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Embedding green infrastructure evaluation in neighbourhood masterplans – does BREEAM communities change anything?

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Green Infrastructure (GI) evaluation is reported to improve the sustainability of neighbourhood masterplans, but there has been little research examining the links between GI evaluation and masterplan decision-making. A study of six English masterplanned sites was carried out, with paired case studies reflecting three types of neighbourhood development (estate regeneration, urban infill, and rural-urban extension) to examine whether the sustainable neighbourhood standard, BREEAM Communities (BC), affected GI evaluation and masterplan decisions. In each of three pairs, one site had adopted BC and one had not. Strategy-as-Practice provided a conceptual framework to analyse 13 evaluative episodes, based on 48 interviews and public documents. The analysis revealed that GI-related recommendations were typically deprioritised at later masterplan stages, despite earlier decisions or the application of BC. Potential ways to enhance the embeddedness of GI evaluative practice include improving practitioners' understanding of GI and increasing accountability at later masterplan stages, such as through sustainability reporting.

Keywords: green infrastructure; BREEAM Communities; sustainable neighbourhoods; masterplans; Strategy-as-Practice; evaluation

1. Introduction

There is often an implicit assumption in masterplanned neighbourhood development projects that evaluating certain Green Infrastructure (GI) intentions upfront at the design stage of the project, such as assessing landscape visual amenity, flood relief, or the provision of ecological habitats, will enhance the sustainability of design and development decisions that are made when delivering the masterplan onsite. There has been limited research, however, examining whether formal evaluative practices which relate directly or indirectly to GI, such as Landscape Visual Impact Assessment (LVIA) or transport appraisals, actually affect what is ultimately designed and delivered in neighbourhood developments. The sustainable neighbourhood standard, the Building Research Establishment Environment Assessment Method for Communities or 'BREEAM Communities' (BC) contains this assumption of 'rational' and 'well-informed' decision-making processes (BRE 2011, 2014). The standard specifies certain formal evaluative activities for applicants to undertake at the pre-planning design stage, with the view that this will encourage developers to take greater account of those

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intentions in the transition from masterplan design to construction. This raises the important question, however, as to whether adopting the approach recommended in BC affects how different actors involved in masterplans evaluate GI and what is ultimately constructed on site.

This article outlines an empirical study of the role of BC in relation to GI evaluation, examining six English neighbourhood developments. It begins by providing an overview of the literature regarding GI, masterplan evaluation and sustainability standards to clarify the rationale for the research and research question. The article then outlines the conceptual framework and methods applied to examine how masterplan evaluation is applied empirically at the six sites. The research findings are then discussed and the conceptual and practical implications for GI evaluation, masterplan practice and the future refinement of BC are considered.

2. Background and context: the rationale for studying green infrastructure evaluation in masterplanning

The potential benefits of green infrastructure (GI) to existing and new neighbourhoods are the focus of a growing body of research and reports (e.g. Mell 2017; TCPA 2017; EC DG Environment 2012). These benefits include the provision of: (i) multiple ecosystem services (i.e. cultural, productive, supportive and regulating services, such as climate change mitigation through vegetation absorbing carbon and reducing urban over-heating effects) (Lennon *et al.* 2016; Hansen and Pauleit 2014; Elmqvist *et al.* 2010); (ii) multi-scale ecological connectivity or ‘bio-geography’ (Kupfer 2012; Kent 2007); (iii) social wellbeing and inclusion (Holland 2014; Agyeman and Evans 2004) and (iv) ensuring long-term ecological functioning over time (Pauleit *et al.* 2011). Natural England (2009, 7) gives a broad definition that tries to capture these GI intentions:

Green infrastructure is a network of multi-functional green [and blue] space, both new and existing, both rural and urban, which supports the natural and ecological processes and is integral to the health and quality of life of sustainable communities.

Others are less sure, however, that a shared understanding of the definition and intentions of GI has been reached (Maitlis and Sonenshein 2010), and that these intentions are still too loosely defined to be fully operationalised by practitioners in their decision making (Lennon *et al.* 2016; de Groot *et al.* 2010). For example, practitioners involved in urban masterplans may recognise separate GI functions, such as flood amelioration or the provision of wildlife habitats, but are less likely to share the same understanding described by policy-makers and academics (Hansen and Pauleit 2014; Elmqvist *et al.* 2010). In essence, there remains some ambiguity about how GI is understood and therefore likely to be evaluated in ‘real world’ practice.

There has also been little research regarding how GI is evaluated within the masterplan process for a neighbourhood development, and how the evaluation of certain GI intentions affects masterplan decisions and outcomes (Lennon *et al.* 2016; Schweber and Haroglu 2014). A masterplan process is described as a strategic process, involving a range of practitioners from planning, design, engineering, community engagement and other technical backgrounds who define a vision, plan and programme of work about how a new neighbourhood could be designed, both physically and functionally (Al-Waer 2014; Carmona *et al.* 2010; Bell 2005). Evaluation, including GI



Figure 1. Green Infrastructure references in the BREEAM Communities technical manual.

evaluation, is described as an ‘embedded’ part of the urban design or ‘place-shaping’ practices (Carmona *et al.* 2010) involved in masterplanning. Formal evaluations (such as community consultations, hydrological, ecology surveys and landscape visual impact assessment) are assumed to help establish, shape and refine masterplans’ strategic intentions and designs (HCA 2014; van der Voordt and van Wegen 2005; Schön 1983). There is research that recognises the need to monitor and evaluate implementation (e.g. Tiwary and Kumar 2014; McDonald *et al.* 2005), and looks at the validity of particular evaluative methods relating to GI (e.g. Abrahams and Nash 2018; Busch *et al.* 2012; Weber, Sloan, and Wolf 2006). Yet, whether the evaluation practice actually leads to the incorporation of recommended GI intentions into masterplanned neighbourhood developments is less understood (Cormier *et al.* 2017).

A number of sustainable neighbourhood standards emerged globally in the early 2000s, including the UK standard BREEAM Communities (BC), which adopts the implicit assumption of ‘embedded evaluation’. These standards outline a series of specific sustainability intentions (e.g. ecological conservation, social inclusion, climate mitigation, local economy) which should be evaluated at an early design stage, and assume that the practice of evaluation will result in the rational reflection and incorporation of those intentions in later masterplan decision-making and material outcomes (BRE 2014; DiMaggio and Powell 1983). GI is included as one of 41 issues in the BC technical manual, which awards credits to developers who address certain criteria for each issue or sustainability intention. Unlike the first eleven mandatory issues, the GI issue (SE 11) is optional for BC applicants and specifically aims to encourage developers to provide inclusive access to green spaces for local residents. Despite this fairly narrow definition of GI, there are numerous direct and indirect references to GI in all but two issues in the BC technical manual (Figure 1).

There has been some scholarly critique about which issues or intentions are included in the definition of a ‘sustainable neighbourhood’ by BC and similar neighbourhood standards (e.g. the Australian Green Star communities, US LEED and German DGNB standards). For example, some researchers question the balance of

various environmental, social and economic intentions that each standard expects developers to address (Sharifi and Murayama 2013, 2014; Hamedani and Huber 2012). Less debated is how the adoption of the standard actually influences developers' evaluation, design and construction practices and decisions, and ultimately the material outcomes arising from a masterplan (Sullivan, Rydin, and Buchanan 2014; Schweber and Haroglu 2014).

This highlights a need to understand how GI evaluation unfolds empirically, how evaluation might influence neighbourhood masterplan design and construction decisions in general, and more specifically, to elucidate whether standards such as BC, by recommending certain evaluative practices, actually contribute to achieving the outcomes they intend. We aim to consider (i) How is GI understood and evaluated empirically? (ii) What is the empirical reality of 'embedded evaluation'? and (iii) What is the role of BC in shaping how GI evaluation is enacted and reflected in masterplan decisions? The broad research question is therefore: "to what extent does BREEAM Communities promote an 'embedded' approach to green infrastructure evaluation in neighbourhood masterplans?"

