Green infrastructure implementation: perspectives from English planners.

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Green infrastructure (GI) has increased in prominence in urban planning due to its environmental, social, and economic benefits. These include climate change adaptation and mitigation, biodiversity enhancement and benefits for human health and wellbeing. Drawing on research findings from semi-structured qualitative interviews with English planners implementing GI in residential development this paper aims to explore: the support for GI implementation provided by the policy frameworks; the impacts of the regulatory planning system and; the influence of urban planners' knowledge and the value they place on GI. Our findings suggest key challenges in implementing GI through planning process include: lack of policy synchronicity and weak evidence bases, attrition of GI through a discretionary regulatory process and issues with GI competing for recognition and resources within organisations with multiple policy aims. We identify how planners are using their knowledge and value of GI to mitigate these challenges, and that further research is required to explore the development of planning cultures in relation to GI.Key words: Green infrastructure, spatial planning practice, qualitative study.

Introduction

It is estimated that by 2050 68% of global population will live in urban areas (UN 2018). Urban capacity limits mean that urbanisation will require the use of previously undeveloped or 'greenfield' land as well as urban intensification (Austin 2014). The ecosystems services provided by green infrastructure (GI) make retrofitting and developing new GI a critical component of new urban provision (Khoshkar et al 2018, Mell 2021) to mitigate the environmental impacts of development and provide social infrastructure (Austin 2014). Urban planning (planning) plays a key role in the delivery of GI (Zuniga-Teran et al 2020) and the role of practitioners and the wider implications of their role in planning process are recognised (Sheppard & McClymont 2021) yet there has been little research into how urban planners (planners) facilitate this

process. (Cowell et al 2020). Drawing on data from qualitative interviews with English planners this study contributes to addressing this gap. The article explores three key aspects of the planning process: the efficacy of policy frameworks; impacts of the regulatory system and; planners' understandings of and the value attached to GI.

Firstly, a literature review establishes the current understanding of GI and its role in urban development and outlines the English policy and regulatory context. The research methodology is then presented, followed by an analysis of the findings, the discussion and conclusion. The research enriches existing knowledge by exploring planners' perspectives on delivering GI through the English planning system and identifying the significance of their role in delivery including wider implications for GI policy implementation through planning.

Understanding Green Infrastructure

This research employs the European Commission's definition of GI (EC 2013a) as comprising: green and blue elements; 'natural', 'semi-natural' and designed components; connectivity between and across spatial scales; place and context specificity; and multi-functionality, including the provision of environmental, social and economic benefits.

These benefits are increasingly conceptualised as ecosystems services (Lennon and Scott, 2014; Hansen et al 2015; Schubert et al 2018; Matsler et al 2021). Environmental benefits include biodiversity protection and enhancement (Hansen et al 2019), and climate mitigation and adaptation (e.g. Demezure et al. 2014). The social and wellbeing benefits include: the visual integration of new development into the wider landscape and urban context (Nikologianni et al 2019); the provision of green space for recreation (Lennon et al, 2017), including active travel (Coutts 2016); opportunities for human nature contact; and contributing to place attachment and social cohesion (van Vliet & Hammond 2020). Economic benefits stem from addressing issues such as flooding, and the value of development arising from the aesthetic and quality of

life benefits (Wright 2011; van Vliet and Hammond (2020). This potential contribution to urban development makes it vital to promote GI through planning (Zuniga- Teran et al 2020).

Mell (2017) discusses the consolidation of GI as a global and holistic construct but identifies a dislocation between GI as a set of globalised principles and its embedding in national policies, including planning policy (Mell et al 2017; Schubert et al 2017; Szulczewska et al 2017, Hoover et al 2023). Countries tend to emphasise different functions of GI, e.g. stormwater management in the USA (Hoover et al 2023); real estate and sponge cities in China; and greenspace in Europe – causing conceptual ambiguity (Mell et al 2017; Mell and Clement, 2020, Mell 2023). This dislocation is exacerbated by sub-national GI narratives (Matsler et al 2021, Hoover et al 2023) where multiple disciplines engaged with individual functions of GI adopt different terminology, including greenspace planning, urban ecology, and water management (Mell et al 2017, Hoover et al 2023). Whilst this can cause confusion and fragment the potential benefits of GI it also means GI can act as a bridging concept between disciplines enabling the delivery of multifunctionality and responsiveness to varying funding regimes (Callway et al 2019; Hislop et al 2019; Mell and Clement 2020).

