "Government's zero carbon buildings policy and adopt nationally described standards" (para. 95). Elsewhere, the NPPF prescribes how these standards should be expressed in the corresponding local plan, be subject to proper engagement and be mindful of their potential impacts on viability.

Further support was also cited from the *Select Committee on National Policy for the Built Environment* (2015/16) [in England] (House of Lords, 2016). Paragraph 37 of this document notes that:

"*The Government must do more to protect and promote Green Infrastructure in national policy and guidance, including setting out its benefits for sustainability. It should also encourage local authorities to set minimum standards for Green Infrastructure provision and management in local plans and in planning decision-making*".

Association with local planning policy

There were contrasting views over the extent to which local planning systems were actively including GI, with participants noting differences in the sophistication of policy, the robustness of evidence and the overall creativity of ideas. A range of reasons were suggested to explain this disparity, including the perceived lack of knowledge and skills amongst planning policy teams to draft appropriate policy, areas where action on GI was perceived to be less important than other policy goals (such as relating to the provision of homes and jobs). This latter scenario was often felt to have arisen in response to local politics. In policy teams, where knowledge and experience was felt to be lacking, it was acknowledged that policy tends to be focused on the protection of GI assets rather than new provision or enhancement. Statutory consultees, and other relevant groups, often played an important role in helping to specify, and appraise, the form and nature of GI intervention. But the strength of local GI policy was typically felt to be dependent on the level of evidence that had been collected and the extent to which more ambitious policies had been watered down in advance of a local examination to ensure the timely adoption of the plan.

As part of this discussion, some scepticism was also raised about the weight given to GI policy in decision making as compared to other lines of policy. For example, a site with a questionable commitment to GI could still be supported if extra weight is afforded to policies encouraging housing and job creation. While some felt that a GI benchmark could be attractive to developers in order to help their projects gain planning permission in a shorter amount of time, others felt that it would have little traction in a system where the developer increasingly has the advantage. In contrast, there was the suggestion that the benchmark could capture the endeavours of a developer who is committed to GI, actions that might have gone unnoticed with a less rigorous method of assessment.

Potential contribution of a national benchmark for GI to planning processes

The use of the benchmark by planners was also discussed. Here it was felt that the benchmark and/or the technical guidance could be useful in helping with a range of planning activities, including as a:

- Tool for helping to appraise development sites, in advance of their potential inclusion in a development plan document;
- Reference point for the consideration and appraisal of a development proposal, either at a pre-application stage or in advance of a formal decision being made;
- Guidance document for helping to shape the form and nature of GI evidence required by the local authority;
- Mechanism for helping to shape local policy concerning GI (either at an authority scale or by a neighbourhood planning group);
- Reference point for the drafting of planning conditions and planning agreements;
- Point of discussion between developers, the general public and other key stakeholders;
- Mechanism to influence local spending, particularly respect to the Community Infrastructure Levy.

Given the intention that the benchmark could be applied to both plan making and development management activity, it was noted that it would need to be able to function at a range of spatial scales. For the former, the benchmark was seen as a possible mechanism for ensuring cross-boundary strategic cooperation. Under these circumstances the benchmark could be used to facilitate the 'duty to cooperate' that all English local planning authorities are expected to successfully demonstrate.

Associated guidance and other materials

There was clear agreement that the benchmark would need to be accompanied by a clear set of technical guidance that would have to be kept up to date. This would need to be directed towards the requirements of benchmark users although shorter 'briefing papers' or marketing materials would also be necessary for the public and other key stakeholders. A web-based system of assessment was suggested by some participants.

Timing of the assessment

There was detailed discussion on the point in the development process at which the benchmark should be applied. It was felt that the benchmark should respond to the early parts of the design and development process, such as early commitments to community engagement. However, as already mentioned there was concern that awarding the benchmark pre-completion was problematic as often the planned GI is not delivered. As well as not being desirable in terms of the aims of the benchmark to improve GI quality this would also be detrimental to the credibility of the benchmark. Generally, it was felt that the full benchmark should not be awarded until post-completion with the suggestion that this could be a key performance indicator tied into the final payment for contractors. But, an 'in principle' option should also be offered pre-completion to allow developers to work towards the benchmark as early as possible (e.g. during masterplanning).