3. Conceptual framework and methods

3.1. *Strategy as practice: masterplans as strategic processes*

As outlined above, masterplans can be understood as strategic processes or projects where various stakeholders engage through a series of activities, or 'practices' including evaluation, to create and implement the masterplan. To understand the interactions between the GI evaluation practice and other design and construction practices, 'Strategy as Practice' (SaP) offers an analytical framework to help map out these inter-relationships over discrete periods of time. SaP is derived from a combination of social practice, process and strategy theories, and is typically applied to study strategic processes in individual organisations (Whittington 2006; Jarzabkowski and Spee 2009). According to Whittington (2006), SaP uses three concepts to help study strategic processes: practitioners, practices (e.g. evaluation of GI) and praxes, which is the real-time enactment of a practice by practitioners. As a strategic process, masterplan broadly aligns with the SaP framework involving different practitioners (e.g. architects, developers, clients, residents, local planners) who enact masterplan practices (e.g. design, evaluation, appraisal, or construction) at certain times. Masterplans are highly inter-organisational processes, where some practitioners involved in the various evaluation, design, or construction practices, are more central or internal to the masterplan process. Others, such as the BC assessors who review BC implementation, are more peripheral, but still seek to influence the masterplan. Whittington's (2006) diagram of the SaP framework provides a visual way of mapping out the timing and interactions between different practices and practitioners in a masterplan process in discreet snapshots of time, or 'episodes'. Figure 2 presents an abstract example of a specific episode during a masterplan's timeline, indicating five boxes of praxis (or enactments of practice) and the different practitioners involved at each point in time. For example, praxis 3 is a Landscape Visual Impact Assessment (LVIA) conducted by a design team and results in some change in design practice (e.g. reorganising the layout to protect a culturally significant landscape view). The new designs are presented at a consultative workshop (praxis 4) where a construction change is agreed.

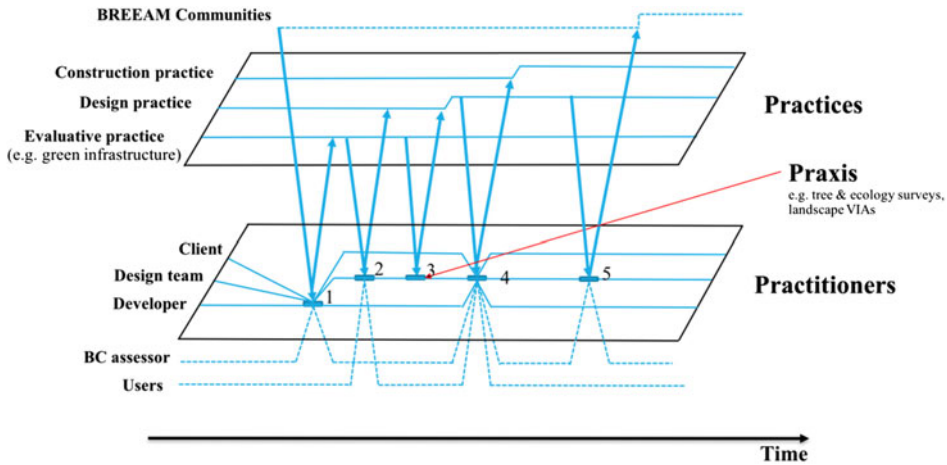


Figure 2. Masterplans as Strategy as Practice with numbered praxes (the enactment of practice by practitioners) and arrows indicating praxis influence (or lack of influence) on other practices.

3.2. Method: comparative case comparison

This research sought to understand the extent that BC impacts masterplan evaluative practices and whether these evaluations resulted in any associated changes in design and construction practices. One or more evaluative *intentions* that relate directly and indirectly to GI tend to underlie each evaluative practice. For example, evaluative practices with *direct* GI intentions, or explicit references to a GI attribute, include ecology surveys, which seek to examine the potential impact of a development to wildlife species and habitat functioning. Similarly, the intention of LVIA is to assess the impact of the development on the visual amenity of a site and surrounding area. Tree surveys seek to clarify tree quality and assess which trees can be retained as opposed to those that are unhealthy and can be removed. Evaluative practices with an *indirect* intention relating to GI include travel surveys, which review the quality of travel routes to promote particular modes of travel. The surveys can include appraisal of visual amenity provided by soft landscaping that can encourage walking as opposed to vehicular travel.

A cross-case empirical study of masterplanned sites was applied to enable a richer examination of how practitioners (people) and strategies interact and interrelate in 'everyday' practice, compared to what a sector-wide survey might offer, for example (Grant 2003; Flyvbjerg 2001, 134). While the BC standard is designed to be applied on a range of masterplan types, an inherent methodological challenge is to select case studies that offer a 'representative' sample of masterplan sites, as each site has distinct contexts, groups of practitioners and requirements (Bassioni, Price, and Hassan 2004; Shenhar and Dvir 1996). Furthermore, only 16 sites had been certified with the BC standard in 2016, limiting the number of sites that had applied BC that could be studied. Initially, 10 sites (involving a mix of sites with and without BC) were considered for the study. A broad review of the sites helped to clarify the three broad development types used in the study: housing 'estate regeneration' projects in a generally urban context; smaller 'infill' projects on brownfield urban sites; and 'Rural Urban Extensions' or projects that expand an urban conurbation within a more rural context. From the initial group, six sites were selected, analysed and compared using the SaP

framework over a period of 18 months between 2016 and 2017. Each site was at a similar stage and scale of development, with at least one phase constructed, and where key representatives were willing to be interviewed. Each site was predominantly residential but involved a mix of uses, amenities and services (Table 1). Only English sites were selected to maintain a more consistent planning context and retain a manageable level of data for one principal analyst to review. And, although there is no single definition of a 'typical' neighbourhood-scale (Carmona *et al.* 2010; BRE 2014) a minimum scale of neighbourhood development was adopted of over 100 residential units, to capture a larger scale than a single building or street scale.

In each of the three development types, two sites were examined – one that had adopted BC and one that had not. This allowed us to understand the extent to which BC application affected formal GI evaluation and also to offer some lessons on the standards' potential relevance to masterplans more generally. The examination focused on the formal evaluative practices, masterplan decisions and material outcomes in each of the sites. Although the selected case studies may not necessarily be representative of all English masterplans, they do reflect a range of development types, as well as funding contexts, with privately funded projects (e.g. RUE 2) and local authority-led regeneration sites (e.g. Estates 1 and 2). And whilst, each site had distinctive features and contexts, the broad masterplan stages and technical evaluative processes were not dissimilar at each site, supporting some degree of comparison.

Semi-structured interviews were conducted with 48 representatives from distinct actor groups [i.e. representatives from developers, urban designers, landscape architects, local authority planners, housing associations, evaluative consultants (ecologists, arboriculture assessors, community facilitators), engineers, residents, local groups]. The interviews examined different practitioners' experiences with masterplan processes and BC, specifically how they perceived GI evaluation and more general masterplan practices, intentions, enactment and response, and how they engaged with them (e.g. commissioned, conducted, or sought to influence it). This helped to capture a range of views about the perceived impact of evaluative practices to masterplan design, construction and in-use decisions. The analysis of the anonymised and transcribed interviews was supplemented by analysis of publicly-available planning documents, such as Design and Access Statements and ecology reports to cross-check interview information, clarify the sequence of events and identify formal decisions arising from evaluative praxes. In addition, site visits were undertaken to verify the stage of masterplan development and identify material outcomes.

