An Actor Network Theory Analysis of BREEAM Communities

Lewis J. Sullivan

EngD in Urban Sustainability and Resilience at University College London (UCL)

I, Lewis J. Sullivan, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Abstract

BREEAM Communities is a framework for assessing and improving the sustainability of the built environment at the neighbourhood scale. It is thought of primarily as a market-led, voluntary framework but is now being used by some Local Authorities in the UK as a requirement for planning applications of large developments. Previous research has mainly focused on comparing these frameworks to identify their strengths and weaknesses *on paper,* and sometimes to develop new frameworks. However, there has been less research on their development and implementation. This investigation looks to understand the ways in which BREEAM Communities interacts with actors across three interconnected phases in the lifecycle of the standard: its fabrication, its translation into particular development projects (often obligated by local planning rules and guidelines), and finally its attempts to influence development decisions, judgements, calculations, processes (and so on). This thesis hopes to increase sustainability practitioners' understanding of what the framework asks of development actors and why, how it is incorporated into planning policy and developments, the ways BREEAM Communities seeks to assess and influence neighbourhood sustainability, and how actors react to this new standard in practice. As such it has contributed to our understanding of how successful these sorts of third party, voluntary, market-led frameworks might be at delivering the improvements in the sustainability of new neighbourhoods. This thesis also contributes to our understanding of how ANT might be used to study these sorts of assessment frameworks that seem to act at the boundaries, supporting incremental (if any) changes to development networks.

Impact Statement

This project has made a number of observations and recommendations that should be beneficial to a variety of readers: researchers, those developing new sustainability assessment tools, policy makers, assessors, and those looking to improve neighbourhood sustainability more generally.

For researchers, the study's Actor Network Theory approach, focusing on translation of the standard and its calculative prescriptions, has yielded a detailed understanding of the actions BREEAM Communities asks of its users. Existing research has tended to focus on the technical scope and assumed outcomes, not the process. On the contrary, this ANT approach to studying BREEAM Communities' implementation has highlighted the messy, difficult, heterogeneous ways in which development actors seek to work with and resist the standard. It has also investigated whether ANT is a helpful approach for studying marginal or meek actors, such as standards that seek small improvements. These lessons in applying ANT have been discussed in a working paper and at several conferences.

For those developing new sustainability assessment tools this paper has made a number of recommendations to improve the process of development, the content of these tools, and their methods of application. For example, this study has argued for wider reaching consultation in their fabrication and made several recommendations for changes in the technical criteria. It has also shown the importance of the various roles of parent organisations and assessors. BRE is currently updating BREEAM Communities and the author has discussed results with the current scheme manager and attended an initial workshop; this engagement will continue after publication.

For policy makers and those wishing incorporate BREEAM Communities into Local Plans, this study has shown that this method can be successful in encouraging BREEAM Communities certification. It has also highlighted the work needed for this success and suggested reasons for failure. Similarly, for assessors this report has shown the importance of their role and the difficulties they face. I discussed the emerging results with some assessors and it is hoped the findings will be incorporated into on-going training and support given by BRE.

For those seeking improvements in neighbourhood sustainability, this paper has explored the extent to which BREEAM Communities can play a role in this in the UK. It has suggested

it can be a useful tool for making incremental improvements but that it fails to address fundamental conflicts that lead to unsustainability. The author has suggested a future research agenda that might explore this further.

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Introduction

Introduction

This thesis investigates the development and implementation of the BREEAM Communities sustainability assessment framework. Sustainable communities are viewed as essential parts of sustainable villages, towns and cities (Sharifi and Murayama 2014). Correspondingly, poorly designed neighbourhoods can culminate in social, economic, and environmental problems at larger scales. Therefore, improving the sustainability of new neighbourhood-sized developments is important in moving towards more sustainable places and cities. Sustainability assessment frameworks are one common method of achieving this (Joss 2012). Since the emergence of environmental assessment frameworks in the 1990s, such as BRE's Environmental Assessment Method (BREEAM) and the US Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED), efforts to assess urban[1] sustainability have been focused on the building-scale, on environmental sustainability, and on the physical features of the built environment that contribute to sustainability. More recently, however, tools designed for the neighbourhood- and city-scale have been published. One such tool, BREEAM Communities, is the focus of this study.

Report structure

This thesis is set out over 8 chapters and follows a traditional structure. The first four chapters set out the context, identifying the research gap and the theoretical and methodological approach.

Chapter 2: Literature Review, provides an overview of research on (1) the fabrication and implementation of standards, and (2) of sustainability frameworks, particularly around BREEAM Communities and other standards at the neighbourhood scale, and highlights gaps in this literature.

Chapter 3: Theoretical Framework, introduces Actor Network Theory (ANT), the theoretical framework for this study. It evaluates of the suitability of ANT for studying BREEAM Communities and develops a set of theoretically informed research questions.

[1] BREEAM Communities can be used in urban, peri-urban, and rural settings. For ease 'urban' has been used throughout this thesis.

Chapter 4: Methodology, describes the methodological implications of the theoretical framework and sets out the research procedure. It describes how ANT's mantra of *follow the associations* has been translated into practical steps in each of three *sites of action*. This chapter also describes those cases studied and provides a statement on the ethical considerations of this project.

These are followed by three analysis chapters, each presenting results and analysis of each site.

Chapter 5: BREEAM Communities and its Fabrication, describes the BREEAM Communities framework, looking at the way it structures information, the sorts and scale of development it assesses, and the actions it prescribes of its users. This is followed by an analysis of the development of the framework that sheds some light on how these elements were fabricated. This chapter provides background for the analysis in the following two chapters.

Chapter 6: BREEAM Communities into Policy and Practice, first follows the adoption of BREEAM Communities into planning regulations and guidance, and second, its adoption into several development projects.

Chapter 7: BREEAM Communities at Work, describes BREEAM Communities' attempts to influence the design and development processes of 7 development cases. This includes how it helps define sustainability for that place, how it forms part of emerging project teams, designs, and management processes, and how it sometimes fails at doing so.

And finally, an eighth concluding chapter.

Chapter 8: Discussion and Conclusions, discusses the possible implications of this research, suggests some recommendations for practice and theory, and directions for future research.

BREEAM Communities

BREEAM Communities is a tool designed "improve, measure and certify the social, environmental and economic sustainability of large-scale development plans by integrating sustainable design into the masterplanning process." (BRE 2013, 1). Broadly, it seeks to define procedures, levels of performance, and features of a sustainable urban

neighbourhood, and then to assess a development's level of achievement against that definition. Successful developments are awarded a certificate to authenticate and publicise their achievement. BREEAM Communities is published by Buildings Research Establishment (BRE) as part of a suite of similar tools for different urban scales and construction lifecycle stages. Their most well-known standard, BREEAM New Construction, was first published in 1991 to assess the sustainability of buildings. It was not until 2008 that BRE published BREEAM Communities, expanding the scope to the assessment of new neighbourhood-scale development. This framework was used in several projects in the UK and internationally with reasonable success (Venou, 2014; pilot work for this investigation also found this). The framework was then re-issued in 2012 after a significant re-working. This standard has been adopted by Local Authorities into local plans and guidance, and implemented in UK and international development projects. This new version is the topic of this study, which investigates BREEAM Communities in three stages in its life-cycle: its fabrication by BRE; its adoption into planning policy and urban developments; and its implementation by, and interactions with, development actors in seven cases in the South of England.

Frameworks (also interchangeably called standards within this report) for assessing the sustainability of *buildings* (as opposed to neighbourhoods) have been studied in various ways: the formation of these standards (Schweber and Harty 2010; Chandratilake and Dias 2013; Goulden *et al*. 2017), their implementation (Spinks 2013; Schweber and Haroglu 2014; Alwaer and Kirk 2015), their interactions with their users (Schweber 2013; Ismail *et al*. 2012) and the outcomes or impacts of their implementation on some aspects of sustainability (Lam *et al*. 2010; Lee, Young, and Denise 2010; Altomonte and Schiavon 2013). However, standards that look to assess and improve the sustainability of *neighbourhood*-scale developments are relatively sparsely covered in the academic literature. Research that does turn to these frameworks (such as Sharifi and Murayama 2014; Berardi 2013; Haapio 2012; Wangel *et al*. 2016a) have tended to focus on comparing and critiquing the standards; there has been a lack of attention directed towards their development and implementation. This is a concern because, despite the lack of evidence of their efficacy in promoting urban sustainability, they are increasingly adopted by private developers and planning authorities (Schindler 2010) to advance this goal. Understanding the ways BREEAM Communities seeks

to act in delivering neighbourhood sustainability is therefore an important missing piece in our understanding of these tools.

This paper seeks to investigate BREEAM Communities by tracing its interactions through its development and implementation in policy and practice. The study takes Actor Network Theory (ANT) as its theoretical lens. By following Latour's mantra to *follow the associations* (Latour 2005), this study looks to challenge assumptions about how BREEAM Communities might work towards sustainability. Instead of starting with a stable object of study, this paper begins by asking about the ways in which a framework is developed, and the principles by which that development is guided. Differences in these processes are expected to result in significant differences between frameworks (Joss *et al*. 2015). Moreover, it is well understood in the science and technologies studies (STS) literature that these differences are unlikely to be 'merely' technical, but generated through processes of social construction or heterogenous engineering where complex human and nonhuman relationships must be satisfied (Goulden *et al*. 2017). Understanding how BREEAM Communities has been developed, therefore, is also crucial component in our understanding of how and why it differs from its contemporaries, what it seeks to achieve, and how it seeks to achieve it.

Then, again, instead of assuming a uniform adoption into development projects, this paper then looks to understand how the different ways it is adopted might impact its eventual use in policy and practice. These frameworks are increasingly used by policymakers (and developers) to achieve environmental (and other sustainability) goals. If it is strongly incorporated into policy such that it becomes *obligatory* (Rydin 2012) it may be able to define those goals and the method of their achievement. In other words, the degree to which BREEAM is able to "monopolize the definition of what counts" (Schweber and Harty 2010, 668) as sustainability will determine (in some ways) the success of BREEAM Communities in a particular development. Therefore, understanding how it is adopted by policymakers and developers contributes to our knowledge of how the framework might integrate sustainable design into the masterplanning process.

The final part of this thesis describes the interactions between BREEAM Communities and seven development cases. BREEAM Communities is comprised of 40 assessment issues, each made up of several criteria, that themselves often reference further standards,

institutions, site elements, interest groups, and so on. The framework is also represented within a development by an assessor, who herself brings tools and techniques, personal and professional experience, biases, and so on. BREEAM Communities is not a monolith and its implementation is not straightforward. Again, the particularities of a development and this BREEAM Communities assemblage will result in difference in the resultant sustainability outcomes (Joss *et al*. 2015), yet this messiness is ultimately reduced to a single certification level. In attempting to expose the details in its implementation, this final section turns to the ways in which BREEAM Communities seeks to influence development actors and how it is resisted.

Chapter 2

Literature Review

Introduction

This chapter reviews literature on (1) the fabrication and implementation of standards and (2) sustainability assessment frameworks. The first section of this review puts this thesis' analysis of BREEAM Communities in the context of a more general discussion on standards and standardization. For this review, standards are seen as "any set of agree-upon rules for the production of objects" (Bowker and Star 2000, 150), and as such this wider view is important for understanding how BREEAM Communities might be implemented. Timmermans and Berg (2003) classify standards into four sub-types: Design standards, which define properties and features; terminological standards, which standardize meanings; performance standards, which set expected outcomes; and procedural standards, "which specify how processes are to be performed" (Timmermans and Epstein 2010, 72). Although sustainability frameworks have been characterised primarily as procedural-based standards (Wangel *et al* 2016; Ali-Tourdert and Ji 2017), BREEAM Communities could be seen as incorporating elements of each type and as such a broad standards literature is potentially relevant to this study. In summary, this section looks at the fabrication of standards; the ways standards are implemented by a range of heterogenous actors; how the individualism of these actors is limited by standardization; how that "erasure" (Timmermans and Epstein 2010, 83) of local contingencies allows for new courses of action, and how much erasure is necessary; how standards tend to be embedded or nested within other standard and across communities of practice; and how standards regulate while being voluntary.

This is then followed by a review of the current state of research around neighbourhood sustainability assessment frameworks. This literature focuses on the comparison and critique of these standards to each other and/or ideal standards of urban sustainability. The review seeks to understand what comprises these standards and the extent to which that literature can shed a light on the implementation of BREEAM Communities.

Method

This literature review has followed guidance on designing qualitative research (Marshall and Rossman 1989; Mann 1985). It has also looked to incorporate lessons from performing more formal, systematic literature reviews where appropriate (Hagen-Zanker and Mallett 2013; Kysh 2013). Although it is not a systematic review in the formal sense (e.g., its goals are to provide a summary and overview of the topic, not to answer a focused question and eliminate bias), by following a more formal procedure (outlined in Figure 1) and setting out the question, scope, search terms, and so on in advance, I hope to increase the chances of performing an effective review.

This literature review progressed through 8 stages, set out in the figure below. The author undertook an original review in 2013. Stages 3 – 8 of this process were briefly repeated twice over the course of the research programme as new issues became important and updates to the early reviews became necessary as new papers were published. This occurred in Summer 2015 as analysis of interview data was commencing, and again in

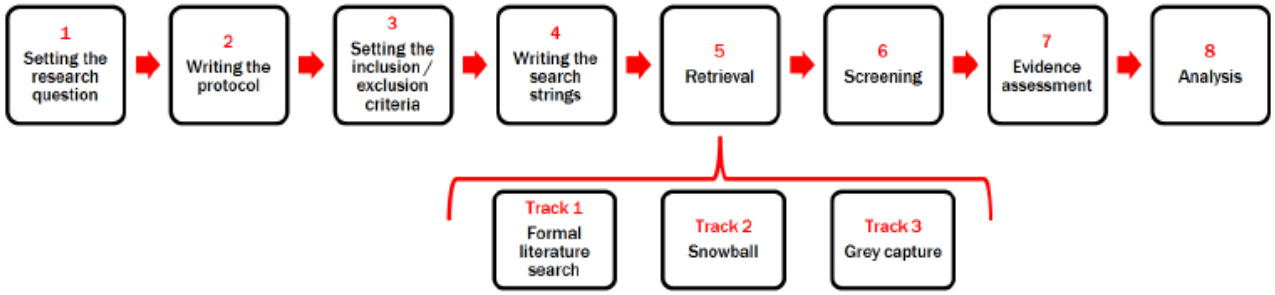

Figure 1 Stages in a literature review (Hagen-Zanker and Mallett 2013, 6)

2019/2020 to capture some, but not all, recent literature on the subject and expand the section on the sociology of standards.

Setting the research question: This chapter seeks to identify the existing evidence around urban sustainability frameworks (particularly at the neighbourhood scale) and highlight gaps in that research. Because this study is interested in the contents and implementation of these standards, this also includes an investigation of the literature on standardization and the implementation of (voluntary) assessment standards.

Inclusion/Exclusion criteria: This review included papers focusing on urban sustainability assessment tools and a briefer turn to the wider sociology of standards literature, and excluded other papers. As the focus of this research is on the implementation of BREEAM Communities, papers exclusively focusing on new frameworks have been excluded from the review, but other categories of research were included:

Schweber (2013) identifies three categories of research around sustainability frameworks (1-3 below); here the author also notes an additional category:

1. New frameworks or methods (excluded, as above);
2. comparisons of current frameworks, usually analysis the details of a framework (the scope, credit weightings, etc.);
3. application of frameworks, analysing the effects of a framework on the processes of urban development;
4. As knowledge, information for further research (beyond comparisons between them). This ranges from providing information for discussion or critique on a theme separate from these frameworks (e.g., Grant and Tsenkova 2012 in their study of new urbanism) to the technical/formal components being used systematically to generate new knowledge (e.g., Chrysochoou *et al*. 2012 in their project to identify sustainable brownfield sites). Although interesting, this review will not cover these types of study however, as my research questions are focused on the development and implementation of these frameworks as intended by their authors.

Retrieval, Screening, Assessment, and Analysis: To increase the efficiency of the review, directories of peer-reviewed journals (such as ScienceDirect) were the primary source of material for this review. Mendeley was used to keep track of targeted literature, and screen and assess appropriateness of the material using the programme's in-built 'tags. ATLAS.ti was used to analyse the literature, identifying key themes and controversies. Literature was analysed through a narrative approach in which "findings are described … summarised and synthesised" (Hagen-Zanker and Mallett 2013, 15).

Standard Making

An important phase in the life of a standard is its fabrication. Here, studies have sought not only to understand how standards are made, but also what the implications of that making are for their implementation and outcomes. Timmermans and Epstein (2010) in their review of the sociology of standards identify several key themes in the literature, including the investigation of: the forming of consensus by social actors (including questions of legitimacy and the role of evidence); the inclusion and exclusion of actors in this process; presentation and discussion of the methods of those tasked with standard making. In the sustainability assessment literature, standard making is rarely the object of study. However, many studies do present (a snapshot of) a method for developing a new standard. This section considers the literature on standard making across other domains, before discussing what can be learnt from the literature on new sustainability assessment standards.

Timmermans and Epstein (2010) take as a starting point that "standard creation is fundamentally a social act" (75) and argue that any investigation of standardization should seek to map and understand the interactions between a collective of actors that goes beyond the individual or organisation nominally leading the standard making process. As has been pointed out (Clarke 1991; Bowker and Star 1999), this may also include actors that may have been expected to participate but are not. In summarising findings in this area, Timmermans and Epstein (2010) state that "the creation of standards can thus be thought of as the meeting of numerous parties with the aim of obtaining legitimate coordination, comparability, and compatibility across contexts" (75). They go on to "emphasize the roles played by scientists, engineers, representatives of industry, courts, states, standard-setting bodies, and activists" (*ibid*). However, for the purposes of this study this list could be expanded to include BREEAM (and other types of) assessor and governmental actors (as Schweber and Harty 2010 do); this list could then be expanded further to include nonhuman actors (e.g., Goulden *et al* 2016).

Standard-making groups tend to follow similar principles on which the authority of their standards rest (Timmermans and Epstein 2010): that these standards are (in principle) voluntary, that they are developed with consensus from representative stakeholders, and that they represent optimal solutions to technical problems (Higgins and Tamm Hallstrom

2007). This is illustrated by Goulden *et al* (2016) in their study of the development and uptake of green building tools in Israel. Those authors describe a series of negotiations and conflicts among governmental, industry, and academic stakeholders to define and adopt a green building standard. This study also emphasised the wide range of interpretations of that standard beyond its original conception as a tool to reduce energy use. This interpretive flexibility of standards is also highlighted by Schweber and Harty's (2010) study of BREEAM's development. Their study, which takes a social construction of technology (SCOT) approach, highlights "the way in which social groups influence technological development" (Schweber and Harty 2010, 658) through collaboration, negotiation, and competition. By mapping relevant social groups and their technological frames, the authors discuss how competing ideas about what the standard is for from groups with more or less power to influence may shape the technical contents that is removed from a straight-forward interpretation of "scientific" (*ibid*) concerns around sustainability. These questions of competing ideas also raise questions about what types or sources of ideas, values, evidence, and so on are included and which are excluded ("who gets to decide what is "other"?" (Bowker and Star 1999, 325) and how?). These studies emphasise the work done by local actors to define, form consensus, promote, and defend a standard. However, there is a gap in the sustainability assessment literature when it comes to understanding this for neighbourhood-scale standards.

Another relevant theme identified by Timmermans and Epstein (2010) is that of the role of evidence, expertise and legitimacy in setting standards. In introducing this literature, those authors suggest a number of questions studies in this area seek to answer: "What evidence is sufficient or necessary to implement standards? Who should set standards? Which risks are acceptable?" (70). These concerns are explored in relation to sustainability assessment standards by Schindler (2010), who notes that so-called voluntary sustainability standards are being adopted by governmental organisations without those sorts of questions being asked or answered by democratically accountable groups. Studies of standard setting in other fields explore these questions in the context of particular institutions, highlighting biases stabilised in institutionalised standard setting (and implementing) methodologies (e.g., Healy (2004) explores the problematic links between drug companies and medical standards committees, cited by Timmermans and Epstein 2010). Although likely less

controversial than Healy's study, this implies the need to understand more about the role of BRE in setting standards and the decisions made in the fabrication of BREEAM Communities. However, only Schweber and Harty (2010) above have approached this question and, as they admit, without a strong empirical base.

The literature considered above highlights several key themes and questions that do not seem to be answered for sustainability frameworks (and neighbourhood-scale frameworks in particular): who is setting a standard? How are they seeking legitimacy? What parties are involved? How is consensus being built? What will be included in (and excluded from) the formal standard? (Bowker and Star 2000) And so on. In general, it is understood that while "the contents of a given eco-city framework, in the form of principles and indicators, may give the appearance of objectivity, exactness and absoluteness, … upon closer inspection they frequently reveal considerable normativity and uncertainty at work" (Joss *et al* 2015 14). However, the sustainability assessment literature does not address these questions comprehensively. Instead, (apart from a few exceptions noted above), the literature that comes closest to shedding some light on these issues are studies that present new standards for urban sustainability. These studies' often present a new standard as well as their method of creating that standard. So, although these questions are often not asked or answered deliberately to contribute to the standardization literature, they can give some insights. This literature suggests that standard makers for urban sustainability have numerous concerns: from how these standard fit within legal and technical procedures of a national development process (Al Waer, 2015), to integrating international expertise and local knowledge (Ali and Nsairat, 2009), and building consensus based on commonalities between several different standards (Alyami and Rezgui, 2012). They give examples of many different types of consensus building, such as stakeholder meetings, surveys, quantitative modelling, and of course publication in academic journals. However, these papers only present a snapshot of their fabrication process.

Implementation

A second key theme in the standards literature is their implementation. For urban standards, this literature focuses (most often, but not always) on their role in the

development process of particular sites: how are standards are used? By whom? And how effective they are at advancing their goals? In other words, how the technical content of a sustainability standard must be "decoded" (Joss *et al* 2015 13) for a particular time and place. Joss *et al* (2015) also note how a standards' outcomes are greatly contingent on those actors (human and nonhuman) who participate in this decoding. This echoes key themes in discussions around the implementation of standards more broadly, which are sensitive to how standards bring disparate, heterogenous actors together in their implementation; how the individualism of these actors is limited by standardization; how that "erasure" (Timmermans and Epstein 2010, 83) of local contingencies allows for new courses of action, and how much erasure is necessary; how standards tend to be embedded or nested within other standard and across communities of practice; and how standards regulate while being voluntary.

Local Practice

If the making of a standard is a "fundamentally social act" (Timmermans and Epstein 2010, 75) then their implementation is surely social too. As such, studies (Rydin 2010b; Timmermans and Epstein 2010) emphasize the importance of local, contingent actors in the implementation of standards (at the expense of drawing broader links to standards' role in social life). The role of standards in "making things work together" (Bowker and Star 2000 150) implies significant boundary work to resolve tensions (Joss and Rydin 2018) between a standard's generic formal features and the many and varied sites of action it might be applied to. This involves transcribing those generic features into "situation-specific knowledge" (Joss *et al* 2015, 15) and then implementing that via local practices. This work often requires "an auxiliary support army of technicians, auditors, monitors, and consultants" (Timmermans and Epstein 2010, 80) who often have significant skills and expertise (Joss *et al* 2015). This work is also undertaken by less visible actors, such as classification systems embedded in standards (Bowker and Star 2000) or maintenance staff (Strebel 2011). How this supporting network is constructed, maintained, and mobilised to implement a standard is therefore an important area of research.

For sustainability assessment frameworks, studies that look to investigate these questions about the varied and contingent work to implement standards tend to explore assessment frameworks' multiple users and roles. Although there is a recognition of the complexity of the context in which these standards act (with their actual users considered "very difficult, if not impossible, to distinguish" (Haapio and Viitaniemi 2008, 476)) developers, designers, engineers, architects, assessors, other consultants, and local planning authorities are commonly discussed and canvassed for insights. These studies seek to describe how these groups are brought together to define and implement a standard (e.g., Goulden 2016; Goulden *et al* 2017) or how that implementation effects its users (e.g., Schweber 2013). For example, applying a socio-technical approach to the implementation of BREEAM, Spinks (2013) seeks to understand how actors interpret and implement the standard. In doing so, the ways these groups participate processes of network building and mobilisation are mapped. This study shows how actors' different interpretations of the standard are "influenced by the immediate contexts in which expertise is engaged" (Spinks 2015, 16) and how those were "shaped" by a strong, highly connected actor (in this case the client) to implement the standard and (now) shared goals. Elgert (2016) similarly finds that centralised, institutional support is necessary to maintain the significant work needed to incorporate sustainability standards into local planning policies.

Other ways in which the literature has shown sustainability frameworks to form and mobilise this "support army" (Timmermans and Epstein 2010, 80) is in providing guiding principles for sustainability. According to Goh and Rowlinson (2013) sustainability frameworks help construction professionals to prioritise issues and set goals that serve to align the project team's actions towards achieving sustainability (in a similar way to how Spinks' (2015) client used BREEAM to shape their development teams' efforts). Others have shown they can be useful in establishing precedents for sustainability (King 2016) that may go onto guide future work. As well as setting the strategy, these standards also build these networks at a more granular level. For example, participating in or prompting good data management and allowing construction professionals to gauge progress against assessment targets (Goh and Rowlinson 2013), inserting the standard into activities already embedded in development practice. Construction professionals have also stated frameworks are useful

to “[defend] design decisions” (Schweber 2013, 139) against being value-engineered out at a later phase, (though not always successfully (Spinks 2013)).

One approach to understanding this aspect of the implementation of standards is literature that explores how standards tend to be embedded within other, often more familiar standards or classifications, or across communities of practice (Lampland and Star 2009). Communities of practice “are formed by people who engage in a process of collective learning in a shared domain of human endeavour” (Wenger 2006, 1). More specifically, these communities are shown to form around a domain (e.g., development sustainability), a community (e.g., BREEAM assessors), and practice (e.g., implementing a BREEAM Communities assessment). This collective learning is then shown to occur in three modes belonging: *engagement*, doing things together, talking, producing artefacts, etc.; *imagination*, orienting ourselves, reflecting on our situation, exploring possibilities; *alignment*, working with established guidelines, coordinating with others. Communities of practice contribute to the ease by which standards can be implemented (Lampland and Star 2009). Each nested element of a standard may have its own community of practice (or otherwise a socio-technical network) that supports (or does not support) its implementation; complex or new standards may be made more implementable through simpler or more familiar building blocks, or by importing a specialised practitioner (such as an accountant (Lampland and Star 2009) – or in our case, an assessor).

Embeddedness in practice communities seem important for the implementation of sustainability assessment frameworks. The quality of implementation is tied to prior experience of the project team with the standard and with each other (Schweber and Haroglu 2014). Similarly, the embeddedness of BREEAM in epistemic communities is shown in its contribution to implementation (Spinks 2015). This is shown not only to benefit the implementation of the standard but also contribute to learning for its users, as interviews showing the “understanding and knowledge of construction stakeholders on sustainability issues have been increased in the process of applying rating systems” (Goh and Rowlinson 2013, 1367) suggest. Similarly, Wallhagen (2016) finds self-reported increase in knowledge from using these standards, though the effect is small. However, other studies show a small (or no) effect on those that implement these tools. Some blame this on the implementation of frameworks as ‘checkbox’ exercises that constrain innovation rather than promote new

thinking (Kyrkou and Karthaus 2011; Conte and Monno 2012). On balance, as Schweber (Schweber 2013, 140) suggests, “it does seem reasonable to say that it is an important element in the landscape contributing to the on-going inflection of internalised standards of good practise”, as well as being a tool that can bring people together to talk about sustainability that would otherwise not have done so.

Prescription and Local Contingency

Another theme in the literature on standards is that of the tension between standardization and individuality, between “erasure” of local contingencies and the ability of standards to travel between localities, and between prescription and flexibility (Bowker and Star 2000; Joss and Rydin 2018). Timmermans and Epstein (2010) argue that “the power of standardization lies exactly in how such local erasure allows new manipulations to take place, such as calculation and commodification” (83). This argument is also made by Callon and Law (2005) who describe how that calculation, which is at the centre of many standards, requires work to “qualify [things] before they can enter a process of [calculation] … [making them] into a shape that fits [the calculative process]” (719); a process of standardization. This ‘making fit’ into a common shape or frame (i.e., a common understanding of how the calculation should progress) is always imperfect and flows into and out of this are the norm. These imperfections are what allows calculations (or to extend this argument slightly, standards) to “add value locally” (Callon 1998 8) at all: “a totally successful frame would condemn the [standard] to the sterile reiteration of existing knowledge” (*ibid*). In summary, this qualification, “making fit”, or standardization implies some degree of local erasure that enables calculation to occur, but it also implies a need for flexibility to allow multiple actors to participate in the same calculation. (As we have discussed above, this bringing together of multiple different actors in multiple settings is also important to standards’ implementation).

This is illustrated in research on standards for management accounting by Wouters and Sandholzer (2018) who show how adaptability in a standard form of calculation (i.e., one that limited firms’ ability to use their own methods but allowed the “possibility to modify significant elements of the calculation” (59) enabled their effective implementation. This

finding, that pliability in a standard (as opposed to rigidity) “is what makes them influential” (*ibid*) is found in many other studies: “a recurring surprising finding is that loose standards with great adaptability may work better than rigidly defined standards” (Timmermans and Epstein 2010, 81). Of course, too much flexibility can undermine the standard. A further question is also raised by Wourter and Sandholzer: that of *what* that standard seeks to prescribe or erase. For Spinks’ (2015) users of BREEAM, the meaning of BREEAM was flexible but method was prescriptive (“[interviewees] saw BREEAM categories as prescriptive and limiting ways of doing things” (Spinks 2015, 12)); but for Wouters and Sandholzer management accounting standard, it was not concepts that were pliable but the “calculations themselves” (2018, 60). Adaptability is of course relative to the user, and contrary to Spink’s findings above, many find sustainability assessment frameworks to be flexible in various ways. For LEED “not only are many of the standards themselves flexible (e.g. requiring a reduction in water usage for landscaping by 50%, but not specifying how), but the entire system allows builders to choose which points they want to pursue.” (Cidell 2009 626). Similarly, the various comparisons of LEED and BREEAM presented below show that BREEAM takes a similar approach, both in how nonprescriptive its criteria are deemed to be and in the flexible scorecard approach it takes to certification (Wangel *et al* 2016). Questions remain as to the impact of this adaptability on the implementation of these standards. However, it is argued that this flexibility risks the ability of these frameworks to assess the “actual performance of the area as regards sustainability” (Wangel *et al* 2016 208).

Voluntary Implementation

A final relevant theme in the implementation literature discusses how standards are regulate behaviour of actors while often being voluntary (Brunsson and Jacobsson 2000). This question is highly relevant to the implementation of voluntary assessment frameworks, as their impact on the processes of urban development is disputed. Hudson (2002) considers BREEAM’s effect on the design process significant. In contrast, however, Garde (2009) finds, based on a survey of 11 respondents, that “it appears the rating system had very little influence on the planning and design of the projects... because many developers

were already designing and buildings projects with “sustainability in mind”” (Garde 2009, 428). Similarly, other studies have found that frameworks are mainly used for “flagship” projects (Spinks 2013), which are likely to already be of high quality. It seems that the influence a framework can exert on a project is linked to numerous factors that need exploring further. These include how it is adopted, with projects that incorporate frameworks early and effectively into project processes seeing the most benefit (Schweber and Haroglu 2014). Given the variation in implementation, questions arise about how these sorts of voluntary, sustainability assessment standards do succeed in regulating behaviour for improved urban sustainability (or whether they “perpetuate business-as-usual” (Joss *et al*. 2015, 10)) is of keen interest to scholars.

BREEAM and other assessment frameworks – despite being adopted in some regulatory contexts – are often described as voluntary. This is a common status for standards and describes professional qualifications, environmental accreditations, some forms of planning guidance, and so on. One approach to this problem seeks to understand the balance of costs and benefits to those implementing standards (Arora and Ganopadhyay 1995). As such, this literature suggests that voluntary standards often require some form of incentive to promote compliance (Timmermans and Epstein 2010). These incentives vary for different parties and may seek to promote achievement of the standard (e.g, through added market value) or avoidance of a cost (e.g., environmental standards like BREEAM New Construction is so prevalent in office buildings in the UK that not attaining certification may be a cost to building owners). The role of incentives in promoting implementation of standards seems to apply to neighbourhood sustainability frameworks, which often seek to offer market value, opportunities that allow organisation to market to niche customers, cost savings, and expedient regulatory progress (Carter 2008; Garde 2009; Goh and Rowlinson 2013). Other explanations for complying with standards that go beyond minimum, non-voluntary requirements include: the anticipation of stricter regulations in the future, signal setting to regulating bodies to tighten regulations for the wider industry, reputational gains (Arora and Gangopadhyay 1995), and increasing competitiveness (Carter 2008). For sustainability frameworks, their uptake is made more likely by local sustainability champions (Cidell and Cope 2013). A champion is theorised as able to reduce the costs of bringing together the sort of broad, heterogenous networks that standards seek to engage with (Joss and Rydin

2018). In this sense, “A champion can be considered as a network manager, facilitiating communication across the network and the commitment to action by various actors. They can reduce transactions costs provided they are centrally located in the network and actively seek to promote collective action.” (*ibid*, 374). For BREEAM, a possible candidate for such a champion might be the BREEAM assessor – a professional employed to facilitate the application of the assessment and certification.

Whether certified buildings can actually deliver these benefits is debated (and, as is often the case, there is no evidence available for neighbourhood-scale certification schemes). Eichholtz *et al*. (2009) found that buildings with an Energy Star rating had a rental price 3% higher, and sold for 16% higher, than an otherwise identical building. This agrees with research done by the Australian Green Property Investment Index and the Building Better Returns Report (Green Building Council of Australia 2013). However, Eichholtz’s findings for LEED rated buildings were not statistically significant (though they suggested a higher premium), and others have found that sustainability metrics had either a limited (Lützkendorf and Lorenz 2011) or no effect (Fuerst and McAllister 2011) on property values. It seems likely that some consumers would be willing to pay a higher price for green credentials than others; as Schweber (via Dixon 2009) points out, “while BREEAM provides a useful market signal for occupiers already committed to sustainability, for other groups location, cost, and availability continue to take precedence” (2013, 132). In a similar vein, it is also claimed that the use of these frameworks can lead to a reduced cost of development, but for building-scale schemes, this claim is also debated. For example, a LEED certified building costs 10% more to refurbish, though achieves savings through running costs and GBCA(ustralia) 5 and 6 star buildings cost 4% and 10% more to build, respectively (Zuo and Zhao 2014).

Others approach the problem of voluntary compliance through the perspective of governmentality. This approach seeks to understand how the personal identities and aspirations of actors are “enmeshed” (Clegg *et al* 2020, 319) with the aims of (in this case) regulatory organisations. Standards are an important tool of this sort of (neo-liberal) mode of governing (Locanto and Busch 2010, cited by Schweber 2013). Indeed, they seem to be positively received by the industry (Garde 2009; Schweber 2013). In a recent survey of the UK property development sector, 64% of respondents described BREEAM as an essential

tool (Schweber 2013). This agrees with similar work in the US that 70% of municipalities that incorporated LEED into their policies reported a positive overall reaction (Retzlaff 2009). As such, Schweber (2013) has applied governmentality to the study of BREEAM New Construction. In this context, the ways in which "policies and techniques directed at promoting sustainability inflect or transform professional understandings and practices" (133) are key to understanding how the implementation of such a voluntary standard might be directed. Through investigating the extent to which development professionals internalise new norms of sustainable building, this study showed how BREEAM was incorporated into practitioners understanding of 'standard practice'. However, BREEAM is also criticised for offering offer a "weak technique of government" (Schweber 2013, 138) and finding that the responsibility of ensuring sustainability is done can be "down to whoever [cares] the most" (*ibid*). Further, this approach highlights the tension between the standardization required to generate market signals and project-level contingency. This touches upon the tension between adaptability and standardization described above, but also highlights the tension between methods for voluntary regulation and sustainability outcomes at the project-scale.

Implementation of voluntary standards can also be aided by local or national governments as part of "gray-letter law" (Higgins and Tamm Hallstrom 2007, 5). This adoption by government is not uncontroversial, with concerns about the legitimacy of applying frameworks created by private institutions (Schindler 2010). Indeed, these institutions often have close relationships with government (Higgins and Tamm Hallstrom 2007). In this sense, standards created by NGOs enhance this "neo-liberal rule at a distance" (Higgins and Tamm Hallstrom 2007, 698; as discussed by Schweber 2013) that a governmentality approach might seek to investigate. For sustainability assessment frameworks, the list in Table 1 shows that many are indeed published by quasi-governmental organisations; similarly, standards published by BRE (the Code for Sustainable Homes and BREEAM) have been supported by local and national planning rules in the UK and (at the time of writing) 9 Local Authorities have adopted BREEAM Communities in some way in the UK. In the US, 21 states (as well as a number of smaller municipal bodies) have adopted the LEED framework in some way in their policies (Retzlaff 2009). For the USGBC at least, this has been a successful relationship, with a strong correlation between the number of registered LEED-certified

buildings and the presence of a policy that “requires or incentivises such certification” (Cidell and Cope 2013, 1).

Comparing and Critiquing the Frameworks

A major theme in the literature is research to compare sustainability frameworks to one another or to some ideal of sustainability. These studies vary in purpose, though it is suggested that understanding how schemes compare will allow for more transparency and credibility, address their inherent subjectivity, and identify their strengths and weaknesses leading to improvements (Lee 2013). As such, they usually look to understand and critique some aspect of their technical features: certification procedures, sustainability coverage, structure, and so on. While many studies are descriptive (e.g., Eberl 2007; Haapio 2012; Hamedani and Huber 2012) some also undertake limited analysis of the effects of, or reasoning behind, these technical characteristics (Chandratilake and Dias 2013). Li *et al* (2017, 156) identify four levels of comparison: “(1) general comparison; (2) category comparison; (3) criteria comparison; and (4) indicator comparison”.

The leading frameworks have been developed by national green building councils (GBC), as in the case of LEED, or similar organisations such as the Building Research Establishment (BRE). The first frameworks were designed for individual buildings (Cole and Larsson 1997) and focused on environmental sustainability (Goh and Rowlinson 2013). More recently, there has been a move towards neighbourhood scale assessments and a more holistic approach to sustainability (Haapio 2012). Most leading building level tools now have a companion neighbourhood level tool. Table 1 provides a summary of some common neighbourhood assessment tools.

There is no set object of analysis and the specific tools analysed vary between papers. This therefore makes it difficult to draw general conclusions about frameworks’ features from these reviews. However, there seems to be a core of three tools, namely CASBEE-UD, LEED-ND, and BREEAM Communities, which are present in most studies. Unfortunately, BREEAM Communities 2009 (as opposed to the newer 2012 version) is reviewed in a large proportion of that research, further making the case for the need for this investigation. In a systematic

Table 1 Some common neighbourhood-scale sustainability frameworks

Framework	Organisation	Country	Publication Year
BREEAM (Communities)	Building Research Establishment	United Kingdom	2012
LEED(-ND)	US Green Building Council	United States	2009
CASBEE(-UD)	Japan Green Building Council, Japan Sustainable Building Consortium	Japan	2007
DGNB(-NSQ)	German Sustainable Building Council	Germany	2013
Green Star (Communities)	Australian Green Building Council	Australia	2012
Green Townships	Indian Green Building Council	India	2013
HQE2R	European Commission	European Union (France)	2004
EcoCity	European Commission	European Union	2005
EarthCraft Communities	EarthCraft, Greater Atlanta Home Builders Association, Southface	United States	2013

review of building-scale frameworks, (Li *et al*. 2017) similarly find that the most studied building-scale tools are LEED (included in 95% of papers), BREEAM (74%), and CASBEE (47%).

Before discussing the literature around sustainability frameworks, it seems sensible to define them in more detail and identify their common features. These are a set of tools developed to assess, certify, and ultimately to advance urban sustainability. These tools differ from broad collections of indicators (e.g., Shen *et al*. 2011) by having a defined procedure for implementation and, often, a certification of the quality of that implementation. They tend to be voluntary or market-led, with that certification signalling a level of quality to the market and prospective customers, and as such differ from sets of

requirements for sustainability within policy or regulation. Broadly, a similar rating and certification process is followed by all major tools (Hamedani and Huber, 2012; W. L. Lee and Burnett, 2008): credits are given for completed indicators, and certificates are awarded for receiving a certain percentage of credits. Developments are certified in different ways at different times during the development process (LEED-ND, for example, uses a three-phase certification, while BREEAM uses one phase and does not certify post-construction). Ali-Toudert and Ji (2017, 597) identify 8 common characteristics of these tools. The below list is adapted from their work:

1. They have a tree-like structure, with indicators arranged within assessment issues or themes;
2. They tend to be conceptualised around the 3 (or 4) pillar model of sustainability; because these pillars are represented by interchangeable indicators, frameworks often represent a *weak* model of the 3 pillars;
3. They use process- and performance-oriented scoring approaches; credits may be awarded for doing the right thing or doing a thing in the right way;
4. The indicators define goals or actions to be undertaken;
5. Each framework defines indicators in (slightly) different ways, making them hard to compare;
6. Indicators may have some overlap;
7. Similar indicators may be given different emphasis depending on their placement in the overall scheme; similar themes may have different emphasis depending on the indicators chosen;
8. Indicators tend to be scored independently from one another, although some frameworks do have linked criteria (BREEAM Communities in particular).

Benchmarks

Making these comparisons is not straightforward. Although these standards tend to be organised in similar hierarchical structures of themes, criteria, and indicators (Ali-Toudert and Ji 2017; Li *et al*. 2017), there is considerable variation within those structures making analysis difficult. Indeed, Haapio and Viitaniemi (2008) note that the complexity of frameworks and their different structures may even make them impossible to compare. For example, BREEAM Communities has five themes (with three 'sub-themes'), while LEED-ND has three (Kyrkou and Karthaus 2011), and DGNB-NSQ has five (Hamedani and Huber 2012). Likewise, criteria within themes are delimited and grouped differently (Ali-Toudert and Ji 2017). This is summarised in a useful diagram by Ali-Toudert and Ji (Figure 2 below) showing the different terminology used by various frameworks and the similar approaches to organisation taken by many of them.

