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Placemaking and Blue Green Infrastructure for Liveable, Resilient Places: Insights from Dundee, Scotland

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Abstract

Climate change means that urban areas are experiencing more extreme weather events. Although effective, grey infrastructure solutions to flooding have been criticised for harming the environment, having a negative impact on place and not delivering social and wellbeing benefits. There is increasing interest in using natural elements, such as rain gardens and green roofs, in combination with a placemaking approach to facilitate solutions to flooding that deliver multiple benefits. However, the means to achieve this is poorly understood. This paper contributes to the limited knowledge base on how placemaking and adaptation measures can be integrated in urban areas to meet the needs of communities. This was achieved through research undertaken in the Dundee local authority area. This area faces threats from groundwater, coastal and surface water flooding and a range of socio-economic challenges. Findings from 24 semi-structured interviews with practitioners and community group members (CGMs) suggest that while placemaking and blue green infrastructure (BGI) can deliver multiple benefits, the realisation of these can be hampered by a range of obstacles. For example, a lack of clear consensus on who is responsible for maintenance and a preference for grey infrastructure solutions. Practical guidance is provided to help overcome the obstacles identified to enhance flood resilient and liveable places. This guidance will be particularly relevant to colleagues in academia, planners, policy makers and a range of practitioners with a remit in flood risk management, climate change and water management and the communities they serve.

Ethical Compliance: This study received ethical approval on January 30 2024 from the School of Humanities, Social Sciences and Law Ethics Committee at the University of Dundee, approval number UoD-SHSL-EES-

PGR-23/24-001.

Keywords: placemaking, blue green infrastructure, climate change, urban planning, sustainability

1. Introduction

In the United Kingdom, flooding events are anticipated to increase in frequency and magnitude because of climate change (UK Health Security Agency, 2023). This can have a significant impact on health and wellbeing (UK Health Security Agency, 2024). In addition, the economic impact of flooding can be significant, inundating properties and businesses, disrupting essential services and damaging infrastructure (Water Connect, n.d.). Therefore, it is essential to adapt to the impacts of extreme weather events caused by climate change.

Traditional approaches to flood management, such as sea walls, embankments and sluices, although effective, have been criticised for causing environmental harm and having a negative impact on place. Furthermore, they can overlook the social, environmental and cultural factors that contribute to resilient and liveable communities. This has led to a growing interest in utilising natural systems, such as blue green infrastructure (BGI) and a placemaking approach to respond to flooding challenges.

BGI is a nature-based solution that relates to the integration of naturalised water flows and green spaces in urban areas and acknowledges the importance of water in urban planning (Lamond & Everett, 2019, Sörensen et al., 2021). BGI utilises interventions such as road verges, play spaces, community growing spaces, living roofs and green walls to reduce flood risk (Nature Scot, 2024). Placemaking is a collaborative, creative and people centred approach to the design and development of the built environment (Project for Public Spaces, n.d.). It is concerned with environmentally, socially and economically sustainable development (Ellery et al., 2021). Placemaking is closely aligned with the theory of co-creation, which emphasises community engagement and the collective input of a broad range of stakeholders. While the focus of BGI is on the integration of blue and green spaces in urban areas and placemaking is a people-focused approach to improving the built environment, both concepts can provide social, environmental, economic and wellbeing benefits that enhance liveability. Thus, BGI and placemaking intersect in practice.

Liveability is a core concept in urban planning, encompassing the social, environmental, economic, physical, cultural and wellbeing effects that result from the growing trend of urbanisation (Paul and Sen, 2018). The Coronavirus pandemic increased the focus on liveability, highlighting the vital role of neighbourhoods to health and wellbeing, while also exposing the strengths and weaknesses of urban areas (RMIT University, 2020). Although liveability lacks a clear definition, it is broadly recognised as relating to the "living standards or overall wellbeing of cities" (Paul and Sen, 2018). This includes the health, happiness, social, cultural and economic impacts that arise from living in a place (Paul and Sen, 2018).

As the concept of BGI is relatively new, knowledge gaps remain concerning how placemaking can be combined with BGI to maximise liveability benefits and achieve climate resilience. For example, Nouri and Costa (2017) stated that while most of the international research community recognise that climate change adaptation is essential, there is limited understanding of how it can be integrated with placemaking. Similarly, Platt (2021, p. 144) points out that despite the urgency of addressing climate change within placemaking literature, this area has received scant attention. Likewise, Boros and Mahmoud (2021) argue that climate adaptation as part of placemaking interventions is not widely understood. Increasing our understanding in this regard is particularly urgent in Scotland, where policy is steered towards a placemaking approach to achieving blue green, water resilient cities to enhance sustainable, liveable places (Scottish Government, 2023; Scottish Government, 2021). Thus, research is needed to explore how placemaking can complement BGI to enhance climate resilience and bring liveability benefits, particularly within the context of Scotland's policy goals for sustainable, water-resilient cities.

This study utilises a qualitative, case study design to investigate how placemaking and BGI can enhance

resilience to flooding while delivering the social, environmental, economic and wellbeing benefits that enhance liveability. In doing so, it also revealed challenges in this regard. It achieved this objective through semi-structured interviews with community group members (CGMs) and practitioners in Dundee and Broughty Ferry, Scotland. The findings of this study inform a suite of recommendations to support the integration of BGI and placemaking to increase flood resilience while enhancing liveability in the two locations, contributing to the identified knowledge gap.