Once the interviews had been transcribed and anonymised, both deductive and abductive analyses of the qualitative data (Fletcher 2017) were used to clarify the process of green infrastructure evaluation at each site. A first round of coding of the interview data included two sets of directed or 'deductive' codes. One set of deductive codes clarified the *technical details* of formal evaluative praxis, including the actors involved, methods used (e.g. on site, off site), and the masterplan stage a praxis took place. The second set of deductive codes classified the interviews according to the *enabling or constraining factors* that affected the influence of evaluative practices on other masterplan practices. This was based on three C's (Schweber and Haroglu 2014; Timmermans and Epstein 2010): (1) coordination between evaluators and other practitioners; (2) commitment towards an evaluative intention by an individual and organisation and (3) capability to engage with evaluation, such as the skills, knowledge and available resources. The influence of *external drivers* on the conduct of evaluative

practice, such as rules, norms and mimetic practice (i.e. the socially accepted ways of doing things), was also considered as this was reported to have an impact on *internal* organisational processes (Lounsbury 2008; DiMaggio and Powell 1983). Although external drivers are likely to have a strong framing function regarding how evaluation is conducted, the agency of the different organisations and individuals is also thought likely to play a significant role to play in how evaluative practices interact with other masterplan practices (Jarzabkowski 2005). Through a reflexive process of adding, refining, and removing topics that appeared commonly associated with how evaluative processes were applied across the six sites (Fletcher 2017), an initial set of ten codes expanded to over 100 codes. This was followed by an abductive analysis, consolidating the large set of codes into four groups of *probable* drivers of ‘embedded’ evaluative practice: external drivers, evaluative responsibility, negotiation and reflexivity (Figure 3).

The four broad drivers each include sub-themes:

- i. **External drivers:** external coercive rules, normative guidance and mimetic practice (Lounsbury 2008; DiMaggio and Powell 1983) set intrinsic or extrinsic expectations for how practitioners use evaluative information;
- ii. **Responsibility:** the mode of agency, including iterative (past), practical-evaluative (present), and projective agency (future) (Battilana and D’Aunno 2009; Emirbayer and Mische 1998), personal and institutional intentionality (Gluch and Bosch-Sijtsema 2016), and differing sense of control over evaluative practices (Carmona 2014; Fox-Rogers and Murphy 2014);
- iii. **Negotiation:** the mediation of multiple evaluative intentions in masterplan processes required in order to make decisions (Sharma and Kearins 2011; Vlaar, Van den Bosch, and Volberda 2006). Negotiation involves integration (consolidation) and distribution (prioritisation) of different evaluative intentions between practitioners (Filzmoser, Hippmann, and Vetschera 2016; Beauvais and Baechtiger 2016; Holland 2014);
- iv. **Reflexivity:** the learning, interpretation and decision-making response to evaluative information (Beunen, Assche, and Duineveld 2013; Flyvbjerg 2001; Schön 1983). Changes in the practitioners involved can affect the personal and institutional interpretation of evaluative information and increases the likelihood of a changed response.

4. Cross-case analysis: evaluative transitions

The four drivers of evaluative embeddedness (external drivers, responsibility, negotiation and reflexivity) were combined with the SaP concepts (practitioner, practice and praxis) to conduct matrix analyses of thirteen evaluative episodes across the six sites that took place at a fixed period of time. The matrix analysis helped to clarify which dominant drivers affected the way practitioners shaped, enacted and responded to GI evaluative practice in each episode, during different masterplan stages: outline design, detailed design, construction and in use (summarised in Table 1).

For example, the matrix analysis applied in Episode 8 indicates how weak external drivers, responsibility and negotiation contributed to a compromised evaluative response (Figure 4).

Table 1. Case study site data* *BREEAM Communities applied on site masterplan.*

	Estate 1*		Estate 2	Infill 1*		Infill 2	RUE 1*		RUE 2
Masterplan type	Estate regeneration	Estate regeneration	Estate regeneration	Urban infill development*	Urban infill development	Urban infill development	Rural urban extension	Rural urban extension	Rural urban extension
Location	A central London estate built 1960–1970s overlooking a large park	An outer London estate built 1950s–1960s, overlooking an allotment and park	An outer London estate built 1950s–1960s, overlooking the city station to town centre	North East England, an industrial area connecting the city station to town centre	Inner London, an old hospital site overlooking a woodland park	Inner London, an old hospital site overlooking a woodland park	South West England, on an old golf course	South West England, on an old military barracks	South West England, on an old military barracks
Area	28 hectares	25 hectares	12.1 hectares	1.85 hectares	1.85 hectares	1.85 hectares	47 hectares	73 hectares	73 hectares
Dwellings	3,575 units	2,517 units	800 Units	257 units	257 units	257 units	1,400 units	4,000 units	4,000 units
Density	125 dwellings per hectare	101 dwellings per hectare	66 dwellings per hectare	138 dwellings per hectare	138 dwellings per hectare	138 dwellings per hectare	30 dwellings per hectare	55 dwellings per hectare	55 dwellings per hectare
Affordable units	50%	50%	25%	35%	35%	35%	30%	35%	35%
Client (current landowner)	Local authority (Developer at completion)	Local authority (Developer and housing association at completion)	Local authority and private owners (Developer at completion)	Local authority and private owners (Developer at completion)	Regional authority (Developer and housing association at completion)	Regional authority (Developer and housing association at completion)	Local authority	Local authority	HCA / developer
Masterplan timeframe	2010–2032	2011–2027	2011–2032	2011–2032	2012–2020	2012–2020	2011–2035	2012–2037	2012–2037

Note: *Each site is anonymised to protect the confidentiality of the interviewees.

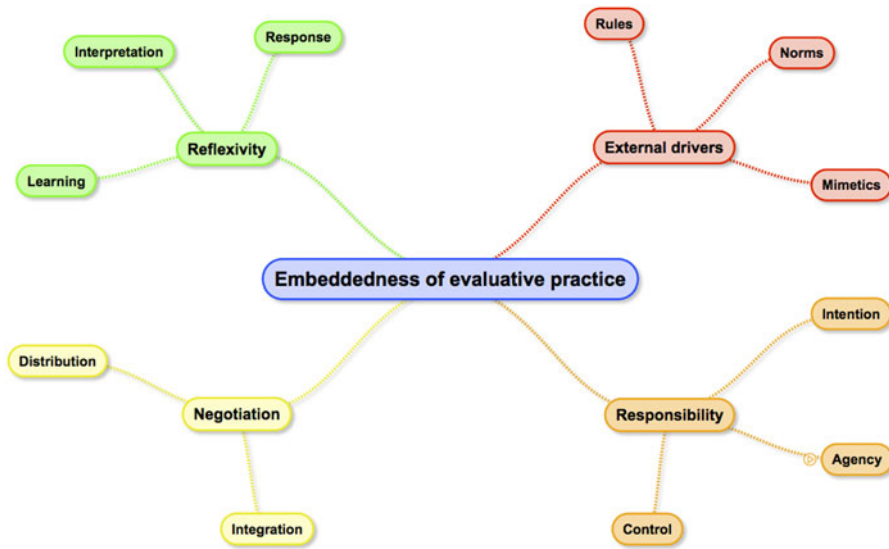


Figure 3. Constraining and enabling drivers that shape evaluative embeddedness.