Possibly because of this variation, researchers often use theoretical benchmarks or categories to compare various frameworks to some ideal of sustainability rather than attempting to directly compare them. This work often includes categorising the sustainability coverage of a framework according to those categories set out by the author. These vary paper by paper but are often based on variations of the three pillars (indeed a recent systematic review of the literature around neighbourhood scale frameworks noted that most mention the traditional pillars (Kaur and Garg 2019, 152)). Others are developed specifically for the research at hand: Luederitz (2013) developed nine principles for sustainable urban neighbourhood development, Lee (2013) uses ten, Hamedani (2012) identifies eight criteria in his comparison, both Haapio (2012) and Chandratilake (2013) use seven, though these do not match; a review of these comparisons found 23 different themes used by authors (Kaur and Garg 2019). See Table 2 below for a summary of these. This makes reviewing results of these studies problematic as the sustainability assessment tools are not compared on the same terms. Indeed, different common bases of comparison has been sought and proposed by several authors. An agreed standard of comparison could aid research in this area. However, defining methods to compare sustainability may in the end be as successful as attempting to define sustainability itself in a universal way (i.e., not very). Moreover, it may also hinder innovation and debate; new ways of thinking about

sustainability can be valuable and the particular ways of categorising urban sustainability are as much a useful output of the above articles as the comparative analysis themselves.

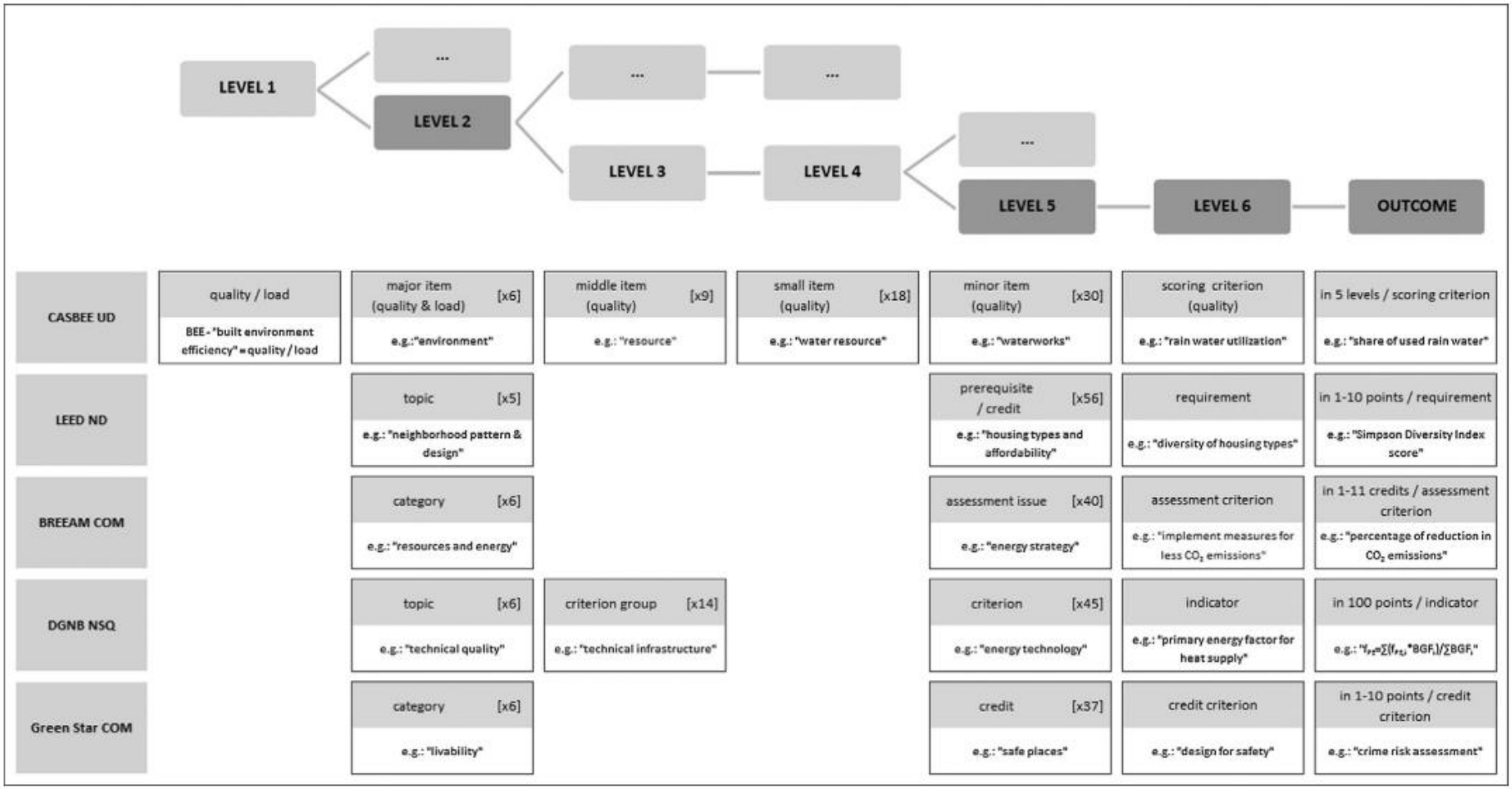

Figure 2 The tree-like structure of the investigated systems including their successive levels. (reproduced from Ali-Toudert and Ji, 2017, 601)

Table 2 Sustainability Themes (adapted from Kaur and Garg, 2019, 153)

Environmental	Atmosphere and climate	Ecology	Land use and green infrastructure	Resources and energy	Water and wastewater
	Natural hazards	Solid waste management	Buildings and resources		Material management
Social	Social and health wellbeing	Urban layout, pattern, and design	Transportation and connectivity		Amenity
	Safety and security	Comfort in outdoor areas	Visual aesthetic significance	Innovation	Governance
Economic	Economic impact	Economic structure	Cultural	Local community, cultural, and heritage	
Institutional or Political	Institutional framework	Institutional capacity			

Scope

A primary concern for those seeking to compare these standards is the sustainability coverage, or scope, of a framework. As defined earlier: the breadth and depth of sustainability topics covered in a framework, often arranged following the same 3 or 4 pillars approach as in other fields (despite criticism of this approach, for example Neuman and Churchill 2015). Coverage is not only determined by which topics are covered by various themes or criteria, but how each topic itself is defined, operationalised, made mandatory or rewarded through indicator scores and weightings. This is important because each development certified under these schemes is understood publicly to be 'sustainable' by virtue of a grade and certificate. It is clear from the literature that this is far from a uniform standard.

It is generally considered that there is good consensus on the scope of both building and neighbourhood frameworks (Lee 2013; Sharifi and Murayama 2013). This is perhaps surprising given the supposed variety of definitions of urban sustainability, as well as the

very large number of relevant indicators; in a review of such indicators, Ameen, Mourshed, and Li (2015) identify 600 in one catalogue and 141 in another. A recent review of the criteria found in 6 neighbourhood scale frameworks revealed 41 primary indicators and 252 sub-indicators (Kaur and Garg 2019). This is not to say that there is no agreement; common outputs of these studies are analyses showing the different emphasis of frameworks rather than complete disagreement.

There is agreement, however, in that most literature considers the scope lacking in various aspects (Ameen, Mourshed, and Li 2015). For building-scale frameworks, Goh found "mixed responses" from construction professionals on the "sufficiency of scope" (Goh and Rowlinson 2013, 1367). Furthermore, no building-level frameworks assess social and economic aspects to the same degree as environmental issues, if at all (Goh and Rowlinson 2013; Lee 2013; Schweber 2013). This has led to criticism of these frameworks for ignoring the holistic, systemic nature of sustainability and focusing on eco-technical solutions (Conte and Monno 2012). As Schweber (2013, 135) and others note, this contributes to the gap between "UK policy discourse which... encompasses issues of social sustainability and governance; and... indicators and policy mechanisms, which tend to privilege environmental dimensions". Perhaps tellingly, many authors refer to these schemes as 'green' or 'environmental' assessment tools rather than 'sustainability' assessment tools. As with their building-level counterparts, neighbourhood-scale tools have been criticised for focusing on environmental sustainability (Ameen and Mourshed 2017). However, this is not universal across schemes; although of the 6 studied, 4 assigned more than half their score to environmental criteria, both LEED-ND and BREEAM Communities gave social and economic issues greater prominence (Kaur and Garg 2019, 154).

There are also some issues that are covered in some frameworks and missing from others. However, this area of the literature is underdeveloped, with few papers adopting a systematic approach to exploring these differences (some do, for example Sharifi and Murayama 2014). Some papers do make useful suggestions, but these often seem *ad hoc* and not the primary focus of the research. Some common issues that seem to be noted as missing include: influence on a wider hinterland, social or economic (rather than technical) solutions, life-cycle assessment, total amount of materials, embodied energy, tree cover, agricultural land conservation, snowfall, humidity, hydrology, soil, wetlands, water bodies,

hazardous substances (outside building certification), perceptions of safety, recycling stations, local labour, local building materials, local jobs, awareness of sustainability, local food production, IT and internet connectivity, education, culture, aesthetics, scenic views (Ahvenniemi *et al*. 2017; Wangel *et al*. 2016a; Sharifi and Murayama 2013, 2014; Kaur and Garg 2019; Zuo and Zhao 2014) This difference in coverage is also seen where frameworks encompass different aspects of development life cycles, for example the BRE has different tools for each life-cycle stage (as defined by RIBA and the BRE; e.g., *New Construction* for design and planning, *In-Use* for post-occupation, and Refurbishment), whereas the USGBC chooses to assess multiple stages of the development process in one tool. It is worth noting that most frameworks do not requiring post-construction certification, l*et al*one a full life cycle analysis.

Emphasis

As well as varying in scope, frameworks often have different weighting or scoring, go into differing levels of detail, or use different definitions, leading to variations in emphasis (even if the scopes are similar). The most explicit way frameworks vary in this regard, is through giving different value to indicators through ‘weightings. Every framework studied uses indicators in broadly the same way: as targets for which credits are awarded. There are some differences in their structure, however, with CASBEE-UD uses benchmarks representing standard practice to aim for, giving less/more credits for under/overachieving, instead of setting minimum standards. Weightings are then applied to these indicators differently for each framework, varying the emphasis of the eventual certification.

In contrast to the agreement between frameworks on the scope, studies have found a lack of agreement in the weighting of criteria in neighbourhood frameworks (Berardi 2013; Haapio 2012; Hamedani and Huber 2012; Kyrkou and Karthaus 2011; Sharifi and Murayama 2013). This disagreement is found both on wider themes (e.g., Sharifi and Murayama show a range between 17% and 33% of indicators for ‘resources and environment’) and within sub-categories (or issues) such as water (where despite having the same overall ‘resources and environment’ score, LEED-ND puts nearly twice as much emphasis on energy compared to ECC). There is some agreement, however. No neighbourhood framework dedicates more

than 8% of indicators to cultural dimensions (Ameen, Mourshed, and Li 2015). This is summarised by Sharifi and Murayama (2013) in Table 3 below.

There is often an uneven distribution of credits available for the major themes. This has led some to accuse frameworks of a “lack of balance” (Sharifi and Murayama 2013, 79) between each of the three/four pillars of sustainability. This is summarised by Ahvenniemi (2017) in Table 4 below. As with the scope, weightings also seem to be a biased towards the environmental, with economic sustainability being less valued in particular. However, environmental factors are less favoured in neighbourhood frameworks (BREEAM Communities and LEED-ND) compared to building level assessments, perhaps suggesting a move towards a more holistic definition of sustainabiltiy (Haapio 2012). These differences also are seen to lead to overall variations in the standard of sustainability assessed, though most work in this area is focused on building-level frameworks. Chandratilake (2013) notes that, “the best rating (i.e. *Excellent*) in BREEAM is probably better than the best (i.e. "platinum") one in LEED.” (23) This corroborates findings by Lee and Burnett (2008) that BREEAM had the strictest indicators assessing the reduction of energy use in building level assessments.

Table 3 Degree of emphasis on major themes in seven selected neighbourhood frameworks (reproduced from Sharifi and Murayama 2013)

Theme	Issue	Percentage of the maximum points achievable for each main theme and its sub-themes													
		LEED-ND (total)		ECC		BREEAM		CASBEE-UD		HQE2R		Ecocity		SCR	
Resources and environment	Water	9	(18)	9	(33)	4	(23)	13	(41)	7	(26)	3	(26)	5	(15)
	Energy	6		1		6		9		7		15		5	
	Materials, ecosystem, biodiversity, resources conservation, etc.	3		13		13		19		12		8		5	
Transportation		5	(5)	8	(8)	17	(17)	10	(10)	7	(7)	15	(15)	8	(8)
Social	Affordable housing	6	(11)	4	(12)	1	(11)	0	(6)	2	(45)	3	(15)	13	(30)
	Inclusive communities	0		5		3		0		5		3		2	
	Safety, community well-being, community outreach, heritage, social networks, etc	5		3		7		6		38		9		15	
	Local jobs and economy, finances, investments, employment, business	3		2		7		0		5		6		25	
Location, site selection		18	(18)	12	(12)	5	(5)	3	(3)	2	(2)	6	(6)	1	(1)
Pattern and design	Mixed use	4	(36)	11	(31)	2	(31)	0	(40)	2	(15)	3	(32)	1	(12)
	Green infrastructure, compact development, access, urban planning and design standards	27		20		29		40		13		29		1	
Innovation	Accredited professionals	1	(9)	0	(2)	0	(6)	0	(0)	0	(0)	0	(0)	0	(9)
	Innovation	8		2		6		0		0		0		9	

Table 4 Division of the indicators of urban sustainability frameworks under ten sectors and three impact categories (reproduced from Ahvenniemi *et al*. 2017, 240)

		Percentage Impact categories (three pillars)			
		Environmental	Economic	Social	In total
Themes	Natural environment	11	0	5	16
	Built environment	5	1	7	13
	Water and waste management	10	0	3	14
	Transport	7	0	4	12
	Energy	5	0	1	6
	Economy	1	5	3	9
	Education, culture, science, and innovation	0	1	3	5
	Well-being, health and safety	0	0	15	16
	Governance and citizen engagement	2	1	5	8
	ICT	0	0	1	2
	In total	43	10	47	100

Another area in which frameworks differ is in their treatment of local variation in geography, regulation, demographics, and so on. At the national scale, frameworks are not adaptable and have strong linkages to their original national contexts (Haapio 2012). As such, they are not necessarily easily used internationally (Garde 2009) and largely seem to focus on national markets. Indeed, only HQE2R, Ecocity (Sharifi and Murayama 2013), and BREEAM Communities (in its Bespoke Process) have dedicated processes for addressing national differences that may alter the framework's technical content (such as criteria weighting, linked regulations, or definition of indicators) to take local development context into account. The BREEAM Communities Bespoke process allows for negotiation based on differences of local legislation, regulations, culture, climate, etc. However, it is not always successful in supplanting its "Britishness" leading to some difficulties in implementation (as found in the pilot study for this work) and may not be suitable for different national

contexts (Säynäjoki *et al*. 2012). At a regional scale there are various solutions to addressing differences in development context, for example, offering slight modifications for different regions (used in BREEAM Communities 2008), awarding a small number of credits for addressing local issues (LEED-ND), or requiring consultation with local stakeholders. An outlier, LEED-ND has no requirement to stage meetings with local communities or public officials, or to gather stakeholders together. Others do: Earthcraft Communities for example requires a pre-planning meeting with a variety of stakeholders and has a theme dedicated to community engagement; BREEAM Communities demands similar meetings with a requirement that their conclusions are integrated into the design. Another way this is handled is by developing unique frameworks are developed for national or even regional contexts (Conte and Monno 2012). Some Green Building Councils have gone further and developed national versions of the BREEAM Communities scheme (for instance BREEAM ES Urbanismo in Spain). This suggests that the results from this study may not be immediately transferable to a non-UK context.

As noted by Ameen (2015, 111), inter-relationships between indicators are also an important aspect of sustainability coverage. One approach to addressing this in the comparison literature is to identify indicators representing functional categories (e.g., energy, transport) that assess several "impact categories", i.e., pillars of sustainability as in Ahvenniemi *et al*. (2017, 240) and Table 4 above. This approach highlights the absence of interactions between functional categories and economic sustainability (beyond indicators directly addressing the economy). This is seen in BREEAM Communities where economic sustainability is primarily addressed through SE 01 – Economic Impact. Other studies claim that assessment tools (including BREEAM Communities) do show inter-relationships (Ameen, Mourshed, and Li 2015), however, it is not clear where this assertion is supported and nonetheless seems to be limited in regards to economic sustainability. This is an area where there is scope for additional research. This differs from similar tools designed to assess smart cities, where 28% of indicators interact with economic sustainability (Ahvenniemi *et al*. 2017). The authors suggest "finally it has been understood that economic advantages do not contradict with other sustainability targets: when reaching for environmental sustainability of a city, economic activities do not need to be compromised

but instead they can co-benefit from the environmental sustainability targets" (*ibid*, 241); if this is the case, it hasn't necessarily been internalised by the authors of these tools.

Certification

The final stage of assessing an urban development under these frameworks is the award of a certificate to verify and publicise the achievement of a certain level of sustainability. To calculate the level of award, all frameworks use tiered rating scales, awarding increasingly better certificates to developments that obtain larger percentages of credits. There are four types of rating scales: linear (as used by BREEAM New Construction and ESGB), concave non-linear (adopted by LEED, CASBEE, and BEAM Plus), convex non-linear and "S" shaped (as used by BREEAM Communities; three identified by Lee (2013) and the final shape identified by the author; see Figure 3 below). Lee argues that a convex scale (i.e., a scale where credit scores become higher and thus more difficult to achieve the gap between certification levels decreases) is preferable because it would better encourage developers to aim for better performance; however, no frameworks seem to adopt this method. There does not seem to be studies to back up Lee's suggestion. As well as different scale shapes, there are also differences in the minimum standard for certification. BREEAM Communities' lowest certification level is 30%, LEED-ND's is 40%, and DGNB-NSQ is 50%. While the BREEAM Communities awards its highest certificate at 85%, 80% for LEED-ND and DGNB-NSQ. BREEAM Communities' approach could allow for certification of a wider range of developments, but again, there is no literature describing the impact of this on development outcomes.

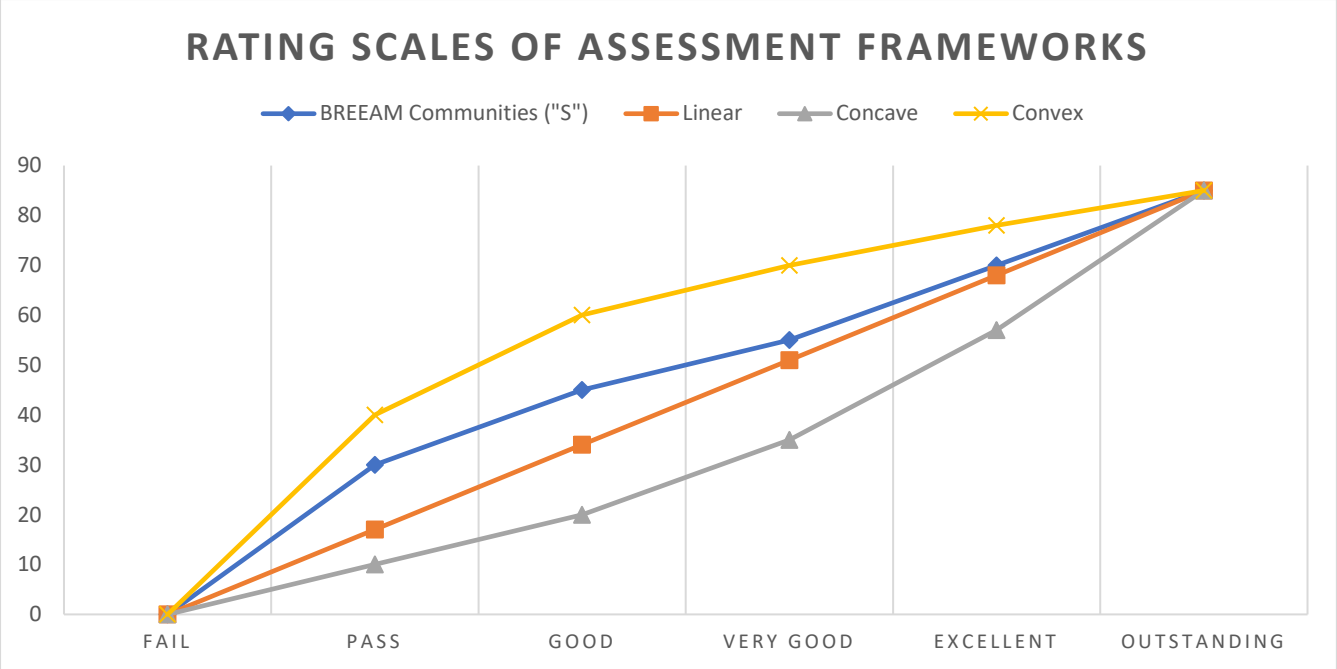

Figure 3 Possible frameworks' rating scales compared to BREEAM Communities

Explaining Differences

A small number of studies delve deeper, seeking to explain the differences in weighting and emphasis described above. Others also consider these differences, without that being the focus of their research. One important finding is that the rationale behind these differences is not explicit and often unclear, with open questions remaining. For example: are credits be given in proportion to the environmental, social, and economic consequences of failing to apply a measure, or the cost of implementation? And which is preferable? A disconnect between weighting and cost of implementation has been blamed for some criteria generally not being taken up (Garde 2009). It is suggested that LEED-ND and BREEAM Communities both base weightings on the criterion's impact on sustainability (Hamedani and Huber 2012). However, this cannot explain the differences between those frameworks, which some suggest stem from the different principles of urban sustainability assumed by their authors: with LEED-ND perhaps looking to smart growth and new urbanism (J. Grant and Tsenkova 2012) and as such having a strong focus on site selection and connectivity, while it has been suggested that BREEAM Communities reflects the BRE's history as an

environmentally focused organisation, “tending to address more environmental concerns” (Grant and Tsenkova 2012, 207). However, these assertions do not seem to be rigorously tested – not least in the above observation that BREEAM Communities does not have an environmental bias.

A notable exception is work by Chandratilake and Dias (2013), in their study of building level frameworks. They analyse factors (primary energy use, water scarcity, and population density) suspected of influencing weightings of major themes (‘Energy Efficiency’, ‘Water Efficiency’, and ‘Site’ respectively) to suggest how a framework’s national context might change its emphasis. They find a strong relationship between the water scarcity in a region and the emphasis given to those criteria (Water conservation Water efficient landscaping Sustainable water technologies); similarly there is moderate relationship between population density and ‘site’ criteria (Land use, Site selection, Infrastructure efficiency, Transportation, Housing density, Microclimate, Landscape design) and between tonnes of oil (equivalent) usage per capita and ‘energy’ criteria (Energy usage, Building envelope performance, Lighting efficiency, Greenhouse gas emission, Renewable energy). This is significant because it begins to suggest explanatory factors for some of the

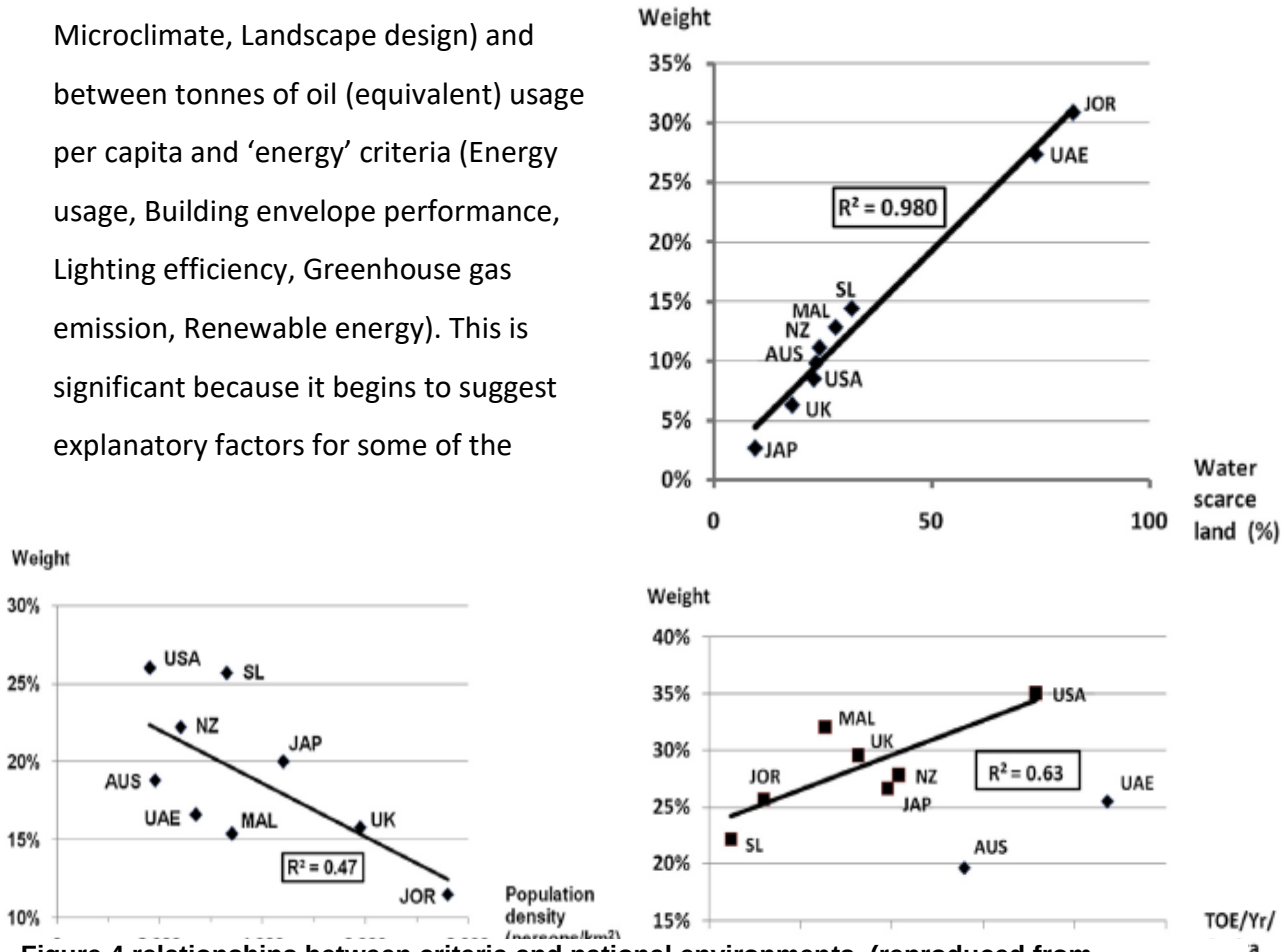

Figure 4 relationships between criteria and national environments (reproduced from Chandratilake and Dias 2013, 27)

differences in weightings described above and has the potential to identify outliers. This can provide a stronger basis for comparison, allowing researchers to understand where weightings differ due to (perhaps) systemic differences in national contexts and where more idiosyncratic explanations are needed; this could help target qualitative analyses. It could also help judge a framework's inter-regional applicability. For instance, Figure 4 suggests that CASBEE-UD (produced in Japan), may not be applicable for use in the UAE due to their large differences in the importance of preserving water, but may be applicable in New Zealand with minor amendments to weightings on 'site' and 'water efficiency' criteria. Potentially more usefully, this can help compare the relative sustainability of developments in different contexts. And suggests that methods that seek to simplify comparisons by combining criteria across frameworks designed for different places will miss these important reasons for difference.

Summary

The bulk of the literature on sustainability frameworks (and neighbourhood-scale frameworks in particular) looks to compare and critique sustainability assessment frameworks *on paper*. These studies hope to identify gaps and suggest improvements, allow for comparison of sustainability across different frameworks and national contexts, and help explain the scope or emphasis of these tools.

The literature shows frameworks can vary in breadth or scope, considering different areas of urban sustainability. However, there is considerable agreement in the scope of neighbourhood sustainability, with few major differences between schemes; BREEAM Communities was shown to be like other tools in its scope suggesting lessons from studies of other frameworks may be useful in informing this study and in discussing its findings. There are more significant differences, however, in their emphasis of certain issues. Some of these differences can be explained by systemic differences in nationally aggregated environmental and demographic factors. Others have suggested that broad differences in national discourse (such as an interest in the US in New Urbanism) can explain these differences. However, the fabrication of these standards have been shown to be far more

complex processes requiring a more rigorous approach (Schweber and Harty 2010). These comparisons also do not tend to look beyond the major themes or issues covered in a framework, instead choosing to compare several frameworks at a high-level to broad categories or pillars of sustainability. There is a clear need to look more closely at these frameworks to understand how they define sustainability at the same level of detail that construction professionals are expected to engage.

Conclusions

This chapter has reviewed the some of the broad literature on the sociology of standards and voluntary tools of regulation. It has also reviewed the literature on sustainability assessment frameworks. Studies in the former focus on the making, implementation, and outcomes of standards, whereas the latter has focused on comparing and critiquing the formal content of the frameworks themselves.

Sociology of standards literature emphasises the local and the contingent in the "fundamentally social act" (Timmermans and Epstein 2010, 75) of making and applying standards. As such authors here have focused on how disparate parties are brought together and coordinated, how consensus and conflict is approached, and how tensions between local conditions, individuality, and flexibility are bourn out in applying standards that seek to "erase" those to a degree. These studies have shown that flexibility, in both meaning and method is often necessary to allow standards to work across different contexts and between different groups. In particular, the degree to which this tension between prescription and adaptability or flexibility allows for, and gives agency to, calculations has been shown to be important in adjacent research fields. Studies have also warned at the risks of institutional biases, inappropriate use of evidence, or lack of accountability in who gets to decide appropriate levels of flexibility or what is included at all (Bowker and Star 1999). They also emphasize the large, complex networks of actors or communities of practice that participate in their implementation, and that the outcomes depend on local specificity of those networks.

This analysis of fabrication, implementation and outcomes is missing from the literature on sustainability frameworks. Some studies do approach aspects of this, with analyses of the

implementation of these standards (Sharifi and Murayama 2013; Spinks 2013; Schweber and Haroglu 2014), their impact on their users (Schweber 2013), their impact on development designs (Callway, Dixon, and Nikolic 2019). However, the majority of the literature identified by this author works to compare and critique the standards themselves. Sustainability assessment frameworks for *neighbourhood-scale* developments are relatively new, with the majority being published in the last ten years. Despite them having some use in certifying developments across the world, these new frameworks have been less well studied than their building-scale counterparts. This literature shows that neighbourhood-scale frameworks seem to be organised in similar ways and there is generally good agreement on the scope of these frameworks. It is generally thought they provide a more holistic approach to sustainable development, covering the *three pillars*, though they have been accused of favouring the environmental aspects; BREEAM Communities differs here awarding more points than others for social and economic criteria. There is also criticism of sustainability frameworks' role in governance and regulation, but there is almost no research on how BREEAM Communities is adopted into policy (with the only study looking at LEED in the US), or the effects of that.

Therefore, it seems that this research project would have a clear contribution to the study of sustainability frameworks if it were to explore in more detail the fabrication and implementation of BREEAM Communities. This study could usefully build on findings from the wider sociology of standards literature in identifying if and how the questions of local contingency, adaptability, and voluntary standardization apply to these sorts of sustainability frameworks.

Chapter 3

Theoretical Perspectives: Actor Network Theory and BREEAM Communities

Introduction

As discussed in the previous chapter, there appear to be clear gaps in our understanding of building- and neighbourhood-scale sustainability frameworks, and BREEAM Communities in particular. The majority of literature surveyed on sustainability assessment frameworks looks to compare and critique assessment frameworks' formal content with less attention paid to how they seek to change the sustainability of the built environment (with some notable exceptions). As was argued in the literature review, by focusing on comparisons between standards (rather than placing importance on the locally contingent implementation of the standards) this 'comparison and critique' literature implies that the formal features of the frameworks are paramount and the problem of implementation is secondary (and possibly relatively uncontroversial). On the contrary, the sociology of standards literature has shown that there are indeed unknowns and tensions in the ways standards are implemented. This literature shows there are recurring questions in the ways standards like BREEAM Communities seek to build and maintain consensus around their claims to superior knowledge or practice, how they balance prescription with local contingency and adaptability, and how such standards succeed in regulating despite being voluntary (Timmermans and Epstein 2010). Building on both these literatures, the central research problem for this investigation is therefore to better understand**: how, as a voluntary framework, BREEAM Communities is adopted into policy and development projects; how it prescribes requirements for users in the context of those particular developments; and how this standard is implemented, adapted, or resisted in those developments?**

Timmermans and Epstein (2010), in their review of the sociology of standards, demonstrate that "[standards'] sociological import comes out most clearly through scholarship that is specific, empirical, and located in concrete social settings" (84). To approach this research problem, a theoretical frame must therefore be found that emphasises these site-specific actors and actions (actors that are not only human but also material (Bowker and Star 2000)). I will set out in this chapter how an Actor Network Theory (ANT) approach, employing a focus on translation and calculation, can provide a helpful theoretical framework for studying these sorts of sustainability assessment frameworks.

Actor-Network Theory

Actor Network Theory (ANT) developed out of the wider field of Science and Technology Studies (STS). STS is an interdisciplinary field of "sociologists, historians, philosophers, anthropologists, and others" (Sismondo 2010, vii) studying the social nature of technology. STS scholars look to study the interactions between actors that are seen to define the constitution and use of such technology and lead to emergent characteristics. ANT moves away from studying technology and asks that researchers to describe the actions of a network of interconnected actors (some of which may be technological) in a way that does not make judgements in advance of the contribution of any one actor or relation, human and nonhuman. The broad applicability of this thinking, unanchored to a particular object or arena of study, has allowed its expansion beyond its original settings, moving outside the laboratory and away from objects traditionally understood to be technologies. This has led ANT from the study of scientific facts, water pumps, and key chains, to aiding the understanding of urban planning policies as socio-technologies mediating urban development (e.g., Rydin 2007).

As a well-known theoretical strand of STS, ANT has been both widely applied and criticised. Helping fuel both this wide application and critique is the breadth of interpretations of the theory. Developed as much as a philosophical project as a method, Latour's writing (e.g., Latour 2005) describes a material, relational ontology-*cum*-methodology; for others, ANT is a well-bounded analytical framework with a technical vocabulary of actants, associations, translation, circulating references, qualculation, and so on (e.g., Callon 1986, Callon and Law 2005, Latour 2001, Berker and Larssaether 2017); others see it as a metaphor that is helpful to think about complex, hybrid problems – "less a matter of precise definitions than one of an (allegedly) shared sense regarding the objects researchers investigate and are curious about, and the kind of studies and discussions they engage in." (Farias and Bender 2010, 2–3). Moreover, ANT is in near-constant use and advancement (Metzger 2011). Despite this interpretive flexibility, studies using ANT tend to have some principles in common, as set out in a useful summary by Farias and Bender (2010):

> "It is well known that what ANT does it in the first place to extend the principle of relationality … to all entities: hence its radicality. Objects, tools,

> technologies, texts, formulae, institutions and humans are not understood as pertaining to different and incommensurable (semiotic) realms, but as mutually constituting each other (Law 1992). The methodological principle sustaining such radical relationality is called by Michel Callon (1986) the principle of generalized symmetry, which pleads for the use of a common conceptual repertoire to describe and analyse the relations between humans and nonhumans. Now, this unveiling of hybrid chains of actants[2] partaking of the social does not aim at deconstructing the social, but at understanding the associations that make up the social. The social is thus not a thing, but a type of relation or, better, associations between things which are not social by themselves (Latour 2005)." (3)

In short, for ANT, the "world is assembled from the associations of actants" (Rydin 2012, 24). Rather than being uniform or static as the term 'network' may suggest, this world can be conceived as populated by porous, nested, fluid assemblages: "heterogenous collectivities of people and things, relationally tied to each other over time and space" (Doak and Karadimitriou 2007, 221). Indeed, for Latour (2005), Rydin (2012), and in this study the term network does not describe a thing 'out there' but refers to a tool used by the researcher to illuminate associations between actors. This leads Rydin to describe an ANT account as one that is "based on understanding the dynamic ways in which relationships between [actors] are forged, negotiated and maintained." (Rydin 2012 25). As such, ANT directs the researcher to explore questions of how associations are assembled and generate action through relations with specific, heterogenous assemblages of actors. A study of BREEAM Communities from this perspective then might therefore investigate the ways in which the standard is brought into coexistence with development actors at specific sites of action, and how those relations enable (or resist) changes to BREEAM Communities and that development assemblage. This section further explores how these core assumptions and some key concepts might be useful in investigating sustainability frameworks and sets out how they are used in this study.

[2] Some authors use actant to distinguish an agent without form, character or figuration from an actor ("an actant endowed with a character" (Akrich and Latour 1992, 259). For simplicity, this study refers only to actors.

Relationality

The first core assumption of ANT is radical relationality. This elevation of all actors to the same ontological plane requires the elimination of assumed hierarchies (Salinas, 2014). This aims to dissolve the distinction between human and nonhuman, 'macro' and 'micro', local and global, structures and agency. Rules, values, norms, scale, institutions, cultures and other structures that might otherwise imply a source of agency (Spinks 2011) are instead treated as emergent properties of associations between actors. These structures "are seen as accomplishments" (Tait 2002, 72) and they are to be explained rather than having explanatory power in ANT (Latour 2005). If an entity does act (i.e., is an actor), it is because they have been made able to do so through work to build, transform, and maintain associations to that effect. ANT therefore is used to investigate how such associations are formed, remain stable, and go on to act (Rydin 2012).

For this study then, relationality draws attention to how BREEAM Communities is given the capacity to act and influence others' actions through specific association (rather than, for example, assuming its status as a standard will drive behaviour). Relationality also encourages the researcher to pay attention to how the standard is, and remains, a stable entity as 'BREEAM Communities', or indeed how it is instead manifested as individual technical criteria, a planning policy, the assessor, as some elements that are made more visible, and so on. In other words, relationality requires that BREEAM Communities is not treated as an already established actor. Instead the researcher is directed to study an assemblage featuring BREEAM Communities as it moves and morphs from a technical document to an instrument of planning to a decision-making tool, and as emerging characteristics of that assemblage spread out across a development in question.

Symmetry

A second core assumption of ANT is that the social is equally accessible by human and nonhuman actors. This extension of relationality to nonhumans is a further consequence of committing to a relational ontology that understands distinctions between actors as made

rather than given. This radical ontology is supported by a methodology that urges researchers to *follow the associations* (Latour 2005) in a symmetrical way, painstakingly revealing those relations that make up the social rather than relying on structural explanations, which includes *a priori* distinctions between human and nonhuman. Indeed, this level of abstraction – to first explore, without prejudice, what the social is made up of before reassembling it in an account – implies the necessity of "[extending] the principle of relationality" (Farias and Bender 2010, 3) to nonhumans. In this way for example, Berker and Larssaether (2017) are able to describe how an assemblage of construction firms, investors, planners, energy performance, a view of a fjord, party politics, and so on participate in forming a definition of an environmentally sustainable building. Then, instead of assuming the role and perspective of the planner or planning as formed by their social contexts, this radically relational approach allowed those authors to show how varying assemblages of actors participated in constructing the planner differently in different cases: as directive leaders in one and open and collaborative in another.

The enfranchisement of nonhumans is central to ANT and exemplified in Latour's now classic study of colour charts' and plastic maps' participation in soil science (Latour 1999) or Strum and Latour's (1987) discussion of baboon societies. In that 1987 paper, Strum and Latour argue that nonhuman actors are needed for social stability. This is an argument also made by Murdoch (1998) and endorsed by Rydin (2012), in the context of planning studies, as necessary for understanding how, only by achieving some degree of stability, an actor can "deliver action" (Rydin 2012, 25). This stability can also make that action more predictable and portable (such as is achieved by inscribing a sustainability assessment criterion in a document supported by an organisation like BRE, assessor training documents, websites, planning regulations, sub-contractor contracts, and so on). More generally, taking account of nonhumans in an account of BREEAM Communities is important in understanding how it might act in a broad spectrum of ways. As Latour argues:

> there might exist many metaphysical shades between full causality and sheer inexistence. In addition to 'determining' and 'serving as a backdrop for human action', things might authorise, allow, afford, encourage, permit, suggest, influence, block, render it possible, forbid, and so on. (Latour 2005, 72).

The heterogeneity of an assemblage and "metaphysical shades" (*ibid*) of associated actions are particularly illuminated when asking questions about:

- "[First], innovations. … In these sites, objects live a clearly multiple and complex life through meetings, plans, sketches, regulations, and trials. Here they appear to fully mix with other more traditional social agencies. It is only once they are in place that they disappear from view.

- second, even the most routine, traditional, and silent implements stop being taken for granted when they are approached by users rendered ignorant and clumsy by distance – distance in time as in archaeology, distance in space as in ethnology, distance in skills as in learning.

- the third type of occasion is that offered by accidents, breakdowns, and strikes: all of a sudden, completely silent intermediaries become fully blown mediators.

- fourth, when objects have receded into the background for good, it is always possible – but more difficult – to bring them back to light by using archives, documents, memoirs, museum collections, etc." (Latour 2005 72, *emphasis mine*)

This idea of radical relationality fits well onto a BREEAM Communities assemblage that is comprised of humans (assessors, BRE staff, construction professionals, consultees, etc.) and nonhumans (the manual, on-line resources, the site, calculative tools, workshops, and so on). Indeed, the pilot study revealed many ways in which BREEAM Communities was presumed to have agency by interviewees (e.g., as a representative for BRE, a scapegoat, or an advisor). Moving forward slightly prematurely, often in this study the site is ascribed the agency to influence BREEAM's implementation by permitting or denying certain courses of action.