The data collected through the interviews was interpreted and compared with current research on placemaking and BGI, resulting in a critical interpretation of the data. Furthermore, rich examples of interviewees' quotations are provided. This allows the reader to judge how transferable the results are to their own contexts and settings (Younas, Fàbregues, Durante et al., 2023; Stalmeijer, Brown and O'Brien, 2024).

This paper will be of interest to policy makers and planners in Scotland, where there is a policy mandate to ensure a placemaking approach to achieving blue green, flood resilient places. In addition, it will be relevant to a range of professionals working with remits in urban and environmental planning, flood risk management, climate change and water management and the communities they serve.

2. The concept of placemaking

Placemaking is a nebulous concept that transcends disciplines and evades a clear definition and consensus on its purpose. It is linked to the cultural geography tradition of 'sense of place' (Lew, 2017). A sense of place influences how we view, understand and interact with the world (Russ et al., 2015). It is concerned with the attachments people have to a place and how place is experienced. Planners, community groups and a range of place-oriented organisations have worked to elevate the importance of place and its role in facilitating environmentally, economically and socially sustainable development (Ellery et al., 2021).

Reflecting this interest in socially sustainable development, a core objective of placemaking has been to design and develop places for people, focusing on their needs and acknowledging the importance of personal and community wellbeing (Beske, 2018; Moreira, 2021). There is also a growing interest in utilising placemaking to respond to urgent environmental concerns (Sachs Olsen, 2022; Nature Scot, 2022). For example, placemaking interventions which help to mitigate the impacts of climate change through flood reduction and water conservation (Nature Scot, 2022; The Land Trust, nd). Such interventions can lead to the creation of places where people can interact with nature and each other, contribute to a sense of place and enhance local identity and distinctiveness (Soga & Gaston, 2020). Placemaking can also have a positive economic impact, going beyond social and environmental outcomes (McKinnon & Schrag, 2020). For example, through the creation of commercial centres to attract business and to create an inviting environment that is attractive to tourists (Akbar & Edelenbos, 2021; Anderson, 2019).

To achieve these multiple and overlapping benefits, a collaborative approach to placemaking is fundamental (Campion, 2018; Meetiyagoda et al., 2023). In the United Kingdom, this is reflected in planning policy documents that call for collaboration between the various agencies involved in placemaking and the communities that placemaking efforts seek to serve.

2.1 The concept of BGI

The utilisation of BGI in urban areas can help to address global challenges, such as biodiversity loss and flooding (JNCC, 2019), fragmentation of natural landscapes (Donati et al., 2022) and limit temperature increase (Environment Agency, 2019). Furthermore, BGI can offer co-benefits for people through careful integration into urban areas (Newman, 2011). For example, through enhancing public spaces, improving access to urban greenspace, aesthetic enhancement and amenity benefits (The University of Nottingham, 2020). For instance, the water square in Benthemplein, Rotterdam, as shown in Figure 1, addresses flooding challenges in the area while providing a multifunctional public space. During dry periods, this area provides space for recreational facilities. During wetter periods, this area can retain excess water. Water channels

convey stormwater to the water square, creating a feature of interest and a sense of playfulness and planting introduces greenery into the area.

Figure 1: Rotterdam water square (author's image)

BGI can stimulate the economy by attracting leisure and retail spending, creating employment opportunities and attracting tourists (Natural England, 2008). It can also provide educational opportunities, promote environmental stewardship and contribute to cultural heritage (Gates, 2020; Newport City Council, nd; Waltham Forest Council, 2020). For example, the Rijnvliet food forest, near Utrecht in the Netherlands, which doubles up as BGI, is managed by residents, provides information on Roman history in the local area and provides educational opportunities to young people on the maintenance of blue and green spaces (bARK, nd; Landezine, 2022).

Careful integration of BGI in the built environment can also bring health and wellbeing benefits. Interaction with green landscapes can address a range of health issues, including obesity and cardiovascular disease, improve mental health and protect against dementia (Mell, 2019; Wade, nd). Spaces that utilise greenness to enhance aesthetics can help to encourage physical activity (Davis & Naumann, 2017). The impact of urban blue spaces on health and wellbeing is less understood, although it is acknowledged that water can impact olfactory, visual and auditory senses, increasing a sense of wellbeing (Townshend, 2022). Furthermore, health and wellbeing can be improved through actions to safeguard natural habitats. For example, through ensuring access to freshwater and food security (World Health Organisation, 2015). This underscores the complex and interconnected nature of BGI.

To achieve these goals, BGI demands a collaborative approach, with cross-sector collaboration between the various stakeholders (Consumer Scotland, 2022). Furthermore, understanding the social, cultural and economic context is crucial, making community engagement in the process essential (Everett et al., 2021).

2.2 Conceptual framework

While placemaking and BGI differ in their approach, these concepts intersect in practice due to their ability to deliver social, cultural, economic, environmental and health and wellbeing benefits while enhancing resilience to flooding. These benefits are essential in realising the principles of liveability (Saleh and Baper, 2023; Christy, Raissa, Sihotang et al., 2021). Figure 2 summarises the benefits of placemaking and BGI. This shows that both concepts can bring about an interrelated range of impacts that can enhance liveability. Figure 2 presents the conceptual framework of this study.