Infill 2 was a small infill site on an old hospital grounds in East London, looking over a wooded cemetery park in an area with limited green spaces. Initial consultations with residents and a park friends group established an intention to link to the woodland with the site by lowering a wall that surrounded the site and planting plant species that matched the neighbouring woodland species. However, a separate heritage appraisal advised that the site wall needed to be retained in its current form, and Environmental Impact Assessment regulation, that might have supported the ecological connectivity of the planting arrangements, did not refer to the woodland area which was only classified as a local Site of Importance to Nature Conservation (SINC), which do not need to apply EIA. Additionally, practitioners involved at the early design stage changed during construction – with a new site manager joining the development team and a new (cheaper) landscape architect, who then created a revised landscape plan and planting scheme. The sole local government ecologist who might have identified the changes to earlier commitments, indicated that they viewed thousands of planning applications in their borough every year and only made site visits to large sites. They would have only checked the post-planning application delivery through desk-based reports. The Housing Association involved in the original public consultations indicated they had prioritised the provision of affordable homes over other intentions and had not kept track of earlier ecological commitments. This combination of weak support from the regulatory and planning processes, as well as a weak sense of responsibility by key practitioners (the landscape architect, local government ecologist, housing association) undermined the intention to deliver a more open and ecologically connected site and led to the deprioritisation and loss of that intention in the negotiation with other masterplan intentions (heritage, cost savings, affordable homes) (Figures 5 and 6).

The analysis from the thirteen episodes points to three types of ‘evaluative transition’ (Jallow, Demian, and Ruikar 2011), *regressive*, *static* and *progressive transitions*, relating to how changes in the evaluative drivers affected the influence of evaluative

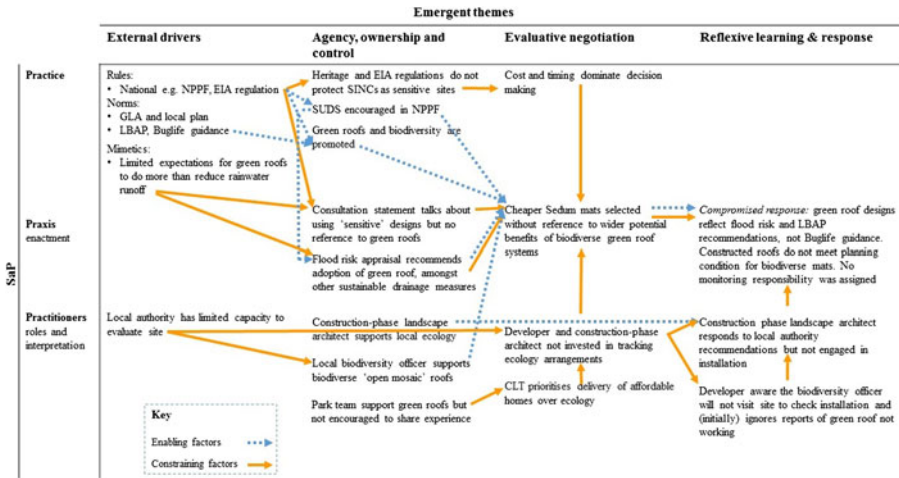


Figure 4. Matrix analysis of episode 8: evaluation of GI links between Infill 2 and the local park.

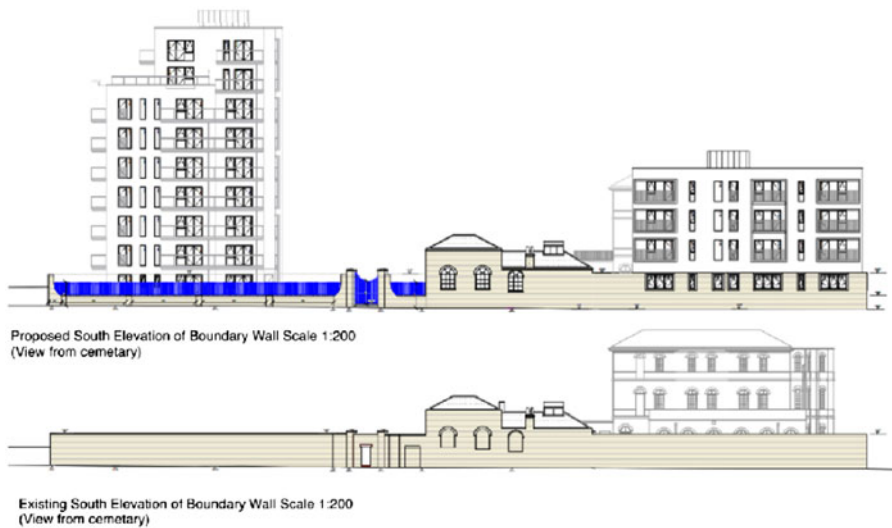


Figure 5. Episode 8, Infill 2: Proposal to drop southern boundary wall, before (bottom) and after (top), (source: Design and Access Statement, 2013).

practice at different masterplan stages (See Table 2). Six episodes presented a 'regressive' shift in the evaluation and implementation of GI decisions, as per episode 8, where early evaluative recommendations were diminished during the later masterplan stages (see Table 2, regressive episodes highlighted in yellow). Five episodes displayed a 'static' evaluative transition, where GI intentions (e.g. GI multi-functionality and ecological connectivity) were weakly addressed from the outset. These intentions were not promoted by external drivers and were subject to a practical-evaluative (short-term) mindset throughout the process (see Table 2, static episodes highlighted in grey). A 'progressive' GI evaluative transition was observed in just two episodes (see Table 2, progressive episodes highlighted in green). In the latter episodes, a dominant



Figure 6. Episode 8, Infill 2: Early planting along boundary without reference to original ecologically connected planting scheme. (Photo: R. Callway)

practitioner (a design team and an external inspector) was able to apply a ‘projective’ or forward-looking evaluative approach at later masterplan stages (detailed design, construction and in use). In both instances, the progressive transition was enabled by external rules, combined with strong resident engagement that combined to give the practitioners greater powers of control and intentionality to prioritise GI evaluative recommendations.

5. Findings regarding GI evaluation

The study indicates that GI evaluative recommendations were ‘compromised’ or deprioritised in 11 out of the 13 evaluative episodes studied. This compromise was principally the result of the dominant mimetic (habitual and commonplace) and practical-evaluative (short-term) mindset adopted by dominant practitioners when enacting certain formal GI evaluations, such as LVIA, arboriculture (tree) surveys, ecology surveys and overshadowing modelling. In addition, relevant intentions in external rules and norms were narrow in their definition of GI, and such rules lacked enforcement by regulators during detailed design and construction stages.

The results point to four issues that affect the embeddedness of GI evaluation in masterplan processes: (1) GI was not an established concept for all masterplan practitioners; (2) GI was principally treated as an object for anthropocentric (human-centred) intentions; (3) there was a weak sense of responsibility for GI; and (4) there was limited local engagement in formal GI evaluation. These issues and possible recommendations are discussed in turn below.

5.1. GI as an established concept

Overall, varying understandings of GI intentions were present across the episodes. In terms of external drivers, no legislation explicitly supported evaluating and creating a multi-faceted view of GI. Few normative policies promoted *multi-functionality* or *ecological connectivity* (Mell 2017; Davies *et al.* 2015), nor did the interviewees appear to share a common understanding of GI. Developers, housing associations, residents

Table 2. Dominant actors and drivers for GI evaluation and decision-making (*BC applied).