Each of the above suggested topics of enquiry are relevant to this study. First, where BREEAM Communities is innovative, either as an new and controversial addition to planning regulation or an attempt to suggest new ways of doing things in a reluctant the development process, it can be studied exactly as suggested, through descriptions and records of meetings, plans, discussions, workshops, and so on that characterise its

interference with more familiar planning and development actors. Second, BREEAM Communities requires learning from assessors, local authority officers, specialist consultants and developers. Many people's early experience of the tool is characterised by learning, either at a BRE run workshop or training session (as is often the case for assessors or planners) or at meetings chaired by assessors (as for development professionals). This unfamiliarity provides the researcher an opportunity to isolate action ascribed to BREEAM Communities in a messy development process. Third, although 'breakdown' conjures the idea of mechanical failure, it is likely that the BREEAM process (being innovative and in some ways confrontational with standard practices) will suffer breakdowns. This may be more procedural, such as BREEAM's technical prescriptions falling foul of local authority planning procedures, or they may be more 'material', such as in the site resisting implementation (for example by being in a flood plain or being judged to be too small to implement a mixed use development). Finally, the development of the BREEAM Communities standard and its incorporation into local planning guidance are (recent) historical events and although interviewees will likely have reasonably good memories of them, documentary evidence that can help reignite the controversies alive at the time will be sought. Moreover, although each development case was in the process of being developed at the time of investigation, planning applications already submitted, meeting minutes, parish council agendas, and so on will be called upon to perform a similar task – reminding interviewees of the innovations, controversies, lessons and breakdowns that occurred around BREEAM Communities (as well as being sources of evidence in their own right). As such, the heterogeneity of an ANT account is crucial to understanding BREEAM Communities.

Association

A final core assumption of ANT is the "importance of association between [actors] as [the] way of achieving change" (Rydin 2012, 25). ANT asserts that no 'action at distance' can occur. Instead, hybrid chains of actors redistribute action (or the capacity for action) along the chain (or more likely through a web) of associations (Akrich and Latour 1992). Actors

that (re)interpret and change action or information, rather than simply "[transporting] meaning or force without transformation" (Latour 2005, 39) are referred to as mediators (rather than intermediaries). In other words, mediators "redefine the social organisation of [socio]technological systems" (Grandclément, Karvonen, and Guy 2014, 3). A classic example of association is Latour and Akrich's description of hotel keys. Reproducing a hotel manager's wish that customers might 'please, return your room key' onto a polite sign simply transmits this demand to a different actor (with little difference to the result). However, by associating a room key with a heavy metal weight a hotel manager may translate the action "leave your key at the front desk" (Latour, Maugin, Teil 1992, 4) to "get rid of an unwieldy object" (*ibid*) which more of the hotel customers group react to.

Since associations make action possible, the tracing of work involved in their making and unmaking is central to ANT (Rydin 2012; Latour 2005). When associations are settled and stable these traces are hidden from view: as discussed above in relation to nonhuman actors, only through unfamiliarity, controversy, distance, innovation, breakdown, and other dynamics is the researcher able to describe a network (Akrich and Latour 1992). Further, in keeping with ANT's generalised symmetry, mediators are important not because of who or what they are (human or nonhuman), but what they do. In an urban development context for instance, important work may be carried out by normally 'invisible' and unexpected actors such as maintenance staff (Strebel 2011) while highly visible actors such architects may end up performing a more passive role. This concept of association therefore directs the researcher's attention to finding the specific, traceable agents of change in the development process. It reminds the researcher (in this case) to be sensitive to sources of unexpected support for BREEAM Communities. For example, Spinks (2011, 2015) combines ANT with a social network analysis (SNA) approach to investigate the implementation of BREEAM. By "[deconstructing] material and social constructions … which facilitate sustainable building development" (Spinks, 2011, 88) the author is able to map the specific associations between groups of actors, unpicking how different meanings of the framework are constructed, distributed and manifested across two development projects. Further, by focusing on the dynamic "*processes* of network formation" and the "*assertion* of power" (2; emphasis mine.) Spinks is able to conceptualise BREEAM "not as a desired outcome [as

others see sustainable building certification schemes] but as a *mobiliser* [and] as part of the *process* of sustainable building" (92; emphasis mine). This focus on associat*ing* makes ANT ideally suited to the study of a new, unfamiliar, untested standard like BREEAM Communities. It is also suited to studying the implementation of a standard rather than its formal features, as this investigation aims to do. This study seeks to apply this through following ANT's mantra of *follow the associations*. For BREEAM Communities, this means tracing the work of assessors, specific technical criteria, spreadsheets, construction professionals, and so on to form associations with other development actors in attempts to redistribute and redefine the BREEAM framework in that assemblage. It also means identifying where associations simply transmit agency and meaning or alter the standard (and other actors) in some way.

Summary

In summary, I have outlined how ANT is based on three core principles of radical relationality, a generalized symmetry between human and nonhuman actors, and an understanding that the capacity for action is developed through/by associations between actors. Because of this conception of agency, this prompts questions about how associations are formed, remain stable, and transmit or translate action and agency throughout chains (or webs, or assemblages) of hybrid actors. I have argued this theoretical framework can help explore how a standard like BREEAM Communities (one that is heterogenous, itself an aggregate of other standards, calculative requirements, professional communities, and so on) might access, become part of, and effect change through, assemblages of urban development. This next section outlines some key concepts that are employed in this study to achieve this.

Key Concepts

I have set out the core assumptions of ANT and discussed the implications of these for a study of BREEAM Communities. Building on that, this section sets out the key concepts that

will be used in the empirical analysis. These are: uncertainty, translation, mediation, and calculation.

Uncertainty

As discussed above, because ANT rejects structural sources of agency, arguing instead for radically relational explanations of action, there is now a need to first understand what the social comprises and how actors are assembled, and to do so without prejudice for size, scale, type (and so on) of actor. For this study, uncertainty therefore refers to this ambiguity (whether on behalf of the "observer or in the phenomenon observed" (Latour 2011 22)) about what the social is made up of: ambiguity about "the type of aggregates thus assembled and … the ways they are connected to one another" (*ibid*). Latour's *Reassembling the Social* (2005) presents four sources of uncertainty to be investigated in understanding an assemblage (Latour 2005, 27–140). These sources of uncertainty are: (1) the nature of groups, (2) the nature of actions, (3) the nature of objects (already discussed above under Symmetry, p. 54), and (4) the nature of facts. These sources of uncertainty are not set stages of analysis but "have to be piled on top of one another" (Latour 2005, 22). As such, the reader should not expect to see these four titles under each of the analysis chapters of this report. Instead, these uncertainties have been employed in two ways. First, as heuristics to guide the emprical work, shaping the collection and analysis of information gathered from informants; and second, to guide the written account where an uncertainty seemed particularly relevant to the case at hand. For example, in describing the fabrication of the BREEAM Communities manual, uncertainties about groups (e.g., who could participate in the process of making the standard) and matters of fact (e.g., what technical issues were deemed controversial and which were not) became most relevant to the description.

The first uncertainty, that of groups, seeks to refocus a researcher from looking at established social aggregates (individuals, organisations, roles, etc.) to questions of what the social comprises. The term "group" is deliberately abstract, referring to any (relatively) stable concatenation of actors that might be part of an assemblage. Latour (2005) argues that starting with these assumed aggregates, leads to questions about which is the better

way to characterise an actor or which is the more natural group to put them in. Instead, ANT prompts the researcher to look at what groups are made of and *how* these groups are made and unmade by the actors themselves. In other words, to understand how actors themselves are characterised. In this study, I primarily focus on unpicking the (potential) groups formed by and around BREEAM Communities, for example, the standard itself, those in support or resistant to its implementation, how an actor is seen as compliant or not against BREEAM criteria, and so on (this limitation – not applying this uncertainty more broadly – is discussed in more detail on page 71).

When groups are being formed, various "traces" are left "in their wake" (Latour, 2005 31) by actors doing work to assemble actors in a certain way, this work could include actions to::

- delineate, speak for, justify, define and measure up one group against another
- designate other groups as "being empty, archaic, dangerous, obsolete, and so on … for every group to be defined, a list of anti-groups is set up as well" (*ibid*)
- mark and stabilize the boundary of a group and its previously established definition. This stabilization often includes nonhuman actors as durable, predictable allies.

A note on "anti-groups". This concept is not well used in the ANT literature and when it is, it is often introduced without being defined and does not play a large role in the analysis (e.g., Vuokko and Karsten (2007), who only note that anti-groups "have a role in underlining the differences between those included in and those excluded from a network" (336)). A critique may arise that to use anti-group in analysis infers a normative position on behalf of the author. However, this is not the intention, and in this investigation the anti-group is always positioned in opposition in some way *as defined by the actor or group currently being discussed*. This concept has been useful in two ways. First, to ask questions of informants about how actors or groups are constituted in opposition to BREEAM Communities (as described in the Chapter 4, Methodology) and as a term in the analysis to refer to those actors in opposition to the issue at hand.

The second source of uncertainty has to do with "the heterogeneous nature of the ingredients making up social ties. [In other words], when we act, who else is acting?" (Latour

2005, 43). As before, Latour provides a list to clarify uncertainties about who or what is acting:

- "first, agencies are always presented in account as *doing* something, that is, making some difference to a state of affairs, transforming some As into Bs through trials with Cs." (Latour 2005, 53). To evoke agency, the researcher must provide an "account of its action", which may or may not align with an actors own "theory of action" (56);
- "second, if agency is one thing, its *figuration* is another." (53), where figuration is the form of an actor.
- "third, [in the same way as in the formation of groups] actors also engage in criticising other agencies accused of being fake, archaic, absurd, irrational, artificial, or illusionary." (56).

Again, for this study of BREEAM, this uncertainty has been useful to investigate and trace sources of action in support (or in opposition to) the implementation of the standard. When a document submitted as part of a planning application ascribes greater sustainability to BREEAM Communities, for example, who or what (specifically) is acting? Is it BRE, a planning obligation, an assessor, an instruction inscribed in a technical criterion or compliance note? And what are the traces left by that action? How is it enforced, stabilized, translated through hybrid chains of actors from 'BREEAM Communities' (to a particular energy strategy, for example)? And, are there unexpected sources of support or resistance?

The fourth uncertainty regards the nature of facts (the third, the nature of objects, has already been discussed above). In short, this refers to ambiguity about what is a fact and what is a *matter of concern* and how these are distinguished. This uncertainty points the researcher towards controversies and disagreements about knowledge, ideas and meaning. This distinction well understood by those investigating the fabrication and distribution of standards, where disputed ideas are corralled by processes to achieve consensus (e.g., Goulden 2016). When something is considered a 'fact' it seems natural and uncontroversial. However, while an idea is disputed, a *matter of concern*, its assemblage is visible, risky,

costly, debatable, interesting and publicly relevant (Latour 2005). For Latour, these matters of fact seem most often based in claims that some scientifically defined object is 'natural', however, it is no great leap to begin to identify those unproblematic 'matters of fact' embedded within assemblages of urban development against the more lively 'matters of concern' introduced by novel actors such as assessment standards like BREEAM Communities. The establishment of matters of fact in urban development processes perhaps rest less on claims of some natural genesis but on long-standing rules, procedures, assumptions that strongly mediate behaviours of actors. Jumping ahead, interviewees offer various seemingly indisputable and agreed actors – such as particular cost models and relations to planning permissions – and many other more uncertain issues, including often those made problematic by BREEAM Communities.

For this study, understanding the nature of groups, agencies, actors, and knowledge claims that generated, comprised, and was generated by BREEAM Communities was the starting point for the empirical work. For BREEAM Communities, this work of defining and stabilising its own claims to superlative knowledge of sustainability begins in the writing of the standard (Timmermans and Epstein 2010). The concept of uncertainty prompts the researcher to ask which experts, organisations, protected species, existing standards, economic models, and so on are brought into this process? How is their inclusion (or exclusion) justified? How is controversy approached? Then, in implementation BREEAM Communities is shown (in the literature review and in more detail in Chapter 5) to contain numerous, nested standards and procedures that require the attention of myriad technical specialists, site elements, residents, and so on (Lampland and Star 2009). The first step in understanding how this "support army" (Timmermans and Epstein 2010, 80) of actors keeps BREEAM Communities "on track" (*ibid*) is to determine what exactly is assembled in support (or opposition) to the implementation of the assessment framework.

Translation

Translation is broadly defined by Latour (2005) as the bringing together of two (or more) actors into co-existence, the process of which changes those actors and that surrounding

assemblage (actors/action after all is defined by relations). This process can be broken down into four stages: problematization, interessement, enrolment and mobilization (Callon 1986). These stages help unpack the ways in which "agency is negotiated, … identities are fought over, roles ascribed and power relations fixed" (Tait and Jenson, 2007, cited by Rydin 2012 26). As such, translation helps identify how groups and agencies are formed and how matters of concern (as discussed above) are made visible and problematic, negotiated over, and how these negotiations are stabilised and go on to further participate in the (inter)mediation of a (development) assemblage. These four stages can be defined as:

- Problematization: the work to define an actor as a problem and as indispensable in resolving that problem. This problem framing is a key part of the definition and functioning of obligatory passage points (Rydin 2012; as discussed below).

- Interessement: the creation of roles and processes by which that problem might be approached.

- Enrolment: the strengthening and allocation of those roles to supporting actors and groups; the building of alliances and aligning of interests.

- Mobilization: the deployment of methods to ensure those actors and groups are able to continue to represent and implement those roles; the on-going, often disputed, and varyingly successful work to solve the problem.

As such, translation offers a conceptual framing to investigate how actors come to be incorporated into particular assemblages. It also, through the processes outlined above, describes a process by which those actors/assemblages are altered, shifting to incorporate and mobilise around new problematizations.

Rydin (2012) also argues that translation (and specifically problematization) are important in explaining how an actor like the UK's regulatory planning process can act as an *obligatory passage point* (OPP). An OPP is an actor that requires others to "come together around [a] dominant framing and then engage in specific negotiations [or other actions] within the context of such framing" (26). This dominant framing can only occur when work is done (and perhaps stabilised by nonhumans) to impose an agreed problematization. This obligation

can both test the stability of actors required to engage (failure is possible!) and provide a mechanism by which actors can assemble resources to meet that obligation. In urban development in the UK for example, the work to create a planning application is only possible – indeed only needed – because the obligation to negotiate with the planning authority prevents development otherwise. Rydin (2012) argues that the "ability of [nonhuman actors] to embody compliance with planning policy is *the* key feature" (37; emphasis mine) that allows these policies to persist across time and space. Translation then, offers a framework for investigating how these persistent policies can organise roles and processes of planning, and how association with this OPP might generate agency for an actor like BREEAM Communities.

Translation then aides the researcher in understanding how actors are incorporated into association with development assemblages. We have already seen how BREEAM and other sustainability assessment frameworks have been adopted into planning policy. In this study, we can explore how BREEAM Communities is translated with this OPP in planning policies and development sites, how stable this entanglement is, whether this permits BREEAM Communities to frame activities in support of its aims, and how BREEAM Communities is transformed by this association. This framing also provides a framework for investigating how this otherwise voluntary assessment standard might regulate and organise action within a development.

Calculation and Prescription

Calculation, broadly, can be seen as a way of creating new relations between actors that have been made to conform with manipulations and transformations as defined by the calculation (Callon and Law 2005), and is (always?) a central element in the implementation of standards. Callon and Muniesa (2005) define three stages of calculation: (1) the assembling, qualifying, detaching, arranging, and ordering of entities in a single space and time (broadly defined); (2) "entities are then associated with one another and subjected to manipulations and transformations" (1231); and (3) extracting a result. Following the above discussion, this study focuses on questions of how calculative prescriptions are able to

demand entities are assembled and manipulated, and how these calculations then participate in the implementation of the standards, including how they behave as actors in organising or translating others across site assemblages.

To enable these calculations to occur, work must be done to generate a "calculative space" (Callon and Law 2005; Ehrenstein and Muniesa, 2013, 163) that can provide the resources (in the broadest sense) required. For example, Ehrenstein and Muniesa (2013) show the work undertaken to "frame [a carbon offsetting reforestation project] as an object of prospective calculation" (163), including establishing a legal basis through the Kyoto Protocol, organising a new economic market in cap-and-trade emissions systems, negotiating the inclusion of reforestation in that market, as well as more prosaic actions like establishing business contacts, writing letters, consulting with local communities, and so on. Returning to urban development, this illuminates the on-going work to establish and maintain a planning system that enables judgements (rational or not (Berker and Larssaether 2017)) about the suitability of planning applications (Rydin 2012). This also recalls the work to establish standards, professional training activities, industry conferences, and so on that enable the making of those development plans. In the sociology of standards, these relations might be described as communities of practice (Lampland and Star 2009). For ANT, these relations, the work to create them, and the emergent effects of calculability (the ability or power to calculate) need explaining (Fox 2000; Ehrenstein and Muniesa 2013). In other words, how does a standard come to be able to guide its users through those stages of calculation?

Actors that are assembled in pursuit of calculations are constrained (to a varying degree) to whatever logic describes those manipulations and transformations (Berker and Laessaether 2017). Studies of standards and other calculative tools highlight these prescriptions in such tools and the (hidden) assumptions, frames, scripts, and so on which shape their outcomes (Woolgar 1991). The degree of prescription of these manipulations varies, with some logics or prescriptions more adaptable than others (Akrich and Latour 1992). In the case of standards and assessment frameworks, some define the action to be done in great detail, with precise terms, relating to existing guidance (with significant communities of practice), requiring quantitative manipulations; other prescriptions may be require ambiguous

judgements, provide fewer details or guidance, use open-ended or vague terms, and offer less support from associated communities of actors. Where calculations are more prescriptive in this way, the required actions may be more predictable and the expected users made more intermediary; where calculations are less prescriptive, users may be able to mediate to a greater extent and actions may be less predictable (and more contingent on the user and related actors). In this way, prescriptions, allow, suggest, require, demand (and so on) action from the standards' expected users (Akrich and Latour 1992). As discussed in the literature review, the extent to which calculative requirements balance adaptability by site actors with prescriptiveness is a key tension in understanding the implementation of a standard. Those subject to calculative manipulations can only be constrained to a certain degree (which may not be clear in advance; Heuts and Mol 2013). And as such, the degree of predictability and mediation is (as ever) determined by association at sites of action.

Assessment frameworks and standards such as BREEAM Communities can be seen as a collection of rules and resources for performing calculations (Timmermans and Epstein 2010). For BREEAM Communities, these rules or prescriptions, allow, suggest, require, demand (and so on) action from the standards' expected users (Akrich and Latour 1992) – assessors, project managers, technical consultants, and so on. For example, a BREEAM criterion that requires the assessment of recommendations for reducing energy use provides (1) criteria for the types of actors to be assembled (BREEAM assessor, energy consultant, site topography, energy use, and so on), (2) directions for how the calculation should be performed to gain a credit (in this case, to consider recommendations), and (3) an expected form of result (a written recommendation under a set number categories). Through its various rating and weighting systems, it also provides information by which other actors might prioritise the sustainability criteria presented within the framework. These prescriptions also define the other actors that must participate if the assessment is to be complied with. This contributes to the problematization of certain actors and the exclusion of others. How these prescriptions problematize development actors, how actors resist or adapt these calculative demands, and how the processes and results are further mobilized in design decisions (and other development calculations) can help unpick how BREEAM's definition of sustainability might be inscribed in a development plan (Berker and

Larssaether 2017). Calculation can thus be useful in understanding how a standard like BREEAM Communities can move from a static, formal definition of neighbourhood sustainability to one that is translated in a particular development assemblage.

Limitations

There are some limitations of an ANT approach in general, as well as the particular version developed for this project. Many of these have been discussed before (sometimes at great length). Within this changing and controversial theory/method, debates have been on-going and extensive; sometimes amicably in the pages of scientific journals about individual issues (e.g., Boelens 2010; Rydin 2010a; Metzger 2011) and sometimes furiously (see the so-called 'Science Wars' about seemingly 'everything'!). Here, I will focus only on those surrounding the key issues noted above that might have implications on the research procedure set out above. By addressing key positions in those debates, I wish to highlight potential pitfalls in relation to this investigation and ways in which I have designed this research program to address them.

Institutions

First, how ANT deals with institutional or structural effects is central to its conception of the social. In ANT, there are no non-local actors; action implies a site of action, even if this is through long (distance) chains of actors. Structures do not exist as such, yet they may be articulated by informants (for example, the whims of development capital may be bemoaned by municipal planners). This potentially presents difficulties for the researcher. If a 'structural effect' is articulated in some way, we have to ask "where are these structural effects actually being produced?" (Latour 2005, 175). Relating this to this project's theoretical and methodological framework, we might focus on local actors, only being drawn 'out' to so-called structures when we are directed to by our informants (human or nonhuman). This leads us to focusing on the 'production sites' of action such as the offices, meeting rooms, community halls, websites, planning applications, and so on that BREEAM

Communities might act at/in/on. This also directs a researcher's questioning towards material practice, asking informants "what do you actually do with BREEAM?", "Who and what was involved?", "Where did it occur?", and so on.

Making Comparisons

Second, because an account is generated from a description of a network of site-specific actors, it raises a question about the possibility of using ANT to compare different urban developments. While Callon and Law (1997) suggest looking for "patterns of relations" (179) and comparative studies have been done in ANT (e.g., Alcouffe, Berland, and Levant 2008; Berker and Larssaether 2017), Latour (2005) insists on disposable, specific explanations that seek to describe an assemblage's irreducible complexity. How then does this study seek to proceed when investigating multiple cases? To compare cases, there must be some similarity in their situation or context. However, any comparative study must not either describe and then side-line the 'context' (by doing so imagining the case to be free of any particular situation), or to assign elements of 'context' a guiding role without identifying the ways in which that guidance is effected. For example, each case in this study is situated within the English planning system, subject to its rules and requiring of economic capital and technical resources (and so on) to navigate it. The particular ways these rules and requirements (etc.) interact with the development are mediated by 'local' actors. Where then does 'context' end and the case begin? How then to draw a boundary around the description of a specific case? This is a familiar problem. Returning to Callon and Law (1997), they give an example of a form of action (strategic reflexivity) that they aim to show occurring in various places and times. One reason they can do this is because of the way "in some measure [the action itself draws] a boundary between inside and outside" (179). Applying this to the urban development, where might this boundary be drawn? Or more accurately, where might the actors themselves draw this boundary? And will this allow comparisons to be made? This study addresses these questions by following ANT's maxim of 'follow the associations'.

This study therefore only draws in these 'contextual' assemblages where interviewees and other sources have themselves made links between BREEAM Communities and some other group or actor. One exception to this is the identification of broad sites of action (BRE, local planning policy, and development projects) that were identified in the pilot study and a brief description of cases in the next chapter. This means that actors themselves have drawn the boundary of the cases. It also means that the 'context' that might allow easy comparisons is less visible to the reader. I have sought to preserve the description of BREEAM Communities relations at the cost of distinct descriptions of the cases themselves. What is presented in the following chapters then is the outline of BREEAM Communities' interactions with development cases, not seven case studies as such; instead of providing separate, comparable accounts of each case (for which the picture remains incomplete) the analysis describes and seeks to explain types of activities and assemblages BREEAM Communities participates in across cases. In other words, by describing how BREEAM Communities acts at specific sites of action or common events across case studies. This makes it more difficult to draw conclusions about the differences in approach to similar case studies, a potentially valuable research output, but does enable instead an explanation of BREEAM Communities' interactions with different specific actors. What this approach also offers is the use of a single, coherent method and analysis throughout each of the three 'sites of action' as defined in the introduction to this work: the development of the standard, its incorporation into policy and practice, and its implementation in those seven development cases.

Meek Actors

Some of the classic examples of ANT focus on actors not traditionally at the centre of sociological accounts. While scallops and key chains provide examples of accounts of unlikely heroes, "with ANT's focus on agency, positions from which it is difficult to act make for less interesting positions from which to tell stories. So, ANT may encourage the following of heroes and would-be heroes." (Sismondo 2010, 89). In other words, a third limitation regards the ability of ANT to uncover traces of action and association that are hidden due to passivity or meekness rather than heroic action or resistance.

I suggest that this possible limitation comes from the sorts of questions ANT leads one to ask about agents and agency. Much of the language employed setting out the method above is that of direct and meaningful action on the one hand and resistance on the other. An exciting prospect! However, it is just as likely that actions may be small, subtle, on the edges; resistance might look more like indifference or forgetfulness. Does ANT prompt the right questions if, for example, instead of designating competing actors as archaic or illegitimate (as described above) those actors are simply ignored, side-lined, or forgotten? The frustrations of assessors spoken to in the run up to this project suggest the latter may be more likely, as sustainability is *de-prioritised* rather than *ousted* from the development. For example, instead of being rigorously negotiated away, might aspects of assessment criteria be gently put to one side by busy assessors and project managers? Instead of a calculative method being adapted to the site (which takes active work) might it be 'paid lip service', with its potential influence obfuscated and passed over.

This is potentially problematic for developing an ANT account. In ANT, if an actor or association does not leave a trace it cannot be justified for inclusion in the network based on a strict interpretation of *follow the associations.* Yet, if an actor is shunned from a network due to silence, absence, distance, ignorance, and so on, the 'trace' may only be followed through hard work from the researcher to re-imagine or re-create a controversy (Latour 2005) which may not have taken place in quite the same way before research began. Here, the researcher becomes a key component in that meek or silenced actor's assemblage, forcing it to the fore through their research activities. We have discussed various ways the researcher might investigate nonhuman actors and "make them talk" (Latour 2005 79), such as looking at innovation or distance. However, these are primarily discussed as methods to describe the mediating role of otherwise hidden actors in events, where their agency might be obscured by 'social forces' or mistaken for human action. This approach may be less helpful when seeking to understand (almost) non-events, or non-action.

For this study, I have followed the approach set out above, paying particular attention to the small ways in which BREEAM Communities might be translated or resisted by informants

and other actors across sites of action. This potential limitation is further discussed in the final chapter of this thesis.

Boundaries of the study

Finally, there are some important limitations that stem from the incongruity between the necessary boundaries drawn in delimiting the object of any study and a theoretical framework that understands boundaries as made not given. This study focuses on the implementation of BREEAM Communities as the object of study and is primarily interested in how the standard is constituted and translated in various sites of action. A study with a wider remit, (as well as investigating how BREEAM Communities is comprised, translated and participates in calculations) might have also explored the reciprocal effect of those associations. For example, as well as questioning how municipal planners define and build support for the standard in local planning regulations, an ANT study could also explore how those planners incorporate the standard into their own (professional) identities and practices as BREEAM Communities is drawn into association with their roles as planners. Alternatively still, an ANT scholar might instead be interested in describing how the concept of neighbourhood sustainability is translated over the course of a BREEAM Communities-assessed urban development (later perhaps highlighting BREEAM Communities' role).

The approach taken here was chosen partly due to practical and methodological concerns (such as access, which is discussed in the next chapter) and partly due to the primary research interest in BREEAM Communities (due to the administrative set up of the project as an EngD). As with the discussion of making comparisons above, this focus on BREEAM Communities enables a thorough description of how the standard is translated through the development, but it will limit the ability of the researcher to bring other actors to life in the same way.

Research Questions

This chapter has introduced ANT as a theoretical framework and shown how its core assumptions of radical relationality, generalised symmetry and association are well suited to the study of a heterogenous and social standard like BREEAM Communities. The literature review highlighted several important themes in the study of standards that have not yet been investigated for sustainability assessment frameworks: how they seek to build and maintain consensus (both in fabrication and implementation), how they balance prescription with local contingency and adaptability, and how such standards succeed in regulating despite being voluntary? As such, the central research problem identified by the literature review is one of action: **how, as a voluntary framework, BREEAM Communities is adopted into policy and development projects; how it prescribes requirements for users in the context of those particular developments; and how this standard is implemented, adapted, or resisted in those developments?** This chapter has argued that those core assumptions of ANT, as well as the key conceptual tools outlined above (uncertainty, translation, and calculation and prescription), position the theoretical framework to usefully investigate such questions.

Now we have set out the assumptions of ANT and the sorts of questions it allows the researcher to explore, the research problem might be restated in terms of ANT. This will make it clearer how the theoretical framework allows us to investigate how action emerges (or not) from the participation of actors like BREEAM Communities in assemblages across three sites of action, the fabrication of the standard, its incorporation into planning policy and urban developments, and its implementation. The overall research question can be restated as:

How are associations with BREEAM Communities created and maintained across different sites of action? And how do these relations enable action in pursuit of its implementation as a standard?

Based on the concepts discussed above, this question can be broken down into sub-questions that help to make the research task clearer:

1. **How is BREEAM Communities assembled at specific sites of action?**

2. **How is BREEAM Communities translated (problematized, interessed and enrolled, and mobilized) (in)to sites of action? And how does this translation enable (or resist) BREEAM Communities' ability to act?**
3. **How are (calculative) requirements of the standard prescribed, enacted, and adapted by development actors?**

The next section returns to the object of study, BREEAM Communities, to illustrate what these questions mean for the study in practice.

Research Question 1: How is BREEAM Communities assembled at specific sites of action?

This question seeks to help understand what acts when BREEAM Communities is acting. Building on the above questions around uncertainties, this research question directs the researcher to question what comprises BREEAM Communities and how the framework relates to other actors across various sites of action. The research task here is most straightforwardly related to the work of following the associations. It directs the researcher to trace how the formal elements of the standard are associated with other actors at across sites of action: identifying other actors, relations between them, controversies or more generally matters of concern.

A pilot study for this investigation (described in the next chapter) suggested that once 'formally' adopted by a planning authority and developer as a necessary part and outcome of the development process (see translation), there is work to understand what BREEAM Communities means for that development: how it will be implemented, to what extent, who will do that work, what does it mean for already emerging plans, and so on. Relevant criteria must be identified, implications for the site understood, costs estimated, work delegated, technical experts found. This highlights how BREEAM Communities is assembled at a particular site of action and is brought into relation with a wide variety of actors. Answering this first question requires the identification of (human and nonhuman) actors that are participating in the implementation of BREEAM Communities and analysing how they are contributing to assembling a site-specific definition of the sustainability framework.

Understanding how BREEAM Communities was fabricated and what (in detail) the technical document contains (as outlined in Chapter 5) will help the researcher (and the reader) appreciate the breadth of possible actors and attune questioning to potential absences as well as visible traces (as discussed in the limitations).

Research question 2: How is BREEAM Communities translated (in)to different sites of action? And how does this translation enable (or resist) BREEAM Communities' ability to act?

That work to define BREEAM Communities in a particular way is likely only possible because the sustainability framework has been problematized (or is in the process of translation) as a necessary actor in forming planning policy or delivering a planning application. ANT highlights the translations that occur as BREEAM Communities is brought into concert with more established development actors, forming new groups and forcing series of judgements and calculations as actors grapple with this (then) new standard. In other words, the ways BREEAM Communities brings 'new' people, ideas, standards, elements of the site etc. into the development in attempts to improve sustainability. Investigating the translations of BREEAM Communities highlights the ways the standard is brought into contact with the site and development assemblage, which may resist, permit, or be indifferent to the attempts by BREEAM Communities to problematize its (co-constructed) definition of sustainability onto the development or planning policy. How do existing ways of working, already emerging plans, other legal and technical standards, and so on interact with BREEAM Communities? How are those criteria are included, excluded, given agency or turned into intermediaries? Further, are, as suggested by Rydin (2012), the requirements of the manual delegated agency through association with the OPP of the planning consent process? There are also two cases where there seems to be no specific planning inducement to use BREEAM Communities. How, in each case, does BREEAM Communities become part of the development assemblage? How BREEAM Communities succeeds or fails in defining sustainability according to its criteria, how it succeeds in making that definition a matter of concern for others and enrols them in acting on its behalf are all questions central to

assessing its ability to improve sustainability. In sum, this investigation looks to follow BREEAM Communities through those translations, from a new standard to its incorporation into planning guidance and onward to urban developments. The ways the standard and/or sustainability is problematised, enrolled, and ultimately stabilised as part of a planning/development assemblage is part of the story of how it comes to influence sustainability in a particular urban development.

Research Question 3: How are (calculative) requirements of the standard prescribed, enacted, and adapted by development actors?

Lastly, this proposed ANT framework prompts the researcher to investigate the ways BREEAM Communities prescribes calculations and judgements in the development process; what Joss *et al*. (2015) call the "decoding processes" (13) of sustainability assessment standards. This leads one to ask what sort of prescriptions the framework sets out in its practice guidelines, classifications, and calculation methodologies; the work to make these prescriptions calculable in a particular (development) setting; how different actors interpret, adapt to, and resist these requirements in relation to competing definitions claimed by other groups of actors (such as by existing internal guidelines or construction professionals); and how these prescriptions (and their implementation) leads to different decision-making for sustainability across sites of action.

This question also prompts investigation of how these prescriptions and their results are translated into emerging plans, commitments, and reports compiled for a planning application (the latest development stage in any case studied here). It also highlights the work to resist this, whether it is uncomfortable changes to existing ways of working, competing priorities and standards, inability of BREEAM to secure adequate resources, and so on. I will also look to the work done by the assessor as the representative of BREEAM Communities in that development. To what extent do they mediate these actions or simply transmit the contents of the manual as intermediaries?

Conclusion

This chapter has set out the theoretical framework used in this study, described limitations of this framework, and discussed its relevance to an investigation of BREEAM Communities. Research questions were developed by reflecting on previous research, knowledge of the BREEAM framework and lessons from a pilot study through the lens of ANT. Three questions were identified that will guide the researcher in describing how BREEAM Communities is translated across various sites of action (including its incorporation into local planning policy and development projects) and its work to prescribe calculative actions in pursuit of that (local) definition of neighbourhood sustainability.

Method

Introduction

This chapter describes the methods used to operationalise the theoretical framework in pursuit of answers to this project's research questions (repeated below). Following advice from various authors (Silverman 2012; Lynch 2000; Mann 1985; Marshall and Rossman 1989) this chapter sets out to: first, summarise the theoretical assumptions made in the previous chapter and their implications for method; second, to describe how I decided to work with the particular cases investigated in this report, including discussing ethical considerations, criteria for soundness and transferability, and lessons from a pilot study; third, to describe those cases; fourth, to outline the research activities undertaken in collecting and analysing data; and finally, to discuss problems encountered during this research project. In the previous chapter I developed three Research Questions:

1. **How is BREEAM Communities assembled at specific sites of action?**
2. **How is BREEAM Communities translated (problematized, interessed and enrolled, and mobilized) (in)to sites of action? And how does this translation enable (or resist) BREEAM Communities' ability to act?**
3. **How are (calculative) requirements of the standard prescribed, enacted, and adapted by development actors?**

This section sets out the way I have approached answering these questions.

Research Procedure

This section sets out how I developed an appropriate research strategy. It then describes the procedures followed in the course of this research project to select cases; gain access and ethical approval; plan and carry out interviews, observations, and document reviews; and analyse that data. It sets out the ethical considerations and efforts made to ensure the soundness of the data and analysis. It also describes the cases studied that will be referenced throughout this report. And finally, limitations and difficulties of the method are discussed.

As discussed in Chapter 3, this project was undertaken to following an ANT theoretical framework. This framework is associated with Latour's mantra of *follow the associations*. In other words, to seek out and describe the traces left behind by the making, maintaining, and breaking of relations between actors at various sites of action. The version of ANT described Chapter 3 requires a methodological framework that allows the investigation of calculations, translations and sources of uncertainty through methods that get the researcher as close to the action as possible: methods like observations, semi-structured interviews, and close readings of documents that report on the action undertaken at these sites. The previous chapter also set out possible questions, interactions, sites and events that might be usefully investigated as part of this study, namely the fabrication of the BREEAM Communities manual, its translation to local planning policy and development cases, and its implementation in development projects. The research methods, ways of data collection, organisation, and analysis need to be compatible with this research focus and questions. This chapter describes how an evidence set populated by interviews, document review, and observations of meetings and workshops is deemed appropriate to enable the researcher to interact as directly as possible with these actors and sites of action. More generally, methodological lessons taken from investigations of 'case studies' seem apt due to the 'how' and 'why' type of research questions asked about contemporary events over which the researcher has little control (Yin 2009). Practicably, the small population (i.e., number of BREEAM Communities developments) limits the use of methods that rely on statistical generalisation to draw conclusions; this recognition also guided the choice of theoretical framework.

Ethics

This study was approved by the UCL Research Ethics Committee (project ID 7103/001) on the 6th of July 2015. The project was undertaken in compliance with the UK Data Protection Act 1998. The pilot study also complied with the equivalent Swedish Personal Data Act 1998 and 2004 and Belgian Data Protection Directive 1992. Consent was sought from all

participants through a consent form and again verbally at interview. All participants agreed to be part of the research.

Data sources require different levels of anonymity and confidentiality. All participants were offered anonymity, but most were happy to be cited; some documents are available to the public; some observations are in plain sight. Other interviewees have requested some level of anonymity and/or confidentiality; some documents are private and given over with an understanding of anonymity; some meetings are commercially sensitive. As such I have decided to represent all cases by letter (Case A, B, etc.) and interviewees by job title and case only avoid any potential ethical conflicts. This should not impact the usefulness or rigor of the research. Although some site characteristics are important actors (such as number of dwellings, topography, status as a designated site, ownership, and so on) it is possible to describe these common site elements for the reader without identifying the particular development the interviewee represents. However, this does not guarantee anonymity as the number of BREEAM Communities sites is very small, in some cases it may be the only site in a local authority area, and there are a small number of working BREEAM Communities assessors. If someone is already familiar with a development or local authority area they may be able to identify a project. This seems a risk for any project balancing the protection of interviewees with describing a network in the detail required by an ANT approach: a perspective that requires specificity makes it difficult to present a textual account of the assemblage while excluding crucial details. This risk has been discussed and agreed with interviewees.

Cases

Cases across sites of action were chosen based on a combination of BREEAM activity (i.e., was BREEAM Communities part of planning guidance in some way? Which developments were undergoing a BREEAM Communities at the time of the research?), a likelihood of access, and continuity between research questions. For example, given that there were a large number of BREEAM Communities-developments in Eastleigh, that Local Authority's planning guidance was also chosen for investigation. Developments and local authorities

with active BREEAM Communities policies were identified through discussion with BRE and confirmed through online searches of planning policies. To be assessed and certified according to the BREEAM Communities method the development must register with BRE and a BRE certified assessor. BRE therefore have a good knowledge of active cases. Moreover, this information – that a site is seeking certification – is often not made public until a (successful) assessment has been made. As such, BRE are the only good source of this information. This method offers perhaps a less comprehensive approach when used to identify local authorities that have included BREEAM Communities in their planning policy and/or guidance. Although BRE tend to give advice to these local authorities and as such have a good knowledge of activity in this area, there is no formal requirement to notify BRE.

Access was probably the most important factor in choice of cases. Due to the small number of BREEAM Communities-related developments and local authorities, attempts were made to access all cases that were active at that time. As noted above, BRE were often the first point of contact here and was asked to introduce the researcher to all assessors involved in active projects and council representatives; where there was no contact with local authorities the researcher made an approach directly via email. Once initial contact was made, this was followed up by a short telephone call to explain the purpose and method of the research project. This process was important in bringing these key informants (assessors and individuals at local authorities with responsibility for the BREEAM Communities policy) on board; they would go on to participate often in numerous interviews, as well as providing further contacts, persuading other interviewees to join the project, and sharing documentary evidence. It was soon clear that gaining the permission and buy-in from the client or developer was important in gaining further access to the project. On the advice of assessors, they were asked to seek this permission from developers. Once granted, a project was considered formally as a case for this research project.

Lessons from the Pilot Study

In the summer of 2013, I undertook a pilot study with two aims. First, to test and improve the practical and theoretical aspects of this research programme; second, to gather initial data to inform the main study. For the study, I investigated uses of BREEAM Communities in Sweden and England. I studied two developments in Sweden, one where BREEAM Communities had been used, in Malmö, and one where it had not been implemented, in the Hammarby redevelopment in Stockholm. I also interviewed other relevant experts with experience of BREEAM in the Swedish development context. In England interviews were held with key actors from two BREEAM Communities certified developments (in Derby and Salford) as well as BRE staff. The case study was underpinned by a conceptual framework based on the 'development processes' model proposed by Healey (1991a, 1991b, 1992) and modified by Guy and Henneberry (2000) and Hooper (1992). Guy and Henneberry (2000) provide a useful summation of the model: "a basic empirical account of a specific development, combining events-sequence and agency considerations; an institutional analysis of the wider strategies and interests of the actors related to the resources, rules and ideas which they employ; and an urban political economy framework as a setting for the development" (2401). By asking broad questions about 'structural influences', 'key actors and their motivations', 'roles', 'BREEAM Communities' 'place in the development processes', and so on, the study began to bring into view uncertainties or controversies that could be investigated further in this thesis. It also highlighted where an ANT approach could be particularly useful (e.g., acknowledging the work of nonhuman actors and delving more deeply into specific sites of action, specific qualculative events, specific translations).