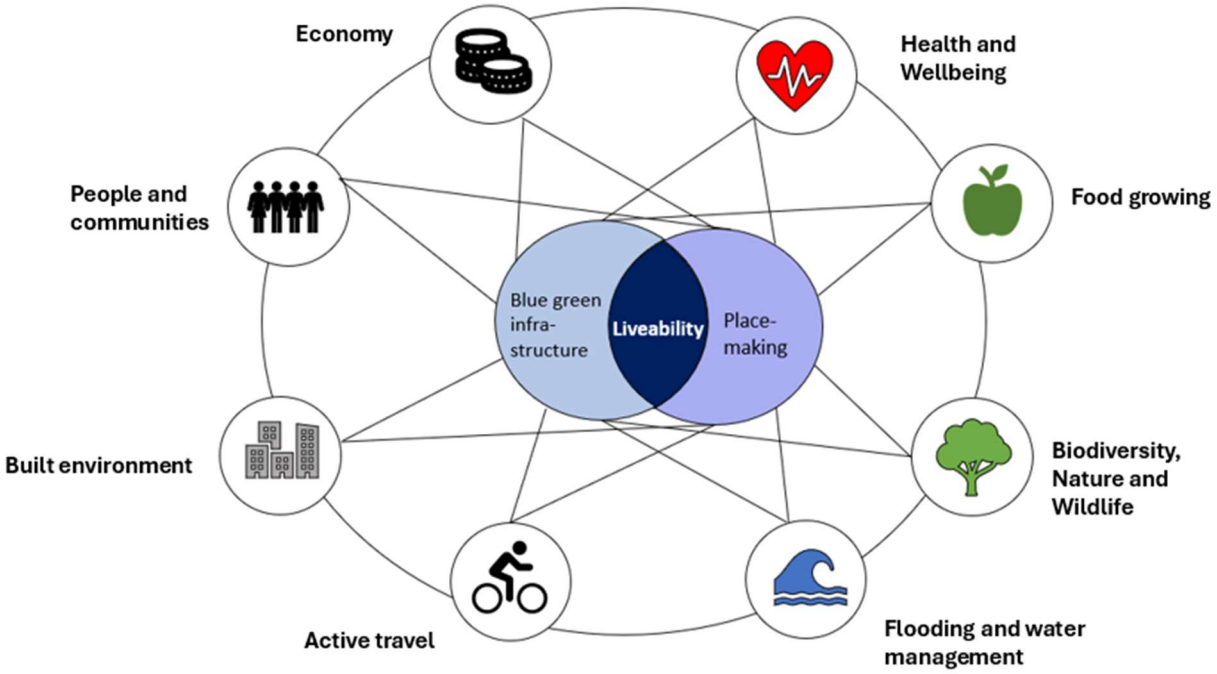

Figure 2: Conceptual framework showing benefits of placemaking and BGI (own work).

3. Methods

This study applied a qualitative approach to a case study design. A qualitative approach is utilised when little research has been conducted on a phenomenon and is exploratory in nature (Cresswell 2009). Case study research investigates a contemporary phenomenon in detail within its real-life context (Yin, 2003). This approach was appropriate for this study, as it is exploratory in nature, seeking to better understand the broad range of impacts and challenges associated with placemaking and BGI from the perspective of CGMs and practitioners in Dundee and Broughty Ferry. The purpose of this is to better understand how these concepts can work in combination to enhance liveability and the challenges to this. This section introduces the study area and establishes the approach to the semi-structured interviews.

3.1 The case study area:

Dundee and Broughty Ferry (Figure 3) face flooding from the Dighty Burn, which runs through the city, as well as from coastal and surface water flooding. Dundee has one of the highest levels of deprivation in Scotland, with 70 out of 188 data zones falling within the 20% most deprived in Scotland (Dundee City Council, 2022). The Broughty Ferry and Broughty Ferry Central neighbourhoods sit within The Ferry ward, which is part of the Dundee local authority area. Central Broughty Ferry has a high rate of mental health related hospital admissions and a large “percentage of people of working age classed as income deprived” (Dundee Partnership, 2020a). Additionally, Broughty Ferry Central and Broughty Ferry are the only areas within the Ferry Ward “where a percentage of the population live in a data zone ranked in the 20% most deprived in the crime domain” (Dundee Partnership, 2020a, p. 14). The cost-of-living crisis deepens these issues, with people routinely struggling to pay for essentials, such as public transport, utility bills and food (Dundee City Council, 2024). Thus, the need to address climate challenges, such as flooding, in ways that bring wider benefits to communities is particularly urgent in Dundee and Broughty Ferry.