Site	GI episode	Decision-making stage	External drivers	Dominant actor	Agency	Negotiation of GI	Reflexive response
Estate 1*	1. <i>Inclusive view of park</i>	Outline - detailed plan	Rules, norms and mimetic practice	Developer (Local authority – LA)	Practical evaluative	Deprioritised	Compromised
		Outline plan	Rules, norms, and mimetic practice	Design team	Iterative and practical evaluative	Deprioritised	Compromised
		Detailed plan	Rules, norms	Design team	Iterative and projective	Prioritised	Embedded
3. <i>Overshadowing of gardens and public space</i>	Outline - detailed plan	Rules, norms and mimetic practice	Developer	Iterative and practical	Deprioritised	Compromised	
	Detailed plan	Rules	National regulator	Iterative and projective	Prioritised	Embedded	
Estate 2	4. <i>Courtyard block trees</i>	Outline - Post-construction	Rules, norms and mimetic practice	Design team	Iterative and practical	Deprioritised	Compromised
		Detailed plan	Norms and mimetic practice	Design team	Iterative and projective	Prioritised	Embedded
Infill 1*	5. <i>Trees and allotment external to block</i>	Construction	Mimetic practice	Developer	Practical	Deprioritised	Compromised
		Outline - detailed plan	Norms and mimetic practice	Design team	Projective	Prioritised	Embedded
		Construction	Mimetic practice	Developer	Practical	Deprioritised	Compromised
Infill 2	6. <i>Soft SuDS</i>	Outline - construction	Rules, norms and mimetic practices	Developer	Iterative and practical	Deprioritised	Compromised
		Outline plan	Rules and norms	Design team	Iterative and projective	Prioritised	Embedded
		Detailed – construction	Mimetic practice	Developer	Iterative and practical	Deprioritised	Compromised
RUE 1*	7. <i>Street trees</i>	Outline - construction	Rules, norms and mimetic practices	Developer	Iterative and practical	Deprioritised	Compromised
		Outline plan	Norms and norms	Design team	Iterative and projective	Prioritised	Embedded
		Detailed – construction	Mimetic practice	Developer	Iterative and practical	Deprioritised	Compromised
RUE 1*	8. <i>Link to local park (and SINC)</i>	Outline - construction	Rules, norms and mimetic practices	Developer	Iterative and practical	Deprioritised	Compromised
		Outline plan	Norms	Design Team	Projective	Prioritised	Embedded
		Detailed – construction	Mimetic practice	Developer	Iterative and practical	Deprioritised	Compromised
RUE 1*	9. <i>Green roof</i>	Outline - construction	Rules, norms and mimetic practices	Developer	Iterative and practical	Deprioritised	Compromised
		Outline plan	Norms	Design Team	Projective	Prioritised	Embedded
		Detailed – construction	Mimetic practice	Developer	Iterative and practical	Deprioritised	Compromised

(Continued)

Table 2. (Continued).

Site	GI episode	Decision-making stage	External drivers	Dominant actor	Agency	Negotiation of GI	Reflexive response
	<i>10. Link to ancient woodland (and SINC)</i>	Outline – construction	Rules, norms, mimetic practice		Iterative and Practical		
	<i>11. Soft SuDS</i>	Outline – detailed plan Detailed plan	Rules, norms Mimetic practice	Local authority Developer (phase2)	Projective Iterative and practical	Prioritised Deprioritised	Embedded Compromised
RUE 2	<i>12. Street trees</i>	Outline plan Detailed plan	Norms Mimetic practice	Design team Developer (private)	Projective Iterative and practical	Prioritised Deprioritised	Embedded Compromised
	<i>13. Amphibian wildlife corridor</i>	Outline - detailed plan Construction	Rules, norms, mimetic practice Norms, mimetic practice	Developer (private) Developer (LA)	Iterative and practical practical Practical and projective	Deprioritised Deprioritised	Compromised Uncertain

Note: Green: Progressive episodes; Blue: Static episodes; Yellow: Regressive episodes.

and some consultants tended to prioritise just one or two GI intentions, such as the contribution to ecology, aesthetics or flood relief (Hansen and Pauleit 2014). Some also referred to ‘green’ energy solutions as a part of the GI concept (interviews with an architect, two developers and a designer); for example, “When you’re talking about green infrastructure are you talking about sustainability e.g. district heating networks or actual green?” (Interview 12, architect)

Urban designers, landscape architects and ecologists who worked directly with GI, presented a broader understanding and applied a more projective mode of agency when evaluating GI. Local authority planning, biodiversity and tree officers also referred to multi-faceted GI intentions, but faced policy and resource constraints, such as time-bound housing targets and budget cuts narrowing their approach towards GI intentions; for example:

They ignored the point about our objection to the [building] height because if its stops the afternoon sun ... it creates a shadow but, as you know, a planner’s view of shadow, they’re not taking any account of horticultural impact. (Allotment holder, Estate 2)

The intention to support GI connectivity (linking habitats and ecology between sites and local surrounding area) was limited in all sites except RUE 2, which was included in a countywide GI strategy. Yet, even at RUE 2, connectivity was undermined by hard infrastructure and financial intentions. A major A-road was permitted to cut through the GI space and wildlife corridor, and the local authority developer was either unwilling or unable to buy some private land that would have reduced the ecological impact of the road.

Perhaps this variation in understanding and approach to GI by different practitioners is unsurprising but it raises questions about who drives evaluative practice and how GI could be given greater priority by those practitioners – this is discussed further in the section on evaluative responsibility below. Other masterplan intentions also appear to be more clearly defined, with more immediate and familiar intentions such as time management, cost control and hard infrastructure, and therefore dominated decision-making; as the engineer (Infill 1) said:

“The council may have all these sustainability criteria but no one gets out of highways demands [Why?] Highways are the front line for council’s complaints wise. I’ll phone the council about poor roads or waste collection services, but would I call about a lack of green space?”

The inconsistent definition of GI within external rules, norms and mimetic practice, discouraged a more projective mode of evaluation by practitioners, and limited the prioritisation of GI over more familiar evaluative intentions; as a developer (infill1) said: “At the time we started the council [we?] didn’t really understand it, so it was kind of ‘stick to what we know.’”

This narrow GI interpretation also affected how ecological systems were evaluated. Developers in all the sites commissioned external consultants to evaluate the status of legally protected species onsite (e.g. badgers and bats) during construction, but not to consider unprotected species or habitats, or their relationship with neighbouring habitats. For example, a legally required ecology appraisal at Infill 2 site only referred to on-site trees in the context of providing a habitat for protected birds, and not regarding

the intrinsic value of the trees or the additional ecosystem services they could provide (Lennon *et al.* 2016).

In the context of the narrow GI conceptualisation and a paucity of tools to evaluate GI more broadly (Davies *et al.* 2015, 86), it is understandable that GI intentions were compromised. More research is therefore required to operationalise a working definition and evaluation of multi-faceted GI intentions within masterplan processes, especially during construction and in-use stages.

5.2. *GI as an anthropocentric object of impact*

In the research, a commonly held view is that GI is predominantly used for human-centred reasons, neglecting the wider context that the living species and natural habitats are essential for ecological functioning, upon which humanity depends (e.g. woodlands supporting climate mitigation, promoting soil and air quality and water filtration). Furthermore, GI contains living organisms that have their own agency and functions, which arguably are intrinsically valuable in their own right (Bang and Marin 2015; Gschwandtner 2013). That is, all living things, not just humans, can impact and change their surroundings, shaping not just neighbourhoods but also the wider world (Dürbeck, Schaumann, and Sullivan 2015).

Evaluative practices, such as arboriculture (tree), noise, flood, energy, microclimate, overshadowing and transport surveys did not formally consider GI as a subject or agent of impact with inherent value. The anthropocentric interpretation contributed to the failure to respond to several GI-related evaluative findings (e.g. dead courtyard trees, episode 4, Estate 2), or restricted GI functional potential (e.g. planting ornamental rather than natural hedges, episode 10, RUE 1). For example, arboriculture surveyors were more concerned with ensuring trees were safe for humans than considering wider ecological benefits of trees that are of importance to the long-term survival of both humans and other species (Hayhow *et al.* 2016). Even where trees were classified as good quality (A or B categories under BS 8537), other development priorities (highways, car parking, underground utilities) outweighed that healthy status (Episodes 7, 8, 10 and 12). As various interviewees indicated, this status was accepted as normal practice; for example: “It is accepted that not all high-quality trees can be retained due to the constraints that they may impose on the development of a perimeter block layout and a clear street network” (Design Access Statement, Estate 2).