Types of case (sites of action)

As described above, this thesis investigates three main types of case: the design and publication of the standard by BRE; its inclusion in planning regulation and guidance by local planning authorities; and its implementation in 7 residential and mixed-use development projects. This necessitated the study of three types of cases with different methodological concerns (though with theoretical continuity). Each of the three types of case (described as

sites of action above) were approached in as similar way as possible (as described above). However, there were some notable deviations. First, because the standard has already been published and local planning guidance was already in place at the time of writing observations of these events were not possible. Moreover, interviews were made more difficult due to historical nature of the events being discussed. When speaking to interviewees about the implementation of BREEAM Communities in developments, the events discussed tended to have happened within the last 6 months or were still on-going. For these cases (the development of the standard and planning guidance) the time-lag was longer, over a year in some cases. This meant there was a greater need for the interviewer to do preparatory work as to and provide greater structure to the interview. As time increased, a helpful approach was to provide prompts and reminders of specific details of policies. It was also less easy for interviewees to speak at length, and interviews tended to be shorter with a greater number of questions from the interviewer. However, there is no reason to believe that what evidence that was obtained from these interviews were less sound. Interviewees often spoke confidently and in detail about the events they remembered and made it clear where they were not confident with an answer. On my part, I attempted to curate a friendly atmosphere where this could happen, making it clear I understood the difficulties and suggesting it was acceptable not to remember (rather than persevere with a half-remembered description). I also attempted to ask questions in different ways, often referring to specific parts of the texts, stakeholders, or events.

Second, this time-lag also meant that access was often more difficult. Documents may not have been publicly available (in the case of historic local plan consultation documents for example) or people involved may have moved away from those organisations. This could be mitigated by contacting interviewees through other means (such as via the social media site LinkedIn) or enlisting the aid of often helpful council staff. However, this was not always the case and difficulties remained. I have highlighted where I felt this impacted the analysis in the relevant chapters. Following this, limited access meant that analysis of these cases was sometimes based on interviews with only 1 or 2 persons, comprising primarily of documentary evidence. By contrast, development case studies were based on up to 10 interviews, observations, and documentary evidence. In some ways, this is representative of

the scale of BREEAM Communities' interactions with these different sorts of cases. It was often inscribed in a single line of planning guidance in comparison to a 'golden thread' running through a development process. This is also reflected in the depth and breadth of analysis presented in this document, with a greater focus on development cases.

The Design of the Standard

The first case, the design of the standard itself, was evidenced by a review of the technical manual, literature review, and three interviews each with the two scheme managers. These interviews were relatively lightly structured at first, primarily asking "can you describe how BREEAM Communities was developed", with considerable discussion, tangents, and follow up questions. I looked to build rapport with the two scheme managers by working from the BRE offices on several occasions and attending a training course there. I also discussed the research project with them as it was developing. These relationships, it is hoped, contributed to more open discussions about the difficulties of the process. The following interviews where then based on topics that demanded further attention as the research progressed. There were also several occasions when short follow-up questions were answered over email or phone.

Inclusion in Planning Regulation and Guidance

The second type of case, planning regulation and guidance, was evidenced by interviews, reviews of planning guidance, email correspondence, meeting minutes, and records of community engagement. At the time of carrying out this research project, 9 local authorities[3] had included BREEAM Communities in some way in their planning regulations and/or guidance. Of these, 4 responded positively to the invitation to interview and were investigated (these are described briefly in Table 5). I looked for continuity between these local authorities and the locations of the development cases. Of the local authorities represented by the 7 development cases, two – Eastleigh and Bristol – required BREEAM Communities in some way in their planning policies and are studied in this part of the investigation. This allowed for exploration of how not only the published, stabilised policy

[3] At the time of writing: Eastleigh, Bristol, Swindon, North West Bicester, Hounslow, Watford, West Dorset, Weymouth and Portland, Guildford, and Derby

sought to influence uptake of BREEAM, but also how the problematization of the standard might have impacted its implementation in those local authority areas.

Development Projects

To study BREEAM Communities' implementation in residential and mixed-use development projects interviews, document review, and observations were organised around 7 cases. Table 5 outlines each of these, which are described in more detail below. Attempts were made to investigate a range of types and sizes of developments at different stages of assessment. Moreover, although most cases have adopted BREEAM Communities because of a regulatory requirement, two (Case F and Case D) adopted the scheme voluntarily. These projects were also accessible due to good relationships with assessors and BRE, as discussed above. A total of 28 interviews were conducted for this phase of the investigation, though some had experience of multiple projects. As such, the sum of the 'interviews' in the final column is 39. Access to projects was not uniform, a problem discussed in the penultimate section of this chapter.

Table 5 Local Authorities with BREEAM Communities policies investigated in this report

Local Planning Authority	Description of BREEAM Communities inclusion	Evidence Base
Eastleigh Borough Council	Local Plan (2013). "Excellent" for developments > 100 dwellings	3 interviews (Local Authority planning officers, expert witness), document review (policy documents, consultation and evidence records)
Bristol City Council	Development Framework Core Strategy (2011), which set out the overall approach for planning in Bristol. Also adopted into the supplementary Bristol Central Area Plan. "Pass" for developments > 100 dwellings	Document review (policy documents, consultation and evidence records)
Bicester (Cherwell District Council)	Supplementary planning document (2016) for the "Bicester Eco-Town" masterplanned area.	1 interview (Local Authority planning officer), document review (policy documents, consultation records)
West Dorset, Weymouth and Portland Borough Council	Local Plan. "Pass" for "large sites" and "major designated sites".	1 interview (Local Authority planning officer), document review (policy documents, consultation records)

Case A, Eastleigh was predominately a mixture of pasture and formal recreational space. It is one of the largest case studies at approximately 60 hectares. It is bounded on the north side by an existing urban area and on all other sides by greenfield land, woodland, and a country park. Most of the site lays to the north of a motorway, with a small parcel of land south of the road. The site is allocated in the local plan and part owned by Eastleigh Borough Council.

The proposed development comprises 1,100 dwellings, a residential care home, a primary school, community facilities, retail and office buildings, sports pitches, and a pre-school nursery, as well as significant areas of public open space.

Table 6 BREEAM Communities Development Cases

Case	Size (approximate # dwellings)	Type	Previous Land use	Assessment Progress	Interviews
Case A, Eastleigh	1,100	Mixed-use	Greenfield	Interim Certificate	10
Case B, Eastleigh	1,400	Mixed-use	Green/Brown	Steps 2 and 3	9
Case C, Eastleigh	200	Residential	Greenfield	Interim Certificate	8
Case D, Chelmsford	1600	Mixed-use	Green/Brown	Steps 2 and 3	3[4]
Case E, Eastleigh	100	Residential	Brownfield	Steps 1, 2, and 3	5 + workshop observation
Case F, Lincolnshire	200	Mixed-use	Greenfield	Interim Certificate	3
Case G, Bristol	<100	Residential	Brownfield	N/A[5]	1

[4] In this case, the client preferred that questions be put to technical consultants via the assessor. As such, the number of interviews conducted does not represent the breadth of data obtained.
[5] Case G fell below the 100-dwelling-threshold required by Bristol Council to comply with the BREEAM Communities standard and did not progress. This also explains the lack of interviewees.

Case B, Eastleigh is one of the largest of the case studies at approximately 80 hectares and 1,300 dwellings. It is situated on an existing golf course and hotel on the edge of an existing settlement. The proposed development mixed use with retail, a clinic and primary school, and housing. The site is being developed by a 'national housebuilder'. At the time of writing the assessor had begun the assessment process for the final certification of the first phase of development, following a lengthy appeal. As with other cases in Eastleigh, it is aiming for a BREEAM Communities *Excellent* certification.

Case C, Eastleigh is similar to Case E in that it is a small site – comprising around 200 dwellings situated in 6 hectares – within the Eastleigh Borough Council administrative area; the developer is the same national house-builder; the site is partially previously developed; it is bounded on two sides by existing low-density residential areas. It differs in that the majority of the site is currently open fields, and it is bounded on the two remaining sides by woodland and agricultural land.

The proposal aims to achieve BREEAM Communities Excellent with a 100% residential development. All existing buildings are to be demolished. The work for this planning application went on at approximately the same time as that for Case E, being submitted in the autumn of 2015.

Case D, Chelmsford is situated in a semi-rural area and occupies agricultural land and a former 'informal' industrial site. The majority of the site is open field bordered by hedges. There are also areas of open water and ancient woodland. Some areas were highly contaminated from the previous use. The planned development is a mixed-use development, consisting of residential units commercial, a printing press, sports pitches, gardens, and various other facilities. Case D is the first BREEAM Communities development to be awarded an innovation credit. The developer has a long-term interest in the site and plans to occupy the site on completion.

Case E, Eastleigh is a brownfield site previously occupied by hospital buildings, some of which are locally listed and are to be retained. It is part of a wider site, which is to be developed in the future and forms the site's north and west boundary. It is bounded to the

west and south by existing residential developments. It is one of the smaller sites at approximately 3 hectares and comprising 120 dwellings, of which 20 will be situated in the renovated listed hospital building.

The current development is in partnership between the developers – a 'national house builder' – and the (then) Homes and Communities Agency (HCA; now Homes England). At the time of writing it is subject to an approved development brief agreed by the HCA and the local council. The proposed scheme is 100% residential. As with other cases in Eastleigh, it is aiming for a BREEAM Communities *Excellent* certification due to that level being required by local planning policy. The initial planning application was submitted in the winter of 2015.

Case F, Lincolnshire is one of only two case studies to use BREEAM Communities voluntarily (in that it is not specified in local planning documents). The developers are also atypical (in the context of this investigation) being local landowners who have family ties to the village. The site is medium sized at 17.2 ha and is currently in use as farmland (an organic chicken farm), partially situated in a floodplain, and outside the development boundary of the local village; despite a BREEAM Communities score of 'Outstanding', at the time of writing it has been refused planning permission due to a lack of proof of the desire for development by local population. The proposed development included housing, employment land, commercial space, community facilities, recreational facilities, and public open space.

Case G, Bristol is a residential development in a former industrial site in Bristol. Centred around the retained chimney, the proposed development consists of 81 new homes, landscaped public open spaces and new pedestrian routes linking to the surrounding areas and neighbouring parkland. When the development was first proposed it comprised 105 dwellings and so came within a threshold set by Bristol's Local Plan requiring BREEAM Communities (>100 dwellings). However, the BREEAM assessment was stopped following a re-design that lowered the number of dwellings to 81.

Access and Evidence Collection

Once it was becoming clear which cases would likely be accessible, I gathered publicly available planning submissions, relevant local planning regulations and guidance, and made an initial sweep of documents to identify potentially relevant actors. I then performed initial, informal interviews with key contacts to identify further interviewees, relevant documents and opportunities for observations. (This was repeated at later stages with other interviewees.) Which actors to investigate were decided in a number of ways. Consistent with *following the associations,* actors (human and nonhuman) were identified through preceding interview or document analysis, a heterogeneous chain-referral-sampling method or 'snow-ball' method (problems and techniques of chain sampling are discussed by Biernacki and Waldorf (1981) and by Latour (1996)). Interviewees were initially selected based on suggestions from the assessor and/or developer. This was also supplemented by a snow-ball method, where interviewees were asked to suggest other actors the researcher should contact. These methods were quickly exhausted, in that the same actors were often suggested. These actors include: BREEAM Communities assessors, development clients, design professionals, engineering and surveying consultants, consultees (including local people, special interest groups, and local council representatives), national legislation and regulations, local planning policy documents, planning applications, web sites, news articles, and so on. For most development cases, interviews were made with at least one of each of the above (human) actor-type, with the exception of consultees who proved difficult to access. For Case D, questions to consultants were given via the assessor due to stipulations made by the developer. For Case C and G, much information has come through document review and second-hand through interviews with the assessors as access to other members of the development team was not forthcoming.

A total of 38 interviewees were interviewed during the course of the investigation (across each site of action), with some interviewed multiple times and responding to follow-up questions. This comprises the primary source of evidence.

Table 7 Number and Type of Interviewees

Interviewee Type	Number of Interviewees
BRE	4
Assessor	5
Technical Consultant	13
Project Manager	5
Local Authority/Parish Council	8
Consultee	1
Developer	2
In total	38

A semi-structured *proforma* was developed to guide interviews and provide a 'backbone' that could be returned to if interviews strayed too far from their intended aim. They also prompted the interviewer to ask the right questions but gave the interviewees space to focus on what they thought was important. Efforts were made to integrate ANT and the insights developed in Chapter 3 as far as possible into this proforma to ensure the investigation would be theoretically underpinned. To do this, I worked to break down the primary research questions into several sub-questions – questions that were specific enough, it was hoped, to be answered from the data available and contribute to answering the primary research question. These were broken down further into analytic tasks – the various, relatively well bounded, tasks needed to answer the empirical questions. These tasks then informed the interview proforma, which was developed iteratively from a long-list of questions based on that work to breakdown the primary research questions. An example of this can be seen in Table 8 below.

Table 8 Example of sub-questions and analytic tasks

Research Question	Sub-question example	Analytic Task example	Interview proforma example
How is BREEAM Communities assembled at specific sites of action?	Which actors are associated with the standard through time?	Identify human stakeholders. Identify site, regulatory, organisational (and so on) associations. Identify plans, reports, and other documents that reference BREEAM Communities or sustainability.	[general opening] "How do you work with BREEAM Communities?" [if not forthcoming] "who do you work with on BREEAM Communities?" "How does BREEAM Communities work/fit with [planning policies/site characteristics/your ways of working/other relevant prompt]?" "Are there any relevant documents I should see?"

Because 'nonhuman and other technical terms are unlikely to be a understood by interviewees in the same way it is used here, the analytic tasks and subsequent proforma questions break down these theoretically-led sub-questions into a framework likely to be better understood by interviewees. I could then travel in the reverse direction, bringing together evidence obtained in the interviewees own language to answer questions using an ANT vocabulary. In summary, the aim was to interpret insights from theoretical discussions, intuitions, hunches, rules for investigation (radical symmetry, for instance) into questions relevant to the activities of the informants, and in a language that could be understood by all. In this way, I hoped to embed ANT into each question asked; to translate flatness, radical relationality, nonhuman mediation, and so on, into a questionnaire for construction industry professionals. Then, for each interview, available documentation and previous interviews

were explored to add situation specific questioning. For instance, when interviewing an energy consultant, the energy strategy they produced was reviewed so I could question the specific relations between BREEAM Communities, *that* report, *that* consultant, *that* development, and so on.

Interviews were conducted in-person where possible, and occasionally by telephone or by video streaming where an in-person meeting was impractical. Most interviews were preceded and followed by a small interchange of emails or short phone calls to arrange the interview and ask some short introductory questions (such as “are you able to send me an example of your work with BREEAM Communities?” or “what stage of the process are you at now?”). These initial questions would inform specific prompts left open in the interview proforma. Interviews broadly followed a similar pattern. Interviewees were asked simple, open introductory questions (“can you describe your prior experience with BREEAM Communities?”, “what are your experiences with the scheme so far?”) that were designed to suggest directions for further questioning. If these responses opened up further lines of questioning (“can you speak more on that…”, “how did you make that decision…”, “why do you think that did not happen…” and so on) then they were pursued. If they did not, the interviewer returned to the proforma where it seemed relevant. In addition, interviewees often brought documents along to the interviews, and these suggested questioning also. I also attended a small number of meetings where I was primarily an observer. Many of these were recorded, transcribed, and added to the data analysis software much like an interview. Others were documented through notetaking during and after the event.

Criteria for Soundness

The soundness of any data and analysis is of paramount importance to any researcher. One way of addressing this is to make sure the research strategy is appropriate for the setting and the theoretical perspective taken. Marshall and Rossman (1989) present four criteria by which to judge soundness, these are: credibility, transferability, dependability, and confirmability. I shall briefly address each in turn, identifying their applicability to this study,

any conflicts with the ANT perspective, and actions taken to ensure soundness of the research strategy.

Credibility

When judging credibility, we might ask, "how truthful are the particular findings of the study? By which criteria can we judge them?" (Marshall and Rossman 1989, 144). Marshall and Rossman suggest that if the parameters of a setting and the "complexities of variables and interactions" (*ibid*, 145) are sufficiently described data "cannot help but be valid" (*ibid*). But how to develop a 'sufficient' description? One way of determining the validity of data is through 'triangulation'.

Patton (2002) suggests four methods of triangulation, two of which are particularly relevant to this study. The first, data triangulation, refers to multiple sources and types of data that corroborate the same 'fact'. The use of multiple sources to describe a network is certainly compatible with ANT. This was achieved by having multiple interviews and document sources support each case where possible. For example, the author(s), the assessor, the project manager, the report itself (and perhaps a draft copy), emails, referenced documents, a BRE employee, and a sustainability officer from the local council might all comment on some aspect of a single BREEAM Communities influenced report. This level of triangulation was not possible for all cases, but some amount is achieved for the majority. Some interviewees were also re-interviewed and emerging themes tested with them. The second, methodological triangulation, refers to using more than one kind of method. As inferred above, interviewing has been supported with analysis of various documents (and vice versa) as well as reviews of previously published peer-reviewed articles.

Transferability

To be a useful piece of research the findings must be applicable to other settings. As was discussed in the previous chapter, ANT does not necessarily produce comparable or transferable descriptions. However, it does not preclude identifying patterns of associations. In this case, this research should be of relevance to those interested in other developments where BREEAM Communities is applied or the study of other voluntary assessment standards The pilot study (described below) suggested that although there were some

differences between how the framework was perceived in the UK and Sweden, the functioning of the standard seemed similar in a variety of contexts; similar studies were also highlighted in the literature review suggesting some level of transferability. Moreover, a range of case studies in England has been studied, contributing in two ways. First, by studying different cases (large and small, greenfield and brownfield, voluntary and mandated), it is more likely those looking to apply findings to other settings will find a case study with some similar characteristics. Secondly, the findings show that experiences are often shared despite different project characteristics, suggesting that some findings are applicable to settings sharing a wider context (e.g., an English development-legislative context or being part of a particular community of practice).

Dependability

"How can we be reasonably sure that the findings would be replicated if the study were conducted [again] with the same participants and the same context?" (Marshall and Rossman 1989, 145). Here, the ANT-based proforma ensures a systematic approach to questioning and analysis, where findings are developed from simpler 'analytic tasks'. Information gained from these activities was also subject to several iterations of coding and analysis, which was regularly discussed with my tutor. Moreover, the relatively large number of interviewees has increased the chances that errors, omissions, and unexpected findings can be identified as standing out from other responses and investigated further. Indeed, most interviewees responded to follow-up questions or second interviews, which gave the researcher a chance to clarify and further investigate possible errors and gaps. It is thought that a sensible balance was achieved between doing the hard work of *following the associations* and having limited resources available for this study.

Confirmability.

In other words, "how can we be sure that the findings are reflective of the subjects and the inquiry itself rather than the product of the researcher's biases and prejudices" (Marshall and Rossman 1989, 145). Latour argues that the credibility, objectivity, truthfulness of an account is judged on whether "the event of the social can be extended all the way to the event of reading through the medium of the text" (2005, 133). In other words, does the

account enable the reader to follow the “string of actions” (129) between actors, showing the “energy, movement, and specificity” (129) of these mediations, and not rely on the author’s own work (for instance, in enrolling some ‘social force’) to connect them. Throughout this research paper I have erred on the side of inclusion when presented with the opportunity to quote directly from interviewees, with the aim of showing these findings in their own words. This was made easier by selecting codes in organising the analysis that, again, were based in the interviewees’ own language (as far as possible). Moreover, during second interviews and discussions with BRE the researcher was able to test emerging findings and themes.

Approaches to Analysis

This section describes how the analysis was structured and how key themes and conclusions were arrived at. Data was organised first by transcribing recordings of interviews and observations to text. Second, data was imported into Atlas.ti (Atlas.ti 2015). Throughout the research process ATLAS.ti has been the principal data collation and analysis tool, alongside several notebooks (whose content was then re-recorded in ATLAS.ti). Although described as a piece of qualitative data analysis software by the publisher, Cleverbridge, “software programs do not analyse data but they can be a tremendous aid in data management and the analysis process” (Dicicco-Bloom and Crabtree 2006, 319–20). Indeed, all data (including information collected over the course of the literature review) were managed, stored, organised and coded, and analysed within this programme. Data was named in ATLAS.ti and according to the case, data type, title, and date (as in the example below). It was also coded with ‘meta’ codes to help in the organisation. These codes included the case, data type, actor category (e.g., technical specialist, assessor, planning guidance, and so on). This helped identify trends across these variables.

“Case B_Interview_Bob Smith_2017-01-01”

The analysis then followed an iterative process of manually identifying significant portions of data (as defined by the researcher and/or interviewees), coding these portions of text, grouping these into themes, identifying emerging findings within these themes, and re-

testing this against new and existing data, alternative explanations, and with interviewees themselves where possible. Through these simple steps large data sets can be managed, ordered, and interpreted (Marshall and Rossman 1989). To identify significant portions of text, data was compared to the research questions and their sub-elements. In this way (as well as the work in Chapter 3 to develop theoretically-led research questions), I ensured both thematic and theoretical concerns were imbued within the analysis. These comparisons of the data were aided by the use of pre-defined 'codes. However, the analysis was not entirely circumscribed by these codes and many significant portions of text were identified using codes developed as the analysis progressed, using the interviewees' words where possible. Pre-decided codes included:

- those relevant to the 4 research questions, sub-questions, and 'analytic units' as described above.

- Key analytic concepts from the theoretical framework that cut across all research questions, including sources of uncertainty (such as group formation, defining boundaries, defining as illegitimate, etc), stages of translation, stages of calculation.

- Those used to identify actors whose involvement was already known (e.g., interviewees, BREEAM Communities Manual, BREEAM Communities Issues or Criteria)

- Questions that previous research suggested might be relevant (e.g., relating to 'timing' of assessment, the size of a development).

Other codes were developed in an iterative process of free-coding salient portions of text, consolidation of similar codes, comparison with existing codes (to reduce unnecessary complexity), and incorporation of new codes into the schema. This was aided by adding an 'X' prefix to emerging codes and removing it once they were deemed a useful and repeatable code that represented an interesting and important part of the emerging network.

Text identified through coding was then grouped into emerging themes. These themes represented common threads through multiple data sources and possible contributions to

answering the research questions (e.g., “Supportive networks are necessary for BREEAM Communities to mediate”). They were initially identified through triangulation of multiple data sources and based on systematic and theoretically legitimated coding, which supported their soundness. Then, these emerging themes were tested against alternatives, existing literature, and in some cases with interviewees, further establishing their robustness. These emerging themes were continually added to and re-tested as data analysis progressed. Through this iterative process, these became the chapter headings and paragraphs in the subsequent chapters.

Problems and Mitigations

I have identified a number of potential issues that may hamper this investigation. I present four below along with mitigations employed (where appropriate).

Access

The case (study) is a way of organising data and analysis but does not dictate what sort of data to include or how to gather it. One problem with data collection is access. For this project, the primary issue was that there was only one route of initial access: through BRE. The assessors, BRE, and the developer enter into confidentiality agreements restricting information about projects in pre-assessment stages; only once a project is awarded a certificate are the achievement, grade, and credits achieved made public. By this time, the project has likely been completed and the development team may have moved on, or at least time has passed that may prevent important details being remembered. As such, initial access to all cases was made through a contact at BRE introducing the researcher to an assessor, and subsequently to a developer, where permissions for further access would be sought. In some cases, this worked well: the developer was happy to help, the assessor willing to assist in the research, and team members responded positively to invitations (often via the assessor or developer) to participate in interviews. However, in other cases this was not the case: assessors (and project managers) were unwilling to allow other team

members to interview, preferring to answer questions on their behalf; team members did not respond; developers were not willing to help; and so on. This was also the case with Local Authorities, where the person responsible for the policy may have moved on and was uncontactable or, if they were accessible, other interviewees were unavailable to corroborate.

I have responded to this in a number of ways. Face-to-face meetings or telephone calls were made to developers to explain the project and potential data protection arrangements. In some cases (Case A, Case B) this greatly increased the number of interviewees; respondents often asked if the developer had "okayed" their involvement and responded more positively when the developer was "cc'd" into invitation emails. Building relationships with the developer (and other team members when possible) also had the effect of increasing the points of contact with the case, providing a back-up if the assessor was uncooperative in some way. For some projects, this also didn't work, and alternative routes had to be found, now possible as basic information had been given by BRE. Public planning documents, newspaper articles, local politicians and civil servants, and so on, were reached out to. This was also the case in the projects where access was easier.

Difficulties with access has led to a somewhat lopsided investigation with some projects (Case A, Case C, Case B, Case E, and Case D) benefiting from greater numbers of interviews than others (Case G and Case F). In some respects, this is not a serious issue as ANT does not require 'representative samples' or similar. Nonetheless, it is helpful that data from document review has reduced these imbalances in interviews to a certain extent. And, as we shall see, the analysis seems to show many similarities between BREEAM Communities' (in)action between developments of different types.

Technical Bias

I have a civil engineering degree and worked as a flood risk engineer before embarking on this project. I current work in housing policy for the Ministry for Housing and Local Government. And I look after an allotment. In some ways, this background in housing, sustainability, ecology (after a fashion) and urban development provided me with a

vocabulary and familiarity with the concepts of my interviewees to build rapport, ask pertinent questions, and understand the significance of the answers. However, despite conducting the literature review in Chapter 2, I am more knowledgeable in some areas that BREEAM Communities covers than others. As such, it is likely that my questioning of those relevant consultants or my attention to the detail of those criteria within the standard may be greater than for other areas. This was mitigated where possible by first asking interviewees broad, open questions that allowed them to respond in their own words. And then by using coding that was also based in their vocabulary where possible. Only if interviews were not forthcoming did I follow up with more specific questions that began to rely on my technical expertise. However, it is likely some bias remains. This could have been further mitigated by employing a multi-disciplinary research team (not available for this project) or co-designing interview and review questions with interviewees or other technical experts.

Outcomes

This analysis did not focus on the outcomes of a BREEAM Communities assessment: the certification process, inscriptions of design decisions and calculations in masterplans, construction and occupation, consultant experience and identities, and so on. This was primarily because when I was collecting data, only two of the cases were 'on site'. Although more could have been made of emerging masterplans and outline planning permissions, this would have necessarily taken resources away from other parts of the analysis and – due to the different stages of development of the various cases – produced only a partial understanding. As such, 'outcomes' was out of scope for this study. It is hoped that future research may build on this analysis of BREEAM's interventions in design and development when assessing its impacts on sustainability outcomes.

Distribution of projects

Each of the development cases studied are in the South of England. This suggests a possible difficulty in extrapolating findings to other areas of the country. One significant (and deliberately simplified) observation is that the South is an area where residential land values are high (relative to 'the North') and as such the uplift from a change of use to residential is more significant than in other parts of the country. Similarly, house prices are high and so some costs of development (such as materials) may be a smaller proportion of sale prices than in other areas. A further possible generalisation might suggest that more affluent areas in the South might lead to more people able or willing to pay a premium for more 'sustainable' developments as marketed by a BREEAM certification. Each of these generalised assumptions lead to more money available for the sorts of improvements to masterplans that BREEAM Communities advocates. There are of course also many other possible differences between these cases and others across the country and further research is needed to confirm the general applicability of this investigation. However, as outlined above, I believe there is enough variability within the cases for the findings to be generally applicable to a large number of cases. Moreover, many findings seem to be consistent across cases in different 'contexts.

Conclusion

This research project has followed a methodology developed according to instructions implied by the use of ANT as its theoretical framework. This was operationalised by the interpretation of ANT-inspired research questions into ANT-informed interview questions. The researcher performed 38 semi-structured interviews, 4 observations of design team meetings and sites, and an analysis of a multitude of documents including legislation, local planning regulations, guidelines, planning permission submissions, project management tools, and meeting minutes. These were coded using a combination of free-coding and pre-decided codes, which were consolidated into emerging themes, and eventually the report's findings in an iterative process of data analysis. Due to *inter alia,* the strong connection to

the theoretical framework, the variety of sites, the relatively large number of interviews and other data sources, it is argued that (with some specific limitations) this research project and the results derived from it are robust and transferable to other instances of the use of BREEAM Communities.

Chapter 5

Background: BREEAM Communities and its Fabrication

Introduction

The purpose of the chapter is to familiarise the reader with the BREEAM Communities manual and how it prescribes types of (qualculative) action of development actors. To do this, it first analyses the formal features of the framework. Then the chapter traces the various processes followed, issues evoked, and groups involved in the fabrication of BREEAM Communities to begin to explain how the framework stabilised in such a way. This chapter does not seek to employ the full range of theoretical concepts described in chapter 4 and as such is not presented as part of the ANT account of BREEAM Communities. However, this chapter does seek to begin to answer the first research sub-question of "how is BREEAM Communities assembled", as well as presenting useful background for the remaining chapters.

The first part of this section builds on the comparative analyses described in the literature review. This previous research has primarily focused on the comparison and analysis of frameworks' structures and content. This section departs from those studies by looking to describe in detail how the criteria structed within the BREEAM Communities standard prescribes actions from its users. The second part of the chapter develops a description of the fabrication of BREEAM Communities based on interviews with those close to the process.

A Description of BREEAM Communities

At this stage we have not discussed in any great detail what BREEAM Communities actually comprises. Research comparing its formal features with other similar frameworks has been discussed in the literature review but its focus on comparing technical issues and criteria does not give a good idea of the standard in the level of detail at which an assessor or construction professional might be required to engage with it. This understanding is important for the analysis of the framework's implementation. This section will describe the framework itself, giving the reader a fuller picture of the actor we are looking at and introduce some of the controversies that have emerged from the analysis presented in the next chapters. This section will also fill some of the gaps of previous comparative analyses,

which by the necessity of making general comparative assertions smooth over some of the particulars of the assessment framework. Following previous studies of frameworks, this section describes the scope, structure, and content (Wallhagen *et al*. 2013), taking time to look in more detail at the actions (and in particular the calculations) the framework requires of its users. This section is based primarily on the author's own reading of the BREEAM Communities manual and is the most descriptive of the results and analysis chapters.

Structure

BREEAM Communities is organised in five overlapping ways: a hierarchical structure of categories, issues, and criteria; two types of criteria, mandatory and credit scoring criteria; a score weighting and aggregation methodology; temporally organised steps; and a certification procedure of interim and final assessments. These help the user navigate the standard, provide a methodology for assessing sustainability and calculating a final certification score; and link the standard to the English planning process.

Hierarchy

The framework is structured around 7 categories, themselves split into 40 assessment issues, with an additional issue for 'Innovation'. These issues are themselves made up of a varying number of criteria. Categories encompass broad sets of issues (such as 'Governance' or 'Resources and Energy'). Issues seek to define a specific topic for assessment (such as 'Local Parking' or 'Transport Carbon Emissions'). The criteria then set the properties of the issue to be assessed, the conditions by which the issue will be assessed, and the number of credits available (Wallhagen *et al*. 2013). In BREEAM Communities, these are often supported by compliance notes (or footnotes to the Criteria) that describe the conditions for assessment in additional detail. These are organised into a hierarchical structure (as depicted in Figure 7 below).

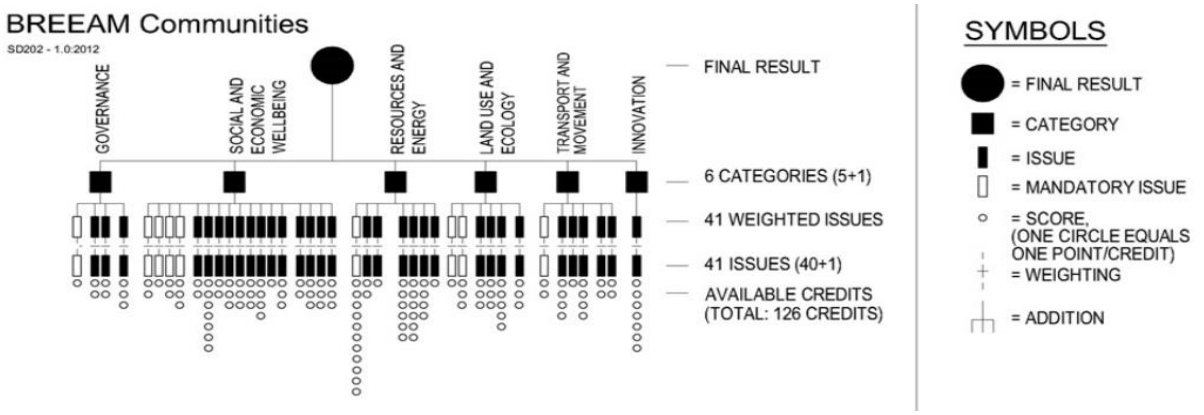

Figure 5 The structure of BREEAM Communities (reproduced from Wangel *et al*. 2016b)

Weighting

Not only does this hierarchy aim to assist the user in navigating the manual, it also provides a structure for calculating the level of achievement towards certification. Criteria either contribute to credits, which are aggregated to calculate the overall certification score, or prescribe mandatory requirements, for which no credits are scored but which must be completed to achieve certification. To achieve this, another system of valuing is overlaid, by which credits are weighted differently under each issue. For example, "one credit under the issue 'SE01 Economic impact' is worth 14 times more than one credit under the issues 'SE09 Utilities' or 'SE16 Light pollution'" (Wangel *et al*. 2016b, 205). The percentage of credits achieved for each issue are multiplied by an issue weighting to deliver an 'issue score'. This score is then summed with other issues in that category which contributes to a 'category score'. In BREEAM Communities, category scores are then summed to determine the overall certification level: 40% is enough to be awarded a Pass, whereas 80% is needed for an Outstanding score. An example of one section of an assessment scoresheet is shown below in Figure 8.

Identifier	Issue name	Credits achieved	Credits vailable	% of credits achieved	Issue weighting	Issue score	Category score
Governance							
GO 01	Consultation plan	1	1	100.0	2.3	2.3	7.2
GO 02	Consultation and engagement	1	2	50.0	3.5	1.7	
GO 03	Design review	2	2	100.0	2.3	2.3	
GO 04	Community management of facilities	2	3	66.7	1.2	0.8	
Social and economic wellbeing - Local economy							
SE 01	Economic impact	1	2	50.0	8.9	4.4	8.4
SE 17	Training and skills	2	3	66.7	5.9	3.9	

Figure 6 An example BREEAM Communities assessment scoresheet (reproduced from the Technical Manual)

Steps and Certification

Alongside this hierarchical structure, the system of mandatory and credit scoring criteria, and score weighting and aggregation methodology, the framework is also organised into a series of steps (as outlined in Figure 9). These steps aim to link masterplanning with the assessment process (BRE 2012) and the manual considers the types of issues in each to be qualitatively different, i.e., those in Step 1 aid in "establishing the principles" (*ibid,* 3) of a development, while those in Step 3 cover "the details" (*ibid*). These are also overlaid by a fourth and final structure, that of the preliminary certification, requiring only mandatory criteria which are scored on a pass/fail basis, and the final certification based on credits gained through the non-mandatory criteria. All mandatory criteria are in Step 1, with the exception of GO 02 Consultation and engagement, which also has a mandatory criterion. Step 1 Issues also contain scored criteria. Certification is also tied to the Steps. As introduced above, BREEAM Communities has a two-phase certification procedure: an interim certificate awarded after completing Step 1 mandatory criteria and a final

certificate. This final certificate is scored according to the weighting system described above. The interim certificate is not scored and is awarded on a pass/fail basis.

This description highlights two things. First, the complexity of BREEAM Communities. Many interviewees commented that the framework was complicated and that it required training and/or support from the assessor to navigate. Second, that the various structures used to help navigate this complexity are differently interpreted by users of the manual. Many interviewees simply ignored some of this complexity where they could. For example, assessors and developers did not seem to differentiate between 'category' or 'sub-category', instead fitting the framework to their own existing understanding of the project at hand. Steps 2 and 3 were almost always mentioned as the same item (e.g., "when we get to Steps 2 and 3, we will…"). Step 1, however, was recognised as being qualitatively different, delineating between the strategic nature of Step 1 and the more detailed criteria in Steps 2 and 3. Similarly, the concepts of Step 1, the interim certification stage, and mandatory criteria were often conflated, grouped as 'criteria relevant for achieving outline planning'.

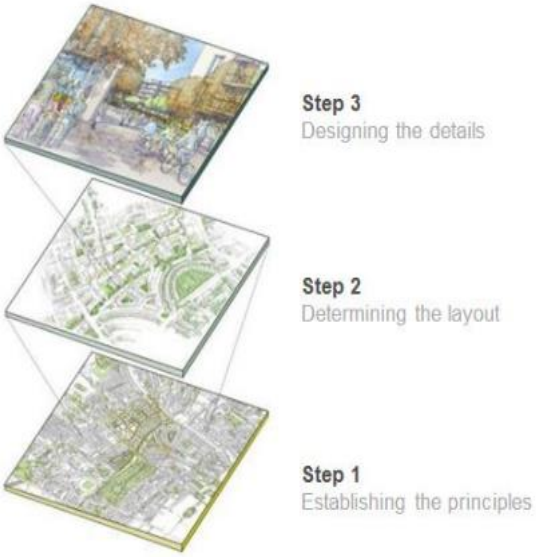

Figure 7 BREEAM Communities Issues arranged over 3 steps (reproduced from the technical manual BRE 2012, 3)

Scope

The scope of the framework is described in this section. This looks to the questions: what technical concepts does it assess and what does it exclude, at what stage in the development process, of what type and scale of development? In other words, this section

begins to identify the elements that have been combined as part of BREEAM Communities that might (in the ANT analysis) be shown to act in a development case.

Timing

BREEAM Communities can be delineated from other similar frameworks by when it interacts with a development process. Although other BRE schemes, such as BREEAM New Construction, seek to intervene as early as possible, suggesting an assessor is appointed at the earliest possible stage, a large proportion of the work is done at later stages (BRE 2018). For BREEAM Communities, all mandatory criteria are to be achieved at this early stage, before outline planning permission is granted in many cases. This is illustrated in Figure 11 below, taken from the BREEAM Communities manual. However, this does not tell the full story. BREEAM Communities criteria often define their own temporal scale at which the actions they prescribe should be undertaken, which at times does not fit with the neat schematic below (although the majority of criteria either do not specifically define a time to act, often implicitly requiring action early enough for it to make a difference in decision making – something the assessor is required to enforce). For some criteria, this temporal scale is defined in the text of the manual. For example, maintenance arrangements for "safe and appealing streets" should be in place until at least "five years from occupation" (BRE 2012, 101). Others are less definitive and require the assessor and developer to agree their definition (such as an appropriate Skills plan that will deliver a "*legacy* of local training").

Step 1	Step 2	Step 3
Governance		
GO01 – Consultation plan	GO02 – Consultation and engagement GO03 – Design review	GO04 – Community management of facilities
Social and economic wellbeing		
SE01 – Economic impact SE02 – Demographic needs and priorities SE03 – Flood Risk Assessment SE04 – Noise pollution	SE05 – Housing provision SE06 – Delivery of services, facilities and amenities SE07 – Public realm SE08 – Microclimate SE09 – Utilities SE10 – Adapting to climate change SE11 – Green infrastructure SE12 – Local parking SE13 – Flood risk management	SE14 – Local vernacular SE15 – Inclusive design SE16 – Light pollution SE17 – Training and skills
Resources and energy		
RE01 – Energy strategy RE02 – Existing buildings and infrastructure RE03 - Water strategy		RE04 – Sustainable buildings RE05 – Low impact materials RE06 – Resource efficiency RE07 – Transport carbon emissions
Land use and ecology		
LE01 – Ecology strategy LE02 – Land use	LE03 – Water pollution LE04 – Enhancement of ecological value LE05 – Landscape	LE06 – Rainwater harvesting
Transport and movement		
TM01 – Transport assessment	TM02 – Safe and appealing streets TM03 – Cycling network TM04 – Access to public transport	TM05 – Cycling facilities TM06 – Public transport facilities

Figure 8 Steps 1, 2 and 3. Issues with Mandatory Criteria are highlighted in a similar way to how assessors highlight these issues for consultants (adapted from the Technical Manual)

Some, such as the consultation plan, draw in local actors to set the time-scale for the development, in this case requiring the consultees are engaged “when they can usefully contribute”. Others, such as criteria available for defining an energy strategy do not require immediate design decisions but instead commitments that come into force (i.e., are able to mediate the design) at a later design stage, during construction, or during site operation. The “written commitment” (i.e., a requirement that the developer commit to achieve a criterion in writing to the planning authority) is a common method, with 16 issues using this

method to help ensure decisions made (and certified against) in early phases are delivered. However, there are other methods required, such as 'appropriate legal commitment', 'written confirmations', use of planning conditions, S106 agreements, and is not always clear the reasons for using one type or another. In subsequent chapters, I will argue that a key way BREEAM Communities influences the design of a development is by moving decision-making forward in time (i.e., at an earlier Stage than it might have otherwise occurred) and by tying early, sustainable decisions to new decision-makers (and development assemblages in general) at later stages. These various instruments play an important role in this.