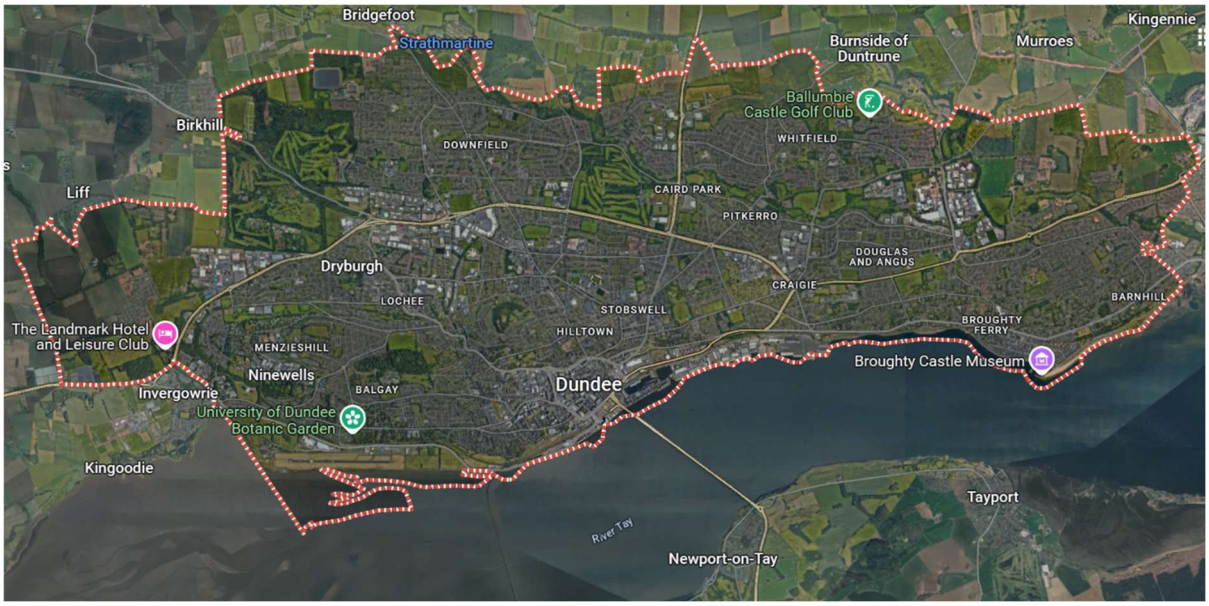

Figure 3: Map of the study area (Google, 2025)

3.2 Data Collection

A qualitative approach, utilising semi-structured interviews was applied to respond to the research objective. Appropriate interviewees are people who have detailed knowledge and experience regarding the topic of interest (DeJonckheere & Vaughn, 2019). Therefore, interviewees were selected using a purposeful sampling method, recruiting practitioners and community group members who had been engaged in placemaking and BGI in the study area. Table 1 provides generic descriptors for interviewee roles and community group remits.

Practitioners	
Participant ID	
P1	Urban planning
P2	Public greenspace projects
P3	Public greenspace projects
P4	Water management
P5	Support to community groups working on place-based projects
P6	Water management
P7	Climate change and sustainability
P8	Water management
P9	Economic development and policy
P10	Community engagement in place-based projects
P11	Climate change and sustainability
P12	Community engagement in place-based projects
P13	Community engagement in place-based projects
Community group members	
P14	Social and environmental interest
P15	Built environment and social interest
P16	Built environment and social interest
P17	Public greenspace interest
P18	Built environment and social interest
P19	Environment and wildlife interest

P20	Built environment and social interest
P21	Built environment and social interest
P22	Climate and environmental interest
P23	Environment and wildlife interest
P24	Public greenspace interest

Table 1: Interviewee details

All interviewees were contacted by email. 24 Interviews took place between February and June 2024. These were held using Microsoft Teams and lasted 40-60 minutes. Interviewees were informed via email that the interviews would explore their views in relation to the impacts of placemaking and BGI. A definition of these terms was provided to ensure that the interviewees had a shared understanding of the concepts.

The Teams video calls were recorded and transcribed manually. This allowed for in-depth immersion and familiarisation with the data. Interviewees were asked "what impacts do they feel placemaking can have" and "what impacts do they feel BGI can have". Follow-up questions were based on the key areas emerging from the literature in relation to placemaking and BGI, outlined in sections 1.1 and 1.2. These were summarised into broad categories to avoid asking questions that were too specific, with the potential to lead interviewees to a particular response. The follow-up questions were as follows:

a) Impact on the built environment
b) Impact on the economy
c) Impact on health and wellbeing
d) What benefits to communities do you feel placemaking/BGI can bring?
e) Have you experienced any barriers or negative impacts of placemaking/BGI?

The concepts of placemaking and BGI were introduced as separate concepts, as opposed to asking interviewees about the combination of the two approaches. This was in keeping with the research objective which was to understand interviewees' views of placemaking *and* BGI in Broughty Ferry and Dundee, rather than simply their views on the combination of the two concepts. By doing so, the study benefitted from a nuanced analysis of the characteristics, challenges and opportunities of the two concepts. This allowed for a critical comparison with the existing literature, offering deeper insights into how each concept is experienced at the local level.

3.3 Data analysis

The interview transcripts were analysed using template analysis (TA). TA encourages a depth of coding that is more complex than other thematic approaches (King & Brooks, 2017). It involves "the development of a coding template which summarises the themes identified by the researcher as important in the data set and organises them in a meaningful and useful manner" (King, 2024). Analysis utilised a hybrid method of a deductive a priori coding template, with themes derived from the follow-up questions outlined above, combined with an inductive, data-driven approach which allowed themes to emerge from the data.

The themes derived from the interviews were interpreted and compared with current research into placemaking and BGI, resulting in a critical interpretation of the data. Furthermore, rich examples of quotations that reflect the themes are provided in the results and discussion sections. This allows the reader to judge how transferable the results are to their own contexts and settings (Younas, Fàbregues, Durante *et al.*, 2023; Stalmeijer, Brown and O'Brien, 2024).

4. Results

Following thematic analysis, ten key themes from the interviews were identified. This section presents these findings and positions them in the context of the literature on the impacts of BGI and placemaking. This will provide an opportunity to investigate how the findings align with or challenge existing research on BGI and

placemaking. This will facilitate a discussion on how the two concepts can work in combination to increase resilience to flooding in ways that enhance liveability and the challenges to this.

4.1 Health and wellbeing

Practitioners and CGMs noted that both placemaking and BGI could positively influence mental and physical wellbeing. For example, P1 noted that there is "a very strong connection between placemaking and health". For P7, placemaking initiatives can "change how we use public and outdoor spaces for our health". These comments show an understanding that placemaking can extend beyond the creation of aesthetically pleasing and functional places and underscores a perception that well-designed places can improve wellbeing. This concurs with scholarship on the impacts of placemaking, such as Zhou and Hatton (2024), who highlighted the deep influence of design on health and wellbeing.