Another aspect that was highlighted as requiring some consideration was the stage/s at which the benchmark would be applied in large projects that could be developed over a series of years. Here the

suggestion was the benchmark could be offered 'in principle' for the masterplan with each phase achieving the full benchmark upon completion.

The use of the term 'whole life approach' was felt to be potentially confusing although it was agreed that the underlying principles of the phrase would be understood and were welcome. There was agreement about the need for the benchmark to consider the long-term, as governance, management and maintenance considerations are often a critical factor in the performance of GI. Thinking about these long-term challenges in the short-term was also felt to be essential and something for the benchmark to target. There was debate as to how this should be operationalised in practice, for example, whether the benchmark should simply require evidence that appropriate plans and mechanisms were in place to ensure the long-term success of the GI, or whether the scheme should be subject to regular review to maintain the benchmark. In addition, it was suggested that there should be some flexibility in any further review to allow for the GI to evolve over time (e.g. based on new priorities, how residents use the GI). So, returning to assess performance after five or ten years was suggested as being sensible with different aspects assessed at these stages. However, it was acknowledged that it was likely that the initial developers would be then off-site, so other parties would need to be involved (such as home-buyers or management companies).

Grading of the assessment

Although the rationale for having two categories of award was understood, some of the participants questioned whether this could be somewhat restrictive and possibly deter applicants. This was especially highlighted as a risk if the requirements for both levels were perceived as demanding and far above that which developers would normally provide. As an alternative, reference was made to Code for Sustainable Homes' system where a development could be awarded different levels from one to five. This might be more encouraging as a development could shift up the categories with time. This sliding scale could also make the benchmark more attractive for local planning authorities to adopt by providing greater flexibility over the level of award appropriate for that situation (i.e. a middle-point could be targeted). Should the proposal for a two stage award be maintained, it was felt that the terms 'silver' and 'gold' carried the risk that the benchmark would be seen more as an award. The terms 'pass' and 'fail' or 'achieve' and 'excel' were suggested as alternatives but these suggestions also attracted concern. For example, use of the term 'fail' was seen as being possibly too final and negative, while 'achieve' could be misconstrued if it was awarded to a scheme where deficiencies had been noted (if a developer had 'achieved', might they be tempted just to remain at this level rather than progress upwards).

Calculating benchmark performance

There was consensus that a points-based system was probably the best option for assessing overall performance against the benchmark. However, it was noted that this type of system often led to trade-offs between some aspects so it would be important to ensure to select the mandatory standards carefully. Specifically, it was suggested that a developer might wish to achieve a very high standard against one of the themes in order to help 'subsidise' a lack of activity or performance. It was noted that scoring for certain standards could become quite complicated, especially where qualitative reflections need to be assigned a numerical value. Other complications were also envisaged if one standard was being used to assess a number of functions of GI.

The importance of the technical guidance was also recognised in ensuring that standards can be judged as objectively as possible. This would be particularly important for standards requiring more subjective assessments, which may be dependent on the background and experience of the assessor if adequate guidance is not in place.

It was agreed that the assessment would need to follow an open and transparent process to ensure results were understood. This was felt to be critical for the credibility of the benchmark. There was suggestion that there should be a right for appeal for those not awarded the benchmark or that encouragement and clear guidance should be provided for a subsequent application.

Ownership of the benchmark

The intellectual property for the benchmark is owned by Gloucestershire Wildlife Trust and one proposal is that the national Royal Society of Wildlife Trusts takes responsibility for administering the benchmark. While the rationale for this was generally acknowledged, there was some concern about whether the trusts would interpret and assess GI too narrowly (in terms of a focus on nature conservation). To be successful, it was felt that the benchmark should have a broader constituency, for example with joint branding across the project partners. The symposia were helpful in identifying alternative options for the long-term administration of the benchmark. Although it would clearly need to be self-financing.