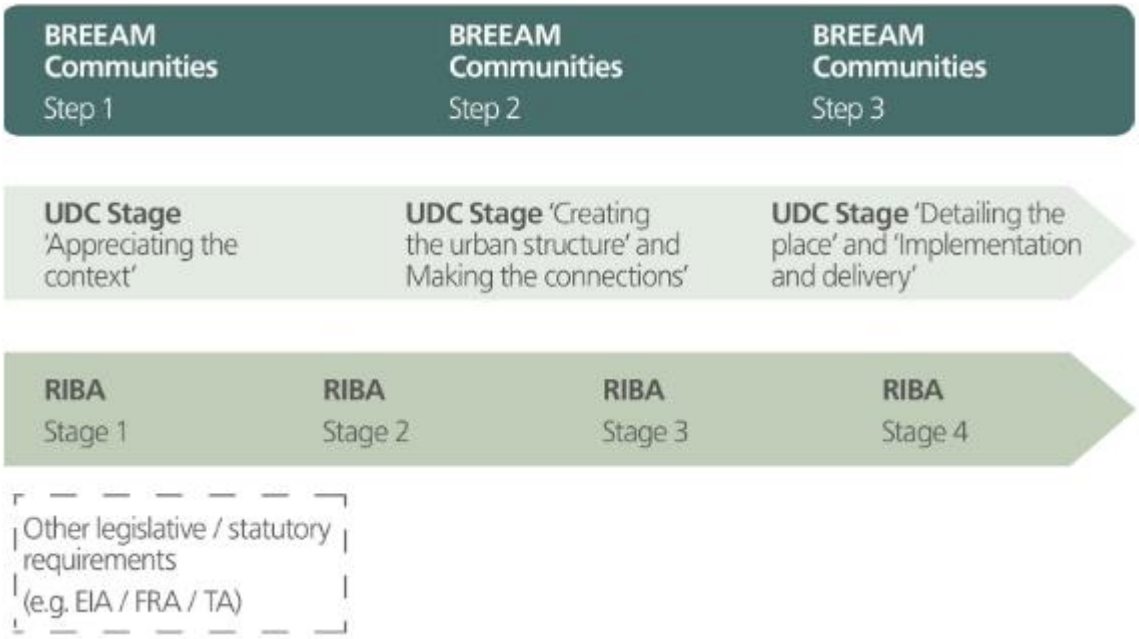

Figure 9 BREEAM Communities Steps and RIBA Stages (reproduced from the Technical Manual)

Sort and size of development

What is the sort of development the scheme looks to certify? Communities and other large-scale, early-phase assessment frameworks are often called 'neighbourhood' assessment schemes (Sharifi and Murayama 2014). However, the BREEAM Communities manual only mentions 'neighbourhood' once in relation to the thing being assessed:

> "this scheme covers the assessment and certification of the designs and plans the new development and regeneration projects at the

> neighbourhood scale or larger, to influence decisions that will have a fundamental impact on sustainability." (BRE 2012, 2)

While developments are awarded credits for delivering on issues perhaps associated with idealised neighbourhoods (community spaces, green infrastructure, and so on) BREEAM Communities makes no such claim and only briefly alludes to the idea that what it is being assessed are indeed 'neighbourhoods'. Instead, the target for assessment is moderate to large developments, with few of the connotations that 'neighbourhood' attracts. These target developments are moderated by a "list of questions" that "help … determine the type and scale of developments that are suitable for a BREEAM Communities assessment at the design and planning stage." (BRE 2012, 12). Through these questions, a moderate or large development is defined as one which:

- Places "significant extra burdens" on local infrastructures, requiring extra capacity (e.g., transport systems, medical centres, schools, shopping, and so on)
- "include[s] or make[s] use of" adjacent areas
- "lead[s] to the enhancement" of economic, social, or ecological value
- "of a scale that could create opportunities the community level utility provision"
- Or otherwise, has "a significant impact on existing communities" (12)

Appropriate developments are defined by the scale of their possible impact on the three pillars of sustainability or by the scope for improvement. Small developments are opposed on the basis of not having "a significant impact on the issues above" (12); largeness is not only defined spatially but by the potential ramifications of a development.

BREEAM Communities addresses these problems by prescribing physical scales that are often contingent on the local development actors. As with temporal scales above (though in a more significant way), criteria prescribe, draw in, and exclude a wide array of actors based on their distance from the site, helping to define the spatial scale of each criteria, and thus the assessed 'neighbourhood'. A variety of physical scales are defined. The smallest concern themselves with elements of the site, individual streetlights, cycling facilities, the layout of

green space, bus stops, buildings. Other criteria prescribe action on a 'site-wide' basis, within the site boundary, or within the 'masterplan'. Others expand the impact of the site further and seem to be increasingly contingent. Several criteria extend to the 'local area' (e.g., SE 01 Economic impact, to assess the "needs and opportunities within the local area and surrounding economy" or SE17 Training and Skills, to "identify training and skills initiatives that would be beneficial to the local area"). Other criteria instead look 'nearby' or 'adjacent to' the site (e.g., in protecting "nearby noise-sensitive areas"), others within 'walking distance' or the 'surrounding area'. Some of these are defined within the standard (walking distance is defined in meters, noise in decibels at a set distance) but others are again contingent (for example, on imagined journey times of not-yet-existing residents). Criteria often also reference several, overlapping physical scales. Some, such as GO 01 Consultation plan require the inclusion of actors from 'within the site boundary' through to 'national' actors (such as relevant national government bodies). SE 01 – Economic Impact defines the scale of assessment varyingly as 'the local area', 'the surrounding economy' and 'sub-regional' impacts.

This variety in spatial scales is to be expected, however, there are some inconsistencies in this approach. Where assessment boundaries extend beyond the site, these are defined with varying degree of prescriptiveness and rely varyingly on established practice. For example, criteria for noise pollution, the energy strategy, and ecology strategy define impacts based on 'nearness' to the site. For noise pollution, that nearness is prescribed within the framework based on calculations established by the British Standards Institute for noise levels measured "in the locality of the nearest … noise sensitive area" (BRE 2012, 35). For the ecology strategy, the development is required to "avoid damage to any valued ecological features on or near site" (47). This is not further defined in the framework, but guidance is given in the form of links to relevant chartered institutes; this suggests a less prescriptive calculation. For the energy strategy, nearness in terms of "opportunities [for] … near-site [renewables]" (39) is not further defined and resources to define it are not linked to; this is less prescriptive still. Similarly, there is no precise definition given for a 'local' area. Instead, this is often defined by the actors required to participate in the calculation (instead of by the technical criterion itself). For example, the local authority is called to provide

demographic data that underpins the need for training and skills in a 'local area'. As such, the local area in part coincides with the local authority's own boundaries (or smaller gradations if the data is available).

Sustainability Coverage

Referring to Chapter 2, the coverage of BREEAM Communities can be defined as the breadth and depth of sustainability topics covered by the framework. The literature review described how different frameworks often have similar scopes but vary in how they emphasise different issues. BREEAM Communities is designed (as we will see in the next section) to achieve a balance between the different pillars of sustainability, including an overarching governance pillar. These are not represented explicitly. Instead, criteria are arranged over 7 themes and sub-themes.

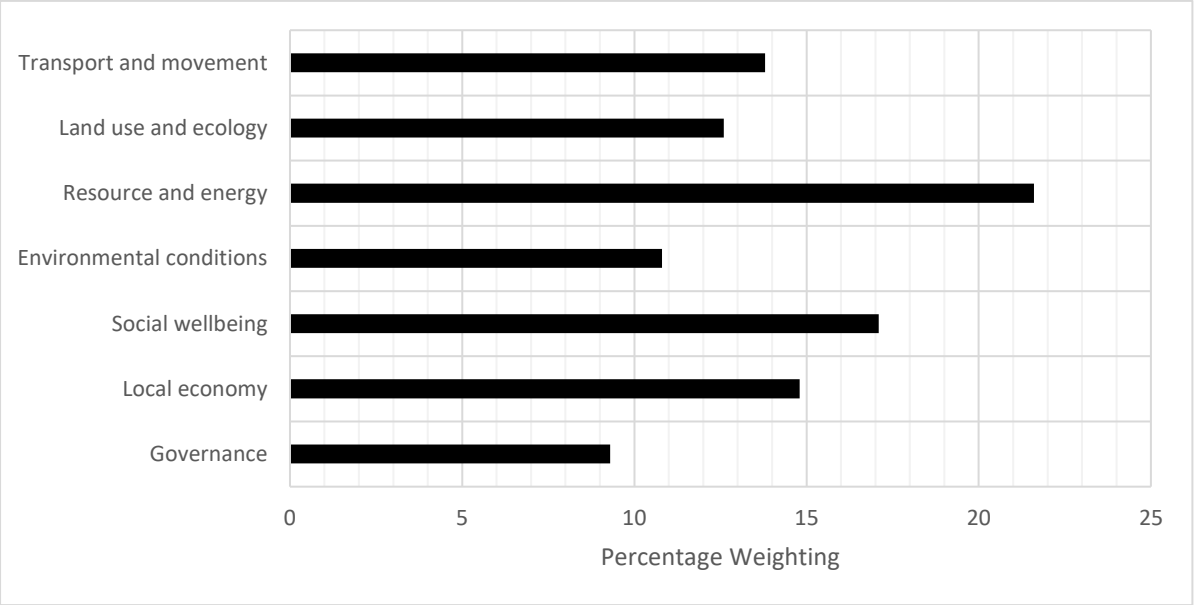

Figure 10 Percentage Weighting of Credits defined by BREEAM Communities

As pointed out in the literature review, these frameworks in general have been accused of having a lack of balance (Sharifi and Murayama 2013) between each of the three/four pillars of sustainability, with a bias towards environmental criteria (Hamedani and Huber 2012). However, this does not seem to be the case with BREEAM Communities. Using the manual's own categorisation (i.e., translating the above themes into their corresponding pillar and categorising "transport" is a social, not economic issue, arguably a cross-cutting issue) there does seem to be a lack of balance, but with a slight bias toward the social and from economic concerns; categorising "transport" as economic leads to a reasonably balanced set of criteria.

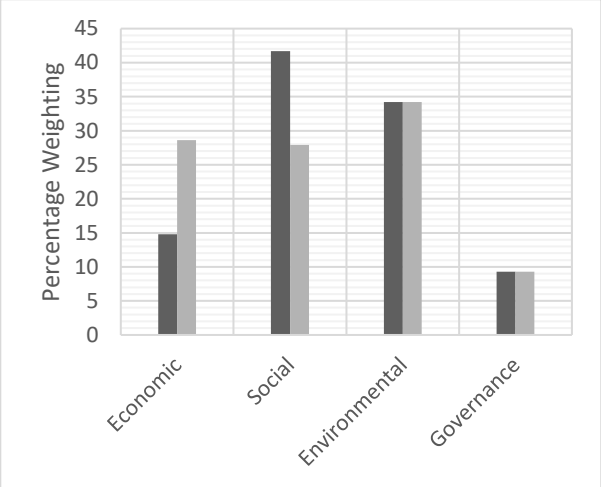

Figure 11 Percentage Weighting of credits by pillar of sustainability. Dark grey categorises Transport as social; light grey shows it as both social and economic.

However, this is almost beside the point. The use of the qualifier, 'seem to be', above is due to the contested nature of making such categorisations, even in the relatively simple case of pillars of sustainability ("transport" is clearly a social *and* an economic issue (environmental impacts of transport are dealt with separately in the manual); indeed, Wangel *et al*. (2016b) side-step this problem, categorising credits by envrionmental (42 credits), socio-economic (50 credits), and other (16 credits)). This uncertainty becomes more apparent when authors attempt to further categorise criteria by topics of concern for sustainability. Table 9 below summarises four attempts to categorise the distribution of BREEAM Communities' criteria. Two issues are immediately obvious. First, there is no agreement in the categories used to structure criteria. Although there is some agreement in the sorts of topics BREEAM Communities covers, the actual groupings differ greatly. This isn't necessarily a problem, as there is no reason to believe one categorisation is better than another and multiple views can be useful. Indeed, BRE's own categories seem to be similar. What is clear, is that BREEAM Communities covers a wide scope of neighbourhood sustainability issues, not only

focusing on environmental sustainability, but paying at least some attention to culture, health, institutional conditions, and so on.

The different scores presented in the table are potentially more difficult to make use of, but also generally seem to match up well with BRE's own scoring as set out in the manual. For example, the 21% BREEAM Communities gives for "Resources and energy" is close to Sharifi and Murayama's 23% for "Resources and environment" and the 23% given by Wangel for the sum of "Ecology and Biodiversity", "Energy", "Materials and Waste", and "Water"; all topics covered in BRE's own categories. These small differences may be explained by the differences between category naming, though authors do not tend to give detailed explanations of their groupsings so it is difficult to tell. Other differences are more puzzling. The range of scores for transport (for which the BRE claim they award 14% of credits) between 17% and 7% highlights the difficulty of describing the contents of this framework even in a category so universally acknowledged (included, as it is in each of the papers above). Also concerning is Orova and Reith's "0" for energy, or only Sharifi and Murayama identifying the innovation credits avaliable.

There are also differences in judgement around what is 'under-represented' or 'missing' and adequately covered. For example, Wangel (2016b) suggests perceptions of safety and aesthetics are missing, yet BREEAM Communities includes the criteria "Safe and Appealing Streets", "Local Vernacular", and "Design Review" that cover these issues. Callway (forthcoming) who shows how Green Infrastructure is more broadly and synergistically described in the academic literature than it is in assessment frameworks. However, it is not clear at what point these criteria do 'enough' to be judged as adequately represented. At what point does a definition become too narrow or isolated to merit being categorised as 'missing'? Site selection is more nuanced still. Although BREEAM Communities doesn't directly concern itself with 'site selection' – other frameworks such as LEED-ND have specific criteria – the framework does bring together actors that are defined, in part, by their relation to a site (e.g., local noise sensitive areas, local areas of green open space). This can make it easier, or more difficult, to achieve a positive certification and as such it is possible that these may influence the selection or more of less sustainable sites.

Table 9 Comparison of Categorisations of BREEAM Communities Criteria

Komeily and Srinivasan (2015)		**Sharifi and Murayama (2013)**		**Orova and Reith (2013)**		**Wangel (2016)**	
Category	Score %	Category	Score %	Category	Score %	Category	Score %
Infrastructure, design and innovation	14	Pattern and design	31	Infrastructure	10	Local Environmental Conditions	4
Transportation	11	Transportation	17	Transportation	7	Transport	13
Location and site selection	4	Location, Site selection	5	Location	14	Accessibility	10
Environment, ecology, and resource efficiency	31	Resources and Environment	23	Ecology	26	Ecology and Biodiversity	8
				Energy	0	Energy	4
				Resources	8	Materials and Waste	7
						Water	4
Sociocultural quality	16	Social	11	Community	10	Democracy, Empowerment and Equity	12
						Health	3
						Cultural Heritage	1
Economic quality	15	Economic	7	Economy	17	Local Economy and Vitality	17
Institutional	9						
		Innovation	6				
				Buildings	9		
						Robustness	6
						Other	13

Although this section has highlighted some of the disagreements in the scope of BREEAM Communities, it should also be clear that there seems to be common understanding of the broad topics that it covers, even if the details are contested. Many of the categories chosen are remarkably similar, and it is easy to see how valid disagreements in the pillar a certain criterion should be placed in can lead to accusations of 'bias'. This section has aimed to provide the reader with an understanding of the scope of BREEAM Communities. However, relatively high-level categoriations of criteria can only take us so far in understanding what BREEAM Communities actually seeks to do in participating in the development process. The

next section looks to describe the specific actions and calculations required of the user, and how BREEAM Communities seeks to influence an emerging urban development.

How does BREEAM Communities seek to act?

One goal of BREEAM Communities is to assess and influence the sustainability of an urban development. Above, we have seen how the framework is structured to provide a procedure for certification and assessment, and to organise sustainability issues into a hierarchy to aid scoring and implementation. We have also seen how BREEAM Communities seeks to define the sorts of developments it assesses and the spatial and temporal boundaries of such an assessment in the context of each development. Finally, in this section I will investigate how the framework prescribes actions for users and those being assessed through the requirements set out in each criterion. These criteria determine a series of procedures, features, or performances (Wangel *et al*. 2016b) that need to be completed, put in place, designed, agreed, evidenced (and so on) for credits to be awarded. In previous studies, these requirements have been analysed by assessing the topic of each issue. However, few papers have looked to describe the types of activities prescribed by the criteria embedded in BREEAM Communities and other standards (with the exception of (Wangel *et al*. 2016b), which this section uses as a starting point).

Wangel (2016b) analyse BREEAM Communities to determine if each criteria assesses a 'procedure' (activities and processes during design), a 'feature' (a specific measures, solutions, equipment, and so on) or a 'performance' (how well something performs). This categorisation gives a hint of the sort of calculations are being required of the development actors, (e.g., what sort of methods are required of the actors brought together and what sort of outputs are expected). They find that BREEAM Communities predominantly certifies procedures and criticise the framework for this, suggesting that BREEAM Communities "[certifies] development processes and urban design features, rather than outcomes in terms of sustainability performance. This implies that an area can be certified, at the highest level, without actually being sustainable in terms of environmental and socio-economic impacts." (Wangel *et al*. 2016b, 210). First, it is worth noting that, interviews with BRE

suggest this was an intentional aspect included by the schemes designers to allow for wider applicability to different types of sites and proposed developments. And as we have seen above, this contingency of criteria extends to the physical (and temporal) boundaries of the assessed 'site'. Second, it is useful to understand what sort of procedural outputs a BREEAM Communities assessor assesses. This criticism might be better grounded if we knew what sort of procedures, or more generally, what sort of prescriptions BREEAM Communities makes of actors over the course of a development. BREEAM Communities defines these procedures, features, and performances of a development, in numerous different ways, with varying levels of prescription. Here, I will briefly re-introduce the terms used in this investigation. As set out in Chapter 3, prescription is taken to mean: "what the device [or in this case criterion] allows [requires, suggests, and so on] or forbids from the actors – humans are nonhumans – that it anticipates" (Akrich and Latour 1992). In other words, how the standard defines the course of action needed to be taken in order for the assessor to award a criterion. Criteria may vary in their prescriptiveness, in that it may allow only a narrow course of action or suggest a broader approach, giving more scope for actors to define their own methods. BREEAM Communities' criteria seem to prescribe these various actions in the following ways (note, each of these do not necessarily appear in every criterion, but represent a common pattern):

(1) By defining (a series of calculative) actions that must take place. For example, "Where the preliminary investigation has identified potential land contamination issues, the contaminated land specialist **has performed** a site investigation and risk assessment" (LE 02 – Land Use). The criteria often go on to further prescribe these actions in detailed Compliance Notes.

(2) By requiring and defining (legitimate) actors or groups of participants in these actions or calculations through their qualities/qualifications (such as by requiring a "suitably qualified ecologist") or through inclusion in lists.

CN1	Members of the local community and appropriate stakeholders. See criterion 1	This includes where relevant: Members of the local community – Actual/intended occupants (if known) – If the site is near one or more existing communities, representative consultation groups from the existing communities – If the site is a new development and there are no existing community representatives, representatives are sought from surrounding communities or from a similar type/size of development – Potential users of any on-site or shared facilities (e.g. operators of clubs and community groups)

Figure 12 Defining legitimate participants through lists (reproduced from the BREEAM Communities Manual)

(3) By defining an appropriate **method** of calculation. Sometimes this is left to the assessor and consultants (for example, "the results of the consultation [about cycle facility requirements] have been analysed"). At other times this is done by enrolling other, already defined and well understood requirements. For example, BREEAM Communities does not itself define the procedure to follow for investigating site contamination, but instead points the contaminated land specialist to "BS 10175: Investigation of potentially contaminated sites - Code of practice".

(4) By requiring that the results of those actions **mediate the emerging design**. For example, "the transport assessment … positively influence the environmental sustainability of the development".

(5) By setting the **parameters for success** of those actions. For example, "The proposed affordable housing units are distributed across the development and integrated with the other dwellings on the site in terms of design." This can be left to be defined by specialists, as above, or defined by the standard: "a commitment has been made to provide adequate space for cycle storage to accommodate the minimum standards shown below:

Building type	Storage requirements
Residential	Requirements: — Studios/1 bedroom dwellings - storage for 1 cycle for every two dwellings — 2/3 bedroom dwellings - storage for 1 cycle — 4 + bedrooms - storage for 2 cycles

Figure 13 An example of a specifically defined feature in BREEAM Communities (reproduced from the BREEAM Communities Manual)

(6) By requiring and defining some **on-going relationship** between that new site assemblage and an appropriate site or extra-site actor. This is often in relation to maintenance.

More prescription

How design teams (and others) work with one of the above types of activities will be influenced by the degree to which that requirement is prescribed by the framework. A more prescriptively written criterion may act more predictably and, although site-contingent actors are brought together to participate in the calculation, the procedure for that calculation may remain similar across different developments. For example, the procedures to assess flood risk are well defined, their scope of that work established, and this is well understood by the technical experts involved; it is an established field. Though different sites will have different bodies of water, rainfall, run-off predictions, and so on, the procedure will be similar and similar stakeholders will be required to participate. On the other hand, a less prescriptive criterion may act less predictably. For example, no standard procedure for calculating 'unregulated energy demands' (energy flows not covered by building regulations) exists, and as such, each case study has achieved that criterion (RE 01) in different ways (this is described in more detail in Chapter 7). This also relies heavily on the on-going work by established professional communities around planning and urban development who have put in constant work creating a rational, calculative planning system. Where an expert has an existing professional community, judgements are made more calculable by the considerable resources related to that profession (standards, advice, training, institutes, examples, etc.). Assessors seem to have a more limited community but

do receive training from BRE and those interviewed for this project had wide experience of sustainability.

One way BREEAM Communities seeks to more tightly define processes is by linking calculative requirements to already established procedures. As introduced above, this method is used to define procedures for assessing contaminated land, but is also used, for example, to define processes for noise pollution (linking to British Standard BS8233), flood risk (to the National Planning Policy Framework), transport (statutory guidance), water pollution (Environment Agency guidance), and inclusive design (generally noting national and local guidance as well as the Equality Act). Sometimes this is included in the text of the document. For instance, in SE 02 – Demographic needs and priorities – the demographic information deemed important is defined by BRE (which is similar to information categories collected by local authorities and censuses) and listed in compliance notes as: age, gender, religion, deprivation, crime, and so on. BREEAM Communities also increases the strength of its prescriptions by requiring highly qualified persons to follow the procedures and linking to their professional bodies. Suitably qualified acousticians and ecologists, geotechnical advisors, and those experienced with Sustainable Urban Drainage Systems (SUDS) are required (interestingly anyone can carry out the flood risk assessment so long as they follow "best practice and planning policy guidelines"). Finally, and perhaps where these established, external processes do not exist, BREEAM Communities can look to define methods and relevant participants within the text of the standard. This can lead binary decisions required by the assessor: has 'x' requirement been taken into account. Figure 15 above gives an example of this kind of prescription.

Less prescription

Where calculations are defined less prescriptively, the assessor, the design team, and other local stakeholders are expected to define legitimate participants, methodologies, parameters for success, and/or future relationships for themselves. In GO 01 Consultation Plan for example, the assessor and development team must define what a useful contribution (BRE 2012, 22) to the consultation is, and an acceptable level of "influence" on "key decisions". In these cases of more loosely prescribed calculations, the assessor plays a

crucial role in mediating these criteria by judging if they have been performed adequately well. As the assessor is often (ideally) present throughout the process, this judgement both marks the final assessment and guides the work done. In many criteria there is often a double calculation at play. The first, a binary 'yes-no' question ("has the stakeholder been contacted?", has "heritage" been discussed in relation to the design of the site's "vernacular"?). The second, more investigative, asks something like, "*is that interaction of sufficient quality to contribute to a sustainable project''*? This latter judgement is left to the experts, to those defined as legitimate (e.g., suitably qualified) and/or the assessor. This (jumping forward to the interview evidence presented in the next chapters) allows assessors and other development actors to adapt the criteria in the standard to their particular site.

However, for some criteria there is potentially a lack of information provided in the manual to enable this judgement (a conclusion also reached by the author from interviews presented later in this report). Shared Street Space is a good example of where interviewees would describe having difficulty coming to (what they felt like) was the right decision. The manual does not prescribe shared street space, but requires the decision be made by local actors. This is due to a conflicting evidence found by the authors of the manual to as to the (dis)benefits of shared streets. Development actors must instead make this judgement, however, unlike in the examples above, BREEAM Communities does little work to make this calculable. For example, the criterion does not give guidance as to why shared spaces might be included, what problem they are trying to solve, how someone should make that assessment, and an appropriate expert or external standard is not required and a methodology is not provided. In effect, shared space that is suitable for the development (which isn't defined), is good and contributes to its sustainability; shared space that is unsuitable is bad and shouldn't be included. This example illustrates the sort of judgements and calculations development actors are called to make in the implementation of the framework.

Summary

This section has described the formal structure and scope of the BREEAM Communities manual. It has also looked at the sorts of prescriptions its criteria make of the manual's users, assessors, consultants, and developers. This section aimed to give the reader a better understanding of the standard, such that the actors described in the ANT section of the analysis are more familiar to the reader. It also sought to build on and go beyond previous comparative studies of these standards that by necessity can simplify important elements of the frameworks. This section argued that BREEAM Communities aims to: (1) facilitate the mediation of the emerging development – from the type and size, to the procedures followed by the design team, the features inscribed in the masterplan, and the performance committed to – by local actors, and (2) prescribes how those local actors can engage in these calculative processes and in some cases, which actors are able to participate. This section also highlighted the potential difficulties with implementing BREEAM Communities, some of which are picked up in the following chapters.

First, we looked at the structure of the framework and described the five overlapping structures that help the user (and hopefully the reader) to make sense of the manual. These included a hierarchy of categories, issues, criteria and compliance notes; mandatory and voluntary criteria; a system of weighting and credit scoring; 3 steps linked to development planning stages; and final and interim certification process. The next section highlighted how the sort and size of development BREEAM Communities aims to assess is often defined by its impact on the local area and potential for sustainability improvement, not a definition of a neighbourhood or community as such. Following this, it showed that the physical and temporal scale of that assessed neighbourhood is constructed by overlapping areas defined separately by individual criteria and contingent on local conditions and decisions. The third section goes beyond previous comparisons of neighbourhood frameworks by describing the types of requirements that criteria make of their users. Wangel *et al* (2016) show that the object of assessment in the most part are procedures, not features or the performance of aspects of the design. This chapter described *how* these calculative procedures follow similar steps to define the sort calculative actions, participants, and outcomes of the technical criteria. It also illustrated how these procedures are varyingly prescribed, with

some well-defined and others more contingent: requiring development actors to define the methods, participants or results in a way that reflects a 'local context'. This exercise also highlighted the embeddedness of the standard in existing assemblages of urban development in England, linking often to established methodologies, institutions, professional qualifications, and so on. However, it was also noted where the framework did not make these links, potentially limiting the resources available for local actors to follow the prescriptions in the standard (as in the case of shared streets).

The Fabrication of BREEAM Communities

BREEAM Communities (as we have seen above) brings together myriad ideas about sustainability, other standards, calculative procedures, professional bodies, and so on into a (contingent) definition of neighbourhood sustainability. This section looks to describe the fabrication of this framework, tracing the processes followed by its authors at BRE and the issues and stakeholders that are brought into (or excluded from) those processes. As with the section above, this part of the is not a strictly ANT account and serves primarily to provide background to the reader on the sorts of actors involved (from the perspective of BRE and BREEAM Communities) in the fabrication of the manual, and the meanings and motivations attached to this definition of sustainability. The evidence for this section is based on 4 interviews with BRE scheme managers involved in the process, the manuals themselves, and minutes of some, but not all, meetings and workshops held as part of the development process.

The Problem of Sustainable Communities

The first BREEAM Communities manual (BRE 2008) emerged from collaboration between several groups with a shared objective: to create sustainable communities. In 2002 the World Wildlife Fund (WWF) launched its One Million Sustainable Homes campaign. This publicly marked the beginning of this programme of collaboration to improve the quality of UK homes. Around the same time, the British Government – through the Office of the

Deputy Prime Minister (ODPM) and then with the Department for Communities and Local Government (DCLG) – was engaging in a programme of "planning for sustainable housing and communities" (Kochan 2002) that included a pledge to develop a Code for Sustainable Building. This turn to urban sustainability by the Government at the time also included the Egan Review: Skills for Sustainable Communities in 2003. Cited by BRE as an important influence, The Egan Review (published 2004) went one step further than the ODPM when it called for a "sustainable community development code or benchmarks" (Egan 2004, 6) for sustainable communities, based on the existing BREEAM standard for buildings. For this group of major actors, this work contributed to the problematization of the solution to creating sustainable communities as requiring a voluntary assessment framework. This was not a given – methods for creating sustainable communities are myriad, for example this group could have lobbied for changes to legislation or planning regulations or worked with local planning authorities and other groups to develop local policies or guidelines. Similarly, that this assessment framework should resemble BREEAM was also not given. Other frameworks (such as One Planet Living) could have provided an alternative model. The work done by BRE and other actors to position themselves as core members of this group and promote BREEAM (and its strengths as a standard) may have led to other models being rejected.

Following this, collaboration between BRE, the then regional development agencies, WWF, ODPM and DCLG worked to develop "a consistent national framework of issues to be considered in planning new developments, tailored to regional concerns and issues and designed to complement the Code for Sustainable Homes." (WWF-UK 2006, 3). This took the form of region-specific checklists. Uptake and implementation of these numerous frameworks were "patchy" (Scheme Manager, BRE) but provided a basis for the next phase. BRE then moved to create a standard framework based on their successful BREEAM model. Aspects of this previous collaborative work, such as a 'regional applicability', can be found in the 2008 Manual. Criteria scores were subjected to an additional weighting corresponding to each of 9 English regions and were "adopted from the specific regional sustainability checklist and their associated links to regional policy" (BRE 2008, 44). Stand-alone regional checklists such as the 'Checklist South East' and 'Greenprint' (BRE 2008, 35) were also used

as tools to “develop local area and site specific sustainability targets for a proposed development which can be independently certified against the BREEAM for Communities standard” (*ibid*). These regional variations do not survive in the 2012 version but provide a bridge between the work of this previous group of organisations and the new network BRE are forming around the stand-alone BREEAM tool, which is emerging at this time.

The 2008 Manual had experimental use and varied success: it was used to support sustainability in UK projects like at Castleward, Derby and adopted outside the UK by the internationally well-known Malmö redevelopment project, with generally favourable results according to interviews performed by the author in the preliminary research. However, it is quite possible that the manual was referenced in more research papers than it was used to certify urban developments. It also required significant work by BRE to promote the scheme. The pilot project for this research showed the importance of personal-professional relationships between BRE and developers, sustainability consultants, assessors, and other green building organisations; although BREEAM Communities 2008’s definition of sustainability had been codified, its role in the development process of any particular development was unstable and needed constant reaffirmation by these committed people. Moreover, these emerging alliances could be unreliable, as when the Swedish Green Building Council (SGBC) first supported, then rejected BREEAM Communities in favour of developing their own, Swedish, version. Contributing to this was the SGBC’s view that BREEAM was “too British” (Officer, SGBC) in its procedures and definitions of sustainability. This resistance to adapting the standard to local conditions was also highlighted in the application of regional weightings and the use of a ‘bespoke’ version in Sheffield, proving messy and onerous.

A New Standard

An update of the manual was published with changes based on lessons from these pilots, still containing this regional weighting (BRE 2008, 31). However,

> “When the Coalition came into government in 2010, they abolished the regional level of planning. So, the RDAs [Regional Development Agencies]

> were gone, and other regional agencies we were dealing with weren't there anymore. We couldn't carry on a regional approach. It wasn't just that the organisations were gone, a whole tier of spatial planning was gone, so that means we couldn't any longer have these regional weightings; it just wasn't supported." (Scheme Manager, BRE).

This lack of institutional support was to precipitate major changes to the standard. In 2011, the decision was made to produce a new version of BREEAM Communities. Records of meetings held at the time at BRE cite a desire for continuous improvement of the standard as the primary motivation of those at the organisation. All BREEAM schemes are subject to a regular cycle of analysis and updates by BRE. However, it has also been suggested by the Scheme Manager at BRE at the time that these changes to UK planning legislation – which is significantly referenced in the manual – destabilised aspects of the 2008 manual. The update may also be seen as an opportunity to reduce dependency on actors that were once supportive of the manual but now proved a hindrance. Regional weighting was a necessary part of the framework while working with regional development agencies and supported by regional plans, but -- being UK specific – was now seen by those at BRE as a hindrance to international expansion and added complexity. This simplification (the 2012 manual is 165 pages compared to the 498 pages of the 2008 manual) and internationalisation are two key motivations expressed by the schemes' authors that influenced the next phase of BREEAM Communities' development. Other motivations include: a desire to produce an evidence-based definition of sustainability that went beyond UK standards, to follow a 3-pillars approach to sustainability, and to strengthen the role of experts and local decision making. This latter issue was influenced by the introduction of the NPPF and the Localism Act 2011, which introduced greater requirements for consultation in the development of planning applications. This was made clear at workshops held at TCPA where the importance of public engagement was stressed to the BRE, prompting the three-stage consultation criteria in the current manual (Consultation Plan, Consultation and Engagement, and Design Review).

In developing the new manual, the scheme manager and other staff at BRE worked to bring together new groups of actors and knowledge claims to define sustainability in a manner that would meet their aims, as described above. Knowledge claims made by different

stakeholders were worked into the manual by the small team at BRE in an iterative process that involved selecting, comparing, debating, judging, evaluating good practice documents, ideas from workshops and their own experience, policy documents (and so on). This team at BRE worked to more or less strongly prescribe these activities, with increased effort in later phases of development. The next section focuses on these processes.

Shaping the Fabrication

As may be expected, at the early stages of its development, these processes (as described by workshop attendees and staff at BRE) tended to be relatively open, permitting a wide range of stakeholders to submit ideas in a discursive environment. These early events included workshops and literature review. These seem designed to limit participation to certain professional or governmental stakeholders (with a few specific exceptions from academia) but to keep the activities therein open and discursive, with a, lack of formal benchmarks or guidelines for the inclusion of ideas.

Initially, there were at least 4 workshops convened with external experts and facilitated by BRE. Each followed a similar pattern. Minutes of the workshops and interviews and discussions with organisers and facilitators suggest a relatively unrestricted environment where groups of experts or development representatives were facilitated in an “open” (workshop attendee, UCL) discussion to induce them to put forward ideas, which were captured by note takers and on post-it notes, and recorded anonymously. In other words, the workshops were prescribed by a deliberative, discursive logic, i.e., by a facilitator guiding a general discussion around “what should be included in the manual” (rather than a series of questions around specific criteria for inclusion for example). The framing of the event was more strictly controlled however, with BRE defining the selection and grouping of invitees and the resources given to them, which would shape the ground covered by the debate. An initial workshop convened at the Town and Country Planning Association (TCPA) comprised of academics from 7 universities; local authority planners; architects, sustainability consultants, and developers; representatives from the Dutch and UKGBCs, CABE, BRE, and TCPA; numbering 31 in total. Developers and consultants (grouped as ‘clients’) were invited

to two workshops, separate from a third held three months later, hosting academics, planners, and other interested parties.

A primary objective of the workshops for the staff at BRE was to "understand what [the participants] need and want from a BREEAM assessment for large developments" (workshop minutes, BRE) and "for attendees to understand the aims of BREEAM Communities" (*ibid*). As described by the scheme manager: "we were … sharing some of our early thinking … but we were also gathering feedback to inform the thinking". Comparison of notes from the workshops and the final manual shows that some of this feedback was incorporated into the stable framework. This analysis highlights the dialogic aspects of the creation of the tool – which could be described as heterogenous engineering – in contrast to the scientific, authoritative façade shown by the stable version. Interviews and presentations given by BRE suggest that a wide range of scientific or "fundamental" (Scheme manager, BRE) sustainability concerns form the basis for the framework: "population growth, peak oil, ageing population, biodiversity, smaller household sizes, climate change, public health issues, water stress and pollution" (*ibid*) that were combined with (and interpreted through) ideas raised by urban professionals and other stakeholders at these workshops.

The example of community engagement illustrates this collaborative approach. Minutes show there was an initial concern by BRE that "The current [2008] approach to consultation may not be genuine" (workshop minutes, BRE) and more needed to be done in the new framework. Attendees at the workshop held at the TCPA agreed, suggesting consultation was a "fundamental part" and that "the community needs to own the process", others thought it an "important consideration" (workshop minutes, BRE). National planning legislation and guidelines were drawn upon to support and give context to these claims:

> "Given the Localism Act and the forthcoming National Planning Policy Framework, the issue of community engagement was discussed in some detail. It is important to require an appropriate level of consultation that is proportionate to the size and type of development. This could be critical in terms of the benefit of the scheme and the viability of a project. Participants explored the idea of the scheme requiring a developer to put in some community 'infrastructure' that builds ongoing engagement and ownership." (Scheme manager, BRE)

According to meeting minutes ,'planners' felt that community engagement and governance issues could be used to increase participation, both more widely (getting "the electorate involved" (workshop minutes, BRE) and more meaningfully (with suggestions that "the Governance category could support a community trust being involved and making decisions about the project such as deciding on an architect and influencing design" (Workshop minutes, BRE). Conversely, 'developers' and 'consultants' attending one workshop seemed to highlight the various difficulties in including community engagement: "[it is] difficult to consult the community (Who lives in or next to the site? What do they want and how does this vary?)" (Workshop minutes, BRE). Interviews with the BRE suggest that consultation did become more important after the workshop stage, with dedicated Issues and links to other criteria throughout, and community trusts were retained, but without the power to decide on an architect. However, developer concerns were also brought into the emerging consultation criteria by allowing local development teams to determine appropriate consultees. Not all claims were incorporated into the manual, however. For example, participants in one early workshop argued that "site-selection is the most important part of the sustainable development framework" (Workshop minutes, BRE). However, concerns raised by the scheme designers relating to the BRE's lack of influence at the site-selection stage, the lack of a business case, the need to be flexible and accept a multitude of sites, and doubts about the success of working with other, strategic actors to influence site-selection ultimately proved more important to those designing the manual.

Beyond the workshops, the process of deciding upon an agreed set of criteria for the manual is not well recorded, with no notes available to the researcher and limited evidence available from interviews ("I don't really remember how the [final] issues were chosen" (Scheme manager, BRE)). However, the process did include numerous internal discussions at BRE, commissioning of research and consulting individual experts, and analysing standards, policy, and other guidelines. In particular: "Many issues were selected on the basis of what was in the previous manual. Then I did do a gap analysis … and decided to include more issues with the sign off of other … technical people who I would run my ideas past" (Scheme manager, BRE). Just as the 2008 version of BREEAM Communities built on those previous regional sustainability checklists and other BREEAM schemes – being linked to regional

checklists through the weighting system and originally constrained by the same 8 themes of other building schemes – the 2008 manual and other BRE frameworks shaped the new BREEAM Communities.

The 'gap analysis' took the form of desk research of primarily "good urban design practices: the manual for streets, design guides, things like that. All of those informed what I thought should go into it." (Scheme manager, BRE). National planning policies and guidance (such as the NPPF) were also consulted; other frameworks such as LEED-ND seem to have had limited influence, judged to be "too American" (*ibid*) in their definition (echoing comments from the Swedish Green Building Council who have described BREEAM Communities as "too British"). As in the workshops, academic documents, reports from political groups or charities, and so on, did not seem to be drawn in. Ideas were also sought from experts and brought into the emerging framework through direct communications, though this was limited to a small number of issues: Inclusive Design and Economic Impact. Experts within BRE are also credited with interpreting aspects of national planning legislation, policy and practices that would go on to be influential. In particular, the increased emphasis on consultation introduced by planners at the workshop were only possible due to BRE having a "local authority liaison officer and a very experienced planner" (Scheme manager, BRE) able to consult on the scheme during development.

More generally, the framing of these processes of standard-making can be seen as a way to confront potential resistance to a framework that was being developed according to those motivations set out above. As described in the literature review, the process of fabrication of a standard can be one of forming consensus with competing stakeholders (Timmermans and Epstein 2010; Lampland and Star 2009). One set of interests competing with those of the scheme's authors came from within BRE itself. Staff at BRE who had experience with previous more environmentally focused schemes such as BREEAM for buildings, sought to argue for a more environmentally focused framework that delivered on the more "fundamental aspects" (Scheme manager, BRE) of sustainability. This stood in contrast to the broad social, economic, and environmental standard the designers had in mind. To help promote this 3-pillars approach, the designers enrolled national and international organisations (via policy documents) to "make the argument", including "the Egan Review,

Brundtland Report, Local Agenda 21, Kyoto Protocol, Copenhagen Summit, World Health Organisation, and the Healthy Cities Movement" (*list adapted from interview*). These publications served "as a way to establish the importance and the acceptability … behind why it is important to even have this sustainable community. These international agreements and reports have already made the case". These documents assisted in making the case to colleagues within BRE and other groups who (previously) saw BREEAM as "just being about energy and climate change", that "with Communities, … it is bigger". They allowed the scheme's designers to argue for social and economic sustainability, as well as environmental; "I made a real push for more social and economics and trying to weave that in through things like … the Egan Wheel".

Another set of potentially competing stakeholders were the numerous (external) organisations, academics, political entities, and so on with an alternative claim for the definition of a sustainable neighbourhood (for example, the many competing categorisations discussed in the literature review). In the workshops described here, and in the desk-research and discussions led by BRE, there was limited opportunity for actors to participate if unwanted by BRE (beyond those more obligatory actors such as UK planning legislation). Workshop attendees were identified and invited by BRE, and were also self-selecting, "the assessors and the developers who came along were a group of people who were pro-BREEAM Communities … so it wasn't a representative sample of developers in the UK" (Scheme manager, BRE). Although the criteria for an invitation is not known, some observations can be made. First, there seems to be a necessity for an amount of professionalism; there is no input from non-professionals such as citizens groups or political organisations. Similarly, there is limited input from groups that are not related to professional bodies or established organisations in the field (such as the TCPA). Lastly, there is an English focus with only one non-English organisation, the Dutch Green Building Council.

Interestingly, previous collaborators, WWF and ODPM also did not attend; this is likely another example of the reliance of this process on personal-professional relationships between BRE and other stakeholders, as the member of staff who "held those relationships" (Scheme manager, BRE) had left BRE before the workshop was organised. That these groups did not attend may also have been to limit the influence of the 2008 manual; the Scheme

Manager speaks of the need to "move away from that" (*ibid*). Similarly, the attendees of the workshops were not shown the 2008 Manual (although at some workshops a case study was discussed). Once the framework was published, however, some of these same groups were engaged again through pilot/case studies and industry forums. For example, the UKGBC's network was co-opted through their Pinpoint website, which BRE used to provide information, hold discussions, and gather feedback from early adopters of the completed 2012 framework. (This is another example of the reliance of BREEAM Communities on existing sustainability assemblages that will be discussed in the following chapters.)

Stabilising the Framework

As described, at the outset of the 2012 update the interviews and workshops suggest an 'open' process albeit with participants selected from a narrow set of stakeholders. As the framework moved from speculative to imminent, other concerns started to compete, and the process was more strongly constrained. Again, precise details of this process were unfortunately not recorded by BRE but, as above, can be pieced together through interviews with the two scheme managers at BRE. A number of motivations described by this team at BRE shape their actions to stabilise the rough drafts of ideas taken from the previous manual, workshops, and literature reviews into the final product, these were: to be evidence based, to facilitate local decision-making (non-prescriptiveness), to present a minimum standard for sustainability, international applicability, and to balance BREEAM Communities across the 3 pillars of sustainability.