Within discussions relating to both placemaking and BGI, practitioners and CGMs discussed the role of urban blue and green spaces as alternative settings for medical consultations. This theme highlights that both concepts can provide multipurpose blue and green elements that can be exploited for wellbeing objectives from the viewpoint of CGMs and multidisciplinary practitioners. This expands the findings of Mell (2019), who noted an increasing interest in green infrastructure from a range of professionals because of its ability to deliver a range of wellbeing benefits.

P15 and P16 both felt that people living in disadvantaged areas in Dundee and Broughty Ferry do not have adequate access to greenspace, which limits the positive health and wellbeing impacts this can have. This echoes the research of Bao et al. (2023), who found spatial variation in access to greenspace among disadvantaged communities. However, P9 felt that it was not the availability of greenspace that was an issue, it was that people from areas classed as deprived do not use their local greenspace. The views of P9 and P2 might explain this finding. For example, P9 expressed the view that some of Dundee's greenspaces have been associated with anti-social behaviour and P2 mentioned that "greenspace needs to be safe to encourage visitors". These observations reflect the findings of Wheeler et al. (2020), who also noted that the safety and perceived safety of greenspaces can impact their use.

4.2 People and communities

P4, P8, P13, P17 and P20 all discussed the ability of placemaking initiatives to provide a meeting space in the community, showing an opinion shared between practitioners and CGMs. P8, P12 and P13 felt that BGI could help provide a place to meet; thus, only practitioners felt that BGI played a role in this regard. This may imply that practitioners view BGI through a more multidimensional lens than CGMs. This also suggests that CGMs could have a less nuanced understanding of BGI and its benefits. Furthermore, it may reveal that the term BGI does not bring to mind the idea of a place to meet. This view is supported by P20, who said that it was "really important that we create urban green spaces where people could meet and enjoy outside of the home". In P20's opinion, it is 'green spaces' and not BGI that can provide a meeting space. Nevertheless, this view aligns with the wider literature that highlights the role of BGI and urban green spaces in facilitating social interaction. For example, urban green spaces can provide a natural meeting point that can help foster social interactions (Jabbar, Yussoff & Shafie, 2022).

P7 and P24 spoke about the ability of placemaking to enhance sense of place, strengthen place attachment and foster pride in place. P17 noted that placemaking "helped to create a welcoming atmosphere and made people feel part of the community". P24 spoke about the role that placemaking has in improving community cohesion. The views of P7, P17 and P24 align broadly with the findings of Erek and Krasznahorkai (2024) and Dash and Thilagam (2023), who acknowledge the pivotal role of placemaking in enabling community cohesion.

4.3 Active travel

Another overarching theme between placemaking and BGI is active travel. More specifically, walking and wheeling to connect places within Dundee and Broughty Ferry and nearby areas. P1 viewed BGI as being

“key to encouraging more active travel, more active lifestyles and reducing car dependency”. Similarly, P9 felt that the purpose of BGI goes beyond climate adaptation, to play a role in getting “people out of their cars and walking or wheeling”. P22 and P1 shared the view that places should be connected through active travel routes incorporating green elements. Two interviewees noted the importance of incorporating places to rest into active travel routes. This was felt to be an important element in supporting less able-bodied people to utilise them. This finding concurs with that of Olayode et al. (2025), who found that a lack of places to rest can impact the use of active travel routes.

The term ‘active travel' was utilised by two CGMs and four practitioners. This may imply that active travel is a specialised term that is more commonly utilised by professionals. Nevertheless, two more CGMs saw a role for placemaking in promoting walkability, which reflects the remit of active travel. These findings underline the distinction between how professionals and lay people use terminology such as active travel. This implies that such terminology may be jargonistic. This is reflected in the comments of P10, who said concepts such as “active travel, biodiversity and placemaking do not translate to what people see in the field”. Additionally, P10 noted that from experience, communities welcome the benefits and opportunities that concepts such as placemaking and BGI can bring. Nevertheless, from P10s perspective, communities can resist their implementation as they do not understand the terminology used by professionals. P10s observations echo an independent review of how the Scottish planning system engages with communities, which concluded that “technical language and unnecessary jargon” pose a barrier to delivery (Yellow Book, 2017).

4.4 Food growing

The utilisation of urban greenspace and BGI for food growing was a theme brought up by both practitioners and CGMs during discussions in relation to placemaking and BGI. For P9, placemaking should play a role in creating places where people can grow food. P19 felt that BGI could incorporate places to grow food, which could increase economic sustainability among communities. Likewise, P20 noted that BGI which provided a place to grow food “have a positive effect on families”, particularly for those “who struggled financially”. However, P19 argued that there appeared to be little consideration for what is planted within BGI projects and that “fruit trees” would be a valuable addition to future BGI interventions. This echoes the findings of Bohn and Chu (2021), who concluded that GI concepts often fail to incorporate elements of food growing.

P20 expressed the view that “we have literally dozens of apple trees that produce lots of fruit but nobody goes and picks them”. Although this comment did not relate to fruit trees as part of BGI, it does imply that fruit trees incorporated as part of BGI may be underused. P20s explanation for this was that there is a “disconnect between apples and supermarkets and apples on trees” and that “we’ve taught children there isn’t a connection between these”. This reflects the results of a survey by the British Nutritional Foundation, which found ignorance among children regarding the origin of food (Harris, 2013).