It was felt that professional bodies, such as the RTPI, Landscape Institute and RICs, could play a role in endorsing the benchmark to help promote its use and adoption. Buy-in from Natural England, Department for Environment, Food and Rural Affairs (DEFRA) and/or Department for Communities and Local Government (CLG) was seen as being critical particularly if the benchmark was to be given mandatory status, even at the local level, and its application accelerated.

It was also suggested that local stakeholders, including the general public, would need to be involved. These discussions encouraged a broader debate about the ownership and management of the suggested benchmark, with different views being expressed about the relative roles of national and local interests. Some felt that the benchmark would only get the necessary 'teeth' if it became owned by a statuary agency, while others felt that credibility would only come if the benchmark was able to have sufficient local identity.

Nature and expertise of the assessors

There was some discussion as to whether assessors should be internal or external to the applicant team. There was agreement that both would be needed, with an internal assessor/s being used to coordinate the benchmarking process and to provide expertise to the client or appointing team, and an independent external assessor to verify the decision. There were questions about when the external assessor might need to be involved but there was consensus that early engagement would be preferable to initiate some dialogue with the applicant team and internal assessor. For this general relationship to work, it was felt that the internal assessor would need to be objective and be able to act independently. A key goal for the internal assessor/s would be to collect and compile evidence that the standards had been achieved.

It was important for assessors to be suitably knowledgeable and experienced, but neither of these credentials were explored in any real depth. There was agreement that assessors would need to be trained in using the benchmark but no particular views were aired about either the formality or length of this training. As highlighted above, there was discussion regarding where the assessors would be employed and the nature of their contracts; for example, whether they would be retained full-time or on a more ad-hoc basis to respond to specific benchmark requests. There were also questions about whether assessors would be paid, although concerns were raised about appointing sufficient staff if appointments were entirely voluntary. Staffing via ad-hoc requests could lessen the staffing burden but could introduce concerns relating to the consistency of the assessments.

There was some discussion about whether there would be greater value of having an assessment team rather than an individual given the multidisciplinary nature of GI. In doing so, experts from different domains, such as from water management, design and habitat conservation, could be brought together and invited to offer a collective review. Indeed, it was noted that an expert sufficiently knowledgeable about ecology might be unable to speak with authority about landscape design. As part of this, there was also a suggestion about whether a community voice should be included, such as somebody living on, or close to, the project site.

This discussion over a collective voice introduced the idea of using some kind of design review panel. Many of these are already in place to offer design advice so there was a suggestion about whether their remit could be extended to allow for GI benchmarking. Membership of these panels was often quite mixed, with appointees typically being selected from the local area (thereby providing an insight into the local context that was felt to be important).

Despite the appeal of measuring benchmark performance locally, it was also felt that there needed to be sufficient ownership and direction at a national level.

Cost

Specific costings were not discussed through the symposia but it was felt that clients would be prepared to pay if there were clear benefits from the benchmark. It was noted that many developers were now keen to showcase their environmental credibility and their commitment to both sustainability and social responsibility. In terms of cost, two elements were discussed, namely the cost of getting a project benchmarked (i.e. some kind of application fee), and the broader costs of appointing responsible persons to lead the process internally.

There was also a perception that costs would also be accrued for a project to have GI of sufficient quality to meet the standards required by the benchmark. The cost for securing the benchmark were felt to be sensitive, especially given the costs associated with existing systems, but it was felt that clients would be willing to pay if the process was efficient, timely and fair.

There was some discussion on how the application 'fee' could be structured in terms of timing of different points in the assessment process. For example, the consensus seemed to be that there should be assessment at key points including post-completion with a regular review. However, concerns were expressed about how this would be funded once the developer/contractors had left. There was some discussion about the cost of long-term management of GI (and subsequent review of the benchmark) being funded through a service charge to residents. However, it was recognised that

for this to work, the benefits of the higher quality GI would need to be carefully promoted. The possibility of using CIL contributions to fund periodic re-assessment for the benchmark was also highlighted.

There was agreement that the fee would have to be sufficient to cover costs to the organisation administering the benchmark since any kind of subsidy, from either local or national government, was felt to be unlikely. These could be minimised by having an internal assessment in the project team with the external assessor only verifying that the benchmark had been awarded.