According to interviewees, one of the primary concerns for any BRE standard is to be evidence based and to be seen as such. Knowledge claims accepted for inclusion in the framework must be tested against a local evidence base developed by those at BRE. However, there was an understanding that for BREEAM Communities the standard of that evidence varied:

> "the evidence base is going to be very different at a building scale compared to community design and urban design. It's one of the areas where things like the energy strategy issue or green infrastructure or ecology [are…]

> much clearer in terms of what's the right thing to do and the science behind it. [Compared] with something like the economy or demographic needs then it's maybe not as clear-cut the process that should be done on the basis of scientific evidence, it's not quite as straightforward." (Scheme manager, BRE)

As such, evidence was drawn from a variety of sources:

> "The local science base for BREEAM Communities has a lot of references to British Standards, the design compendium, and publications by places like design CABE, Natural England, of course government documents as well. … There may have been some academic documents." (Scheme manager, BRE).

The choice of sources seems to continue the trend (that began with the workshops) of recognising large, established institutions as the primary legitimate source of ideas. Moreover, this evidence seems to be incorporated relatively uncontroversially. For example, the figure of 400m as an appropriate walking distance between amenities from the urban design compendium is reproduced in BREEAM Communities. There is no sense from the interviews that these precise figures were controversial (to those stakeholders allowed access to the fabrication process). These established sources of knowledge claims (such as CABE) are trusted to produce figures that represent sustainable practice or good urban design despite (or perhaps because of) the process of fabrication behind that figure being hidden to those involved in this process.

On the other hand, BRE do not seem comfortable in making that judgement themselves between conflicting quantities. Where the scheme designers deemed there to be conflicting evidence, there were various approaches taken. Where the evidence was not conclusive, some issues – such as increased housing density (is it appropriate for rural sites?) – were not included in the manual, while others – such as the role of site selection (do prescriptions here skew achievement of sustainability within the site?) – were minimised or transferred to discussion outside the formal features of the framework. For other issues, the manual prescribes that local development actors must decide if the particular issue is appropriate for that development:

> "For example, shared spaces. I found conflicting evidence about shared street space. Some groups or locations found that it was dangerous others

> found it was helpful in reducing car traffic speed and accidents. Because there was conflicting evidence, I felt that we couldn't require it, so we just require that we look at if it's appropriate for the area. So that's the kind of logic we used when there wasn't [scientific consensus]." (Scheme manager, BRE)

One outcome of this approach (to not include issues with conflicting evidence) is that the responsibility for this decision is transferred into a future user of the standard. Indeed, this use of local decision making was another motivation for the staff at BRE in developing the framework, who wanted BREEAM Communities to be non-prescriptive and process based. As described in the first section of this chapter, BREEAM Communities relies often on local development actors to interpret general prescriptions for a specific place. This can be through consultation with the local planning authorities or population (for example in "adapting to climate change" (BRE 2012, 79) the design team must consult with the local authority to "understand the known and predicted impacts of climate change on the site" (*ibid*)). This requirement for local interpretation often also requires involvement of professionals and their accompanying knowledge and communities of practice (including relevant institutions). For example, when, in ensuring resource efficiency, the design team are required to interpret "WRAP's Designing out Wate principles" (127) and guidance from the Institute of Civil Engineers for the scheme design. This desire to facilitate local decision-making stemmed from their assessment that there is a necessary amount of variation in design for developments of a neighbourhood scale:

> "the scale [of large developments] means you can't be too prescriptive. And there's so much variation possible at that scale. So, we tried to avoid telling people exactly what to do and focusing more on process as a result. And that was a very explicit decision. We talk about it in the [assessor] training". (Scheme manager, BRE)

This trust in professional or expert interpretation is also present in the fabrication of the manual where links between issues are often not made explicit because "professionals working in these sectors should know about the links" (Scheme manager, BRE). These decisions were made with an understanding of, and trust in, professional practices.

Another concern for the scheme designers was to present an effective minimum definition of sustainability. The formulation of BREEAM included "a fundamental discussion about does that mean it is a sustainable development" (Scheme manager, BRE). Among the clearest way minimum standards were set was by using mandatory criteria: "that was definitely a very explicit decision to make those issues mandatory which we felt were a bare minimum thing you had to do in order to have a sustainable community" (Scheme manager, BRE). This effective minimum is also prescribed by existing regulations: "It is BRE's view is that it always has to set the Pass a little bit higher than current regulation otherwise there's no point" (Scheme manager, BRE). This need to 'set' BREEAM Communities' definition against current regulation was achieved by comparing "what they would need to do anyway" (Scheme manager, BRE) to current regulation, the NPPF and accompanying national guidelines. This did not extend to local regulations, however, on the basis that "there would be too many [to compare] … it gets too complicated" (Scheme manager, BRE). While an understandable concession on the part of the design team at BRE – there are 408 councils in the UK – local planning policies are significant in the allocation of planning permission and in many ways represent the effective minimum standard that developments must adhere to, undermining BRE's assertion that BREEAM Communities is "a little bit higher" (Scheme manager, BRE). This is explored more in Chapter 6 and 7 where Eastleigh's local plan policies are shown to be close to BREEAM Communities *Excellent*.

A fourth motivation was to increase the international applicability of the standard. In the 2008 Manual, the requirement for a mandatory criterion was one that was "deemed mandatory by national policy" (BRE 2008, 28). As described above, this shifted to take on the less UK-centric idea of a minimum standard for sustainability, albeit a standard still based in part on UK national legislation. This move "towards … something that could work internationally" (Scheme manager, BRE) was yet another competing concern that manifested in the way criteria were structured aiming to make them easy to change during the Bespoke Process, although this wasn't entirely successful and highlights the tension between demanding a standard that represents greater sustainability than (mainly) English legislated standards, and desiring a scheme that can be applied globally, where standards may be significantly different:

> "we considered types of issues and how they would need to be adapted. We recognised that the way that the manual was, was definitely for the UK and could only be applied in the UK, but we knew with the types of issues, and the way we structured it, those things we could change through the bespoke process relatively easily. But even so it wasn't good enough, it wasn't adaptable enough to where we wanted it to be. So still when we did the bespoke process there was quite a lot of process involved in changing that. … references to UK standards or UK planning policy". (Scheme manager, BRE)

A final motivation identified from these interviews was a desire for BREEAM Communities to represent a balanced definition of sustainability. This was operationalised through a '3-pillars approach'. This adopted approach shifted from a vague aim to be mobilised as a qualculative procedure as the fabrication of the standard progressed. Early in the fabrication, the 3-pillars had been one way of shaping neighbourhood sustainability, guiding the review of literature and workshop discussions. Now, this idea re-entered the process, not to frame a problem, but as a resource in qualculative efforts to solve it:

> "[setting the scores for criteria] was primarily an internal experts process. It was clear to us that we wanted to balance social, economic, and environmental characteristics and drivers, so we made a choice that those would need to be equally considered in the process. So, we went through each issue and did a scoring. It was iterative. Almost like a Delphi method because we were doing it all together, but we saw what our initial scoring resulted in and asking, did it seem right? And making adjustments." (Scheme manager, BRE)

Despite having an increasingly defined decision-making process, the judgements involved in balancing the framework remained open, discursive, and at times, fractious:

> "We had a lot of disagreement about the weighting. The weighting involved a group of experts from BRE sitting around a table discussing passionately what is the value of a particular action in the manual and how that will impact on sustainability, from a social, and then an environmental, and the economics; each had to be weighted separately. And a lot of the discussions came back to these fundamental issues. It doesn't really matter if you have good sunlight if the world is flooded because of climate change. So, it came back to these fundamental views people have about what is and isn't important in terms of sustainability". (Scheme manager, BRE)

These debates highlighting the environmental concerns as more fundamental to sustainability help to explain the lack of an entirely balanced framework and slight environmental bias and possible lack of economic credits shown in Figure 13. As noted above and in other literature, social – and particularly economic criteria – remain underrepresented. However, it seems likely that this deliberate method of balancing, and focus on the three pillars of sustainability, may have resulted in a more evenly distributed credit system than similar standards that are criticised more heavily in the literature for a lack of balance.

Other issues were not 'balanced' in the same way. Rather than enrolling dedicated criteria to represent an issue, they were deemed 'too important' to limit to a single criterion, and instead have been threaded throughout. For example, health and wellbeing was understood to be so "cross cutting" (Scheme manager, BRE) that instead of being included as a separate criterion it was referenced throughout the framework. Similarly, behaviour change is not explicitly mentioned (there is no call for a behaviour change plan as there is a transport plan) but it is sown throughout, for example by requiring footpaths and cycling facilities the standard encourages residents to walk and cycle. This is also true of consultation and issues around governance. This is perhaps counterintuitive, that in a framework which operationalises neighbourhood sustainability as something to be solved by a score-based assessment, to not include "important" issues in that system. This decision also excluded those issues from taking part in calculations described above designed to balance the weighting credits. Indeed, by not assigning credits to these it is difficult to assess the extent to which these issues are included, resulting in some commentators suggesting health, behaviour, and others are missing from the framework.

Finally, as well as balancing credits across the three pillars they were also balanced by the team at BRE according to their assessments of cost and difficulty. By performing "run throughs" (Scheme manager, BRE), imagined masterplans were tested against the emerging scoring system, which was adjusted based on the results.

> "We talked about [the relative importance of criteria] a lot. About the relative value of different actions. And also, the costs associated with them.

> So that there wouldn't be any really easy wins that were cheap and didn't necessarily result in higher sustainability". (Scheme manager, BRE)

Local authority plan inspections by the Planning Inspectorate (PINS) were also investigated by BRE in an attempt to ascertain what inspectors would or wouldn't accept regarding the inclusion of BREEAM Communities.

Summary

This section looked to give further background on what constitutes the BREEAM Communities manual to support the reader's comprehension of the ANT analysis which follows in Chapters 6 and 7.

In doing so it has described the fabrication of BREEAM Communities from the perspective of the scheme designers at BRE and workshop attendees. It showed how neighbourhood sustainability for BRE was shaped by publications such as the Egan Review and collaboration with WWF and ODPM, which worked to define the issue as one of assessment. A wide variety of scientific, professional, and policy ideas were combined in various ways to inform the emerging standard: literature reviews, workshops, discussions, thought experiments. They highlight the contested nature of knowledge as it is stabilised to form the particular knowledge-claims presented in BREEAM Communities as a finalised standard. BREEAM Communities was fabricated and actively defined by BRE and other actors by shaping the process of fabrication and sources of ideas could be included. These processes were also shaped by motivations of the scheme designers to build an evidence-based standard (as defined by them); to prioritise processes and local decision making; to present a minimum standard that could apply both in the UK and internationally; and for BREEAM Communities to be balanced according to the established 3-pillars.

Chapter 6

BREEAM Communities *into* Policy and Practice

Introduction

This chapter progresses the investigation of BREEAM Communities *at work* in a roughly chronological order. In each of the cases studied, BREEAM Communities has been formally adopted into the development assemblage: the development has been registered with BRE for a fee, an assessor has been hired, the document distributed to consultants with agreement from the developer. This first chapter of the analysis asks, how did that come about? How and why was BREEAM Communities initially problematized? Can we describe its movements from BRE, as a document, to becoming part of a particular development assemblage? Does this initial translation have lasting effects? Where has this attempted translation and formation of a BREEAM Communities development or policy not led to its inclusion in a policy document or an urban development, and what can we learn from such cases? As such, this chapter concerns itself with the incorporation of BREEAM Communities into policy, plans, and guidance and subsequently into the studied development projects. It focuses on the translation of BREEAM Communities and these policy instruments, which (as discussed in Chapter 3) has meant other actors are presented as relatively static. The following chapters then look at its integration into project teams and processes and attempts to influence those in the enforcement and assessment of the BREEAM standard.

Through this chapter, we see that broadly BREEAM Communities is problematized in three ways: BREEAM Communities being a specific requirement of local planning regulations or guidance (such as Supplementary Planning Documents (SPDs)); a requirement for proof of attainment of sustainability being included in local planning regulations or local interpretation of national legislation that a BREEAM Communities certificate is deemed to meet; a need for a sustainable development based elsewhere (e.g., in a personal care for the environment), which site actors have worked to establish as being met through BREEAM Communities. In practice these overlap, particularly given that all local authorities in the case studies required some form of sustainability appraisal.

For Eastleigh, Weymouth, and Bristol Councils, Communities is referenced directly by the relevant Local Plan through inclusion in a Supplementary Planning Document (SPD); for Chelmsford, a BREEAM certificate was similarly required, but that need not have been

Communities (e.g., it could be New Construction); in Lincolnshire, there was no such requirement and BREEAM Communities was brought in voluntarily by the project manager (who also became the assessor) to help ensure a quality development. However, there was also a need to prove the development was sustainable, particularly given its location (i.e., at risk of flooding, outside the allocated development area, and in use as agricultural land). These local authorities overlap with the development cases presented in the next chapter: cases A, B, C and E are based in Eastleigh; case D is in Chelmsford; case F is in Lincolnshire; and Case G is in Bristol. In this first section, we also consider the case of north west Bicester as an example of where attempts were made by sustainability officers at the council to incorporate BREEAM Communities into policy but were unable to do so; and Weymouth, where a policy exists but no BREEAM Communities developments have been registered.

BREEAM Communities into Local Plans

At the time of writing, BREEAM Communities has been incorporated in some way into the local planning guidance of nine local authorities in the UK[6]. In the majority of the seven cases discussed in this report – the five within the Eastleigh Borough Council and Bristol City authority areas – actors identified its inclusion in the relevant local plan and accompanying Supplementary Planning Documents as an important event in the adoption of BREEAM Communities. Although not always straightforward, these accounts show how planning tools are significant actors in the formation of a BREEAM Communities development. How the standard comes to be incorporated within these tools and the specificity of this translation are therefore important questions to be investigated. This first section presents an analysis of the translation of BREEAM Communities in each selected local authority in turn, before suggesting patterns and discussing potential lessons learned.

[6] At the time of writing: Eastleigh, Bristol, Swindon, North West Bicester SPD, Hounslow, Watford, West Dorset, Weymouth and Portland Local Plan, Guildford SPG, and Derby.

Eastleigh Borough Council

Eastleigh Borough Council are, at the time of writing, undergoing a process of plan making. The previous Local Plan was rejected by the Planning Inspectorate due to a lack of a five-year housing supply. However, the rejected 2011-2037 plan remains the council's "latest thinking" (Sustainability Officer, Eastleigh), and is referenced by development actors in planning applications in each case studied here. This plan contains within it a requirement for large developments (over 100 homes) to undertake a BREEAM Communities assessment and receive an *Excellent* score in the final certification.

In the previous plan, which covers the years 2001-2011, BREEAM Communities is not mentioned. However, within an SPD produced alongside that plan there is a section where BREEAM Communities would ultimately come to fit. The SPD for Environmentally Sustainable Development suggests developments over 500 dwellings should consider "more sustainable outcomes due to their scale and greater autonomy" (Eastleigh Borough Council 2009, 135–36). These outcomes are desired in the areas of water, energy, waste, green infrastructure, and health and wellbeing. The document notes the lack of a BREEAM standard for major developments, having specified BREEAM (for buildings) earlier in the document. This is somewhat prophetic, as such a standard would be published later in that same year.

BREEAM Communities first appears in the draft 2011-2029 local plan as part of policy DM29, Environmentally Sustainable Development under paragraph 6.54 – Climate Change. This policy builds on the above SPD of the same name, and BREEAM Communities is located in the space provided by that previous document. Point 'h' reads,

> h. For all developments over 500 dwellings, undertake a BREEAM Communities assessment at the masterplan stage with a requirement that at least a BREEAM *Excellent* standard (or equivalent) be achieved (EBC 2012, 5)

Note the threshold remains the same from the previous policy. DM29 continues,

> recognising that these measures may involve the use of innovative building styles and techniques. (*ibid*)

In future drafts, a number of slight changes are made, the most important being the threshold triggering the need for BREEAM Communities is lowered and post-occupancy evaluation is added. The policy now matches more closely to earlier guidance produced by BRE in 2010 for the previous version of BREEAM Communities, which suggests the scheme is suitable for developments over 50 units (BRE 2010)

> g. In the case of larger developments (above 100 dwellings or 10,000sq.m. of floor space), address sustainable development issues at the masterplan stage through BREEAM Communities *Excellent* certification and fund post occupancy evaluation studies. (EBC 2014, 72)

The reduction in threshold is based on the outcome of cost estimates showing no viability implications for schemes as small as 100 dwellings. These estimates, made by the council, draw upon experience of the previous version of BREEAM Communities at Salford Media City and the opinion of an assessor who was interviewed. This analysis is based on a linear extrapolation of cost from the Media City project to residential developments in Eastleigh. The policy is also brought forward in the document to 'DM2' from 'DM29', perhaps symbolic of sustainability's increasing importance. Although it remains within the group of climate change and environmental policies, supporting documents stress the social and economic aspects of sustainability. Finally, the requirement is strengthened by the authors allying it to other related local and national strategies and policies. With the exception of the additional post-occupancy evaluation requirement, the policy at this time is identical on paper to Bristol City's policy.

The formation and stabilisation of this policy was reliant on work from actors within Eastleigh Council and BRE, as well as consultees external to these organisations (albeit less significantly). A key actor in Communities' inclusion is a sustainability officer at Eastleigh Borough Council described as "the catalyst within the council" (BREEAM Communities Scheme Manager). Through attendance at BRE training courses and events organised by BRE and Town and Country Planning Association (TCPA) this officer gained knowledge about the scheme and cultivated relationships with BRE staff. The officer then used this new understanding in discussions with colleagues about how best to implement BREEAM Communities at Eastleigh, discussing details such as "the viability and the evidence process

they'd gone through" (BREEAM Communities Scheme Manager). Their role as a sustainability officer enabled discussions (both formal and informal) with colleagues from planning, policy, and development management teams and helped them "persuade planners that it should be incorporated into [the] Local Plan policy" (BREEAM Communities Scheme Manager).

Problematizing BREEAM Communities as being able to solve relevant, already existing problems helped this officer to enrol colleagues as allies in defending and defining this new policy. For example, in developing the local plan, officers already "looking for standards used internationally to assist with design and creating liveable new developments" (Planning officer, Eastleigh) were introduced to BREEAM Communities due to the sustainability officer's links with BRE. Similarly, BREEAM Communities was positioned as able to assist in progressing a major development that was subject to "much opposition" (Planning officer, Eastleigh). It was also problematized as a way to ensure compliance with the NPPF requirement to "take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption" (DCLG 2012, para 96), which previous versions of the policy also related BREEAM Communities to. The Code for Sustainable Homes (CfSH) also appeared as an unexpected ally. Interviewees describe a following rationale (which was not publicly stated) to fill a gap left by the neutering of CfSH following the Government's Housing Standards Review of 2012 (UK Government 2015). There seems to be a hope that BREEAM Communities could perform the same functions as CfSH, leading to lower carbon emissions in homes and the other "lost" (Assessor, Case A and B) aspects of Code (water, lighting, noise, and so on). This theme appears in several other interviews. A Sustainable Development background paper was also developed by the Council to provide cost estimates and testimony from industry experts. In sum, BREEAM Communities was characterised by this officer and BRE as being able to solve various problems: to assess sustainability earlier and more broadly, to help achieve high quality design, to be a checklist of good planning, to be a 3rd party assessment bringing legitimacy, to limit negative impacts and to help realise opportunities of development.

Problematizing BREEAM Communities in these ways, the sustainability officer sought to persuade colleagues that BREEAM Communities should be included to ensure issues already

of concern “were covered” (Sustainability officer, Eastleigh). The BRE were also important actors in strengthening this assemblage, with the scheme manager giving training directly to staff at the council and explaining the benefits and practicalities of working with the tool. This approach led to the enrolment of colleagues as supporters of the policy, for example:

> “He’s very much driven this within the council, I don’t think we would have picked it up at all if it wasn’t for [the sustainability officer]. We’d have read it and thought, oh that’s nice! And put it to one side.” (Planning Officer, Eastleigh).

Because BREEAM Communities was positioned as able to solve already established problems for the local council, the officer was able to persuade colleague of its usefulness. “Despite some initial scepticism with [development management] colleagues … the more they looked at it their reaction was, well this is just good planning really … [it was] useful as a kind of checklist to make sure that things that we would want were covered and we had this independent assessment.” (Sustainability Officer, Eastleigh). And in contrast to the previous policy, which “just had some general sustainable development requirements” (ibid), BREEAM Communities was seen to offer a (more or less) complete set of requirements if an *Excellent* level was achieved. This standard for *Excellent* is worth attention as the rating level has a significant impact on the breadth of sustainability issues that are problematised; requiring a *Pass* means only 40% of credit bearing criteria need to be considered. Eastleigh is typical in requiring *Excellent* and most local authorities studied that have included BREEAM Communities as a policy requirement have set *Excellent* as a minimum level of achievement. For Eastleigh, this decision was aided by calculations made by the same catalytic sustainability officer comparing the Council’s existing policies with BREEAM Communities on an issue by issue basis: “it worked out [our policies would] already get a high Very Good BREEAM Communities score. So, there wasn’t much of a gap between *Excellent* and our policy. Anything less than BREEAM Communities *Excellent* isn’t going to make a big difference. … I don’t think it would be very testing for any developer really” (Sustainability Officer, Eastleigh). This strongly suggested to the policy’s authors that a score of *Excellent* was necessary.

This relatively stable policy was then tested in the form of public consultation on the local plan. During these consultations, numerous actors resisted BREEAM Communities' association with the policy, characterising BREEAM Communities as illegitimate in some way (Latour 2005, 30). However, these were not able to disrupt this assemblage and ultimately the policy passed the test. Consultation for the first policy appearance of BREEAM Communities, DM29, received 14 representations, three of which mentioned BREEAM Communities specifically; the others responded to the wider policy. These three were all objections, with two suggestions that equivalent schemes (such as LEED-ND) should be "recognised" and one suggesting that "an additional overall sustainability measure … [is] unnecessary" (Representations to Local Plan Consultation, Eastleigh). All three representations came on behalf of developers with schemes in Eastleigh. Other consultation stages produced similar results. These objections were dismissed by the council, as an officer at Eastleigh Borough Council put it, "we may have had an objection, which is probably out of ignorance and to do with extra cost, a knee jerk reaction, [but] I don't think we've had [any] serious objections to the policy." (Sustainability Officer, Eastleigh).

As with opposition to Communities from within the council, external opposition in the form of representations to the local plan was not able to resist its inclusion. Those in opposition to the policy did not clearly co-define their opposition as specific to BREEAM Communities, borrowing "knee-jerk" (Sustainability Officer, Eastleigh) responses from opposition to other increases in standards. Further, they were not able to draw in resources from other actors in opposition or forge alliances to bolster their position (e.g., no co-ordinated effort was made). In total, eight representations (of 3297) were made regarding BREEAM Communities, the standard was not mentioned in the minutes of relevant council meetings, and once in the 146-page sustainability appraisal. These representations were of a form and content familiar to the lead actors supporting BREEAM Communities and the resistance to the policy remained firmly within the bounds of the planning consultation process defined by the council. This made it relatively easy to rebuff the objections and to all of these representations the council's response was the same: a copy-paste response aligning itself with a strong ally in regional and national government's policies for sustainable development and the Local Council's own viability studies. As a result, none of these

objections had an impact on the final policy wording and BREEAM Communities was included in the plan submitted to the planning inspectorate.

In 2014 the draft plan was withdrawn from examination after an interim report was made by the planning inspectorate. EBREEAM Communities summed up the process, stating "essentially [the inspector] has concluded that the plan is not sound because it does not provide sufficient housing, expressing particular concerns about affordable housing."[7] None of the examination documents mention BREEAM or BREEAM Communities. Unfortunately, the planning inspector declined the opportunity for an interview, however, discussions with BRE suggest an inconsistent approach to BREEAM by the Planning Inspectorate. Indeed, correspondence[8] with the Inspectorate indicate they do not have specific policies for BREEAM standards, indicating that "any such policies would have to be judged individually" (Planning Inspectorate).

In summary, BREEAM Communities has been integrated into Eastleigh Borough Council's local plan. This outcome owes much to one member of the council who led the translation, characterised by others as a sustainability champion for the standard, enrolling key allies that enabled the council (and BREEAM Communities) to avoid resistance from possible anti-groups. From their position within the council this 'champion' persuaded his colleagues and drew on nonhuman resources (such as cost estimates, comparisons with existing policy, and testimonies from experts) to shore up the boundaries of the emerging assemblage of BREEAM Communities as planning policy. This was aided by work to align BREEAM Communities to existing problems, such as agreement within the council (as inscribed in existing planning policy) for a stronger, neighbourhood-level sustainability standard. Throughout this paper, we will see that BREEAM Communities often relies on strong existing assemblages such as these to achieve its aims (and often struggles without them).

[7] Unfortunately the examination seems to have been removed from the Council's website: https://www.eastleigh.gov.uk/planning-building/planning-policy-and-implementation/local-plan/draft-local-plan/local-plan-examination.aspx

[8] Emails dated 2017-04-20

In 2011, BREEAM Communities was included in the Bristol Development Framework Core Strategy as a requirement for major planning applications. Unfortunately, the officials close to this process had left the council by the time of this research and interviews were not possible; as such this section relies on analysis of the policy, evidence assembled to defend it, and public records of the plan consultation. The policy related to BREEAM Communities states:

> "New development will be required to demonstrate as part of the Sustainability Statement submitted with the planning application how the above issues [energy, waste, water, materials, adaptability, and biodiversity] have been addressed. For major development and development … the sustainability statement should include a BREEAM and/or Code for Sustainable Homes assessment. Additionally, in the case of a super-major development [over 10,000 m^2], a BREEAM for Communities assessment will be required." (Policy BCS15, Bristol Development Framework Core Strategy).

Following that, in 2015 BREEAM Communities was included in the Bristol Central Area Plan, with the same stipulation:

Development type	2013 - 2015	2016 onwards
Residential 10+ dwellings	Code for Sustainable Homes level 4	Code for Sustainable Homes level 5
Residential 100+ dwellings	Code for Sustainable Homes level 4 and BREEAM for Communities "Excellent"	Code for Sustainable Homes level 5 and BREEAM for Communities "Excellent"
Non-residential 1,000m² or greater	BREEAM "Excellent"	BREEAM "Excellent"

Figure 14 Reproduced from Bristol Central Area Plan, March 2015, 32

As part of the evidence base for the local plan, Bristol City Council commissioned a Building Standards Evidence Base report (Bristol City Council 2011, 6) to "provide the evidence base to support BREEAM and Code for Sustainable Homes" and "check that these targets are reasonable by assessing the impact on development costs, land values, viability and delivery of new developments, and to gauge the views of developers" (*ibid*). The evidence base seems wider than that available for Eastleigh and draws in Bristol City's topography, density,

economy, and culture, vulnerability to climate risks and opportunities for sustainable solutions such as combined heat and power (CHP). Nonetheless, the report characterises BREEAM Communities in ways that are similar to those put forward by officials in Eastleigh: as helping to improve, measure and independently certify the sustainability of developments; and helping the council ensure they take account of the full range of issues. Unlike in Eastleigh, however, little effort is made to link BREEAM with cultural, social and economic problems (beyond suggesting a role in creating employment), and the BREEAM standards are associated most strongly with climate change, low energy solutions, and environmental performance. BREEAM Communities is also equated with BREEAM standards in general and when estimating costs, they are not distinguished despite the large differences in scope.

The threshold of 'super-major development' is subsequently defined as being greater than 100 dwellings or having a floor area of 10,000 m^2. This is the same threshold as adopted at Eastleigh. At Bristol, this threshold is not directly explained in their public literature. However, BREEAM Communities' inclusion here is considered to be "proportionate to the scale of development" (Bristol City Council 2011, 3), which follows the framework's own understanding of an assessible neighbourhood or community as discussed in Chapter 5. As at Eastleigh, this threshold was the source of controversy for developers, with at least one project known to interviewees reducing the proposed floor area to fall under this threshold. In the latest review of Bristol's planning policy, this threshold has been increased to 200 homes, perhaps in response to this (February 2018).

As described above, a key test in the making of planning policy, is the examination by the planning inspectorate. The Local Plan and accompanying Central Area Plan passed this inspection. The inspectors report (published February 2015) did not mention specific sustainability standards, nor was there significant mention of BREEAM Communities during the public consultation of these plans or in the latest review (Bristol City Council 2019). However, the consultation statement shows there was criticism by the inspectorate of the council's approach to green infrastructure and climate change. Concern was expressed that their climate change policy lacked clarity – contrary to the council's enrolment of BREEAM Communities as a tool to clarify policy in this area; perhaps the planning inspectorate were

not convinced. Although the planning inspectorate's view of BREEAM is not certain, that the plan passed despite these concerns does follow from the previous case that the standard seems to be a minor concern for the Inspectorate.

In summary, Bristol City Council has incorporated BREEAM Communities into its local plan and accompany planning documents. To achieve this, the council has produced a large amount of evidence supporting sustainability standards, but little supporting BREEAM Communities specifically. Within this evidence, it had characterised sustainability standards similarly to Eastleigh and other councils, although with a greater focus on delivering environmentally sustainable development. Like Eastleigh, Bristol Council also attempted to show that its sustainability standards did not put undue cost on developers but could not provide specific evidence for BREEAM Communities. Opposition to the inclusion of BREEAM Communities into planning policy was limited. This may have permitted its inclusion despite the inability of the Bristol planners to assemble the same sort of specific supporting actors as Eastleigh did (in specific cost estimates, other sites in the form of examples, and specific analysis of its relations to their policies).

Bicester SPD, Cherwell District Council

Bicester Council brought BREEAM Communities into their planning guidance for a large expansion of the town. However, this guidance has not resulted in any BREEAM Communities certified developments. North West Bicester 'Eco Town' (as it was known, before being rebranded by Cherwell council in 2015 as part of 'Bicester Garden Town' in 2015 in line with the latest re-imagining of the garden city project) is a planned 5,000 home development formed under the then Labour government's eco town's planning policy statement (PPS) supplement. While active, this PPS provided a definition and standard for any government sponsored eco-town development. The north west Bicester masterplan was developed by Cherwell county council and a private developer on the basis of that PPS. Alongside this, an SPD was developed by the council, which provides detailed guidance for developments seeking planning permission within the masterplanned area. Within this SPD there are several requirements for BREEAM Communities. This includes a general

requirement for applications to achieve an *Excellent* standard (Cherwell District Council 2016, 16). Unlike other councils, they also introduce additional conditions, requiring that development to achieve BREEAM *Excellent* commitments on occupation of 50% of the development. At the time of writing, however, the NW Bicester Eco Town masterplan has not been assessed by Communities and no subsequent detailed planning applications have included a BREEAM Communities assessment; this does not seem to a barrier to a successful application.

As with Eastleigh and Bristol, much of the work to include BREEAM within planning policy was initiated and led by a single person working within the council's sustainability planning policy team (according to an interview with that person). This work included assembling evidence and persuading teams within the council and external stakeholders of the need for this particular sustainability standard. As with Eastleigh and Bristol, the BRE were also important and the council "had quite a lot of discussions with BRE around BREEAM Communities, especially the role it could play at north west Bicester" (Planning Officer, Cherwell). However, the interviewee could not recall if BRE had meetings or seminars that allowed them to discuss and persuade a wider audience within the council (as they did at Eastleigh and Weymouth). They did, however, describe attempts by the council to build support around BREEAM Communities' ability to "bring [sustainability issues] together in a rigorous way" (Planning Officer, Cherwell) and to clarify policy around sustainability for applicants by having more defined criteria. One way the council achieves this is by making links throughout the SPD to specific BREEAM Communities issues that are of particular importance to the council (helping to locally define the standard). For example, by requiring that "Planning applications should: Provide evidence to show consideration of climate change adaptation. Demonstrate how risks will be reduced through win–win situations (BREEAM Communities SE10)" (Cherwell District Council 2016, 20). This represents a similar scope of the BREEAM standard than proposed by other Local Authorities. In Bristol, Communities is enrolled to clarify and assemble sustainability issues, but also to improve and certify sustainability; In Eastleigh it has a broader remit, influencing quality in general, and supporting innovation, timely interventions, and good planning overall. To support

these wider proposed characteristics, it seems that Bristol and Eastleigh also produced more evidence.

As with other cases, there was some resistance to BREEAM Communities' translation, but with greater effect. As with Eastleigh, this resistance came initially from colleagues within the council. Those seeking to support its inclusion "had discussions with the policy team and they weren't keen to add it in [to the Local Plan] … I think it is down to a concern around whether we end up burdening developments with all the requirements" (Planning Officer, Bicester). Those who resisted BREEAM Communities within policy teams mustered resources in the form of imagined impacts on the number of planning approvals delivered, knock on impacts on five-year land supply, and lost planning appeals on less desirable sites (from the council's perspective) to resist the inclusion of the standard. Other sustainability standards were also important in this in allowing these colleagues to frame BREEAM Communities' requirements as "valid but not necessary" (Planning Officer, Cherwell). To them, these other sustainability policies already resolved the attempted problematization of BREEAM Communities. They were also more solidly embedded within the planning framework and the public branding of Bicester as an 'eco-town'. BREEAM Communities' inclusion in the SPD was negotiated by the planning officer as a result that limited colleagues' concerns about its impacts (as described above) on the wider local plan.

In summary, officials at Bicester have incorporated BREEAM Communities in their local planning guidance (but not in the local plan as Eastleigh and Bristol council have done). As with other examples, the work seems to have been led by a small number of actors with a formal remit for sustainability within the council. They also received some support from BRE. However, despite these similarities, BREEAM Communities was not incorporated into the Local Plan having faced resistance from within the council. The presence of other sustainability standards for similarly sized developments at the masterplanning phase were mobilised against the problematization of BREEAM Communities as an overarching checklist or definition of sustainability. In other local authorities' guidance, although there are high standards of sustainable design required, they do not exist in a single, coherent document such as the Eco-Cities PPS in Bicester. As such, the Planning Officer could not position

BREEAM Communities as a way to solve sustainability problems and had to resort to a narrower problematization of the standard (as a way to clarify existing policy).

Weymouth Council

A final example is that of West Dorset, Weymouth and Portland Borough Council (referred to as Weymouth by interviewees). This account is based on an interview with a key council officer involved and analysis of key planning and consultation documents. For brevity, elements of the account that are similar to the previous cases are only briefly described.

At the time of writing, BREEAM Communities has been incorporated into the Council's Local Plan as both a requirement for third-party sustainability assessment for large sites in the Environmental chapter of the plan and as a specific requirement for designated sites "under all of the major allocations" (Planning Officer, Weymouth). Unlike other cases described here, there is no requirement to achieve a particular assessment level. In line with other Local Plans, a size threshold is employed, where BREEAM Communities is only required for larger developments. However, in this case largeness is not defined by a number of dwellings but by the council's judgement that a development is significant enough to require a masterplan. Other conditions make clear BREEAM is also required for mixed use developments and is required early in the process: "It should be capable of raising sustainable design solutions when there is still ample opportunity to influence the planning process." (WDDC and WPBC 2015, 49). Both considerations not made by other councils but highlighted by the BREEAM communities Manual and implied by many of its criteria (as discussed in Chapter 5).

HIGH STANDARDS OF ENVIRONMENTAL PERFORMANCE

2.6.9 Ensuring development has a high standard of environmental performance is an essential part of achieving sustainable development and often starts at the much broader site selection and master plan stage. The councils will therefore require a nationally recognised assessment (such as BREEAM Communities) to be carried out for the larger developments where masterplans are to be prepared. Like BREEAM Communities, such an assessment will be a measure of sustainable development that can be used for new mixed-use communities, or single-use developments of a significant size. It should be capable of raising sustainable design solutions when there is still ample opportunity to influence the planning process. This should in turn, reduce costs by avoiding the need to rework designs and plans at later stages.

Figure 15 BREEAM Communities requirements have added conditions at Weymouth (reproduced from WDDC and WPBC 2015, 49)

In contrast to other cases, where links between local planning policy and BREEAM was made by a policy officer with an existing remit for sustainability, the standard initially "became part of the local plan agenda" through a senior Director. According to the interviewed policy officer there was little, if any, resistance to the idea from within the council. It was suggested (tentatively) by the interviewee that this lack of resistance was partly due to that initial suggestion by the director lending BREEAM Communities some authority. Like other cases, seminars and meetings were then held by the environmental planning team to persuade other relevant policy officials within the council. And, as with other Local Authorities, BRE also ran a seminar designed to share information about the benefits of BREEAM Communities to the Local Authority, positioning the standard as able to provide a solution to sustainability and planning problems at low cost, or even with benefits to developers overall. Unlike the other cases, however, the interviewee could not recall any specific evidence produced to support BREEAM Communities.

Figure 16 BRE plays an important role in problematizing BREEAM Communities (Reproduced from Pineo 2012)

Here, BREEAM Communities' is described by BRE and that environmental planning officer as able to provide a structure, a process for making sure agreed principals make their way from planning to detailed design, and a definition of a sustainable masterplan; these were set out by the interviewee as important reasons for adoption and used to persuade colleagues. Having a process that could be used by planners to improve masterplanning in general seemed particularly valuable: "A lot of developers think [a masterplan] is an illustrative layout on a piece of A3. … that's not our interpretation of what a masterplan is" (Planning Officer, Weymouth). Again, BREEAM Communities seems to be characterised as a solution to a problem defined by the particular officials experiencing planning (difficulties) in the context of that particular Local Authority, in this case the need for quality masterplanning with sustainable outcomes.

As with other local authorities, the requirement for BREEAM Communities fits into a space in the planning guidance already set out in previous iterations of the Local Plan, although here that movement is less clear, and wording is not directly taken from one iteration to the next. Instead, previous plans include general policies for sustainable design and masterplanning, into which BREEAM Communities was included. An example of this unique to Weymouth is the use of the plan's site-specific guidance (here called Key Sites (WDDC and WPBC 2015, 145)). Whether a development requires a masterplan (and thus a BREEAM Communities, or similar, assessment) is decided by planning officials on a case-by-case basis for each Key Site and set out in the Local Plan. This ensures BREEAM Communities is

considered early in the development process. (It is also a novel solution to the lack of consideration for site selection in the framework.) This inclusion criteria also seems closer to the BRE's guidance for when to use BREEAM Communities than the size thresholds adopted by other councils (i.e., developments greater than 100 dwellings).

As with other cases, the Local Plan then underwent a series of consultations and inspection by the Planning Inspectorate. There was support from the consultation by the local community for higher standards:

> "in the early stages of Local plan preparation we did a lot of community engagement and workshops. From this individual theme groups got together and issues of sustainability, resilience to climate change, building standards were discussed. The groups [were called] Peak Oil, Renewable Energy, Coastal Change and Socially Sustainable Communities. There was a lot of community support for higher standards." (Planning Officer, Weymouth).

However, (and similarly to other cases) there were objections from landowners and developers. These are summarised by a planning officer as "going too far", as being counter to the housing standards review, and as concerns about the cost. In their words, "the usual thing", and as not being specific to the standard. Neither the objections, nor the plan examination "got into the detail of it" (Planning Officer, Weymouth) – echoing the above descriptions of consultations on BREEAM Communities in other Local Authorities. It was also not mentioned in the 2015 Planning Inspector's report although there are changes suggested to the wording of the policy to bring it in line with recent government decisions on housing standards (Pickles 2015). The inspection "was just following the [Housing Standards Review] and we had to quickly re-write all our policies about CfSH etc." (Planning Officer, Weymouth). Because of this, BREEAM Communities was confined to masterplanning: "the planning inspector thought we were justified in asking for it at the masterplanning stage providing it didn't stray into the housing standards element" (Planning Officer, Weymouth). This is the only direct interaction recorded between BREEAM Communities and the planning inspectorate. The standard is removed from a section in the Local Plan dealing with "high quality and sustainability in design" (WDDC and WPBC 2015, 121) but is left unchanged when related to "high standards of environmental performance"

(*ibid*). BREEAM for buildings and CfSH, however, were removed, the inspectorate preferring a general reference to "high standards of environmental [performance]" (Planning Inspectors Report, Weymouth, 2015). At the time of writing, a final review of the plan is underway, but BREEAM is not included in the list of issues and options to be consulted on according to the issues and options consultation documents, and no evidence has been submitted to support it.

West Dorset, Weymouth and Portland Borough Council have included BREEAM Communities in their Local Plan through subtly different problematization and translation, leading to a focus on masterplanning quality as well as sustainability. As with other guidance, work by BRE and a planning officer to problematize BREEAM Communities around a local issue and working to inscribe it in planning guidance where there was already space for sustainability led to its inclusion in the policy. In this case, a focus on masterplanning seems to have facilitated a fit with the 'Key Sites' section of the Local Plan, rather than incorporating BREEAM Communities in the wider guidance. This may have come at the cost of minimising sustainability at the expense of masterplanning, with no evidence collated to support Communities and no level of certification set. As with other cases, resistance in the shape of negative consultation responses did not provide a strong challenge to the formation of a BREEAM Communities planning policy.

Summary

This section has described four cases where BREEAM Communities has been included in local planning regulations. As we will see in the following section, the problematization of the BREEAM Communities standard by the obligatory passage point (OPP) of planning permission is a recurring pattern in the adoption of the standard into development projects. Before summarising and discussing the above evidence, it is important to note some limitations of this section. Firstly, the reader should recall (as described in Chapter 3) that this account primarily follows the translation of BREEAM Communities as it is problematized and enrolled in different planning policy documents. As discussed, this produces an account of how BREEAM Communities is constituted by actors around the plan making process but is

limited in explaining how other actors are themselves constituted. Secondly, with the exception of Eastleigh, cases presented here are based on single interviews with key planning officials and relied on analysis of planning and consultation documents. This will mean that conclusions drawn are tentative and more research is required to understand the processes of translation outlined above. Finally, more research is also needed to understand why many Local Planning Authorities have *not* chosen to include BREEAM Communities in their planning guidance.