Planning context for GI

Though spatial planning systems share many characteristics they have locally specific aspects (OECD 2017). In the UK, the wider context within which English planning sits and shares key characteristics, planning's role is to shape future development patterns into what Cullingworth et al call "publicly desirable directions" (2015, p7) which are set out in planning policy frameworks and used to regulate individual developments. Planning is therefore well placed to facilitate the delivery of multifunctional GI in new development. Antecedents of GI, including green space and networks, emerged early in English planning history; initially through the Garden City movement, then through modernist landscape planning and more recently new urbanism (Hebbert, 2008). It has been expressed strategically through Green Belts, green wedges and greenways and green space provision (Mell 2019). The planning narrative traditionally focused on the social benefits of GI through amenity i.e. Recreation, liveablity and aesthetics. Since the 1990s

approaches to GI have expanded this narrative. An initial re-framing assimilated health and wellbeing objectives including contact with nature; active transport facilitation; social interaction and facilitating sense of place (Hansen et al 2019; Lennon et al 2017). Framing GI using ecosystems services has then assimilated health and wellbeing and aesthetic foci with urban ecology and water management (Lennon and Scott 2014). This evolved construct is now used to encourage a wide-ranging and proactive approach to environmental protection and enhancement (; Hoover et al 2023, Mell 2023)

In the English regulatory system, as in the wider UK, individual developments require planning permission from the state either at the national level or at the local level by the Local Planning Authority (LPA) . Evidence based local development plans (LDPs) (NPPF, 2012, para 31) are designated in statute and provide a strategic spatial and decision-making framework to guide development but are not legally binding (Cullingworth et al 2015). The role of the LDP includes translating national English policy to the local context and reconciling power struggles and competing interests. Since 2012, the requirement for GI to be delivered through the planning system in England comes from the National Planning Policy Framework (NPPF) which provides government guidance on the policy direction for LDPs (Cullingworth et al 2015; Hislop et al 2019). In some (LPAs) more extensive GI policy is also included in statutory, topic-based, Supplementary Planning Documents (SPDs) and Area Action Plans (AAPs). In larger scale development, GI can be incorporated into masterplans, which cover the strategic vision through to the detailed design (Cullingworth et al, 2015; Callway et al 2019). LDPs can be informed by Local City Region- GI strategies, and function-based strategies (e.g. biodiversity and flood management). This provides the opportunity for a more integrated, multi-sectoral approach as well as providing an evidence base for decision making (Mell, 2019; 2021). LDPs can allocate land for GI, and include standards for specific GI components e.g. open space, but national guidance on standards for GI provision (Natural England 2023) had not yet been published.

Decisions on development applications are made in accordance with LDPs and material considerations (other locally relevant issues). While not as strong as the policy in LDPs, SPDs and AAPs are a material

consideration in decision making and more advanced and national policy compliant emerging plans are also given weight in decision making. Applications can be submitted and decided in full, or with the principles of the development granted through outline permission, and the detail, including GI, negotiated and confirmed at a later stage through a further full or reserved matters application. Each application is decided on its merits (Tewdwr-Jones, 1999; Harris, 2010). The system involves a high degree of 'equitable reasoning' (Booth 2016 p 354) and administrative discretion in its operation (Tewdwr-Jones, 1999; Harris, 2010;). Development decisions are the responsibility of politicians on the advice of, and often delegated to, planners. Planners recommend decisions within parameters provided by Government Guidance, national and local policy and case law (Gov.UK 2024) but exercise 'non routinised judgement' (Vigar 2012) and professional discretion (Booth 2007; Tewdwr-Jones 1999). This differs significantly from e.g. the main European tradition of a regulatory zoning system where planners may be more compliance orientated (Catney and Henneberry, 2012; Booth 2016; Clifford, 2018). Discretion should enable planners to respond to context and innovate in the delivery of GI as well as mediating between competing interests (Catney and Henneberry 2012; Clifford 2018). For example, they can: negotiate with developers in pre-application discussions; attach legally binding requirements for specific GI features and functions through planning conditions and; negotiate concessions from developers, known as 'planning gain', that are directly related to the development and benefit local communities. (Greed & Johnson, 2014; Mell 2019; 2021).