Evaluations also did not formally recognise that GI could mitigate negative development impacts. For example, in episode 3 (Estate 1) trees and vegetation were not evaluated for their potential role in creating a buffer for visual, air, soil, water, and noise pollution, or as a physical protection for pedestrians along a proposed road. This meant that GI was not included in the street design, until neighbouring residents with a view of the road protested about it.

The problem with equating ‘green’ infrastructure with ‘grey’ infrastructure is that ecological systems risk being treated in the same manner – as an object for human use, and not as a system that has agency and functions intrinsically valuable in their own right (Bang and Marin 2015; McShane 2007). As a local ecologist (RUE 2) commented, the GI concept feels framed against ecological agency:

Green infrastructure is more for people You can't make a wildlife site multi-use ... you know the usual parlance. 'We'll put a road through the heathland. It won't matter if the badgers get run over. That's hard luck you know'.

This highlights a tension between the anthropocentric, neoliberal views that underpin terminology such as green *infrastructure*, ecological *services* and natural *capital*, and an ecocentric view where human needs and intentions are actually just a part of wider ecological systems and functioning (Steffen *et al.* 2015). Urban design academics and practitioners, such as Jacobs (1961), Carmona (2014) and Gehl (2010), have a strong social intentionality in their work, calling for urban design or 'place shaping' to start by understanding people's needs and experiences. There is a growing body of research which argues, however, that urban life should refer to *all* living things in that foundational context, as a complex interconnected 'urban ecology' (Pauleit *et al.* 2011; Pincetl 2010; Orr 2004). Based on this study, more research is required to consider how GI can be better reflected in formal evaluative practices – for example, broadening landscape appraisal to reflect inclusive, long-term, multi-functional and multi-scalar GI systems (de Groot *et al.* 2010).

5.3. *Weak responsibility for GI as an evaluative intention*

Evaluative responsibility includes the need for a practitioner to have a clear *intention and commitment* to enact and respond to evaluative recommendations regarding a particular issue. The separation of design and construction intentions, practices and associated practitioners, undermined the continuity of responsibility over GI evaluation, (Yigitcanlar and Teriman 2015). Unlike financial and hard infrastructure evaluations which were enacted on a regular basis throughout the masterplan, most formal GI evaluative praxes were 'heavily front-loaded' (developer interviewee), taking place during the outline design stage. This front-loading was encouraged by the external planning rules and norms. During the detailed design and construction stages however, GI evaluation was conducted more intermittently and often by contracted consultants, peripheral to the core design team, further weakening evaluative responsibility. This discontinuity was demonstrated by the failures to plant the agreed number of trees (Estate 2, Infill 1 and RUE 2); construct functional soft Sustainable Drainage Systems or SuDS (Infill 1); establish a living green roof in Infill 2 (Infill 2); and promote bio-geographic connectivity (Infill 2, RUE 1 and RUE 2).

The episodes point to a constrained, risk-averse and practical-evaluative culture that undermined the sense of responsibility to deliver longer-term intentions regarding GI, particularly when evaluating forms of GI that were perceived to be relatively 'new', such as soft SuDS, green roofs and bio-geographically linked landscape design. The episodes also highlight imbalanced negotiations that favoured more familiar or mimetically embedded intentions, (e.g. cost control), which undermined practitioner responsibility to deliver GI intentions. This concurs with other reports about how GI is frequently compromised during development processes (Yigitcanlar and Teriman 2015; Pincetl 2010). Short-term financial intentions resulted in numerous GI considerations to be limited, downgraded or dropped altogether. As two interviewees commented:

“All these green things, they add cost.” (Interview 15, Housing association manager, RUE 2)

“We do green roof stuff occasionally. It’s expensive and the developers don’t like it.” (Interview 42, Engineer, Infill 1)

For example, soft SuDS and green roofs proposed at outline design stages were dropped for installation and maintenance cost reasons (Estate 2, RUE 2 and Infill 1). Biodiverse green roofs were downgraded to cheaper, single plant variety (Sedum), mat roofs during the construction (Infill 2). Failures to install soft SuDS and a green roof (Infill 1 and Infill 2 respectively) were also not rectified for cost reasons. Good quality ‘A’ and ‘B’ category trees (according to BS 5837⁵), were identified for removal to make way for hard infrastructure, and were not considered for onsite relocation, again for financial reasons (Estate 1, Infill 1, RUE 1 and RUE 2). Replanting of trees marked for removal was not a common practice, so it is unlikely that the costs involved were well understood, constraining evaluation of the replanting option. Good quality mature trees were replanted at Estate 2, but it is unclear whether this was because the local authority had strong tree policies or because the developer had decided it was viable to do so.

The developers’ short-term intentions regarding GI evaluation seemed predominantly focused on obtaining planning consent. They had less incentive post-planning permission to assign responsibility over the delivery of recommendations emerging from the evaluative practices. Local authorities also agreed to later design changes that negatively affected GI recommendations in the face of pressures to deliver housing targets and dwindling budgets necessary to ensure sufficient ongoing GI management maintenance. The Sustainability Officer (RUE 1) referred to the whittling down of previous commitments due to external pressures:

[The developer will] say ‘Oh, you know we’ve got this site which is hardly viable’ or ‘We can’t afford to do this or that’ and there is pressure for the council... to accede to some of this because they have their own pressure from [council] members who want numbers of houses to be built.

Neither developers nor local authorities interviewed for this research displayed strong intentions regarding long-term GI management and maintenance. This reluctance was often linked to resource concerns:

Councils have less and less money for managing existing green spaces, our green team are very, very reluctant to take on any new green infrastructure unless there are some funds. (Local Biodiversity Officer, Infill 2)

[Housing associations] are very heavily capped on costs so it just tends not to get done. They have the right aspiration, but then they don’t do it because they... finding the money to do it isn’t always their priority. (Urban designer, Estate 1)

The resource problem is reported elsewhere (Landscape Institute 2014; Bordass 2000), where GI responsibility “*is widely shared and no one is truly in charge*” (Pincetl 2010, 53). As already stated, regulations that would have encouraged developers to take greater responsibility were narrowly defined. Even when a post-construction appraisal was applied by a developer (episode 4, Estate 2), it had more to do with sustaining public support during a lengthy masterplan process. They had no intention of using the findings to inform future phase design and construction practices and did not

share the results with the design teams who could have learnt from and responded to the information: “It’s a question of ownership really, and the more remote it is, the more cascaded it is, the less you can ... the less ownership and less holistic understanding there is” (Local government regeneration officer, Estate 1).

To better operationalise GI evaluation, there is a need to clarify who takes evaluative responsibility for it during the detailed design, construction and in-use stages. For example, one option for BC is to require developers to assign GI evaluative (and management) responsibility at later stages, including assigning sufficient resources (human, technical, financial and temporal) to carry it out. In addition, BC could encourage applicants to be more open when negotiating priorities, such as through introducing a negative score for issues that are compromised by prioritisation elsewhere, such as adopted by the Sustainable Project Appraisal Routine (SPeAR[®]) tool created by ARUP. For example, intentions to integrate hard infrastructure (e.g. utilities, car parking) that undermine ecological intentions (e.g. trees and GI connectivity) could result in a loss of BC credits.

5.4. Exclusive GI evaluation

A lack of specification in external drivers meant local actors were not expected to engage with various formal GI evaluations, including *LVIA, microclimate, overshadowing, flooding, noise, arboriculture and ecology surveys*. Instead, local actors were generally engaged through *generic* public workshops and exhibitions and left to identify and wade through vast quantities of planning documentation. This was true, both for sites that applied BC and sites that did not. At all six sites, seven local actors (residents, associations and park groups) displayed rich knowledge and commitment regarding various GI intentions but also indicated their frustration about trying to share this knowledge and their growing distrust of the process as a result (Interviews with park manager, Infill 2; and local ecologist, RUE 2). This included knowledge that could have contributed to ecology surveys (Infill 2, RUE 1 and RUE 2), financial appraisal (Estates 1 and 2, and RUE 1), flood appraisal (RUE 1), LVIAAs (Estate 1, Infill 2, RUE 1 and RUE 2) and arboriculture surveys (Estate 1, Infill 1 and RUE 1). For example, engaging with local actors would have helped arboriculture surveyors and landscape architects to make an earlier identification of locally significant GI functions in spatial plans, and potentially avoid conflicts that occurred later (episode 3, Estate 1; episode 7, Infill 1; episode 12, RUE 2).