Although the previous paragraphs noted a role for placemaking and BGI in incorporating fruit trees, interviewees highlighted the possibility of resistance to trees from some members of the community. For example, P3 spoke from their professional experience, noting that people complain that leaves from trees can make the floor slippery. P3 and P23 shared instances of people complaining that trees can obstruct views. Thus, although there is recognition that placemaking and BGI can encourage community food growing to support environmental and economic sustainability, efforts to deliver in this regard may be met with resistance from communities.

4.5 Economy

The ability of placemaking and BGI to have an economic impact was a shared theme between CGMs and practitioners. P5 and P20 felt that placemaking could help attract and sustain local businesses. More specifically, P20 mentioned that placemaking initiatives in their community had “slowed the tempo of the place” which had “made people stop and spend money” in the local shops. P8, P9, P14 and P21 connected placemaking to an increase in tourism, which can lead to economic growth. However, for P12, this relationship was complex, as they spoke about placemaking initiatives in Dundee that seemed to be concerned with “attracting people with expendable income rather than serving the needs of existing

communities". This reflects frequently cited concerns in the placemaking literature that placemaking projects can lead to gentrification and displacement (Kim & Holifield, 2022; Rigolon & Collins, 2023). P1, P9 and P12 noted that small-scale placemaking and BGI projects could have an economic impact within communities. This shows the need to focus placemaking and BGI efforts at a local scale to meet the needs of existing communities.

4.6 Biodiversity, nature and wildlife

Only one practitioner, P4, and one CGM, P23, spoke about the connection between placemaking and biodiversity. This represents a low acknowledgement of the role of placemaking in enhancing biodiversity and shares similarities with the findings of Kirk et al. (2021), in that the non-human elements of placemaking can be overlooked. There was a stronger connection between BGI and biodiversity enhancement. For example, P8 felt that "BGI could definitely be a benefit for biodiversity and for bringing nature into the urban environment when there was zero habitat previously". P13 felt that the objective of BGI "was to help wildlife thrive". However, all interviewees spoke about the benefits of BGI and biodiversity in terms of non-human elements.

Interviewees spoke about the challenges to biodiversity enhancement through BGI. For example, P9 highlighted that "people think urban areas are not places for birds". P9 also reported that "when the council doesn't cut the grass, people complain", explaining that wildflower meadows have been viewed as a cost saving exercise by the council. This suggests a lack of awareness of the role played by BGI and related concepts among the wider community. This reflects the findings of Craig-Scheckman et al. (2024) who found a need to raise public awareness of these initiatives to increase their support. It also suggests that there is mistrust of council initiatives. This lack of trust can also impact support for BGI (Steadman et al, 2022).

4.7 Flooding and water management

The relationship between placemaking, flooding and water management was only expressed by P8, a water management professional. In contrast, the role of BGI in flooding and water management was more broadly acknowledged by both practitioners and CGMs. From a practitioner perspective, P9 highlighted that "there was a more positive approach to using blue green solutions to flooding in Dundee". However, P14 was concerned that there was a "reduction in some green spaces in Dundee" and saw this as a barrier to achieving natural forms of water management. Thus, while P9s comments indicate a move towards BGI, the observations of P14 suggest that opportunities for this to happen through existing greenspace are diminishing.

P6 provided insights from their professional experience in water management, explaining that "dunes are preferred to sea walls". This correlates with the results of Waylen et al. (2017). However, the comments of P8 and P23 contrasted with this, expressing the view that people prefer grey infrastructure solutions to flooding. P23 felt this was because "people see hard engineered solutions to flood risk as having instant effects". Bernello et al. (2022) also acknowledged a preference for grey infrastructure solutions among the public. Such entrenched viewpoints could hinder the acceptance of blue green solutions to flooding. Furthermore, P10 and P20 said that it could be difficult to change people's way of thinking, posing a further obstacle to the acceptance of BGI.

4.8 Built environment

P1, P14 and P17 all felt that BGI could enhance a place's aesthetics. Interestingly, given the prominence of water in BGI, P17 was the only person to discuss its impact on the aesthetics of the built environment. However, this may have been implied by P1, P7 and P14, although it was not expressly mentioned. Regarding placemaking, P9 and 21 shared the view that placemaking can help make people happier in the built environment. Similarly, P7 felt that BGI:

> Can create an aesthetically pleasing place, a place that people like to maybe spend time or a place that they're proud of. I think that it can be nice to have something that people feel a sense of pride

in and something that they enjoy.

These comments demonstrate that placemaking and BGI can influence emotional and psychological changes. P13 related the idea that a place could stimulate psychological and emotional changes to the concept of biophilia. More specifically, incorporating natural elements into the built environment would help people "to better connect with each other and nature". P13s comments reflect the discourse on biophilia, which acknowledges the role of natural elements in urban design to alleviate stress and support community interaction (Demorkol & Önaç, 2024).

P2, P9 and P13 felt that placemaking initiatives had to activate and define the built environment to be successful. P16 and P21 felt that the new beach at Dundee waterfront provided a successful example of this and was well used by communities. However, interviewees referred to less successful interventions that were not widely utilised by communities and were therefore perceived to be a failure. The importance of defining and activating public space is broadly acknowledged as a core objective of placemaking (Akbar & Edelenbos, 2020; World Bank, nd). Thus, the observations of P2, P9 and P13 align with the literature in this regard.