The dislocation between global, holistic understandings of GI and its interpretation in practice in national and local policy is echoed in its translation from policy objectives to spatial outputs, or GI 'on the ground', and there is emerging research that provides some understanding of this 'slippage' (Parnham and Jones 2021, Hickman et al 2021, Hoover et al 2023). The way GI is understood and valued by stakeholders in the planning system is important in determining how well GI is embedded into planning policy and subsequently incorporated into new development (Callaway et al 2019; Hislop et al 2019; Willems et al 2021). This may result in the delivery of some GI features and functions but to the detriment of others, particularly multifunctionality and connectivity (Callway et al 2019; Willems et al 2021). This is

compounded by a lack of funding, time and expertise to produce the necessary evidence base to inform plan production and support implementation (Mell et al 2017; Scot et al 2017; Gallent et al 2019), and to monitor delivery (Callway et al 2019). There are also challenges in financing the delivery and maintenance of GI in developments (Mell 2021; Willems et al 2021; Zuniga-Teran et al 2020).

A series of studies indicate that issues arise from the discretionary nature of UK planning (Catney & Henneberrry 2012; Gallent et al 2019). GI is one of many, often competing, policy concepts being factored into decisions by planners (Hislop et al 2019; Hansen et al 2019; Mell 2019), with GI policy often seen as weak, with no statutory basis (Scot et al 2017;), and dominated by economically driven, measurable and statutory priorities (Lennon 2015; Clifford, 2018; Scot et al 2017). Compromised GI occurs at both the consent stage and through the downgrading or loss of specific GI features post-planning permission as planners and developers negotiate on grounds of viability, cost constraints and delivering competing policy priorities, especially housing numbers (Mell 2021; Parnham & Jones 2021).

Methods

Semi-structured interviews were conducted with twelve public sector planners based in local planning authorities (LPAs) and, in roles managing planning applications for housing development. Potential LPAs were selected based on: presence of medium/ larger scale development with the opportunity to include and enhance GI; peri-urban greenfield locations with pre-existing GI context and; speculative housing development, including standardised design (Carmona 2001). The final study covered three LPAs in England chosen based on willingness of the Head of Planning to participate, the availability of policy and context information and the agreement of planners in a range of GI delivery roles to participate. Study contexts, including the local planning policy, are summarised in Table 1. The planning contexts were established employing a review framework developed by Scot et al (2017) and Hislop et al (2019). The framework was based on: a) explicit GI policy, b) presence of individual GI components, and c) functions and used to identify and evaluate references to GI in in the policy wording of the Local Development Plan and supporting planning documents.

Table 1: Context

LPA	1	2		3
Spatial context	18,000 urban extension (1995 to 2030). Agricultural flood plain in strategic blue/green corridor.	600-1800 house developments. Peri-urban sites in gently undulating, partially wooded, post-industrial landscape.		600-1800 house developments. Rural sites in open rolling landscape.
Delivery	Public private partnership	Private		
Adopted plans	1987 Structure Plan -Green space principles with concept sketch focusing on suburban character	2011 Adopted LDP with implicit concept of multi- component multi-functional GI		2000 Adopted Local Development Plan. Green space dominates with some multi-functionality
Supplementary and emerging policy	2016 Area Action Plan requiring multi-functional/multi-component GI to inform emerging Local Plan	2018 Draft Local Development Plan embedding multi-functional/multi-component GI.		Emerging Local Development Plan embedding multi-functional/multi-component GI

Potential participants were identified through the Heads of Planning and then contacted by email. A summary of the interviewee roles is provided below in Table 2.**Table 2: Interviewee roles**

Interviewees are identified by primary role/s as opposed to job title to ensure anonymity.

	LPA 1	LPA2	LPA3
Role	Interviewee identification		
Policy interpretation	I1*	I5	I9
Application management	I2	I6,I7	I10,I11
Design advice	I1*	I8,I12*	I12*
Project management	I3,I4	n/a	n/a

*These participants identified two key roles or worked across LPAs.