In summary, BREEAM Communities has been incorporated in some way into the local planning guidelines of at least seven local authorities in England; this section has outlined how and why that transpired in four cases. In each case, a similar pattern emerges of a single policy official, most often with an existing remit for sustainability, working to problematize the standard: to build evidence, persuade colleagues, and frame BREEAM Communities as a solution to existing concerns within the Planning Authority. This person is often afforded support by BRE, who play an active role in providing evidence to characterise the framework as able to solve problems or provide benefits. BREEAM Communities is problematized by these actors varyingly as:

- Being a checklist to make sure issues were covered;
- Defining 'good planning' or 'masterplanning';
- Providing a structured method for delivering sustainable design;
- Assessing sustainable design in a rigorous or independent way;
- Ensuring opportunities for sustainable development are seized;
- Meeting NPPF requirements for sustainable development
- Costing more;
- Costing less;
- Being contrary to the housing standards review;
- Being in line with the housing standards review;
- Having no cross-over with the housing standards review;
- Being unimportant, or unnecessary;

- Being a bureaucratic or technical burden, as being 'too onerous'.

Compared to BRE's own framing of the standard this shows the broader, more locally specific ways BREEAM Communities is problematized, in particular around specific planning problems like the need for improved masterplanning, to help clarify or summarise local sustainability policies, or a response to the (then) relatively recent housing standards review. However, this broad set of problematizations does seem to align with the scheme designer's motivations (as seen in Chapter 5) to design a framework that was non-prescriptive and applicable to a wide variety of cases. Positioning BREEAM Communities as a response to existing planning problems seems to aid those actors seeking to incorporate the standard in making alliances with those already assembled in response to those problems (whether planning officials, local communities, sustainability evidence, or existing planning guidance).

Translating BREEAM Communities into planning documentation relies on gaining support from other municipal stakeholders; support from stakeholders external to the Authority does not seem necessary (except from BRE) but resistance from other actors can interrupt its translation. In most cases, opposition external to the council seems limited both in form (restricted to a small number of consultation responses) and in character (taking the form of objections generally to an increase in standards and the assumed associated cost, rather than specific arguments about BREEAM Communities). However, the concern of local authorities to not ask "too much" from developers shows the influence of this group despite lack of direct representation. In some cases, producing evidential reports or calculations to support its enrolment (such as comparisons between BREEAM Communities and local policy or cost estimates) seem to have been helpful in persuading colleagues, but this does not seem necessary in all cases. Moreover, this sort of evidence does not seem to have been engaged with by most opposition actors, including planning inspectors who only referenced BREEAM Communities in one case. Unexpected opposition did come, however, where existing sustainability policies acted to help characterise BREEAM as unnecessary or over-burdensome. Support from BRE staff was identified in most cases, underlining that – along with individual sustainability 'champions' – work by human actors is required to enrol the standard on a case-by-case basis and personal relationships with BRE continues to be

important; nonhumans play a part only 'locally' (e.g., as existing planning policy) and rarely in a way that can be easily transported from site to site (e.g., as an evidence base).

There is variation in the characterisations of BREEAM Communities and in the eventual form of its inscription into policy. This inscription may be a general requirement in a Local Plan, a policy or recommendation for a particular area or allocated site, or non-binding recommendations in an SPD. The form of the requirement also often depends on previous iterations of planning guidance, with existing policies shaping a BREEAM Communities requirement. It seems that resistance through 'developer concerns' (enrolled through council offers' judgement of the burden of the policy rather than through direct representation) and alternative standards pushed BREEAM Communities towards less influential policy vehicles (as in Weymouth and Bicester), which seems to have resulted in fewer BREEAM Communities' developments. However, this variation has also identified some potentially fruitful methods of addressing weaknesses of BREEAM Communities identified through the literature review and in Chapter 5. Weymouth tied BREEAM Communities into specific Key Sites, identified by the council as having significant impact or potential to improve sustainability. This is in-line with the standard's own description of how it should be applied and addresses the lack of specific site selection criteria. Policies in Eastleigh and Bicester address a lack of post-occupancy certification by requiring one themselves (Eastleigh) or requiring that development to achieve BREEAM *Excellent* commitments on occupation of 50% of the development. Finally, most local authorities require an *Excellent* standard after comparing BREEAM Communities to their local planning policies, work the BRE were unable to do.

Finally, the above cases represent 7 of nearly 400 Local Authorities, suggesting that there is significant resistance to BREEAM Communities' inclusion in policy (or insignificant desire!), whether this comes in the form of development stakeholders, internal local authority resistance, or nonhuman barriers such as a lack of large sites or resources to provide evidence will have to wait for further study.

Translation into Development Projects

This section describes how BREEAM Communities makes its way from a piece of planning guidance to an adopted standard and assessment framework with ability to impact a development site. The evidence for this section is based on interviews with officials from Eastleigh and Bristol planning authorities and with key individuals from each of the cases studied, as well as reviews of planning application documents and planning guidance.

For most cases (i.e., those in Eastleigh and Bristol) a requirement to achieve a BREEAM Communities certificate is set out directly in the local plan as we have seen. A score of *Excellent* is required for the granting of planning permission and therefore, developers are compelled to complete the BREEAM Assessment. As argued in Chapter 3, we can begin to understand how and why this happens by first employing the ANT concept of the Obligatory Passage Point (OPP). The granting of planning permission has been described Rydin (2012) as an OPP, which can be seen as both a test that most developments in the UK must pass through on their way to becoming a concrete reality and a mechanism by which actors can corral resources to meet that obligation. The regulatory planning process obliges all actors to converge around the conditions for the granting of permission, and as such those conditions mediate that development network and control the application of 'global' resources (e.g., development capital) toward a 'local' site (here literally a development site). The work of incorporating BREEAM Communities into the local plan can be seen as a way of attaching Communities to this strong OPP. If achieved, this hopes to delegate BREEAM Communities access to or control of resources and some ability to mediate actors in a project assemblage. As such, making the formation of a BREEAM Communities-development more predictable and, in theory, more implementable. This also follows the familiar pattern of stabilising assemblages by shifting the figuration requiring or promoting BREEAM Communities from human actors (e.g., negotiations between council staff, presentations by BRE) to assemblages with a higher proportion of nonhuman actors (e.g., text; an appeals system supported by the planning inspectorate and records of precedent; in this case, a clear requirement in a planning policy) who are (often) more stable and more predictable.

However, this joining of BREEAM Communities and the planning permission process is not a given or absolute and the application of a policy is so often dependent on those applying it; sites are often full of unknown and uncooperative elements; planning conditions are flexibly interpreted; economic or political conditions change; and so on. This means the bringing together of a BREEAM Communities policy and a nascent development project into a single assemblage, a BREEAM Communities-development, is not always straight-forward. This is also true for projects that adopt BREEAM Communities voluntarily, without compulsion by a planning requirement. This section follows efforts by planning authorities (and others) to mobilise these BREEAM Communities requirements towards the adoption of the standard for specific development sites. It also introduces two cases where BREEAM Communities was brought into a project voluntarily, without responding to a planning obligation.

Planning Policy-Led Translation

Local planning regulation is often an important actor in BREEAM Communities' implementation. As will be argued below, it seems to do so by problematizing the adoption of the standard into local development sites and corralling appropriate resources (as an OPP) to support stabilisation and mobilisation of the BREEAM process. It is worth noting that there may be other developments where translation has not been completed, which (because they have not applied to BRE for a certification) have not been included in this investigation. This report has primarily focused on those developments that have undergone a BREEAM Communities certification registered with the BRE and an exhaustive search of planning applications is out of scope. As such, this is a study of how associations are made (despite difficult) and not of how this is interrupted.

Interviews with planning officers at Eastleigh suggest the planning requirement to adopt BREEAM Communities has generally been complied with in that local authority. In Bristol, it was suggested by a planning officer there that when the 'champion' of BREEAM Communities left the policy was not enforced. This does seem possible given the sole available case of BREEAM Communities at the time this research was performed, despite having been policy for 4 years (although some more recent examples of the standard being

used can be found, for example, the University of Bristol's Temple Quarter development (Sykes 2017, 5). That caveat aside, in the cases studied within a local authority with such a planning policy (i.e., Bristol and Eastleigh), interviewees consistently describe a straightforward, predictable application of policy as an important reason for BREEAM Communities' presence.

> "[The developer] and Eastleigh agreed it would form part of an application. And I think that is because it forms part of one of Eastleigh's SPDs that for developments over a certain size they should seek and achieve BREEAM Communities, so [the developer] did." (Planning consultant, Case B)

In other words, these planning requirements do seem impose a "dominant framing" (Rydin 2012, 36) or agreed problematization for negotiations around planning consent, and as such (in these cases) seem to generate a predictable adoption of BREEAM Communities. The importance of this relation can also be seen in an example of an attempt to create a BREEAM Communities development that breaks down. As noted above, in Bristol BREEAM Communities is required for developments larger than 100 dwellings. In this case, at some point during the development of outline planning permission, the number of dwellings was reduced to below 100 and the planning policy no longer applied. Despite initially adopting the framework, hiring an assessor, and developing an outline planning application according to the standard, BREEAM Communities was removed from the project when that link to local planning policy was broken; where passage through that *OPP* was no longer attached to BREEAM Communities the 'Communities-Development' assemblage was quickly destabilised.

> "We didn't submit it because the scheme changed and it dropped underneath the Bristol City requirements, so they didn't need it. They dropped it as soon as they could" (Assessor, Case G)

Policy is not always predictable, however. Even within these Local Authority areas, many interviewees describe some degree of negotiation between the planning officers at the Local Authority and developer before BREEAM Communities was formally adopted. At Eastleigh, the opportunity for anti-groups (comprising developers and their consultants) to attempt to destabilise the policy drew on the status of the Local Plan. In sum, at the time of

writing the Plan had been rejected by the Planning Inspectorate due to a lack of a 5-year land supply. This triggered the presumption in favour of sustainable development as set out in the NPPF. This presumption compels the Local Authority into "granting [planning] permission unless any adverse impacts of doing so would significantly and demonstrably outweigh the benefits" (Department for Communities and Local Government 2012, 4). This can make it more difficult for councils to enforce planning policies that might limit housing supply, a fact not lost on interviewees:

> "we were back in the strategic gap, we were contrary to policy, contrary to section 54a, you have to be in line with the plan. … I'm sure there were a raft of policies we were contrary to. [Despite that] I reckon we could have fought the policy [*BREEAM Communities*] because at that stage Eastleigh were after housing numbers. (Architect, Case A)

In this case, the stability of Eastleigh's planning policies was guaranteed through another predictable, material actor: the site, and the council's ownership of it meant a "whiter than white approach had to be taken" (Architect, Case A). This was also the case at Case E. This also follows experiences of cases in the pilot study (such as Masthusen, Malmö) where public stake seemed to make it easier to enforce sustainability standards.

Breakdown in Translation

In Bicester and Weymouth, and to a lesser extend in Bristol, BREEAM Communities has not been translated into specific development project assemblages. One factor was the relatively strong embeddedness of competing sustainability standards. As Bicester, BREEAM Communities was enrolled to enhance the assessment of sustainability in a piece of planning guidance governing a large town extension. A masterplan was developed for this area by P3ECO Group – a consortium of designers, engineers, and Cherwell District Council. According to Bicester's SPD, that masterplan was to be assessed by BREEAM Communities, but it was successfully side-lined by the consortium of consultants in favour of the Eco-Towns Planning Policy Statement (P3Eco Group, n.d.) and their own sustainability standards (for example, Farrell 2010). These standards addressed many of the same issues as Communities, e.g., Green Infrastructure, linkages to existing areas, connectivity, low carbon

transport, local employment. They also include some issues Communities does not cover, e.g., local food production. Despite the opinion of key people at the council that "BREEAM Communities could bring quite a lot of value" (Planning Officer, Bicester), the council were unable to justify the benefit of an additional sustainability standard to those consultants: "we've got standards about carbon and local governance and transport modal shift and all this other stuff so it was difficult to say it was essential to have BREEAM Communities in those circumstances" (Planning Officer, Bicester). Communities' inclusion was also undermined by other sustainability work done on the project through Innovate UK funding particularly around urban overheating and water issues, which BREEAM Communities "just seemed to summarise" (Planning Officer, Bicester). The overlapping of these existing standards and BREEAM Communities undermined BREEAM's enrolment by the council as a technical standard, one that could define criteria and clarify sustainability issues. As described above, Communities was also enrolled at Bicester to bring sustainability issues together in a rigorous way. This seemed to be similarly undermined by the other sustainability standards, in particular, the 'Eco-Towns PPS', described by a planning officer as "pretty much comprehensive" and as a "driving force" for sustainability. This enabled that consortium and resistant council officers to "designate [BREEAM Communities] as being empty, archaic, … obsolete, and so on" (Latour 2005, 32), increasing "Cost. Time. Paperwork" (Planning Officer, Bicester).

Another factor that seemed to resist BREEAM Communities' translation to a development was the timing of its introduction into planning policy. Masterplanners in Bicester had already begun by the time it was formally introduced to the SPD and were "unwilling to approach [the masterplan] in a slightly different way." (Planning Officer, Bicester). Once the masterplan was developed "very much along the right lines in terms of sustainability" (Planning Officer, Bicester) without BREEAM Communities, it became more difficult for the framework to assert itself against an increasingly stabilised set of competing standards. Once the masterplan was defined as 'sustainable' by this assemblage of experts, plans, and council officers, BREEAM Communities was unable to force its inclusion at more detailed stages of development, despite being (on paper) a necessary consideration for a planning application: "[we did not] feel we were in the position where we could start resisting

applications when they were meeting all the PPS standards" (Planning Officer, Bicester). Finally, the resistance from within the council that prevented BREEAM Communities' inclusion in the Local Plan also limited its application in the SPD, making it "difficult to insist on [BREEAM Communities] given we didn't have a [local plan] policy backing for it" (Planning Officer, Bicester). Again, showing the difference of this kind of policy relation above other, less assertive policy tools.

Planners at Weymouth had a similar problem to those at Eastleigh, in that their Local Plan was rejected by the Planning Inspectorate due to a lack of a 5-year housing supply. The officer describes:

> "we are in a difficult position … we don't have a 5-year housing supply so in a way we're desperate to get our major allocations through … whenever they talk about sustainable construction they just say "no, we don't have to do that anymore", and it's very much gone right down the bottom of the agenda. Affordable housing, community infrastructure takes priority" (Planning Officer, Weymouth)

However, they have not been able to produce BREEAM Communities certified developments in the same way. As in the case of Bicester above, competing sustainability standards seem to have undermined BREEAM Communities. According to council officers, that the policy gives planning applicants the choice of using "nationally recognised assessment (such as BREEAM Communities)" (WDDC and WPBC 2015, 49) has been significant: "in response to our requirement for BREEAM Communities we tend to just get a buildings for life assessment" (Planning Officer, Weymouth). Interviewees recognised they are not equivalent standards, with BREEAM Communities having a much wider scope, but do not feel able to press the point: "when you get down to the matter, are you going to refuse permission if it hasn't got [a BREEAM Communities] assessment? No" (Planning Officer, Weymouth). Further, and similarly to above, it seems that defining a site as acceptable or sustainable through other means – through Building for Life or as a Key Site in the Local Plan (WDDC and WPBC 2015) – it weakened BREEAM Communities' authority to specify sustainability, and as such it's necessity for a planning application. Planners describe negotiations with planning applicants to that effect, with applicants asking, "if a scheme is acceptable … why do we need an assessment?". It is possible that the characterisation by

council officers of BREEAM Communities as a significant burden on planning applicants contributed to this concession. That planning officers at Weymouth "knew we were always asking a lot of the developers" likely has well understood connotations for the impact of appeals for a council in a "difficult position" (Planning Officer, Weymouth). This concern was not shared by planners in Eastleigh, who – with the help of a calculation comparing BREEAM and their own planning guidance – had determined that BREEAM Communities was "very easy to achieve" (Sustainability Officer, Eastleigh). These different characteristics defined by councils may have permitted Eastleigh to argue more effectively for BREEAM Communities' inclusion, and inhibited officers at Weymouth (and Bicester) from resisting developers' efforts to remove BREEAM Communities as a planning obligation.

Voluntary Adoption

For two cases investigated in this report, Case F in Lincolnshire and Case D in Chelmsford, Communities was brought into the project without being required by local planning guidance. Unfortunately, council officers did not respond to the request for interview, and this section is informed primarily by review of relevant documents and interviews with key project stakeholders. At Case F, problematization centres around the needs of the developer and project manager (who is also the assessor). BREEAM Communities was initially brought into contact with the project through the project manager, aided by her experience with the scheme. She was familiar with the scheme through her experience as an assessor and of using BREEAM in unconventional ways, as an educational tool:

> "We do all sorts of training and skills, we're just now city and guilds trainer for environmental sustainability, which I'm going to take the concept of BREEAM Communities and I'm going to and train people, use it as a mechanism, not to train in BREEAM Communities, but to train communities in sustainability, using the original objectives of BREEAM Communities. Filtering it down." (Assessor, Case F)

For the assessor/project manager (and with similarities to the other cases above), Communities represented a "robust" and impactful measure of sustainability and a procedure to successfully integrate sustainability principals into the design team. According

to the assessor, the developer's primary driver for the project was to "to regenerate a dying rural village" (Assessor, Case F), in which they have lived much of their lives. However, local planning policy limited development in small villages to "around 4 dwellings" (CLJSPC 2017, 10, 18) and further limited growth in Case F to 10% because of increased flood risk unless the applicant could show that the development was "promoted via a neighbourhood plan or could show clear local community support" (Planning Resource 2018). For the developer, therefore, BREEAM Communities seems to have been enrolled to provide two things; first, a process and set of principles by which a development could be designed to attract the support of the council and its neighbours; and second, a third-party certification that provides evidence that this process – and importantly the consultation requirements embedded within it – was performed to a high standard. Here, BREEAM Communities is therefore not problematized directly by a local planning requirement as in the other cases. Instead, the assessor has problematized BREEAM Communities as a solution to these local planning problems (as planning officers were shown to above). The assessor describes her thinking at the time:

> "I think I wanted to achieve something a little bit more robust for them than just a bespoke SA [sustainability assessment]. … the SAs that I've done typically … I go away and do the sustainability appraisal, but it never really gets into the other parts of the design team. It just sits there, and then it's that mop up thing at the end. … With this [development] being very much for the benefit of the community I thought I needed something that has a stronger impact with what the community is actually trying to achieve. *BREEAM Communities* is something that I came across just through general reading and thought, … "this is perfect". And because the community were also thinking of doing a Neighbourhood Plan, so I thought "excellent!" the two – one piece of work can actually inform the two processes. And the client was really engaged with what BREEAM Communities could offer; the fact that it sits there above everything and it is the starting point. So that's how that came about." (Assessor, Case F)

This is similar to our other case of voluntary adoption. Local planning regulations laid by Chelmsford require a BREEAM New Construction certification for new large buildings. At Case D, the person initially contracted to perform a this BREEAM New Construction certification was also a BREEAM Communities assessor. This assessor, supported by BRE as in other cases, successfully argued that BREEAM Communities should be adopted instead.

Initially, this seemed to be based on the cost savings for the developer in attaining one BRE certification for the whole site, rather than one for each of the proposed buildings (five residential blocks, an education and visitors' centre, and a printing press). This enabled them to address sustainability across the site rather than building by building: "one area of the site might not be practical to do one thing, but you can make up for it in another area of the site." (Project manager, Case D). That BREEAM Communities also overlapped with already existing plans for the development was also important. In this case, the development team problematized BREEAM Communities for the local authority.

Summary

This chapter has described the ways BREEAM Communities is incorporated into specific development assemblages by tracing the adoption of BREEAM Communities into local planning regulation and supplementary guidance (in the first section, above), and then (in this section) by following BREEAM Communities' introduction to development cases. This section It has shown that strong planning regulation seems to succeed in "implicating [BREEAM Communities] in the definition of this obligatory passage point" (Rydin 2012, 26) leading to relatively predictable adoption of BREEAM in a development context. In other cases, where BREEAM Communities is not adopted into the Local Plan, but in supplementary guidance the framework is vulnerable to resistance from competing standards for sustainability or competing concerns (such as the delivery of net additional housing supply). This equally applies where BREEAM Communities is weakly included in the local plan, giving anti-groups an alternative (less stringent) sustainability standard to rally around (in the case of Weymouth and the Building for Life 12 standard). The ability of a sustainability champion or "catalyst" to build support within the council also seems important in supporting the standard in these more marginal negotiations. At Eastleigh, the Local Plan was undermined (as at Weymouth) by an adverse ruling by the planning inspectorate. However, strong support from planning officers, who characterised the framework as both valuable and low-cost, enabled them to successfully negotiate for its inclusion even in sites that might have otherwise appealed. The council's co-ownership of one site is also shown to be a significant

actor in these negotiations to problematize BREEAM Communities. At Weymouth, there was no such support from within the council, and as such less resistance to the use of a less comprehensive standard.

In cases where BREEAM Communities is adopted 'voluntarily', the story of their translation differs. In these cases, the assessor's personal experience with BRE, BREEAM Communities and other sustainability frameworks was essential to its eventual introduction to the development project. It also seemed important that BREEAM Communities and initially supportive actors (the assessor and developer in these cases) were embedded in specific, stable local networks that could be co-opted in support of the standard. In particular, requirements in local plans that could be interpreted by assessors and developers as problematizing BREEAM Communities were significant. In both cases, the developers' on-going relationship with the site also seemed to support the standard (as with the council's co-ownership of the site in Case A). At Case D, the developer plans to retain ownership of the site. At Case F, the developer was also neighbours with existing and potential residents of the village and as such invested in the future of the development in a way 'traditional' developers may not be. Further, at Case F a nascent neighbourhood planning process was also used by the assessor to embed BREEAM further into local planning and consultation processes in the village. At the time of writing, plans were in place to use BREEAM Communities to frame neighbourhood planning activities, both providing evidence for the development through consultation and advancing sustainability within local planning groups. In both these cases, BREEAM Communities is not adopted directly because of the strengths set out by BRE (as outlined in Figure 18) but because the leadership of development actors and stable, local, already existing networks that BREEAM Communities could be made to fit within. The need for this combination (of a knowledgeable and committed development lead and particular local conditions) helps explain the limited up-take of BREEAM Communities in areas that do not have a clear planning obligation for the standard.

Chapter 7

BREEAM Communities at Work

Introduction

We have discussed BREEAM Communities' translation into specific planning and development assemblages: its problematization by local plans or sustainability consultants and its *enrolment* as a compliance document for the granting of planning permission and in some cases a way to achieve sustainability. Now we will look to describe its mobilisation in of a number of development cases. I will look to unpick subsequent re-translations throughout the development assemblage as BREEAM Communities is formed into new groups of development actors. In other words, the ways BREEAM Communities brings 'new' people, ideas, standards, elements of the site (and so on) into the development. Having been formally accepted as a necessary part of the development planning application, BREEAM Communities is now poised to be un-boxed, and individual criteria – which prescribe particular qualculative activities – must now be translated into project assemblages, into the work of realising a development. Most often, it is the assessor who has the task of integrating themselves into the project team, understanding the site constraints and emerging designs, and mobilizing the requirements of the manual to affect changes in the emerging development plans. This chapter describes BREEAM being introduced into the design team; the procedures, meetings, discussions that take place; how criteria are chosen and actors are problematized and compared to existing practice; how these new assemblages are mobilised to affect sustainability; and the barriers to this.

Making a Difference

This section described how the first move in the mobilisation of BREEAM Communities – it's translation into a nascent (or, if BREEAM arrives later, an existing) design team assemblage – has (at least) two overlapping parts. First, BREEAM's enrolment as an obligatory milestone in obtaining planning permission, which involves defining a development-specific version of BREEAM Communities as obligatory; and second, working to secure the resources of the design team, enrolling them as agents capable and willing to deliver sustainability as defined by the standard. There many similarities across cases in how this is achieved: In each case,

the assessor played some role in presenting criteria to the teams. Then specialists would "investigate the credit requirements" (Energy Consultant, Case A), comparing them to other requirements and site constraints. Lastly, some estimate of the criteria to be targeted by the design teams is made.

One of the central actors in these processes is the assessor. Not only is their involvement a contracultural necessity to submit a BREEAM assessment, the assessor also has important roles in facilitating this work and is recognised as an expert, being invited to team meetings and being permitted to give advice on BREEAM Communities and sustainability. In most cases where BREEAM Communities was adopted early, the assessor was invited to a preliminary team meeting, often the first full team meeting, comprising contractors, developer, and assessor. According to assessors, these meetings facilitate several key processes in a relatively discursive and open way:

- Introducing the standard to consultants and allowing questions to be asked, identifying early any tensions with existing ways of working within the teams and any lack of knowledge;
- Defining team members' roles and responsibilities, beginning the process of enrolling them as allies in delivering BREEAM Communities;
- Comparing developer and consultants' standards and local planning requirements to BREEAM Communities requirements;
- Identifying criteria that would be targeted in the design; and
- Building personal/professional relationships that would help influence decisions throughout the development process.

Each of these activities contribute to the problematization and enrolment of BREEAM Communities (criteria) in specific association with those that might implement the standard. In introducing BREEAM Communities to the design team, BREEAM Communities is explained and linked to planning requirements. Then, individual assessment issues are discussed. This is often the first time BREEAM Communities interacts with the project as individual criteria and their requirements rather than a monolithic framework. As noted above, this is also an

important part of problematizing BREEAM Communities and enrolling site and design specialists in the work of delivering the sustainability standard. This is well illustrated by the case at Case A. The assessor first introduced BREEAM Communities to the project team through a full-team meeting. There, the assessor explained the framework through:

> "[a] scoring chart … saying this credit here applies to this, this part to these consultants, this is what we need to achieve, [and asking] how are we achieving that? It was drawing [the design team] in around the design process to make sure we understood where we were going and how it applied to [our] product." (Assessor, Case A).

In the context of that meeting – legitimised by the client and project manager, her tools and experience – the assessor telling the consultants, "you must own these credits, you must tell me as a specialist what's possible what's not possible" (Assessor, Cases A and B[9]), problematises BREEAM Communities and enrols the design team in its delivery.

For all projects, the assessors seemed to introduce issues and criteria they "envisaged could be achieved" (Assessor, Cases A and B), which in each case was "normally all of them" (Assessor, Cases A and B), "basically … most of the credits" (Assessor, Cases C and E), and so on. As described in Chapter 5, the particular definition of sustainability assessed by BREEAM Communities in any one case is in a large degree defined by the specific criteria chosen for assessment and how they are interpreted. Criteria selected for assessment form part of the ensemble of actors able to influence the development; those not chosen are quickly forgotten by the design team and, with a few exceptions, play no further part in the development (except to turn up in the final assessment spreadsheet with a score of zero). Most developments studied required a score of 70% (a score of *Excellent*) to comply with planning requirements, except Bristol, which simply needed to pass (40%). As such up to 30% of criteria (or more) are potentially excluded at this stage. In many cases studied, the development team were seeking outline planning permission and thus an Interim Certificate. At this stage, Step 1, only mandatory criteria are required. However, in every case there was some discussion of non-mandatory criteria, with the assessor arguing (often successfully) it would save resources to address these early on and make decisions about

[9] Some interviewees worked on two development cases (A and B, and C and E). Where this report cites these interviews, the reference will refer to an individual case or both cases, whichever is most relevant.

those being targeted. For cases at a more advanced stage (Case D and Case B) or those seeking a full planning application (Case C) the process of selecting all criteria had taken place at the time of study.

Mapping Requirements

After this presentation, requirements set out in criteria were compared to local authority, county council, and national planning and building regulation and guidance. As one interviewee put it, "there are so many other documents we have to look at, I wouldn't say it was *the* document, but it was there amongst others." (Planning Consultant, Case B). They also compared these requirements to their own understandings of good practice or "the proper thing to do" (Energy Consultant, Case A), which often overlapped with criteria. Finally, the agency of the site and its ability to deliver on certain credits is also recognised by interviewees and forms an important part of these judgements. For example, the site is described as: a constraint owing to a lack of "wind resource" (Energy Consultant, Case A); offering options relative to urban sites ("most of the constraints that they are urban" (Energy Consultant, Case F); a barrier to consultation (because it "is something that is really difficult to get people to do on a greenfield site. On a greenfield site people don't have the experience of how to create a development out of nothing." (Architect, Case A)); and an opportunity to gain credits through its size and location ("If we were providing a housing development on the edge of an existing development we would have struggled to score." (Architect, Case A)), among other things.

> "On this topic, say, up to six credits, how many do you think you could realistically achieve and based on these criteria what is your stumbling block? And is it something that that site can't deliver? Do you draw a line and beyond that you can't get any more credits, because the site isn't within walking distance from a BREEAM acceptable bus stop, for example? It might be a very accessible site from walking or next to a train station but if it's not within a certain distance of a BREEAM compliant bus stop then it's, you kind of hit a brick wall, and that's as far as we can go." (Transport Consultant, Case A)

These comparisons greatly influenced the criteria targeted by the design team. Where there was overlap with other planning or site requirements, criteria were more likely to be targeted by the design team. Where such an overlap was not forthcoming or not clear, choices had to be made. Often, these choices focused around estimating the most efficient or cost-effective way of achieving the required number of credits. Where BREEAM was a planning obligation, an important consideration here was to identify which credits were necessary to achieve the minimum prescribed certification standard (70% in Eastleigh and Bristol, 55% in Chelmsford; Case F was also aiming for 70%). For most cases this was a central concern and there was sometimes considerable pressure on project managers not to exceed the minimum by too much; exceeding any minimum standard was considered an unwarranted cost or an "extra-over" (Energy Consultant, Case B).

> "cost is always a consideration. I was saying something to [the assessor] earlier that if I do get BREEAM *Excellent* as opposed to BREEAM *Very Good* my management is going to slaughter me!" (Project manager, Case D)

Sometimes, this pressure is less explicit and, for example is couched in terms of 'client ambition' and technical, practical limitations.

> "Their estimated score has dropped from 83, 84 down to about 77 at the moment. They don't want to get *Outstanding*; they want to get just over 70." (Assessor, Case B)

For Case A and Case D, a slightly higher threshold was set to allow a buffer, reducing the risk that unexpected reductions in score would be a barrier to planning permission. These thresholds were not formally agreed and often based on estimates about criteria most at risk. For projects part owned by the local council, this was due to a "whiter than white" (Developer, Case A) approach, according to the developer, which contributed to this higher target score.

In those cases where BREEAM Communities had been adopted voluntarily – Case D and Case F – there seemed to be less focus on getting to 70 and a greater focus on what *could* be achieved. These were also sites where the developer had a long-term stake in the site, either through continued ownership as in Case D or a long-term commitment to the village adjacent to the site, as at Case F. Moreover, in these cases, the developers were "very

sustainability focused" (Assessor, Case F). At Case F, the developer had employed environmental assessment schemes to their farming business and erected numerous wind turbines. At Case D, the religious conviction of the developer and project staff manifested itself as a care for the environment and passion for creating a sustainable development. Interviewees here were keen to share promotional videos and literature, with subsequent conversations indicating the developer and project manager drew a direct relationship between Christian beliefs, protecting the environment and the use of BREEAM Communities. Furthermore, membership of this international organisation also gave access to ideas from previous developments, guided by the same principles, and lessons learned from them. At Case D, the developer saw BREEAM Communities as one method by which to achieve this aim, which greatly altered the scope of developer ambition in both the number of credits that seemed achievable (including ones – such as rainwater harvesting – that all other cases had rejected as being unfeasible) and the interpretation of those credits' requirements. Comparisons to requirements and mapping against site constraints still occurred, but with different focus. Here, the 70% figure is present in discussions as a minimum but did not seem to strongly limit the calculation as above, with other concerns predominating. During these initial judgements, and throughout the development, the framework seemed to be used as a way to introduce sustainable design elements that also scored credits, not the other way around. This ambition or commitment to sustainability, combined with a long-term stake in the site, is a key factor in the seeming success of BREEAM Communities to influence the emerging site designs.

The Assessor

When introducing, mapping, and selecting credit requirements, as elsewhere, the assessors' role was not intermediary. They did not simply present the criteria as inscribed in the manual but played an active role translating the criteria to the project and its constraints.

> "you go to project meetings and you try and in a sort of discrete way vet the project as it is emerging and flag up to the design team if there's any pitfalls in the route they are taking. … I'm trying to keep a watchful eye on all the relevant criteria as the project develops." (Assessor, Case D)

This relies on an assessor's experience and their personal and professional judgements and biases. They begin to define how criteria will be viewed by the design team. For example, they may suggest "the most efficient or cost-effective way of … getting the right sort of points to satisfy BREEAM" (Architect, Case A). Two of three assessors said they discouraged the targeting of the Rainwater Harvesting criterion because it was often expensive to implement; another discussed how they repeatedly fought for higher achievement of energy credits (beyond what was necessary for certification) due to their professional belief in climate change mitigation as *the* issue. In another case, an assessor was more interventionist, deliberately estimating scoring in such a way that would steer a developer towards pursuing an issue they thought was important:

> "I feel it quite strongly that it would be quite wrong for the client to not go for SE06 at all: not have to meet that requirement, and still score *Excellent* and I've fiddled about with the figures to make sure that that's not possible." (Assessor[10])

Returning to the second 'source of uncertainty' presented in Chapter 3, there seems to be some ambiguity in whether BREEAM Communities is acting through the assessor to deliver BRE's definition of sustainability, or whether the assessor is being afforded agency to influence the development assemblage according to their own experience. (It is likely a balancing act with a great deal of overlap). Others used this role more passively to facilitate a breadth of discussion by presenting all options – "My advice to the client is 'these are all of the issues, these the ones that I think you can score credits in', and it's normally all of them." (Assessor, Cases A and B) – or setting out numerous ways to achieve the required 70%. This work is described in more detail by an assessor:

> "I'd – with a colleague – worked through the credits I envisaged could be achieved under the scheme. [We] showed [the design team] the assessment tool that was used and indicated that the credits were weighted and had to get to 70. … I'd worked through a couple of different scenarios of credits … [For example] if they could achieve five out of six on one [issue] but looked like they were going to struggle on others, how that would affect the scoring? I guess to give myself some confidence that they could do it for this site." (Assessor, Case C)

[10] I have chosen not to provide the case identifier to this potentially sensitive quote.

After the initial introduction, the role of the assessor changes. As well as informing teams of their responsibilities, their role in defining criteria expands and their experience gained from working as sustainability consultants and on previous BREEAM (Communities) assessments becomes more important. They come up with solutions to BREEAM Communities problems, as well as wider sustainability issues, they facilitate discussion and workshops, in two cases assessors have proposed ideas for potential innovation credits. This mediation is a significant factor where BREEAM Communities succeeds in changing the development (rather than simply recording what is already going on). Moreover, their experience is an example of a continuing theme of this report: exploring the ways that BREEAM Communities is mediated by association with more established development actors. In Chapter 5, we highlighted the need to connect it to existing planning problems; in Chapter 6, to planning permission; in this chapter, to the experience of the assessor, of consultants, and to existing sustainability standards such as CfSH.

> "You can't give BREEAM Communities assessment to a junior consultant. You've got to have the experience and understanding of the big picture stuff to be able to challenge things or suggest ways of doing it. You've got to have the people skills." (Assessor, Cases A and C)

> "the BREEAM Communities assessors were more senior in their organisations. They tended to be at the director level, so they were at a level that was much higher than it would be for a building [assessor]." (BREEAM Communities Scheme Manager)

As well as these people skills, in each case, the assessor also enrols numerous nonhumans to help enlarge, prescribe and stabilise this emerging BREEAM Communities assemblage. These can be as commonplace as an email or a project management tool, or as particular as the marking-up of the Manual highlighting requirements for a specific consultant or legal agreements. In each case, assessors have developed their own tools (often in the form of spreadsheets) to aid them. All assessors deployed some form of tracker document to record responsibilities, targets, and progress against those actions. The use of such a document is discussed in the training BRE provide to assessors. These helped incorporate BREEAM Communities into the project in two main ways. First, they broke down BREEAM Communities into familiar elements and linked them with established technical practices,

allowing assessors and consultants to agree upon, define, and record their roles; second, they made the outputs of these visible and provided a way to for the project manager to incorporate BREEAM Communities work with other project activities. These discussions and judgements facilitated by the assessor and their spreadsheets further contributed to enrolling the consultants and project managers in the pursuit of a BREEAM Communities certification. The complexity of the tracker spreadsheets and the extent to which other actors engaged with them varied. At Case D, not only were documents created to track individual credits and the consultants responsible, but they were integrated into project management tools for the development as a whole, including detailed time-plans with milestones, detailed meeting minutes, with separate BREEAM Communities meetings scheduled. This was a successful tactic which helped integrate BREEAM Communities into project processes.

Also important to the assessors' role was their relationship with BRE and ability to both speak on behalf of the organisation that would ultimately provide the certification (necessary for planning permission) and to negotiate with them. One way this manifested itself was the way assessors used likely (or imagined) judgements by BRE on issues to defend or promote more sustainable design decisions. This was not only used by the assessor, but was also valued by other design team members defending design decisions: "it was useful to go back to the client and say … you need to provide this and this is over and above potentially more than what you would normally provide." (Project Manager, Case A). The assessor could also use their relationship with BRE to negotiate flexibility in the definition of criteria if they seemed unachievable. This seemed to be more common on sites that were small and/or rural. For example, at Case F (both small and rural) the assessor negotiated that a credit for Access to Public Transport (BRE 2012, 106) could be achieved even though the development could not comply fully with its requirements: "in these very isolated rural areas we aren't going to get buses every half hour … [BRE] were good about that, they said they'd be flexible" (Assessor, Case F). It was not only where a project could not deliver due to site or development constraints that prompted this flexibility, but also where a lack of resources meant adherence to the standard could not be calculated. This occurred most notably in the delivery of energy strategies where methods could not be

agreed for making unfamiliar calculations, around unregulated energy consumption for example. Here also, BRE and the assessors seemed flexible in their interpretation of the standard.

Conversely, BRE and the assessors also rely on the design team to interpret the criteria using their own specialist knowledge. As described in Chapter 5, Communities relies on "suitably qualified" technical specialists to produce evidence for certification, and as such help to locally define the level of sustainability that is being assessed. In several interviews with assessors, they stated that they "were not the experts" and deferred often to these technical specialists. However, they also seemed to defer to other definitions of good practice, such as the Local Authority, as described by one assessor:

> "BRE take a pragmatic view and best practice is defined as what's required as a minimum by the local planning authority. That's not quite true. It's a moving feast. Code level 4-5 is considered to be industry best practice at the moment. Not the highest it could go to but it's best practice. That is a bit woolly, yes." (Assessor, Cases A and B).

Such interventions by various actors with competing claims for defining acceptable adherence to criteria seem to occur throughout and contribute to the overall definition of sustainability that is certified at the conclusion of the project.

This initial problematization through team meetings, interventions by the assessor, and the selection of criteria are key processes by which BREEAM Communities begins to make a difference to the development, problematizing and delegating agency to 'new' actors (i.e., those that would not otherwise be part of the developing design) or linking standard practices together in new ways. These calculations and judgements are important in defining certain criteria (and the sustainability issues they encompass) as a necessary part of the development process. The assessor was key in this. A theme from these interviews is that BREEAM Communities requires consistent work from the assessor to be successful (and even then, it may not be enough).

> "From my part, if I had to do extra work in order to satisfy credits for example, she'd advise me … She was the person running it on the ground and we were doing what we were told in all honesty." (Architect, Case B)

The project manager (who may be an external consultant or employed within the developer's organisation) is often also enrolled as a facilitator of the BREEAM Communities process. Project managers could become valuable allies to assessors (as in Case D, where the project manager sponsored numerous key meetings and other activities) or be unreliable in their support (as in Bristol, where success or failure of the wider project was a more pressing concern). This work of explaining the framework, distributing responsibility, calculating scores and scenarios, chasing and checking up on consultants, suggesting solutions, and so on was important in each case to BREEAM Communities' implementation at this stage.

New Work

It is worth reflecting here that a key outcome of the above -- the set of calculations and other activities to initially select possible criteria and being to distribute BREEAM Communities through the development -- is to connect a planning requirement to achieve a BREEAM Communities certification with individual consultants and elements of the developing design. In tying criteria to site-specific matters of concern and giving responsibility to professional consultants, the criteria are imbued with agency delegated from the OPP of 'gaining planning permission'. This enables a criterion and the actors it assembles (as part of its own technical requirements) to enrol/be enrolled in a consultant's practices and design procedures. As criteria are decided upon, some are problematized as issues for the design team to include within their scope and others are excluded from participating further in the development. BREEAM Communities begins to be distributed across the development assemblage. For those newly opened *matters of concern*, these interactions were also an opportunity to begin to enrol development actors, both human consultants and nonhumans (often generalised by interviewees as 'the site', regulations, or 'what-we-are-required-to-do/look-at'), as active agents for mobilising BREEAM Communities. These areas of concern – sometimes 'new', sometimes expected (e.g., in the case of flood risk assessments or energy strategies) – are then the basis for further defining BREEAM Communities for that particular site and further enrolling new actors and groups

into the development assemblage. This represents one of the most visible ways BREEAM Communities changes the work of the development team and contributes to sustainability – by opening up avenues of 'new work'. There are moderate, though not dramatic, numbers of examples of this "work that needs to be done [to realise a BREEAM Communities criterion]" (Transport Consultant, Case A) being additional to what interviewees considered standard, or good practice – interchangeably used to describe what they asserted they would do anyway. Some examples:

> "I think **Economic Impact** was something that we wouldn't have covered … The other one that does spring to mind was an **Energy Strategy** … I think the main trigger for commissioning it was a separate report was BREEAM Communities and we did commission that as a direct response to this." (Developer, Case A)

> "I think a number of the credits for **public consultation** required additional workshops so that's something they probably wouldn't have normally done" (Architect, Case B)

> "One of the requirements is to make a **formal consultation plan**. Although we would have done something on a normal application it wouldn't have been anything near what we ended up preparing for Case A." (Project Manager, Case A)

> "The outline **energy strategy**. There were elements within there that were directly linked to BREEAM Communities. … That might be a good example of specifically where they went beyond what otherwise might have been asked for by Eastleigh under the planning element (Project Manager, Case B)

> "I think it's a good checklist to make sure you cover all the issues and master planning. The **green infrastructure** one: it wouldn't typically look at how you can enhance the wider community and tap into that." (Landscape Architect, Case A)

An exhaustive survey of additional activities was not undertaken as each project was at different stages of development and access to the cases was uneven. However, common additional tasks, issues, activities reported by interviewees included: expanding lighting and energy strategies beyond the building fabric, economic and skills analyses, expanded or more formal consultation plans, the linking of strategies (e.g., joint ecology, landscape, and

heritage strategies), green infrastructure, agreeing walking, cycling, and bus links and improved transport infrastructure (such as bus stops).