I don’t think they paid attention to us. Because one of the reasons, going, back, is we’re not a residents associate ... they look at the list, say ‘oh who should we engage with? Tenants association? Maybe x society’ ... no. not the people actually living in the street, we don’t exist because we don’t have a group with a chair. (Neighbouring Resident Estate 1)

Developers and their contracted facilitators talked about wanting to avoid consultation overload and conflict, but the tightly controlled evaluative practice contributed to ‘information asymmetries’ (Vlaar, Van den Bosch, and Volberda 2006). This was demonstrated by both the closed nature of formal GI evaluations and financial appraisals enacted at all the sites. As one arboriculture assessor (Estate 1) highlighted, contracted consultants, who lacked the agency to respond directly, can feel fearful when it comes

to engaging with the public: “It’s very dangerous to talk to local residents. Things get reinterpreted very quickly, ‘I spoke to the tree guy and he said,’ You know... we tend to be robotic so that things don’t get misrepresented.”

These asymmetries of power between the ‘client’ developer, ‘contracted’ consultant assessor and ‘user’ residents had clear consequences, reducing local trust and engagement and missing opportunities to reflect on local GI knowledge, identify design concerns, or reach more equitable planning outcomes (Fox-Rogers and Murphy 2014; Eversole 2012).

It’s called a public consultation day... but they do not listen. They have made their plans. We have been ignored from day one. (Public comment in local newspaper, RUE 2)

The episodes suggest there was a tendency for local engagement to be applied more to legitimise planning applications than to enhance designs and plans. The risk adversity to local engagement limited the opportunities to enhance ownership by residents, to learn and enhance GI designs as a masterplan is rolled out:

It would be a generous act to give people ownership over what happens in the open spaces. It would be better to give people more scope to define exactly what they want... At the very least, if you do have to define what happens in the spaces on the [first] phase, learn from what works here as you move through the development phases. (Resident comment in Statement of Community Involvement, Estate 1)

A second aspect of inclusivity relates to the distributional impacts of GI proposals (Mels 2016; Davies *et al.* 2015, 85; Holland 2014). The formal GI evaluations studied here, did not disaggregate who would benefit or lose as a result of associated decisions. This was also linked to the negotiation that took place in dominant financial evaluations, where revenue generation dominated social and environmental intentions resulting in apparent environmental injustices (Mels 2016). For example, in Estate 1 and Infill 2, social housing tenants were not allocated flats with a view over neighbouring parks, so the flats could be sold at a higher value to private tenants. In Estate 2, only higher value private tenants were given access to a roof garden on one block (Interview with community facilitator, Estate 2). At Infill 2, affordable housing tenants were allocated a smaller courtyard space with more limited landscaping, compared to a private tenure block. This inequality in GI provision was accepted by the community facilitator as an inevitable compromise required to obtain affordable housing on the site: “We had to focus on our number one priority, to ensure the provision of affordable units.”

External drivers did not support a more inclusive or equitable distribution of benefits from GI functions, except in Estate 1 where legislation relating to Compulsory Purchase Orders (CPO) was applied, which supports the evaluation of the impact of the CPO to social, environmental and economic sustainability by an independent inspector. Further opportunities are needed to support a more deliberative dialogue about the different masterplan intentions regarding GI, as well as increase accountability for the distributional impacts of negotiated outcomes, with sufficient space and resources for dialogue, exchange, learning and response (Beauvais and Baechtiger 2016; Holland 2014). BRE could amend specific BC issues in this regard, such as SE 11 – Green infrastructure and LE 5 – Landscape, to better reflect principles of deliberation and inclusive distribution. For example, requiring the assessment of inclusive visual amenity or ‘landscape justice’ (Mels 2016) during LVIAAs. BC could also address

these principles more generically in GO 01 – Consultation plan and GO 02 – consultation and engagement. Also, it should not be assumed that the residents will necessarily have the interest, skills or resources to adopt long-term responsibility over GI management, as currently proposed in BC issue GO 04 – Community management of facilities. Instead, responsibility for long-term management should be discussed as part of a deliberative process.

6. Discussion

This empirical study of GI evaluation in thirteen episodes across six English master-planned sites has demonstrated that the same types of formal GI evaluative practices (e.g. ecology surveys, LVIA's) were conducted at each of the sites and with similar compromised outcomes, regardless of whether BC was applied or not. Even where evaluative intentions were formally evaluated and responded to, weak rules and norms, changes in personnel, surprise discoveries (e.g. unmapped underground utilities) and risk aversion often led practitioners to adopt more familiar intentions, such as the delivery of cost savings, and compromise in how they responded to more forward-looking GI intentions. Three broad implications, regarding the practice of GI evaluation, evaluative embeddedness and BC, emerge from this analysis.

First, based on the empirical analysis and literature, there remains a lack of shared understanding regarding GI definition, evaluation and response. The varying, and often narrow, definition of GI in external practices (e.g. regulatory rules) restricts how dominant actors (e.g. developers and contractors) evaluate and promote GI within a neighbourhood development. More work is required to operationalise a multi-faceted GI concept in masterplan processes, particularly during the latter stages of development, and raise responsibility for GI by dominant practitioners (Lennon *et al.* 2016; Cormier *et al.* 2017). Table 3 summarises the main barriers and offers recommendations to further embed GI evaluative practice in masterplanning, including for BC. Specifically, the optional GI issue (SE 11) is narrowly defined in BC, ignoring the multi-faceted principles of GI. To incentivise BC applicants, BRE could broaden the current GI definition (in issue SE11) and make it a mandatory rather than optional requirement. Alternatively, the LE 01 Ecology Strategy issue could be revised to better reflect multi-faceted GI intentions.

Second, the findings inform the discussions about Strategy as Practice (SaP) and evaluative embeddedness, indicate that the extent of the *influence* of formal evaluations during inter-organisational collaborative processes (Egels-Zandén and Rosén 2015; Vaara and Whittington 2012; Medd and Marvin 2007), such as masterplanning, is affected by a range of different drivers. 'Evaluative embeddedness', or the degree to which evaluative practice influences other practices, is not a simple linear relationship between evaluative practice and response. Instead, evaluations are transactional and shaped by a combination of *external* drivers and *internal* evaluative responsibility, negotiation and reflexivity which enable and constrain how practitioners' structure, apply and respond to evaluative information at different points in time. Crucially, changes in the dominant practitioner between design and construction stages can affect the individual and organisational interpretation of evaluative information, altering the degree of responsibility, prioritisation and responsiveness to different intentions. This study empirically identifies three types of 'evaluative transition': *progressive* transitions, where evaluations clearly inform and change decisions during the masterplan process, *regressive* transition where early evaluative recommendations are later

Table 3. Barriers and recommendations to embed GI in neighbourhood masterplans.