Semi-structured interviews were used to understand participant's experiences and identify study specific phenomena (Bryman 2012). An interview guide was developed including questions on: role of participant; impacts of English national and local policy, guidance and data bases ; approaches to negotiating GI; support from stakeholders; knowledge and understanding of the value of GI and ; opportunity to raise other relevant issues' Three pilot interviews were conducted and the guide adjusted in response to ensure a balance between comparability and individual perspective. The study was given ethical consent by [Institution].

The interviews were face to face, lasted between 120 and 180 minutes and were audio recorded and then transcribed. Thematic coding was used for analysis. The first stage used a deductive approach (Bryman 2012) using theoretically informed themes based on the analytical framework and research aims. Inductive analysis was then used to identify themes emerging from the transcripts (Flick 2014). The final stage

involved a review for differences and commonalities between the interviewees and identification of key shared themes. Three final themes emerged from interviews. The first two related to the challenges faced by planners from the role of policy frameworks and regulatory system and the third to the planners' knowledge and value of GI. The analysis combines the data from all interviewees across the LPAs but foregrounds the LPA or development context or interviewee role where relevant. Quotes from individual interviewees were selected that best articulated the wider view and were nationally relevant or presented different perspectives and pertinent insights.

Planners' perspectives

Consolidating policy frameworks

The first theme relates to planning policy's role in providing support for implementing GI. Echoing Hislop et al (2019), and Mell (2019), participants recognised that policy provided them with a framework to enable them to engage proactively with developers throughout the application process. They also perceived the GI policy landscape as evolving as expressed by I10 *we've got a green infrastructure chapter in the emerging local plan so that helps ……there is much more drive towards the protection and provision of GI in the emerging local plan'.* There was, however, ambiguity about the efficacy of the existing GI policy frameworks with participants relating a series of challenges.

A key issue not noted in existing literature, was that planners were bound by outdated adopted policy. This often focused on 'green space' or 'nature protection' that pre-dates the consolidation of GI as a policy theme (Mell, 2019). I11 summarises this in relation to their 2004 policy: '*our policies are quite out of date'.* For planners in the first LPA this was magnified by the extensive timescale for building the urban extension. Masterplans were developed in parallel with the renewal of outline applications to support the delivery of 'green networks but were bound by policy and outline application from the 1990s. I1 summarised the impacts: …….*'the masterplan was restrictive as to how green space was interpreted … When we found we needed more the developer effectively came back to us and said this is what you agreed. Many times,*

between 2004 and 2016 we had people saying you should be going for more urban green space and we had to say this is a reserved matters application – we can't rewrite history'.

Previous research identifies that GI policy is weakly expressed in comparison to other policy areas at the national and local level (Hislop et al 2019; Scot et al 2017) and the study identified a series of factors contributing to this. There was frustration at the speed of the conceptual development and adoption of local GI policy as expressed by CS2/4 *'I think it's moving up the agenda quite slowly, cos it's been around for a long time, the idea of SUDs (sustainable urban drainage systems) in particular'*. This was compounded by what planners considered a dilution of the importance of GI through the local plan making process, despite this being clear in national policy (DCLG 2012, MHCLG 2018, 2019, 2021), e.g.: '*The NPPF says that strategic policy should make sufficient provision for GI ……. but through the examination it's quite low down the pecking order'* (I9).

Mell et al (2017) found '*no universally accepted position' (p345)* on the most effective hierarchical level for GI policy. Research participants welcomed the conceptual development of GI in national policy which allowed them to plan holistically and strategically e.g. '*…because GI has such a broad definition in the NPPF … you're getting more ability to look at things comprehensively, at the bigger picture, which is good……..its shown people the linkages'* (I5). They also supported more detailed policy at the local level as providing planners the clarity and the '*hook*' (I11) they needed for implementing GI, as expressed by I5: *'You're getting broader policies, potentially less detailed policies and now I think we are starting to come back to potentially more detailed policies again'*. Hislop et al (2019) found that effective policy should embed GI throughout planning objectives, but our research showed that when not comprehensive this could leave planners crafting policy support from limited sources e.g. I8 '*… we tend to use out residential design guide to give us a firm footing as it talks about creating places with character so we can use that to help shape the development. We haven't got a specific green infrastructure document or guidance. We do have policy that covers the environmental aspects such as drainage and then green space'*. The preferred option for participants was a clear GI specific policy, e.g. I10 '*we've got a green*

infrastructure chapter emerging in the local plan so that helps', coupled with embedding of GI throughout local plan topics. For participants in the first LPA the development of an AAP with a strong GI policy and thematic integration was seen as bringing '…*everything together in a simple manner to bring development forward'* I4).