Marketing and promoting the benchmark

Participants discussed the marketing and promotion of the benchmark in a number of contexts. First, it was clearly seen as essential to market the benchmark effectively to potential users and, as highlighted above, this requires the rationale for the benchmark to be clearly articulate. It was felt that this should particularly focus on the benefits of achieving the benchmark as well as the type of accolade a project would receive. The timing of marketing would need careful planning to ensure that it matched with the availability of resources to avoid delays.

In addition, marketing would also be needed to showcase the schemes that had achieved the benchmark. There was also the suggestion that schemes that had benefited from the benchmark could be highlighted, for example, where the benchmark has raised the standard of GI compared with what was originally intended or where savings to the cost of a development had been secured.

Finally, it was also felt that some marketing should be directed at promoting the collective benefits of GI. A key audience for this activity was felt to be home buyers and local business groups. Here, the suggestion was that other stakeholders should feel equally proud (and recognise the value) of living in an area that had been commended for its GI.

Key principles

Throughout the symposia there were a number of key principles around which a consensus was developed. Many of these are covered above, but in summary, participants generally agreed that the benchmark should be:

- Associated with some clear incentives concerning its use;
- Accessible and relevant to its users;
- A process for encouraging discussion between key parties (including the general public), with the objective of improving the quality of GI provision compared with current norms;
- Flexible so that the GI is assessed based on its response to local context, including the history, culture, landscape and habitats;
- Supported by evidence from both policy and research to define this local context;
- Suitable for areas with differing levels of GI policy and provision;
- Suitable for any size and location of development, for example, an infill development on brownfield and a greenfield urban extension;
- Applicable to both new-build and retrofit projects even if it is initially focussed on new-build;

- Designed to assess GI as a multi-functional network and the interactivity between these functions;

- Capable of assessing how the scheme contributes to the landscape including areas beyond the immediate boundary;

- Developed to assess GI outcomes, as defined by the specific GI objectives of the project;

- Developed to appraise GI outcomes at a range of timescales;

- Capable of responding to future trends, for example, climate change and socio-economic changes;

- Futureproofed so that new best practice and research can be progressively incorporated into the benchmark.

4. Conclusions and recommendations

This feasibility study has involved two packages of work; a review of existing benchmarks and assessment systems relevant to GI, together with a programme of symposia to explore whether there is a market for a national benchmark for GI and, if so, its scope and operational requirements. Both elements have helped to identify the scope of the benchmark and the format of the standards. In addition, the feasibility study has also been extremely helpful in refining the developmental process for the benchmark to secure its long term sustainability. As outlined in the introduction, the study sought to answer the following questions:

- What is the demand for a GI benchmark in the built environment sector?
- What types of GI and corresponding ecosystem services should the benchmark include?
- What is the most appropriate model to ensure the long-term success of the benchmark?

The following summarises the findings from the two strands of work in answer to these questions. These have already been invaluable in informing the development of the local benchmark as part of the KTP. It is also our intention that they will strongly influence the further development into a national benchmark for GI.

What is the demand for a GI benchmark in the built environment sector?

The review highlighted the absence of any specific benchmark (or assessment system) covering GI although certain dimensions were captured by some of the systems studied. This finding and identified need was generally supported in the symposia, with the participants feeling that a) there is a need to improve the planning, design and management of GI and b) a benchmark could be helpful in achieving this. The development of a national benchmark was considered potentially attractive to help achieve greater consistency in the provision of successful GI. In terms of the challenges, it was noted that a mandatory benchmark would sit uncomfortably with the current drive to simplify and speed-up planning processes. Therefore, the benchmark will need to be positioned as offering clear benefits to applicants over and above the existing tools, checklists and guidelines currently in place to support GI. The success of the benchmark was felt to depend on cost, and the simplicity and transparency of the assessment process. Rather than being entirely voluntary, there was a feeling that the benchmark would need to be endorsed by national organisations, governmental bodies and local authorities. This type of endorsement could take a variety of forms, for example, an explicit reference for certain projects to be awarded the benchmark, incorporation into local policy, or a more implicit acknowledgement that the benchmark could be used as one of a series of GI-related tools.