Barriers to embedded evaluation	Policy and practice recommendations
<p>Differing understanding: GI is not an established evaluative concept, in relation to key principles of long term multi-functionality, multi-scalar connectivity, and inclusive GI provision.</p> <p>Anthropocentric intentions: the agency of GI is often missing in formal masterplan evaluations e.g. energy, overshadowing, microclimate, noise, and transport surveys do not consider the impact to and/or by GI.</p> <p>Weak responsibility: there is a lack of commitment to track evaluative recommendations about GI, especially during construction and in-use masterplan stages.</p> <p>Exclusion: the weak conceptualisation of 'inclusive' GI means that the distributive impact of proposals and knowledge of local actors are not considered in formal evaluative praxis.</p>	<p>Clarifying GI evaluative intentions: the broad intentions, principles and potential measures for GI evaluation need to be better defined for practitioners and formally integrated into BC.</p> <p>Recognising GI agency: further research is required to improve formal GI evaluative praxis, to better account for impacts <i>to</i> and <i>by</i> GI in different aspects of masterplan evaluation (energy, overshadowing, microclimate, noise, flood, transport etc).</p> <p>Assigning responsibility: masterplans should include a GI strategy that specifies how, when, by who and with what resources, evaluative recommendations will be enacted, monitored and responded to.</p> <p>Inclusive GI evaluation: the distributional impacts of decisions relating to GI should be evaluated, including a more deliberative process engaging local actors in formal evaluation (e.g. ecology, landscape, tree, over-shadowing surveys) and encouraged in BC.</p>

deprioritised in favour of more dominant intentions, and *static* transitions, where evaluation has no effect on the masterplan process. Regressive and static transitions suggest that practitioners are locked into certain ways of doing practice, making them less likely to respond to evaluative information that diverges from more familiar practices (Gluch and Bosch-Sijtsema 2016; Heeres, Tillema, and Arts 2015; Schweber 2013). Based on this study, practitioners' responses to evaluative practice were more commonly 'locked-in' and resistant to change. Thus, rather than expecting to incentivise change through a voluntary standard, such as BC, it may be more important for BRE and others to examine alternative ways to affect these 'habitual' practices. For example, targeted training and education programmes (Schweber and Haroglu 2014; Bell and Morse 2013) could aim to deepen a more culturally-embedded response to GI in neighbourhood masterplans, especially for non-specialist practitioners.

Third, the study points to more specific limitations in the BC standard, set within the context of dynamic and collaborative masterplan processes. All the formal evaluative practices and the practitioners' responses to them, in relation to the subordinate treatment of GI intentions, were very similar in each of the case study sites, regardless of the application of BC. Once planning permission had been achieved, there was also little to no reference to the BC standard in any later documentation. As such, whilst BC helped developers to legitimise (Schweber 2013) their proposals during planning applications (Schweber 2013), it did not play a transformative role in how the plans were evaluated and delivered. Establishing a clear monitoring and evaluation reporting framework at each masterplan stage, with assigned resources, would enable BRE to ensure applicants take responsibility to track evaluative intentions throughout the

process (McDonald *et al.* 2005). This could be achieved by introducing a new mandatory requirement in GO 01 – Governance on ‘reporting delivery’.

More fundamentally, BC currently ignores the dominant evaluative practices (e.g. cost control and value engineering) where key negotiations occur between different evaluative intentions, particularly during detailed masterplan design and construction phases. As one BC assessor (RUE 1) pointed out, developers lack short-term benefits to invest in longer-term intentions, such as relating to GI:

Where you’ve got a developer who’s going to retain ownership of properties on the site and have a long-term interest in [sustainability] then I think that approach would be so much easier. The big difficulty is where you’ve got the volume homebuilders who are just geared up for buying a site, building and leaving. They have no stake in it whatsoever.

This means the BC standard does not adequately address ‘the reality’ of masterplan processes (Vlaar, Van den Bosch, and Volberda 2006). A new BC issue regarding financial evaluation could incentivise a more open and longer-term mindset when negotiating conflicting evaluative intentions (Jarzabkowski 2010). This could be applied alongside a reduction in credits if prioritisation of one issue results in a negative impact to another. Other neighbourhood sustainability standards, such as the Australian Green Star Communities, include financial reporting requirements. Some organisations adopt developed triple-bottom-line reporting frameworks, such as the ‘G4 Construction and Real Estate Sector Disclosure’ framework (GRI 2014) to improve accountability decision-making. It would be valuable for future research to examine the degree to which altering financial evaluative practice, such as adopting the GRI framework, impacts on the negotiation of differing intentions by the developer.

6.1. Conclusions

A central theme in this study is the need to clarify how and whether evaluative practices are an embedded part of the masterplan process, making sustainability intentions more visible and influencing masterplan decision-making (Schweber 2014; Vlaar, Van den Bosch, and Volberda 2006; Bowker and Star 2000). The research suggests that increasing evaluative embeddedness requires the clear definition of evaluative intentions (Jarzabkowski 2010) to improve negotiation between different intentions (e.g. ecological connectivity, social inclusion, cost minimisation and hard infrastructure) with the aim of building complementarity and reducing conflict (Holland 2014). It also requires allocating clear responsibility including reporting requirements and resources throughout the masterplan process (McDonald *et al.* 2005), to rebalance GI intentions against more dominant intentions, increase accountability and promote a reflexive response to GI intentions during a project and beyond.

The empirical findings offer lessons of wider potential relevance for masterplanned neighbourhoods in England (and elsewhere). Although the findings of this study are specific to the six case study sites, the evaluative practices applied were similar at each site and others have outlined similar concerns about how GI is understood, evaluated and implemented (e.g. Cormier *et al.* 2017; Davies *et al.* 2015; Gschwandtner 2013; de Groot *et al.* 2010). The UK government’s 25-year Environment Plan calls for

the creation of ‘more green infrastructure’ in our towns and cities (HM Government 2018, ch.3). There is a need, however, to be much more specific about what GI is and what it is for, in planning and development policies and practice in order to encourage developers and authorities to take greater responsibility over effective GI delivery.

As a caveat, further research would be needed to clarify whether the above findings and recommendations resonate with masterplan implementation more generally in England and further afield. Nonetheless, masterplans as strategic place-shaping processes also need to be better understood in the context of GI evaluation, planning and management. The idea that a single masterplan can support the achievement of some utopian definition of an ideal ‘sustainable neighbourhood’ in any case has also been debated (Falk and Carley 2012; Carmona *et al.* 2010; Alexander, Ishikawa, and Silverstein 1977). Some are concerned that adopting a rigid masterplan framework, including evaluative practices, limits opportunities for emergent design attributes and, as a result, excludes those who do not fit neatly into an idealised notion of a neighbourhood or community (Campbell 2011). Others argue that a broad masterplan vision could be valuable to help clarify the relationship between people and the built environment and consider how different forms of urban design could positively improve that relationship (Hollis 2013; Larice and MacDonald 2012). Future research could examine how changes in the evaluative practices involved in masterplan processes might better affect material outcomes. For example, there could be a study of developers who had adopted triple-bottom-line reporting at each stage of the masterplan process, to examine whether that affected the negotiation of different intentions by key decision-makers. In addition, sector-wide consultation could be conducted to test the wider relevance of the recommendations. Such additional research would also help to ameliorate any participant or observer bias that may have occurred in the implementation and analysis of the case study interviews and documentation.

Most of the interviewees in this study recognised that it was unlikely that a single harmonious masterplan solution could be formulated that addressed all intentions equally and simply put, made everyone happy. Sustainability intentions, including those relating to GI, often lack more immediate and tangible benefits that would incentivise a developer to take greater responsibility (Abidin and Pasquire 2007; Vlaar, Van den Bosch, and Volberda 2006; Bordass 2000). A voluntary normative standard, as illustrated in this study, can only go so far in incentivising a longer-term mindset by dominant decision-makers (Schweber 2014). Even if BC were required by planning or regulation, external factors, such as restricted public sector capacity (Innes and Tetlow 2015; UK Urban Task Force 2005) can limit the impact of such rules and norms. In an era of austerity, collaboration between all stakeholders, including BRE, will be very important to further embed GI evaluation, reframe dominant evaluative design and construction cultures in masterplanning, and help achieve sustainable neighbourhood outcomes.

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