Previous studies e.g. (Mell et al 2017; Scot et al 2017) identified challenges in producing an adequate evidence base to support local GI policy, including: data dispersal across sources; inconsistent data; late stage consideration of detail; and lack of resources for comprehensive base production. Similar challenges associated with the linked issues of finance and resources were raised in our research, for example '*If you don't have the money you have to look at what Natural England have got, Magic website, ancient woodland inventory, Forestry Commission mapping, OS mapping and open spac*e' (I9). There were wider issues too with the consistency of both data and mapping '*there's loads of habitats out there that you don't know exist cos nobody's ever mapped them, you have an incomplete picture… and you find when you look at the data its inconsistent cos people have updated it at different times and looked at different things'* (I5). Some interviewees also highlighted the limits of scientific knowledge and consensus on data, as expressed by I11 '*gaps in scientific knowledge make it difficult as well. You'd be amazed how little consensus of view there was on things like ancient woodland'*.

Negotiating GI through a discretionary regulatory system

In principle a discretionary system facilitates the delivery of national GI policy while allowing flexibility to respond to local context and negotiate between different agendas (Catney and Henneberry 2012; Clifford 2018). However, the dominant experience of the interviewees was that discretion magnified the impact of competing agendas, both between and within the public and private sector, to dilute GI delivery. '*If you have a good local plan with detail and SPD (supplementary planning guidance) backing or a masterplan for a site, development agreements and there's money for it that can tend to be better. If you don't have these limits, almost prescriptive, you get situations where there is still wriggle room on sites'* (I5). This

showed that the fragmented policy landscape for GI impacts on its implementation through planning (Lennon, 2015; Scot et al 2017; Willems et al 2021). Interviewees reported developers perceiving GI primarily as eroding profit e.g. '*GI is either an afterthought or a cost for them… it makes the development less profitable'* (I6) and that discretion in conjunction with weak policy meant GI was '*nice to have in a way rather than a requirement'*(I11). In contrast to a narrative of housing developers vesting of power in a bureaucratic planning system (Gallent et al 2019) participants considered developers held the '*trump card'* (I11) due to government pressure to deliver new housing (Mell 2021). Planners also raised speculative house building, where a lead developer sells on smaller development parcels, as fragmenting delivery and changing the overall design, eroding GI provision; '*you get piecemeal development, … they want to squeeze in as many houses as they can, so you lose that strategic overview of the sites' (*I7). Planners felt they could not resist *'the design changes as they (the lead developer) negotiate with individual developers'* (I1*).* Finally, the impacts of the risk-averse approach of house builders in relation to innovation and costs (Callway 2019; Gallent et al 2019) was summarised by I11 in that ultimately developers wanted to *'shove everything in tubes and walk away'.*

The range of factors, in public sector agencies, discussed by Zuniga-Teran et al (2020) were mirrored in this study as inhibiting GI delivery. These include limitations to regulatory remit; long term co-ordination and maintenance responsibility; and finance, as illustrated by the approach of the Highways Authority to trees and swales. *'I've been told we don't maintain street trees; we don't understand trees, we don't do things that grow. It's not our area of expertise' …. they are collision hazards and block visibility*' (I2) and '*The highway authority won't want to adopt the swale that is involved with the management of private surface and roof water. So, another divergence of responsibility…. you have to design a separate roof and surface water system for the dwellings and the highway' (*I8). Resistance also came from other sections within the local authority, in particular re adoption, i.e. responsibility for funding of ongoing maintenance for GI: : '*there's an interesting tension that planning have identified it (GI) as important for amenity and resilience but at the same time parks and gardens run a mile if you want to provide more green space'* (I4).