4.9 Community engagement

The importance of community engagement in placemaking and BGI was acknowledged by practitioners and CGMs. P22 linked the concept of community engagement in placemaking to ensuring that a place retains a sense of distinctiveness. In other words, placemaking should harness a community's knowledge of their local area to influence the development of the built environment. Similarly, P16 felt that incorporating the views of the local community was "fundamental to placemaking". Furthermore, when discussing BGI, P22 spoke about their role as a CGM and explained "involving local people can be a real game changer" in ensuring the local area reflects community needs and aspirations. The comments of P16 and P22 align with the findings of Lamond and Everett (2019) in terms of the importance of community engagement in placemaking and BGI in realising benefit provision.

However, for P24, some instances of placemaking in Dundee have "not considered the local context" as the opinions of local people were not considered in the process. Likewise, P16 shared an example of BGI in their community that would have been met with less opposition had the wider community been involved in its planning. This concurs with the research of Nobles and Moore (2024), who emphasised the role of community engagement in raising awareness of the benefits of urban greening and reducing opposition to its integration. P9 provided an insight from their professional experience in Dundee and Broughty Ferry, explaining that some people in the community felt that "placemaking was a waste of money". Although no reason was given for this, it may imply that communities feel they are not obtaining value from the intervention.

In terms of delivering placemaking, P10, a community engagement practitioner, explained that staff consistency was essential in ensuring trust between communities and practitioners. P21 felt that existing community groups played a valuable role in facilitating community engagement in both placemaking and BGI. Their reason for this was that practitioners tend to use specialist language, whereas "community groups speak to people in their own language". This suggests that community groups can be intermediaries in the engagement process, helping to simplify complex concepts and translating specialist terminology into terms that can be understood by community members, reflecting the findings of Mciver et al. (2007).

4.10 Barriers and challenges

Practitioners and CGMs noted a range of challenges to the successful delivery of placemaking and BGI. Maintenance was frequently cited by CGMs and practitioners as one of the main barriers to the successful implementation of both concepts, supporting O'Donnell et al. (2017). More specifically, that there is a lack of clarity on who is responsible for maintenance due to silo mentality, in keeping with the findings of Glaus (2021) and Campbell-Arvai and Lindquist (2021). Also cited was that lack of maintenance could negatively impact the successful operation of BGI and detract from its aesthetic appeal. Silo working was also reported as a hindrance to successful placemaking activities, reflecting the findings of Jackson (2018). However, this

theme recurred less frequently in the discussions around placemaking, suggesting that there is a more established way of working, or that any issues were not impactful enough to warrant highlighting.

5. Discussion and recommendations

Although the relationship between placemaking and BGI with liveability was not asked as a direct question, CGMs and practitioners explicitly acknowledged and discussed the relationship between these concepts. Practitioners in place-based community engagement, economic development, water management and climate and sustainability all acknowledged the role of placemaking in enhancing liveability. This indicates that, from a multidisciplinary perspective, placemaking can generate a wide range of liveability benefits. Likewise, CGMs from groups with a remit covering public greenspace, the built and natural environment and social wellbeing directly correlated placemaking with improving and enhancing liveability. This demonstrates that there is potential for joined-up working between practitioners and the different interest groups to deliver an integrated approach to placemaking projects that enhance liveable places. This joined up approach would help to deliver placemaking that is informed by the viewpoints of community stakeholders, resulting in initiatives tailored to the needs of the local area.

Only practitioners in water management, climate and sustainability made the direct connection between BGI and liveability. Nevertheless, CGMs did discuss the relationship between BGI and liveability in an indirect manner, by commenting on the range of benefits that BGI can stimulate, which echo those in the conceptual framework shown in figure 2. This suggests that, although the term liveability was not used by CGMs, there is still an implicit understanding and appreciation that BGI can enhance liveability. Further unpacking these findings, the lack of use of the term liveability among CGMs suggests that practitioners delivering BGI initiatives should carefully consider how they communicate the related impacts and benefits to communities. In other words, practitioners should cautious about using terms that may be considered jargon. The comments of P10, who noted that terms such as placemaking, active travel and biodiversity do not reflect what people see on the ground, also underscores the need to utilise a shared language between communities and practitioners.

While placemaking and BGI enhance liveability, they can also contribute to individual factors, such as health and wellbeing, economic vitality, environmental enhancement, social interaction and enhanced public spaces. For instance, BGI can contribute to a healthier lifestyle through the provision of active travel routes that incorporate green features, and placemaking activities can have an economic impact through their ability to attract and sustain local businesses. Focusing on the delivery of a single benefit, such as health and wellbeing, rather than aiming for broad liveability benefits, would allow for a more targeted intervention to meet a specific need.

Although there is a significant overlap between the benefits that can be generated by placemaking and BGI activity from the perspective of practitioners and CGMs, there are key differences between them. For example, practitioners saw BGI as being able to provide a focal point in the community. For CGMs, BGI was not directly associated with this concept. In addition, the ability of placemaking to contribute to a sense of place and community cohesion was a more common theme among CGMs. In other words, CGMs were more attuned to the cultural and social dimensions of placemaking. These findings suggest that the two groups may have different expectations from the same concept. In practice, this may lead to implementation challenges, underscoring the need to engage with communities to better understand their needs and expectations and to develop an appropriate approach. Furthermore, since combining placemaking and BGI could be resource-intensive, it is important to consider whether doing this is necessary to meet project needs. In cases where placemaking or BGI could effectively increase flood resilience, it may be more efficient to focus on that approach to reduce complexity and organisational burden.