There was generally support for the benchmark being applied to a range of projects of varying size. However, it was suggested that the benchmark should be focussed to a narrower range of projects during its early development and testing. For example, it was suggested that an initial focus on new development, specifically largescale major development might be beneficial.

What types of GI and corresponding ecosystem services should the benchmark include?

Generally, there was support for the proposed scope of the benchmark in terms of the types of GI and ecosystem services included. The focus on the mix of process- and outcome-orientated aspects of GI

was welcomed, particularly the assumption that the key characteristics of GI as a multifunctional network would be a mandatory requirement. However, some additional elements were suggested including ensuring the benchmark was based on a sound understanding of the local context, which was seen as an essential requirement.

What is the most appropriate model to ensure the long-term success of the benchmark?

Various aspects of the operation of the benchmark were discussed at the symposia, based on the findings from the review and the initial work of the KTP. The review of assessment systems was useful in identifying some important operational principles that would contribute to the long-term success of the benchmark. These were tested in the symposia and there was general agreement that they were a sensible set of principles with which to move forward. There was considerable discussion on the most appropriate model to adopt with general recognition that the benchmark needs to be self-financing, with the majority, if not all of the costs, being borne by the applicant through an 'internal' assessor embedded in the project team and a fee for verification by an independent external assessor. There was general agreement that the benchmark should be run by an organisation representing the breadth of disciplines associated with GI.

Future work

The findings of the feasibility study suggest that there is merit in continuing to explore the further development of the local benchmark into a national benchmark for GI. A series of follow-on steps are suggested below.

Stage one: 0 to 2 months

1. **Engage with planning teams about the potential for broadening the application of the GI benchmark.** Through the feasibility study it was clear that if the benchmark was to succeed, it would be important to embed into guidance and policy nationally. Early indication of the likelihood of this would be an important indicator in the sustainability GI of the proposal. Expressions of interest to become involved would certainly be helpful and would shape the programmes of work outlined below. Any failure to garner this support would put the benchmark on a voluntary footing and place a need for the benchmark to be pursued by others (if, indeed, there was felt to be value in pursuing the proposal).

Stage two: 2 to 6 months

2. **Refine the standards for a national benchmark for GI in consultation with stakeholders**. The standards being developed for the local benchmark should be presented to national stakeholders and, if necessary refined to ensure suitability for the national context. The participants who assisted with the symposia could be re-approached, with additional representation from developers, local planning authorities and relevant professionals (with particular emphasis on landscape architects, designers/master planners, planners and representatives from across the broader environmental consultancy sector).

3. **Consult, and provide confirmation, on the operational elements of the national benchmark**, using the same stakeholders and professional teams outlined above. The local benchmark is currently undergoing testing on frontrunner projects and this will inform the development of the

benchmark. This refined local benchmark will be further tested with national stakeholders to refine:

- ***The grading of the benchmark:*** e.g. Achieving; Excelling
- ***The assessment stages:*** e.g. pre-application, commencement of development, to achieve 'candidate' status; post-completion to achieve 'awarded' status; addressing phased development.
- ***Maintenance of the benchmark:*** e.g. review after 5 years, 10 years; funding for review; refining the standards.
- ***Nature and experience of the assessors:*** e.g. the role of internal assessor and external assessors for verification, design review panel, their skills and experience.

4. **Prepare, and consult on, the technical guidance document**. This will have already been developed for the local benchmark but will need further refining with the stakeholder group.

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Stage three: 6 months to scheme completion

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5. **Test the national benchmark for GI on demonstration projects.** The frontrunner testing in the KTP is representative of the types of development in the area (e.g. largescale major residential development on greenfield in an area with strong GI planning policy). This work would further test the refined benchmark on demonstration projects selected to be representative of other areas and types of development (e.g. infill, small scale major developments, commercial and infrastructure-based development, areas with weaker GI policy).