Inherent features of the system were reported as causing issues in securing GI. Though pre-application discussions and supporting studies are encouraged in Government planning guidance (DCLG 2012) they are not mandatory and planners reported making decisions without full information and/or within very short time frames: *'The amount of applications we get where they've done no ecology studies or partial studies…It's a shame we can't have a more mandatory pre-applications and require more studies* ' (I10). The weakness of the evidence bases, usually noted at the policy stage (Mell et al 2017; Scot et al 2017) were also an issue at application stage resulting in planners, '*having to bring an argument together ad hoc every time looking at the evidence. This is the site; this is what we have got around it. Crafting an argument for each site takes time'* (I11). Finally, the practice of granting outline permission, followed by a detailed permission often years later, left planners bound by decisions that were now dated in their approach to GI. In the first LPA: '*residents were complaining about not having enough 'green space'. It was perceived that we could improve the green space so the local Councillors were saying there should be more green space, but we can't'* (I2). Even when implementing the GI agreed in the outline permission planners could still face resistance during further public consultation at the detailed application stage. 'There *was supposed to be a play space here and there was an application, but it was refused planning permission cos some of the localsin the area said, 'we like the (space) but we don't want children playing there''* (I1).

Planners' knowledge

To implement GI planners need to understand the principles, components and functions of GI and be able to adapt these to local context (Zuniga-Teran 2020). Though interviewees were not asked to explicitly define GI, responses evidenced a comprehensive understanding of GI as defined by the EC (EC 2013a). The need for '*connectivity between and across scales'* (EC 2013a) was recognised, as typified by I1 '*we try to thread it into the (master) plan throughout'* and I9 *'we develop the idea of a network and wider relationships'.* Participants demonstrated they were working with both existing GI networks and with the

design of new GI within the development. Slight differences emerged between the LPAs in relation to multifunctionality. In the first LPA it seemed GI was understood primarily as social, green or amenity space but then expanded to include environmental functions. Planners in the second and third LPAS appeared to have a more holistic view: *'We used to think about it in terms of parks and play spaces and now we think about it as green infrastructure, ……. In terms of how we practice we're certainly more wise to the fact that green infrastructure* is *a multi-functional thing. It's drainage, it's ecology, it's recreational space and it has intrinsic amenity value.'* (I8). This also illustrates interviewees appreciation of evolving conceptualisations of GI and how they were able to translate these principles to the spatial and economic context in which they were operating (Mell 2017). Some respondents were ahead of policy, shown by I6; '*What function does this site have in our ecosystem and the water catchment and the landscape and how can we fit the buildings, preserve all those functions, and still make it a nice place to live mental health wise, nice to look at, does all the other things it should do in terms of flood risk, getting around, waste collection'*. Planners felt isolated in this knowledge and found prioritising multi-functionality and long-term benefits of GI difficult against more immediate concerns of cost and risk of innovation, with not only developers but other public agencies. While planners and the Wildlife Trusts had different understandings of GI (Mell 2017) they shared an appreciation of the potential of multifunctionality, and provided an ally.

Planners used their knowledge to optimise strategies to deliver GI through a system where they felt in a weak position. The process of 'slippage', or erosion, between sustainability principles, plans and implementation, has been identified by Parnham and Jones (2021). Planners used the consent and post-consent process to retain, design and adapt GI to the application context and prevent slippage. They used technical knowledge to inform value judgements e.g. as articulated by I6 *'We work really hard to help them (developers) to move things around a bit and shape the development or offer us a trade off in a way that says you might not have got your prescribed amount of green infrastructure that the policy normally requires but instead you've got something worth having'*. They were looking for opportunities to creatively deliver GI e.g. (I11) *'.... You do sometimes get sites which have so many constraints on them either from*

drainage or flooding or the topography that you can insist on large areas of green space'. They used their knowledge of the planning and development process in combination with negotiation skills to identify the point at which they considered they had optimised GI. e.g. (I12) '*They'll go so far in terms of viability, and they'll always say they can't go a lot further than they initially said - but then they'll weigh up as to whether it's worth that to get the scheme approved'.* Beyond this the planners considered they would not get the support from policy, politicians, or the regulatory process if they wanted to refuse an application on the basis of insufficient GI provision (I10) *'We try and get the most out of it but you get to a stage where you've got to ask the question could we refuse this if they won't deliver anymore? Quite often the answer is you'd never succeed'.*

The views expressed by the planners appear to represent progress in understanding of not only GI but how planners are thinking about the relationship between planning and environmental protection from earlier studies e.g. Cowell et al (2020). In contrast to Catney & Henneberry (2012) this study found that planners are also prepared to take responsibility and accept risks in using their discretion to deliver GI.