The findings from the interviews also provide evidence for some of the implementation challenges highlighted in the literature. For example, that there is a lack of clarity regarding maintenance responsibilities that can impact the functioning and aesthetic appeal of BGI. There were also concerns about the intended

beneficiaries of larger placemaking projects. This suggests a greater role for interventions in addressing deprivation and the need for a deeper understanding of the specific social, cultural and economic contexts in which these projects are delivered.

Table 2 summarises the main contributions and limitations of placemaking and BGI from the perspective of interviewees. It also highlights opportunities and recommendations for the integration of placemaking and BGI which will lead to the maximisation of liveability benefits while increasing resilience to flooding.

Theme	Contributions	Limitations	Opportunities and recommendations
Health and wellbeing	Wide role for both concepts in delivering health and wellbeing benefits.	Unequal access to green space and safety of green space being a deterrent to community use.	A mixture of placemaking approaches alongside BGI, for example, hard and soft measures, such as good lighting, appropriate layout and place activation can help to change perceptions, create a safer place and encourage community use.
People and communities	Both concepts valued for having wider social benefits.	Placemaking and BGI as a meeting space only highlighted by practitioners, suggesting a limited appreciation for BGI in this regard.	Integration of BGI into placemaking to encourage social interaction and a wider understanding and appreciation of BGI to foster social interaction.
Active travel	Placemaking and BGI can encourage walking and wheeling.	The term 'active travel' is mainly used by practitioners, suggesting this term is not widely understood.	Replace jargon and technical terms with precise words. Be clear on the intended audience and tailor the communication method accordingly.
Food growing	Placemaking and BGI share the potential to address food poverty through community food growing initiatives.	BGI does not adequately incorporate edible elements	Ensure placemaking incorporates edible elements. Engage with communities in selection and location of trees to encourage wider acceptance.
Economy	Both concepts can foster economic development.	Placemaking can be viewed with scepticism and not addressing economic disadvantage.	Incorporate blue green elements into placemaking to unlock economic opportunities that their presence can generate in a more inclusive manner.
Biodiversity and wildlife	BGI was viewed as having a core role in biodiversity enhancement.	Limited expression of the role of placemaking in enhancing biodiversity. Role of BGI in biodiversity enhancement was expressed in terms of	Raise awareness that placemaking can enhance biodiversity through blue green interventions that can encourage human and non-human elements to thrive.

		non-human benefits.	
Flooding and water management	BGI widely acknowledged as having a role in flooding and drainage.	Limited discussion of placemaking's role in reducing flood risk from a CGM perspective.	Education and outreach in relation to the connection between placemaking, urban design and natural systems for flooding and water management.
Community engagement	Community engagement in placemaking and BGI is crucial in realising wider benefits while considering the local context.	Complex language and staff changes can prove a barrier to engagement.	Utilise community groups who can communicate with people in a shared language. Ensure staff consistency.
Built environment	Placemaking and BGI were perceived to enhance sense of place, aesthetics and foster pride in place	Placemaking must define and activate a space to achieve these benefits.	Engage with communities in the planning of placemaking to create meaningful spaces which are utilised by the community.

Table 2: Contributions, limitations, opportunities and recommendations

6. Conclusion

Climate change will result in increased rainfall and storminess, threatening many urban areas, bringing an urgent need to adapt to withstand these challenges. There is an increasing interest in understanding how placemaking can be combined with adaptation measures, such as BGI, to increase resilience to flooding in ways that enhance liveability, yet there remains a knowledge gap in this regard. Overcoming this knowledge gap is particularly pressing in Scotland, where there is a policy mandate to ensure a blue green, placemaking approach to delivering flood resilient, liveable places that deliver multiple benefits. This prompted research into the impacts of placemaking and BGI from a practitioner and community member point of view, undertaken through 24 semi-structured interviews in the context of Dundee and Broughty Ferry, Scotland.

The results of these interviews broadly supported the existing literature regarding placemaking and BGI, in that these concepts can deliver a broad range of liveability benefits. The results also aligned with the literature in that they revealed challenges that could impede the delivery of these benefits. Thus, while this research was conducted in Dundee and Broughty Ferry, the findings may have wider applicability.

A key difference between the concepts of BGI and placemaking among practitioners and CGMs is that CGMs have a less nuanced understanding of the multiple benefits of BGI. Furthermore, from the perspective of CGMs, placemaking is more closely related to delivering social, cultural and cohesion benefits. Therefore, in practice, it is essential to understand the goals of each project and the needs of communities to develop an appropriate approach. In other words, while there is a significant overlap between the concepts of BGI and placemaking, there may be occasions where it is sensible to prioritise one approach over another to help streamline delivery efforts.

The recommendations from this research support the integration of BGI and placemaking to enhance flood resilience while enhancing liveability in the two locations. These recommendations can be adapted to suit a wide range of contexts. Thus, this study has contributed to the identified knowledge gap in a way that has clear implications for academia, policy makers and a broad range of practitioners working with a remit in urban and environmental planning, flood risk management, climate change and water management and the communities they serve.

Contributor Statement

Author 1: Conceptualisation, Formal analysis, Investigation, Methodology, Project administration, Writing- original draft.
Author 2: Conceptualisation, Formal analysis, Methodology, Supervision, Writing- Review and Editing.
Author 3: Conceptualisation, Methodology, Supervision, Writing- Review and Editing.

Use of AI

AI was not used within this paper.

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Conflict of Interest

There is no conflict of interest.

Data Access Statement

Data supporting this study cannot be made available due to ethical reasons.

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