6. **Further refinement of the standards and technical guidance document.** Based on the outcomes from the demonstration project testing it is likely that some further refinement will be necessary, for example, to ensure that standards are unambiguous, that the evidence requirements are realistic.

7. **Prepare, and consult on, promotional activities for the benchmark.** Working with stakeholders to develop materials to communicate the benchmark award and promote this, for example, on site, in development marketing material and via the benchmark's website. This would also include developing marketing materials to promote the benchmark itself to a range of audiences.

8. **Develop, and consult on, a costings plan for administering the benchmark**. Following testing on frontrunner and demonstration projects a full costing schedule will be developed based on the time taken to collect and collate evidence for the benchmark process. Different mechanisms administering this cost will also be explored (e.g. based on development size, through the planning fee, incremental based on the stages of award).

9. **Develop long-term ownership model for the benchmark.** This would include handing the benchmark administration over to an identified organisation and putting processes in place for a committee to oversee the evolution of the benchmark, for example, as practices change or new evidence becomes available.

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Appendix A: Participant invite

Invitation to an expert symposium

What is the demand for a national benchmark for green infrastructure? What should be included and how should it operate?

Green infrastructure (GI) is widely acknowledged as an essential component of liveable and sustainable places. There is a now substantial body of research demonstrating the multiple benefits of GI to urban populations. Despite this evidence base there is still considerable uncertainty as to how GI can best be delivered and maintained in practice.

The Centre for Sustainable Planning and Environments at the University of the West of England, Bristol and Gloucestershire Wildlife Trust have been developing a 'local' benchmark for GI as part of a knowledge transfer partnership[1]. This will allow a common understanding of 'what good GI is' to enable different disciplines and sectors to understand the GI solutions available to them, their capabilities and how they can be effectively delivered.

The team are now examining the potential to further enhance this into a national benchmark. We have been awarded funding from the Natural Environment Research Council to test the market for a national benchmark for green infrastructure. This is being done through a combination of desk-based reviews and expert symposia.

This is an invitation to attend an expert symposium so that we can hear your views on the following aspects of the work:

- What is the demand for a GI benchmark in the built environment sector?
- What types of GI and corresponding ecosystem services should the benchmark include?
- What is the most appropriate model to ensure the long-term success of the benchmark?

We are keen to hear a range of views and experiences from practice to inform our work. The format will be a series of brief presentations outlining our findings from the reviews followed by discussions on each aspect of the project.

We very much hope that you will be able to join us at this small symposium, where your contributions will be highly valued. The symposium is on:

Wednesday 23rd March, 11.00 to 14.00, Charles Darwin House 2, 107 Gray's Inn Road, London, WC1X 8TZ

Lunch is provided.

Please reply to: Tom Calvert, University of the West of England: thomas2.calvert@uwe.ac.uk. Please let us know if you have any special dietary requirements.

The research is being carried out by Danielle Sinnett, Nick Smith, Tom Calvert, Sarah Burgess and Louise King. Please contact Danielle at Danielle.Sinnett@uwe.ac.uk; Tel: 0117 3286603 for further information about the project or symposium.

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[1] Funded by Innovate UK and Natural Environment Research Council

Information Sheet

Feasibility study into a national benchmark for green infrastructure

Background

Thank you for agreeing to participate in this expert symposium. This symposium will contribute to a short study examining the feasibility of a national benchmark for green infrastructure, which is funded by the Natural Environment Research Council. The project will examine potential for a benchmark aimed at improving and streamlining GI provision in the UK. The symposium will explore the demand and scope for a benchmark, as well as different models for its long term management. The three questions the project seeks to answer are:

- What is the demand for a GI benchmark in the built environment sector?
- What types of GI and corresponding ecosystem services should the benchmark include?
- What is the most appropriate model to ensure the long-term success of the benchmark?

Anonymity and Data Withdrawal

Written notes will be taken throughout the symposium and you can ask for your comments to be struck off at any time.Comments will be anonymised in publications from the project. The notes from the symposium will be used for research purposes only. , password protected and archived with Research Councils UK following completion of the project

Participation in the symposium is entirely voluntary. You are free to withdraw before or during the symposium at any time. If, following the symposium, you decide you would prefer not to participate in the project please contact me at the address below by the 21st April 2016 and I will withdraw your comments from the study.