Discussion

The interviews provided a consistent narrative of how planners negotiate to optimise GI within a context of weak and outdated policy contexts, impacts of the discretionary regulatory regime and the GI prioritisation within competing demands by both internal factors and wider agencies

Planning policy should provide a robust framework to support planners in decision-making on individual applications (Hislop et al 2019; Cullingworth et al 2015), however, planners in the study were operating within a framework in which GI policy is often outdated, ambiguous and dispersed (Mell and Clement 2020; Matsler et al 2021). GI is embedding in local policy, but this has been a slow process due to the English local plan making process, and some planners were in the position of having sub local level policy with more contemporary understandings of GI than the local policy it was subservient to within the planning hierarchy. Without specific policy targets or national standards for GI, planners were reliant on the NPPF

(2012) requirement for '*sufficient provision'* of GI. The definition of 'sufficient' relies on the robustness of local evidence bases to argue for provision, and a key finding from the study is that the evidence bases underpinning GI policy were inadequate. Planners were calling for both overarching holistic conceptual GI policy principles and for GI policy to be embedded throughout wider themes within plans. They were also advocating the introduction of GI standards, which have subsequently been introduced (Natural England 2023).

Planners faced several challenges posed by a discretionary regulatory system, which, ideally should facilitate flexibility and the ability for a negotiated, context-specific, planning response (Catney and Henneberry 2012; Clifford 2018). However, even if established in principle by policy, dilution and attrition of GI was expected as the planning process progressed. This has been identified previously in relation to design quality e.g. Hickman et al (2021) and Parham & Jones (2021), but not specifically in relation to GI. Contributory factors, in addition to policy issues, arose from the dominant housing need narrative, viability concerns and the speculative housebuilding model. Even when planners considered they had strong GI policy and evidence bases, GI remained at risk of losing out to other objectives either directly, e.g. increases in density to facilitate housing numbers and reduction in quantity or quality to address viability issues or indirectly as planning gains were prioritised for other uses such as education. Significantly, though not identified in previous studies, the two-stage decision making process for larger developments also contributed to the attrition of GI. Planners seemed unable to require applicants to supply evidence bases to support GI provision at the first or outline stage, but when they reached the second detailed determination phase, they found themselves either being constrained by the first decision, facing technical issues not identified earlier, or resistance to GI already agreed in principle. Thus, in combination with the lack of support from policy frameworks, and a two-stage application process, discretion risks dilution of GI provision in response to wider agendas. In contrast to the developer experience of the system as slow, uncertain and over regulatory (Gallent et al 2019), planners felt that they lacked the power and policy frameworks to effectively implement GI.

Planners also felt isolated in delivering multi-functional GI as wider actors, including other local authority departments, pursued single function remits. This was often due to financial issues, but also, as supported by Zuniga-Teran et al (2020), due to wider organisational remits and regulatory restrictions and a lack of knowledge and capacity to operate in a more multifunctional way or to explore innovative solutions. This is compounded by the silo approach inherent in the fragmented institutional landscape for the delivery of different components and benefits of GI (Scot et al 2017; Mell et al 2017; Willems et al 2021, Hoover et al 2023). Interestingly, of the wider agents of planning, community support (Khoskar et al 2018) could prove a significant factor in planners' ability to effectively exercise discretion in GI delivery, depending on whether communities saw development with GI provision as integrated with a loss of existing countryside, or the potential for new or enhanced GI provision as a gain

The research indicated planners to be active agents. Interviewees evidenced a high level of knowledge and understanding of GI though this varied, in terms of contemporaneity, possibly due to the era in which they received their planning education (Cowell et al 2020). Embedded within this holistic understanding of GI many participants still forwarded one function and in contrast to (Sheng et al 2023) in this context this was amenity space. This may be due to the historical context, familiarity or policy and standards support. Critically they placed a high value on GI and it was this combination of understanding and value that drove GI implementation. Where planners exhibited an advanced understanding of GI in an outdated policy context, they expressed frustration at waiting for policy to catch up but were also highly adept at drawing on disparate sources to support their case. Thus, rather than bureaucratically operating a system, planners interviewed were facilitators, substituting the lack of a clear policy remit, or prescriptive standards (Scot et al 2017), with ‘professionally generated’ goals. These were derived from a combination of the policy frameworks that were available, often sectoral and piecemeal, and the patchwork of evidence base and the principle of responding to context. Planners were also using site constraints as an opportunity and enforcing any relevant standards or regulations. e.g. re play space provision in support of wider GI. Critically, they appeared to be translating GI principles into both aspirational and achievable local outputs in parallel to the