Further Information

For further information or questions about the project my contact details are as follows:

Danielle Sinnett
Centre for Sustainable Planning and Environments
University of the West of England
Coldharbour Lane
Bristol BS16 1QY

Telephone: +44 (0)117 3286603; E-mail: danielle.sinnett@uwe.ac.uk

Appendix C: Presentation delivered at each symposium

National Benchmark for Green Infrastructure

Market Assessment
Expert symposium

Danielle Sinnett
Nick Smith
Tom Calvert
Sarah Burgess
Louise King
Centre for Sustainable Planning and Environments

University of the West of England
BRISTOL

better together

Programme

11:00	Brief welcome and participants introduce themselves and ethics
11:10	Introduction to the feasibility project
11:20	Key aims for the symposium and format of the symposium
11:30	Preliminary findings: potential scope of the national benchmark
11:40	Facilitated discussion of the findings
12:00	Preliminary findings: opportunities for a national benchmark for GI
12:10	Facilitated discussion of the findings
12:40	Lunch
13:10	Preliminary findings: potential models for benchmark delivery
13:20	Facilitated discussion of the findings
13:50	Summary and next steps
14:00	Close

Introductions and ethics

Background

- KTP started in August 2015
  - UWE and Gloucestershire Wildlife Trust
  - Gemma Jerome
  - Extensive local customer requirements testing
- Identified the need for a 'local' benchmark:
  - Quality of green infrastructure planning, design, implementation and management is hugely varied, thereby limiting opportunities to create and sustain multi-functionality and associated benefits
  - Lack of detailed planning guidance on green infrastructure
- Potential users: planners, developers, ecological consultants, landscape architects, maintenance contractors, homeowners/homebuyers

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Progress so far

- Draft criteria developed
- Internal review
- Desk-study testing
- Internal 'operational' review
- External review
- Front runner testing

Feasibility study

- Testing the market for a national benchmark
- Three questions:
  - What types of GI and corresponding ecosystem services should the benchmark include?
  - What is the demand for a GI benchmark in the built environment sector?
  - What is the most appropriate model to ensure the long-term success of the benchmark?
- Desk study to review existing benchmarks in the sector
- Expert symposia to test these findings with stakeholders and end-users

Objectives for today

- To **present key findings** from our desk study examining the current benchmarks in the sector, their operation and the scope of the proposed benchmark

- To **'test' these data and approaches** by hearing delegates' observations on them

- To identify whether **the scope** of the benchmark is appropriate
  - Are the types of GI and ecosystem services appropriate?
  - Is the whole life approach appropriate? How flexible should this be?
  - Is it pitched at the right level?

Objectives for today (cont.)

- To identify whether **a market exists** for a national benchmark for GI
  - Is a national benchmark for GI needed? What would its purpose be? Who would use it?
  - What are your experiences of using benchmarks? What their pros and cons?
  - What are barriers to uptake? What lessons can we learn?

- To identify **the most appropriate models for delivery** of the benchmark
  - Do these principles accord with your experiences?
  - Particularly those related to guidance, training and operation?
  - What are your experiences of different certification and pricing structures?
  - What is the most appropriate time to be certified? How frequent?

Approach towards the Gloucestershire benchmark

- Points-based criteria
- Overarching criteria and five themes:
  - Wildlife
  - Water management
  - Health and well-being
  - Design quality and
  - Environmental quality
- Whole life approach to GI from policy to long-term maintenance
- Two categories: silver and gold
- Using existing criteria where possible

Scope of the benchmark

- Types of green infrastructure:
  - Kept as generic as possible
  - Include specific criteria where this affects delivery of services
- Ecosystem services:
  - Flood water management, water quality
  - Recreation, accessible spaces
  - Air quality improvement
  - Shade provision
  - Noise abatement
  - Quality of life, neighbourhood satisfaction

Scope of the benchmark

- Underpinning service delivery:
  - Emphasis on strategic planning, objectives, outcomes
  - Emphasis on network and multifunctionality
  - Criteria to achieve:
    - Net biodiversity gain
    - Inclusive places
    - Good quality environment
    - Long-term governance, management and funding

Questions

- Is the scope appropriate for a national benchmark? Are the types of GI and ecosystem services appropriate?