policy hierarchy and then drawing on this work to implement proposals through the planning process. This was key in addressing the challenges of delivering multifunctional GI arising from competing stakeholders (Cullingworth, 2015) and the ambiguity in the conceptualisation of GI between planners and other professionals (Callway et al 2019; Willems et al 2021). Planners also appeared adept at using support from wider agencies, the community and political actors to judge the point at which the developer would exchange the financial gain secured through GI reduction for the certainty of securing a planning permission.

We found that the English planning policy context for GI is often outdated, constraining planners' ability to negotiate GI, but that it is evolving conceptually as new plans are produced; that a discretionary e system can be a hindrance to delivering GI in new residential development, compounded by the speculative house building model and fragmented policy and regulatory landscape; and that the knowledge and role of professional planners is key to negotiating the delivery of multifunctional GI.

Conclusion

This study aimed to understand GI implementation focusing on the perspective of planners through semi-structured interviews. We explored planners' perception of the support provided by policy, the impacts of the regulatory and the knowledge and value planners place on GI. Our participants provided a narrative of their perspective as key, if power curtailed, actors in GI implementation adept at pragmatically negotiating and optimising GI on the ground. Their understanding of the role of GI and the value they placed on GI were key factors in their engaging with this role. The research adds to the wider work on the global consolidation of GI in planning policy, albeit slowly and erratically, e.g. Nordh & Olafsson's exploration urban GI in Scandinavia (2021) and Gerlak et al study of in the United States (2021). In terms the policy-implementation gap identified by (Mell 2017,2021) the planners in the study share the key challenges identified in Zuniga-Teran et al's expansive study (2020) particularly in relation to design standards, the impacts of a discretionary planning regulatory system and wider single remit regulation system financeability and the lack of resource and spaces for innovation.

The key contribution of this study though is as a 'bottom up' (Nordh & Olafsson 2021) exploration that narrates how planning professionals are operating in response to the policy context and implementation challenges identified above. The role of planners in managing competing public and private interests and balancing environmental, social and economic objectives and political agendas is established, though this differs in nature and timing across different regulatory planning systems (OECD 2017). This study highlights the importance of planners' holistic understanding and technical knowledge of GI to act as integrators and optimise delivery. Particularly in a fragmented regulatory and institutional landscape where other actors have an externally or internally imposed more singular remits (Zuniga-Teran et al 2020, Willems et al 2021). Whilst this study did not explore quantitative GI outcomes it supported that individual actors could influence these (Willems et al 2021). In addition to the knowledge and role of the planner a further key finding is how planners craft and negotiate GI using a variety of resources. As noted by Gerlak et al 2021 professional actors can attempt, and are motivated, to fill the spaces in policy and regulatory systems, e.g. recently educated planners supplying a contemporary holistic ideology of GI and more experienced colleagues providing systems and negotiation knowledge as noted in the study. One of the drivers for this was the value planners placed on the role of GI. This supports that planning 'cultures' (Reimer & Rusche 2019) had emerged in relation to GI. This indicates that GI as an ideology within planning (Davoudi et al 2020) is 'sticking' even as some are starting to argue GI may have been stretched too far (Mell 2023)

Acknowledging limitations of time and place specificity, scale, that the participants were self-selecting and avoided political comment the study provides a unique perspective into how planners operate and indicates the importance and impacts of committed and informed professional actors who value GI. This suggests two directions for future research. Firstly, larger studies on how GI is embedded within professional education, particularly with the potential for exchange between planning education and practice (Healey & Upton 2010), and secondly further and expanded 'bottom up' studies exploring the role of knowledge, ethics and values and motivation within planning and wider professional practice

develop and support GI implementation. Further understanding of how planners in different roles are operating to promote GI within systems and the study of holistic systems could provide useful knowledge and 'bottom up' knowledge on how to adapt and improve those systems. Many of the factors challenging GI implementation are unlikely to improve e.g. financing and focus on the role professional actors and their cultures can mitigate these, is required to optimise the environmental, social and economic benefits of GI. **Acknowledgements**

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