- Is the whole life approach appropriate? How flexible should this be?

- Is it pitched at the right level?

Opportunities for a benchmark

- Review included:
- **Systems related to either solely buildings or to buildings, neighbourhoods and other infrastructure** (BREEAM, Building for Life 20, Building for life 12, Code for Sustainable homes, LEED, LEED Canada, Sustainable sites initiative (SITES), Greenstar, Green building index, Lotus, Global Sustainable Assessment System (GSAS), Envision)
- **Systems relating to GI, biodiversity or greenspace** (The biodiversity benchmark, Green Flag, locally developed audits, best practice, supplementary planning documents: Victoria BID, North West Development Agency, Monmouthshire, Harrogate, Ecotown technical advice worksheets)

➢ None of the benchmarks reviewed cover GI in its entirety
➢ But, many cover elements of GI
➢ Key aspects of GI missing: network and multifunctionality
➢ There is a potential market nationally

Key principles for the national benchmark

- Rationale for the benchmark needs to be clearly articulated
- Criteria to be themed around three to five categories
- Criteria to be simple and clear in their construction and to overlap with existing requirements
- The number of criteria to be kept to the minimum necessary
- Achievement to be graded with two levels of award possible

Questions

- Is a benchmark for GI needed? What would its purpose be? Who would use it?
- What are your experiences of using benchmarks? What are their pros and cons? What lessons can we learn?
- What are barriers to uptake?

Findings: Models for delivery

- Review of existing standards, benchmarks and checklists undertaken
- Variation amongst the systems analysed in a number of key respects:
  - Different terminologies, scales (number of themes and criteria) and costings (both size and complexity of fees)
- There were also some commonalities:
  - More than 1 level of award, good provision of guidance, independent assessors, multiple assessment points, various ways of 'displaying' certified projects
➢ From this review, a clear set of principles can be identified

Operational principles

- Guidance and evidence
  - Appropriate links to, and summaries of, supporting evidence
  - Supporting guidance available for different audiences
  - Guidance kept up to date and subject to regular review
- Application
  - Applicable to a range of size and type of development
  - Benchmarking process developer- and planning-led
  - Staged assessment: design/completion/ongoing maintenance
- Transparency
  - Clear points of contact/clear lead for administration
  - Commitment to transparency and openness
  - Successful projects publicised

Operational principles

- Expertise
  - Assessment to be undertaken by independent and suitably educated and experienced assessors
  - Assessment to be objective, transparent and fully documented with judgements appropriately justified with detailed scoring and, if necessary, recommended actions clearly outlined
- Cost
  - Fee payable to be split into two to reflect two stage process
  - Opportunity for discounted fees for developers submitting multiple sites or variable fees

Questions

- Do these principles resonate with your experiences?

- Particularly those related to guidance, training and operation?

- What are your experiences of different certification and pricing structures?

- What is the most appropriate time to be certified? How frequent?

Summary and next steps

- This is the final symposia
- Consolidate findings with desk study
- Final report to NERC and participants
- Article in Town and Country Planning
- Bid to NERC for full funding?
- Research paper

Appendix D: Ethical consent form

University of the West of England BRISTOL

NERC SCIENCE OF THE ENVIRONMENT

Consent Form

Feasibility study into a national benchmark for green infrastructure

I have read the information sheet for interview participants. ☐

I have had opportunity to ask questions about the information sheet and project. ☐

I understand that my participation is voluntary and that I may withdrawfrom this project during or after the symposium, up until the date of the 21st April 2016. ☐

I consent to participating in the expert symposium. ☐

I consent to my comments being anonymised and used in the project's report and other publications. ☐

Data from symposia will be stored securely, password protected and archived with Research Councils UK following completion of the project.

Please insert name here: _____

Signature of participant: _____

Signature of researcher: _____

Date: _____