This new work did not simply add additional elements for specialists to consider, but could change the way they approached an activity, sometimes permitting them to go on and further influence the development. In other words, criteria were sufficiently stabilised and afforded agency that they themselves could mediate the development process, further problematizing other actors. For a landscape architect, this meant that not only did issues such as "a commitment to native planting", "excavated site materials", and the ecology strategy became part of their scope of work, but BREEAM Communities also permitted him to "stop and rationalise where you are and why you're doing it" (Landscape Architect, Case A). Instead of doing things

> "just … because it's good practice … having [the landscape strategy] as a separate section empowered [them] to pull away from the site and look at the strategic enhancements in the scheme and how that fed down to specific elements on site. It helped structure the landscape strategy." (*ibid*)

This meant working more closely with the ecologist and masterplanners, having concern for "biodiversity and climate change" (*ibid*), and making sure they were "consulting with the right people" (*ibid*). Consulting with the right people, including other members of the design team is an important way 'new work' manifests itself: through strengthening or (marginally) modifying interactions between existing actors. Interviewees described this as breaking down "silos", "formulating collaboration", "integrating" plans and so on.

> "what I think the BREEAM Communities element did do was help formulate collaboration with the other consultants to make sure that there was a kind of consistent approach to the master plan; we were all looking at things individually but there was a collaboration" (Landscape Architect, Case A)

The specific requirements of BREEAM Communities often guided this collaboration, requiring (through specific requirements to produce joint strategies), encouraging (through cross-team discussions of sustainability issues) and/or permitting (through presenting a strategic approach that empowered others to do the same) consultants to be brought together around elements of the site that may have previously been the domain of one

consultant. For example, excavated site material becomes a concern of the sustainable buildings and transport consultants and landscape architect:

> "re-use of materials in the public realm, which meant he had to go away and talk to the landscape architect, but as an engineer/sustainable buildings type of person he'd be more used to thinking about re-using materials, tarmac, aggregate, things like that on the site. Rather than thinking about other types of materials that could be used in an artistic way." (Assessor, Case D)

Similarly, rainwater becomes a concern of both the utilities consultant and flood-risk engineer when rainwater harvesting is designed:

> "the water strategy was very much about water usage, water consumption but it needed him to work with the guy who was doing the flood risk assessment and management to look at how they could do rainwater harvesting and re-use the water across the site. So, I think for him it was a set of dialogue that he had to do but hadn't necessarily had to do in the past" (Assessor, Case D)

Going Further

That BREEAM Communities succeeds in making visible and enrolling (some) new actors or forcing a different view of those already within the development assemblage, is important and essential to any standard that wishes to have an impact. However, an actor can easily be 'taken into account' and at the same time denuded of its ability act. We saw this in the previous chapter where (admittedly weak) representations against BREEAM Communities' inclusion in planning permission were formally 'taken into account' through a formal consultation that easily allowed planning officers to dismiss as "the usual thing" (Sustainability Officer, Eastleigh). During development, this manifests itself as issues are 'paid lip service' to, changing the wording of reports to include reference to the standard, but not seeming to influence the design in a meaningful way (as discussed in the Difficulties section below). Where BREEAM Communities seems to make a difference then, is when its requirements themselves become mediators in the design process in their own right. In other words, when a BREEAM Communities requirement is delegated sufficient agency

through the qualculative processes described above – along with the surrounding ensemble of assessor, consultant, planning requirements and so on – to permit it to translate further 'new' actors. Actors which recognize and enact BREEAM Communities as the/a cause for their inclusion and a source of their agency. This is often the case in Step 1, where BREEAM Communities directly requires a new strategy, report or survey to be undertaken, which in some cases requires the hiring of a specific consultant who has a specific role in creating a BREEAM Communities compliant strategy. At Case A, for example and according to design team meeting minutes, the energy consultant was hired at that time as a direct consequence of the BREEAM criteria. In other cases, the criterion requires the assembling of data or stakeholders, which in turn in its formation translates further actors. For example, an economic study, an energy strategy, or a consultation strategy and associated activities. The latter is possibly the most significant aspect of this sort of mediation.

Consultation is a good example of these newly problematized actors giving agency to further actors. In each case it seems that consultation was expanded beyond that which interviewees might have expected without the interference of BREEAM Communities. At Case F, this expanded consultation was a core reason for using the standard due to planning conditions imposed on the development and a highly emphasized feature of the design process. This is significant in the context of increased interest in consultation by local and central government planning departments (as the Localism agenda and Neighbourhood Planning suggest). The stated aim of consultation in BREEAM Communities is "to ensure the needs, ideas and knowledge of the community are used to improve the quality and acceptability of the development throughout the design and construction process." (BRE 2012, 26). To achieve this, as described in Chapter 5, it sets out several procedures to govern the translation of "the community" (*ibid*): local publics that until that point are not considered in the development as a source of "needs, ideas, and knowledge" (*ibid*). As above, these new actors can be minimised. Alternatively, they can be given agency through consultation procedures to influence decision making. The latter seems to occur in at least some of our cases, as described by an assessor below:

> "You've got so many credits for holding a public event. But, if it's also a workshop where Joe Public can actually sit down and ponder over your

> drawings and doodle on them … it takes it from people just coming and looking at a display and going away again to an event where all attendees are asked to fill in a feedback sheet and invited to please meet one to one with a member of the project team, the design team: "let's look at your concern on paper, this is the way we've proposed but if you have a concern, please mark it up". We have a collection of masterplans of all those four events and some 200 feedback forms, where people actually gave us concrete ideas." (Assessor, Case F)

"Joe Public" is enrolled from a passive actor, "looking at a display and going away again", primarily valuable as data for a statement of community engagement, to an agent capable of "concretely" intervening in the design. Similar stories are told at Case A, Case D and Case E. At Case F, this transformation is more apparent than in other cases, but each produced similar examples of specific changes to outline or detailed designs due to expanded consultation exercises, often contained within summaries of events and changes in Design and Access statements (often the key document summarising BREEAM Communities evidence requirements). This agency is supported by the mandatory criteria in the manual and credits available for holding a workshop and by further credits available for activities such as "[engaging] the communities on specific aspects of the design" (BRE 2012, 26) and guided by links made by the assessor and Manual between design issues and the need for consultation.

Step	Issue
Step 1	GO 01 - Consultation plan SE 02 - Demographic needs and priorities SE 03 - Flood risk assessment RE 02 - Existing buildings and infrastructure LE 01 - Ecology strategy
Step 2	GO 02 - Consultation and engagement GO 03 - Design review SE 06 - Delivery of services, facilities and amenities SE 07 - Public realm SE 11 - Green infrastructure SE 12 - Local parking LE 05 - Landscape
Step 3	GO 04 - Community management of facilities SE 14 - Local vernacular SE 17 - Training and skills TM 05 - Cycling facilities TM 06 - Public transport facilities

Figure 17 Issues with links to consultation, BREEAM Communities Manual (Reproduced from BRE 2012)

Bringing Forwards

As well as bringing 'new' actors into the development process, BREEAM Communities also influences a development by mobilising existing actors earlier than might have otherwise been the case. Interviewees, especially those with a strategic position (e.g., planners, assessors, project managers), often described BREEAM Communities in this way, for example:

> "It is more a holistic assessment procedure to guide the very early stages … I think Communities does a very good job at making people think about all the early things that they should be doing, which then helps it later on." (Assessor, Cases C and E)

> "it does focus minds on the issues that are covered by BREEAM Communities early on and that's really good. I wouldn't say forces developers, but it probably does! To actually think about these things early on and reminds us to do that too." (Planning Officer, Eastleigh)

There seems to be two main ways by which BREEAM Communities changes the timing of work. One, by designating an issue as a mandatory criterion, thereby tying that issue to the achievement of outline planning permission. This then requires work to be done in advance of that milestone that might otherwise have been left until afterwards. Two, by identifying the links between issues in Steps 2 and 3 and those (mandatory) issues in Step 1. These elements are thereby made more visible, sometimes prompting preparations for this future work. This can be strengthened by a planning requirement or work by the assessor.

The obligation to achieve the Mandatory Criteria – necessary for the interim certificate and thus associated strongly with obtaining planning permission – is important. Often, this can result in significant work being undertaken at an earlier stage. In these cases, this was due to the requirement from both Eastleigh and Bristol councils for an interim (mandatory) certification to be part of the outline planning application. Not doing this work put development's BREEAM Communities certification "under threat". The examples described by interviewees were often small changes, for example, negotiating a "hard start point for the employment land phase" (Assessor, Case B) before outline planning rather than

afterwards, or digging additional, early boreholes. Sometimes, however, mandatory criteria brought forward the delivery of significant portions of development strategy, for example:

> "Developers want to spend as little as possible. So, what's been good about this [*BREEAM Communities* development] is that I think it's pushed people to do things they weren't going to do. So, the best example is ecology. So, with ecology … there was going to be a basic baseline survey and that was it. **There was going to be no mitigation plan, no enhancement plan at all.** Not that they wouldn't have done it on the site eventually, but this developer wasn't going to do it. But the Communities requirement because it's mandatory forced them to do that. (Assessor, Case B)

In some cases, work required in Steps 2 and 3 was prepared in earlier stages of development. Assessors promoted this as a way to increase the ease of achieving those Criteria later. They tended to make little distinction between Step 1 and Steps 2 and 3 in their introducing BREEAM Communities to the team. They also highlighted (sometimes literally, as in the figure below) the links between criteria and benefits of thinking about later criteria early. At Eastleigh, an estimated final score was required at outline planning, which was used by assessors there to promote this. In some cases, this work had already paid off at the time of interviewing, "Fortunately, as part of the outline design we had to have a lighting plan to look at light spill for ecological reasons so if we didn't have that I think it would have been really challenging." (Energy Consultant, Case A)

Step 1	Step 2	Step 3
Governance		
GO 01 – Consultation Plan	GO02 - Consultation and engagement GO03 - Design review	GO04 – Community management of facilities
Social and economic wellbeing		
SE01 – Economic impact	SE05 – Housing provision	SE14 – Local vernacular

SE02 – Local demographic survey SE03 – Flood risk assessment SE04 – Noise pollution	SE06 – Delivery of services, facilities and amenities SE07 – Public realm (shared street space and home zones) SE08 – Microclimate SE09 – Utilities SE10 – Adapting to climate change SE11 – Green infrastructure SE12- Local parking SE13 – Flood risk management (inc storm water drainage and SUDs)	SE15 – Inclusive design SE16 – Light pollution SE17 – Training and skills
Resources and energy		
RE01 – Energy strategy RE02 – Existing buildings and infrastructure RE03 – Water strategy		RE04 – Sustainable Buildings RE05 – Low impact materials RE06 – Resource efficiency RE07 – Transport carbon emissions (*Travel Plan*)
Land use and ecology		
LE01 – Ecology strategy LE02 – Land use	LE03 – Water pollution LE04 – Enhancement of ecological value LE05 - Landscape	LE06 – Rainwater harvesting

Transport and movement		
TM01 – Transport assessment	TM02 – Safe and appealing streets TM03 – Cycling network TM04 – Access to public transport	TM05 – Cycling facilities TM06 – Public transport facilities

Figure 18 A table used by an assessor to delegate responsibility to a transport consultant, showing mandatory (red) and relevant issues (yellow). Tools like this helped problematize later issues before they would have otherwise been considered

This sometimes clashed with project timetables. Developers often wanted to withhold work until after an outline planning application is granted to minimise expenditure on a site at risk of not being granted permission (one that they might not yet own, if subject to an option). Further, in at least three cases, the develop was seeking outline permission to sell on the site for the next stages of development. The certification of the Interim certificate and completion of mandatory criteria are bound up into a single, transferable assemblage with the site and conditions of outline planning. They had a further motivation to delay work, minimising these constraints on the site to maximise the sale price. Mandatory criteria directly confront this logic and interviews suggested this was a concern for developers. And indeed, in the one case that was preparing to sell at the time of investigation 'preliminary commitments' made due to BREEAM Communities were raised by prospective buyers. However, it is unknown what the impact of this was on onward sale. What is known is that this transferable assemblage did succeed in mediating the next phase of development in some cases.

> "the planning conditions from the outline [planning application] … stated that we had to achieve a BREEAM Communities *Excellent* rating. … there was already a scoring structure in place that we were able to look at and try and understand." (Architect, Case B)

In this mediation, these actors also contribute to the simplification and interpretation of BREEAM Communities criteria to a relevant action and site-specific vocabulary. During those early meetings between assessor and consultants, the Manual is discussed in context with the development. The outcome of this meeting is recorded in a simplified way on a spreadsheet, on which the credits the masterplanner (for example) has responsibility for are

highlighted (as shown in Figure 21). Later, when the masterplanner is compelled to work on the plan, this spreadsheet is enrolled, along with other nonhumans, standards, old plans, intermediaries for human actors like emails, and so on, and the tacit and explicit knowledge he has. The spreadsheet thus contributes a mediated version of the knowledge-claims and requirements inscribed within BREEAM Communities. This version of BREEAM Communities that the consultant sees only contains a handful of simplified criteria. The criteria for 'adapting to climate change' becomes "tree positioning / overcoming heat island effect"; RE 06 Resource Efficiency becomes "in shorthand … excavation on site will be reused … for landscaping" (Assessor, Cases A and B); SE 07 Public Realm becomes "shared street spaces and home zones". The manual does not often seem to re-enter this assemblage until the assessment. In other words, it seems that early on, criteria are simplified and specified as site-relevant technical problems. Once the design work is done, the more detailed requirements are retrospectively checked to see if it complies with BREEAM Communities.

Further, when a BREEAM Communities requirement succeeds in mediating in this way, it is often aided by nonhuman actors that define and stabilize that agency the assessor (and others) worked to establish. Legal instruments such as Section 106 agreements or quasi-legal 'letters of commitment' written to councils are important due to their established relations with obtaining planning permission, although there did not seem to be agreement by assessors or councils on the best way to employ them. These letters summarised commitments made by developers in complying with Step 1 criteria – many of which require that later work be influenced by the studies, reports, and plans generated for Step 1. By inscribing these in a letter to the council to be considered in planning decisions, these documents and the actors they represent are linked to future development assemblages. (which are often populated by different development actors when the sites are sold to contractors who will build out the homes – as was the case at Case B and Case A). Interviewees also ascribed importance to various reports, public posters and presentations, internal memos and minutes in "locking in" requirements. Assessors described work to provide "further, more explicit text" in reports that would be part of the planning application. Figure 21 shows how simple tables and emails were used to define the roles of consultants, which once agreed to were difficult to regain on. Contracts between developers

and sub-contractors also played this role, both as an artefact around which work was organised and to stabilise the outcomes of that work. For example, requirements to provide an agreed number of apprentices were negotiated in the context of the viability impacts of various clauses in a sub-contractor's contract with the local authority, assessor, and sub-contractor at Case D. The results of that negotiation were then inscribed into that contract. These links between the phases of certification aid BREEAM Communities continued implementation after planning permission is granted.

> "the outline planning application the design was really good … and the consortium haven't been able to disrupt it. They've done a bit of tweaking and they've added in a few extra homes, but they've been stuck with this nice thick woodland boundary and green spines going through the site, they haven't been allowed to get rid of that." (Assessor, Case B)

Difficulties

"Interviewer: did you ever look at BREEAM Communities or the assessor's spreadsheet when working on the design?

Architect, Case A: No."

Although BREEAM Communities is an assessment tool, its users, the literature and BRE (BRE 2013) often see these frameworks as a way to improve sustainability. The above sections document where BREEAM Communities seemed to make a difference in defining and mobilising aspects of sustainability that seem – in often subtle and nuanced ways – to improve emerging development plans. However, despite the best efforts of planning policy, assessors, sensible and clear criteria, and so on, BREEAM Communities often failed to significantly impact the emerging development reports and plans. This section explores the ways BREEAM Communities was hampered in its attempts to integrate sustainability into the design process.

Overlap

In contrast to the combative language often used in ANT literature (that of 'obligation', 'resistance', organised 'anti-groups', and so on) this resistance often comes in the form of absences or weakness: absence of action, of knowledge, of procedures, of data, and so on. One clear absence is where BREEAM Communities overlaps wholly with existing practice, requirements, or more generally 'what would have been done anyway'. As described above, this comparison with existing practice is central to BREEAM Communities' initial problematization. Interviews suggest that where there is overlap, BREEAM Communities seems mostly unable to problematize itself as *the* important standard and that other requirements take precedence. Here, there was an emphasis by interviewees (from non-voluntary cases especially) on BREEAM Communities as a "compliance document" (Project Manager, Case B). This often meant identifying where evidence for complying with the assessment framework already arises in the emerging designs. This seemed to be a familiar exercise or consultants used to working with numerous competing constraints and presented as a sensible approach for those looking to minimise project costs. This framing by interviewees sought to emphasise the similarities between BREEAM Communities and standard practice. As one assessor noted, "it's not going to change the timetable and it's not going to change how the project is set up" (Assessor, Cases D and E). This seemed particularly apparently in cases in Eastleigh, where, as discussed in Chapter 6, following Eastleigh's planning guidance could lead to a project scoring 67% of BREEAM Communities criteria (according to analysis by the local authority). This large amount of overlap seemed to contribute to the marginal impacts attributed to BREEAM Communities.

Access and Hard Work

The degree to which assessors were supported by the developer and had access to consultants seemed to be a factor in how much BREEAM Communities was able to influence development actors. In some cases, for example at Case D, regular meetings between the assessor and project manager we set up and regularly attended. Moreover, BREEAM Communities was integrated fully into project management tools and design team meeting

agendas, enrolling these more established processes and events (and their attendees) in the mobilisation of the standard. This also provided a forum for the assessors' concerns and ideas to be addressed. In other cases (e.g., Case A), this forum took the form of full-stakeholder meetings (where the assessor, the design team, council officers, and so on would discuss the project) and team meetings (where the assessor's participation was more *ad hoc*). In other cases, however, (e.g., Case B, Case E and Case C) this level of integration was not achieved, and the assessor primarily related to consultants at occasional BREEAM specific meetings, on an individual basis, via the project manager, or through email and telephone. To a greater or lesser extent, in all cases BREEAM Communities needed consistent work – often by the assessor – to maintain its place in the development network. However, in the latter cases, it seemed to be particularly difficult to establish and stabilise BREEAM Communities as important. Without the support of formalised processes, the assessors' phone calls and emails could simply be ignored, or meeting invites not sent.

> "my impression was that it was constantly a bit of a battle by [the assessor] to get people to co-operate. [When they did co-operate, it] would help her, but [it occurred] in a way that the various consultants really couldn't be bothered about." (Planning consultant, Case B)

And when at meetings, BREEAM Communities often seemed to be of relatively low priority:

> "the design team probably have a long list of things they want to talk about, and they've only got an hour and a half … So, I'd just chip in and say, you've got to do that, or if the opportunity to do that differently so you can score these extra credits. That's how it works." (Assessor, Cases A and B)

Further, *even* in cases with good integration, where assessors were routinely involved in meetings and were able to contribute to design discussions, to "chip in", they were sometimes limited by a lack of access or information, for example:

> "Assessor (Case D): I noticed in the original planning application it's got approval for visitor centre. Now having changed the master plan –
>
> Project manager (Case D): Let me show you what's going on.
>
> A: Which area is now defined as visitor centre please?

> PM: I can't send these through because they are just internal documents, but I can show you [on the screen] what's happening in that central building. So…"

This innocuous exchange at a BREEAM Communities meeting shows that the assessor, a) does not have access to all potentially relevant documents and b) does not have a full understanding of the project (and is only aware of a major change to the design because he happened to notice the change in the public planning documents). This was a project where the assessor had good and regular access. This raises questions about the level of access the assessor has and requires to adequately assess and guide these developments. In the above example we can see an openness on the part of the project manager to share information, however, in other cases there were some suggestions of attempts to deliberately hide information from assessors: a half-joking request for "BREEAM people [to] cover your ears" at a team meeting, assessors asked to leave meetings half-way through, to reports written in deliberately overly-technical language in attempts to deceive assessors of a lack of evidence are some examples (as interpreted by assessors interviewed).

Here, a distinction between smaller and larger sites can be seen. Broadly, in the larger cases (for example, Case B or Case A), the assessor attended design team meetings regularly, providing on-going opportunities for the above activities. On smaller sites, a full design team meeting may take place only once or not at all. These meetings are a key site for the translation of BREEAM Communities and the assessor into development assemblages, and this lack of opportunity goes some way to explaining the (often) more limited influence of BREEAM at smaller sites. Further, collaboration on cross-cutting criteria is likely to be much less developed. This lack of contact and 'siloed' working is described by an assessor:

> "I go to some meetings. … both schemes are fairly small, [200] something homes at Case C in the end. Case E is only [100] homes. In terms of the design team it doesn't necessarily meet, perhaps because they think there isn't such a strong need in the same way as you might have in a really big, perhaps more complex, site. Not that these sites don't have their own complexities, but they are probably dealt with the individual specialists in a more siloed way." (Assessor, Case C and E)

Retrofitted

For some cases, this lack of integration seemed almost complete, with BREEAM Communities considered separate or being retrofitted by the design team. One factor in this seemed to be the timing of adoption of the standard. This endorses the BRE's own claims, that "to get the most benefit from using BREEAM Communities it is important to appoint a BREEAM Communities assessor early in the project" (BRE 2012, 7). Many interviewees agreed with this assessment.

> "From the outset we impressed on [the developer] that the key to success was getting on board right from the outset. Attending project meetings, so the BREEAM assessor knew what was going on, what was ticking over in the design team, and got wind of any changes in good time" (Assessor, Case D)

> "it's best to be brought in from a very early stage by the client or the lead consultancy. To be able to brief the team as to "this is what I need from you" and the BREEAM process fits into the project timetable. That fits really well." (Assessor, Cases A and B)

For BREEAM Communities, where many early (Step 1) criteria require the delivery of assessments or strategies that (ideally) go on to inform the design, late adoption instead sees design teams seeking out evidence from assessments already made. This late timing is not necessarily in BREEAM's initial introduction to the project, but when it is integrated into development assemblage. In the case of Case B, BREEAM Communities is certainly brought on board late, but the lack of integration also comes from an unwillingness or inability to change existing, obdurate processes. The lateness then serves to make this more difficult as decisions are stabilised.

> "a large part of the problem was that BREEAM Communities was being retrofitted. The process was already being carried out, it went through the developer's normal process and this was an extra" (Planning Consultant, Case B)

Similar experiences are described by interviewees from Case E, where despite being "on board fairly early" (Assessor, Case E), BREEAM Communities was deemed less important than other aspects of the design and as such is retrofitted because of "other pressures" (*ibid*), not the initial timing of adoption. In this case, such was this resistance to BREEAM

Communities' influence on this case, that despite the relatively early adoption BREEAM was only being integrated into development processes after the planning committee has granted planning permission.

> "it's a slightly messy process in that there is sometimes the interest and the will, but because of other pressures that falls away. … I would get responses to my emails saying, "I'm reading your emails and I will get back to you", essentially, and then in practice what's happened is that [they've meant], "now we've got [the planning] committee out of the way, I can really tend to what you need". Which really isn't the way obviously it should work at all … I'm quite pragmatic about it now, not that I'm accepting of that, but if I was starting out, I would be extremely frustrated thinking, how is it going to work properly? Perhaps I'm just happy that particular design team member has come back to me … I guess there's a slightly retrospective element unfortunately." (Assessor, Case E)

Moreover, in the case above, despite being a planning obligation, the planning committee were not concerned with BREEAM Communities. Correspondence with planning officials at Eastleigh Council and analysis of council and parish committee meeting minutes (where BREEAM Communities was not mentioned) supported this in BREEAM Communities' absence. Those promoting BREEAM did not succeed in defining BREEAM Communities as important to this part of the planning process. BREEAM Communities was not enrolled to help the development pass committee and therefore had no agency to influence the design process and was easily left out of discussions leading up to Committee, to the frustration of the assessor. In other cases, this also extended to the unwillingness of the Local Authority to change their procedures to meet BREEAM's requirements: "things like in ecology – the local authority signing off their work before the planning application goes in … actually that just doesn't happen, and [the ecologists] are really struggling. (Assessor, Case F). However, there were also examples of the local authority taking a proactive approach, for example at Eastleigh where "They've got a major development team … pushing us to adopt BREEAM Communities early on" (Project manager, Case A). In sum, despite in most cases being translated through a planning requirement (defining BREEAM Communities as a necessary requirement) it often requires more work to enrol it in specific planning and project processes. Where these are already underway or support from local authority planners or

committee members is limited, this can disrupt assessors attempts to embed BREEAM Communities within development processes until after key decisions may have been made.

Knowledge and Experience

Another factor that seems to have weakened BREEAM Communities' ability to act is a lack of knowledge or experience (or know-how) by project teams. Despite the effort to enrol BREEAM Communities into specialist consultants' practices and distributing BREEAM Communities throughout the development assemblage it was not the case that BREEAM Communities was always (or even often) well integrated into consultants' ways of working or that they had a good knowledge of the criteria or issues.

> Interviewer: "So you didn't have an in-depth knowledge of the criteria or the notes?"
>
> Planning Consultant (Case B): Not at all. And again, [the assessor] and her colleagues did send us quite a lot of stuff through but because it was long, it was involved – probably not too complicated but involved – people, me, others, were reluctant to spend much time on it. And it soon became clear I think that [the developer] were of a similar opinion.

The above discussion was typical, with few specialist consultants admitting to having a good understanding of the framework. During interviews, Code for Sustainable Homes (CfSH) was often brought up as a comparative example by interviewees as a standard they were familiar with. For CfSH, interviewees described having the knowledge and experience to "put forward guidance" to developers of "unusual schemes", and many interviewees had "typologies", "standard practices", or "best practice compliance documents" aiding them in their application of Code. These pre-existing assemblages (or communities of practice (Lampland and Star 2009; Lave and Wenger 1991)) do not seem to exist for BREEAM Communities. This lack of well-developed processes, knowledge, practice seems to lead to BREEAM Communities requirements being "added in … as and when they appear" (Developer, Case A) to otherwise standard procedures. This mirrors findings from studies of BREEAM New Construction (Schweber and Haroglu 2014). This lack of know-how limits how far criteria are actually engaged with as contributing to design and development decisions.

Instead, BREEAM Communities seemed to be approached in a more *ad hoc* way: "it's almost finger in the air stuff really" (Planning Consultant, Case B).

Those who did have good know-how were those who had worked on previous projects (two interviewees had worked on multiple Eastleigh schemes) or had an interest in sustainability (such as the assessor for Case F). Interestingly, experience with other BRE schemes did not necessarily seem to help, as exemplified by an experienced assessor:

> "for a normal interim assessment for a normal BREEAM project … we would help them with their specifications and make sure that all that contractually would be in place. … something like, in the concrete spec. you'd make a note that it has to be BS6001. And you'd see a draft and make comments on it or give them some sample clauses. **We'd normally do that for normal BREEAM except we don't have a clue for Communities**." (Assessor, Cases C and E)

Previous experience of BREEAM Communities was, in some cases, identified and brought to the development by assessors who shared it as a resource to be deployed in decision making. For assessors working in Eastleigh, this meant the project could build on previous experience by sharing documents summarising lessons from a previous project in the borough and discussing them with the team. This was also used by the assessor and design to in identifying where previous projects had fallen short. In other cases, where direct experience of BREEAM Communities was not available, know-how was adapted from experience with other similar work. This applied both to their own knowledge and that of other team members. All assessors had some experience of urban sustainability, all identified as experienced project managers, and all had worked with BRE schemes before. This experience was described as important by interviewees for influencing design decisions and doing the difficult and sometimes frustrating work of integrating the standard into the development process ("You can't give BREEAM Communities assessment to a junior consultant" (Assessor, Cases A and B)). Above, we discussed the tools that assessors develop and enrol to disperse and stabilise BREEAM Communities in the development assemblage. These tools also formed part of this assemblage being developed by each assessor and sometimes tailored to the case in hand (as with Case D, where the assessor adapted the tool to use a similar format to the other project management tools). As well as through

professional experience, the role and characteristics of 'the assessor' are constructed in part by BRE through its training, professional publications and newsletters, accreditation, and so on. That all assessors had some form of 'tracker' (as described above) is demonstrative of training provided by BRE.

> "the knowledge of the assessor is shaped on the 3-day training course, and a lot is covered in there which isn't in the manual. How to interpret it, how to use it, all of those things." (BREEAM Communities Scheme Manager)

And of course, BRE has a role in certification and quality assurance, which are communicated to project actors via the assessor. That the assessor is able to play such a key role in the implementation of BREEAM Communities can only be understood in the context of this assemblage of skills, tools, relations to BRE and experience of previous projects.

Looking Closely at Energy

The above has given an overview of different ways BREEAM Communities mediates the development process and the ways it struggles to do so. To expand on these ideas and give a better idea of how they seem to work in detail, this section will look in depth at how these manifest themselves in work to deliver RE 01 Energy Strategy Criteria. As well as interviews, this section draws on analysis of energy strategies, statements, and other relevant planning documents submitted at the time of writing.

Reductions in Energy

RE 01 Energy Strategy comprises two parts, the first – which is mandatory – requires the completion of an energy strategy by an "energy specialist" (BRE 2012, 48) defined as having substantial experience or recognised qualifications). The second requires a commitment to a certain percentage reduction of CO_2 emissions beyond a baseline, or that the implementation of the energy strategy will result in a carbon negative development. The strategy is required to address energy use throughout the site and culminates in requiring a

calculation of predicted site-wide CO2 savings. The manual prescribes that the strategy includes three aspects, resulting in many of the cases in three (relatively) separate qualculative exercises. These are: the calculation of a baseline; recommendations for reduction in energy use and carbon emissions; and the calculation of carbon emissions saved. To open up this criterion we will look at each in turn, assessing how BREEAM Communities shapes the calculation of energy through each of the case studies.

Qualculative activity 1: Prediction of a baseline

The first compliance note point requires that:

"a prediction of the baseline energy demand and associated emissions for a Building Regulations Part L compliant development calculated using approved Building Regulations compliant energy modelling software and other modelling to cover site-wide consumption. This should include:

- a breakdown of the site wide heating, cooling and electricity demand
- emissions for both regulated and unregulated energy use
- emissions associated with street lighting and other electrically powered street furniture" (BRE 2012, 47)

One interesting point here is that two sorts of actors are being drawn into the calculation and treated as equivalent: the familiar and well established, in the form of Part L regulations or regulated energy use; and the unfamiliar, "outside [the] normal remit" (Energy Consultant, Case A) of interviewed energy consultants, such as site-wide energy modelling and unregulated energy. This combination of familiar elements and less-familiar elements is varying successful. Each report completes the familiar SAP calculations, as required by Part L of the building regulations. However, when it comes to unregulated energy and side-wide considerations differences emerge: two sites (Case C and Case E) do not include either; four of 7 cases include unregulated energy in some part of the calculation; three include site-wide considerations in the form of street lighting. Furthermore, where lighting and

unregulated energy are included, it is often not clear if what is being calculated is a 'baseline' figure or a 'proposed' figure. It seems that only one site has provided the required "breakdown of site wide heating, cooling and electricity demand" (BRE 2012, 47). Despite the mandatory nature of this criterion this does not always lead to the enrolment of the actors of 'unregulated energy' and 'street lighting' into the more familiar calculative arena already inhabited by Part L regulations, CfSH, and others.

What leads to an entity being easily calculable by energy consultants and being incalculable and left out of the energy statement? An important factor, as we've seen above, seems to be lack of supportive, surrounding assemblage. Calculations required by Part L of the building regulations are accompanied by overlapping and nested assemblages of professionals, apprentices, organisations, tools, examples, legislation, precedent, and so on. An emergent outcome of such an assemblage is to make Part L familiar and calculable to the energy specialists interviewed for this study. However, as with BREEAM Communities more widely, these associations are not as developed or is not accessible to our project specialists, for the actors "unregulated energy" and to a certain degree "site-wide energy". Or as put by BRE on the scheme website, "At present there is no standard or national calculation methodology for modelling unregulated energy demands in a building" (BRE, 2014). The unconventionality of these requirements is further suggested by their absence in local plans and SPDs: For instance, Eastleigh specifically require a reduction by "20% of the predicted emissions from <u>regulated</u> energy [sources]" (emphasis theirs; EBC Draft Local Plan). This problem is not lost on interviewees. As above, many energy consultants seem to have circumvented the calculation and not included it in their energy strategies. One interviewee describes (below) how instead he worked around these non-calculable calculation requirements by adapting them to his own methods and negotiating that with BRE and the assessor.

> The main problem is that the BREEAM Communities manual says that it should be done on actual calculations. But it's impossible to do actual calculations if you don't have a typology. … [Instead] we made it very clear in our report we made it based on benchmarks of previous schemes due to the lack of detail at this stage. But if you read the BREEAM Manual line by line, it's energy modelling. (Energy Consultant, Case A)

Qualculative activity 2: Recommendations for energy reduction

The second calculation required by RE 01, Criterion 1, is to: "include … recommendations for reducing energy use … beyond baseline levels through implementation of energy efficient measures including: site layout, use of topography …" (BRE 2012, 47) and so on. Here, the qualculative demands shift. There are no prescriptions on the sort of calculations to make or of specific data or evidence required to be drawn into those calculations; the result not the procedure is assessed and is qualitative rather than the numerous and specific quantities (of carbon, heat energy, and so on) required above.

Perhaps due to the less prescriptive character of the requirement, judgements and their explanations in this area are more variable than other aspects of the criterion. In one example (Case F), the compliance note's suggested themes mirror sections of the report, each of which proceed to draw in both building-, site-, and (at times) neighbourhood-scale elements to produce a number of recommendations. In another, all suggestions – except explicit mention to topography – are included, though in considerably less detail (bullet points compared to paragraphs). In contrast at Case E, elements external to the building envelope are not considered. Of the seven cases, only Case F explicitly addresses all the issues required. These discrepancies are summarized in Table 10 below.

Table 10 Different approaches to recommendations for energy reduction.

Issue	Case A	Case B	Case C	Case D*	Case E	Case F	Case G*
Site layout	✓		✓		✓	✓	
Use of topography	✓	✓	✓			✓	
Shading			✓			✓	
Solar orientation	✓	✓	✓		✓	✓	
Use of daylighting	✓	✓	✓			✓	
Wind management	✓					✓	
Use of natural ventilation	✓	✓	✓			✓	

*Had not completed this part of energy strategy at the time of writing.

As well as adherence to the suggested themes, differences also appeared in the way in which recommendations were judged and presented. A good example of this is recommendations and decisions regarding solar orientation. To illustrate the point, let us compare two case studies, Case F and Case B. At Case F – where the energy strategy closely follows the BREEAM Communities requirements – the energy consultant describes "designing with [BREEAM] in mind" (Energy Consultant, Case F), referring to solar gain and daylight as "fundamental drivers of the design". The result, as shown in the energy strategy, seems to bear out, with all dwellings "oriented towards south +/- 15°". In Case B's energy strategy, solar orientation is framed as considering "passive solar gain" and "to maximize the potential for solar renewable technologies", however, the report then solely describes layout and orientation decisions as based on renewables potential. As a result, passive solar gain and other associated orientation-energy synergies do not seem to be included in the calculations that shape street orientation. As such, the result of this street solar orientation exercise is one where "east-west" orientation is judged to be equally "optimal" as "north-south" orientations. Changes to the design in aid of passive solar gain thus become limited to internal building layouts. Furthermore, it is not clear how these calculations have impacted the design; a simple visual analysis suggests that approximately half the streets are non-optimal by their own, less rigorous standards (compared to Case F).

As well as further similar examples of the differences noted above, here we also see differences related to different interpretations of elements. To achieve this mandatory criterion, the energy strategy must simply give "recommendations … [for] solar orientation" (BRE 2012, 47). The BREEAM Communities manual suggests "passive solar gain" (for instance) but does not give further information or definition; it delegates this responsibility and requires that the assessor (often, though not always, the de facto 'sustainability champion') negotiate this meaning in the calculations above. Although the assessor can draw upon their expertise, BRE, relations to planning and project processes, and their various tool (as shown above), it often falls to the "aspiration" of the client:

> "I think there's quite a degree of flexibility within each Criteria for those sorts of things to do a little bit and get the credits or be really thoughtful and do something really amazing and get the credits. So, you've still got all the credits, but you might or might not have put the effort into it. And it all

> comes back to the client and what the client wants and for Case B the consortium is not very aspirational." (Assessor, Case B)

Qualculative activity 3: CO_2 savings

Finally, the energy strategy should include a summary of CO_2 savings from all measures: "energy efficient design measures, the use of decentralized energy and the installation of LZC [Low or Zero Carbon] energy sources" (BRE 2012, 47). This section of the reports analysed seems strongly linked to the calculations required by the next criterion in this assessment issue, i.e., to quantify and commit to a percentage carbon reduction, and as such, they will be discussed together. Despite the commitment being required only in Steps 2 and 3, there exists some level of calculation in all outline planning energy strategies. As described above, in Eastleigh, this is attributed to a council requirement for an estimated score at outline stage, but all assessors said they looked to bring these discussions forward.

Except for Case D, the summary of CO_2 savings in each energy strategy includes two elements: (1) regulated emissions, which are reduced through LZC technologies (exclusively solar PV) and improvements to the building fabric; and less often (2) low carbon street lighting. Correspondingly, these are elements which either have accepted methods for calculation (as set out within other standards, such as CfSH, or building regulations, or have a simple calculation (street lighting loads). In fact, this summary calculation is often *the same* calculation as required by other policy requirements, particularly for design according to a certain level of CfSH. Adherence to BREEAM Communities and the calculation of the number of credits achieved is overtaken by CfSH criteria. Interviewees responsible for energy described it as such: a reduction target for CO_2 is decided according to (most often) policy requirements for CfSH; this target is used to calculate appropriate changes to building fabric and square meterage of solar panels; this reduction is then combined with unregulated and site-wide energy use to calculate the site-wide CO_2 savings and equivalent BREEAM Communities credits. These calculative procedures are not mobilised by BREEAM; they are instead led by requirements problematized by CfSH. As unregulated energy typically represented approximately half the emissions from a dwelling, the 19% reduction

in regulated CO_2 required for CfSH level 4 becomes the 9.9% reduction required by BREEAM Communities for two credits, with minor adjustments for site-wide usage. In other words, the site-wide reduction of CO_2 assessed under BREEAM Communities seems strongly linked to other policy requirements, particularly achievement of CfSH at the building-level.

> "I was surprised how well Code and BREEAM Communities dovetailed together. That we were targeting two credits, and by achieving code 4, we got the two credits." (Energy Consultant, Case A)

One possible explanation why building fabric and LZC elements are favoured is the relative ease of their quantification (i.e., they can more easily be reduced to numbers, and that process is well backed up by other tests/procedures: air tightness tests, technical information on solar panels, and so on). This is important in the case of BREEAM Communities because the available credits are given on the basis of a quantitative reduction in carbon emissions. A development is not rewarded for energy improvements in RE 01 if you cannot put a number to them. This applies to unregulated energy, for example. Although unregulated energy is included in baseline calculations it is not included in attempts to quantify energy reductions, and no commitments are made regarding it. One energy consultant attributed this to a lack of a "theoretical base" by which to do so. For example:

> "by what basis do you change unregulated? We were struggling to find a theoretical base. I suspect the BRE have done research to work out what unregulated is, but do you take account that a fridge might be better efficiency? I suppose you could argue that unregulated might be, say, 10% less but I couldn't find a theoretical basis for doing that." (Energy Consultant, Case A)

Others made estimates but did not include them in the energy strategy (Energy Consultant, Case F). Another reason may be that these qualculative actors' agency is limited in that they are unable to translate themselves as significant. The result being that they are forgotten about. This was the case for street lighting (and potentially also energy saved from street furniture, solar orientation, overshadowing for cooling and so on). This lack of agency may be supported by technical outcomes (e.g., it might represent a relatively low number of kilowatts saved) and/or it may be because it is unable to disrupt procedures defining similar

calculations (e.g., a consultant follows a well-trod procedure for calculating energy saved and it does not include the BREEAM Communities' element). Its non-appearance in many calculations at this stage suggests at least one of the above is true; the fate of high-efficiency-street-lighting's contribution to total energy saved in one case suggests it may be both:

> Interviewer: "You couldn't include it [the energy savings due to installation of 30 W LED's] in the table?"
>
> Energy Consultant, Case B: "I suppose we could have done a benchmark based on high pressure sodium or something, 70 W, it didn't really occur to me to do that. … I can't remember what the percentage of street lighting was, but I don't think compared to the dwellings, where you've got nearly 3 million kg of carbon and street lighting has 13,000 so even if you got rid of all of it..."

Other methods of reducing energy were also notable in their absence from discussions with interviewees. Discussing the sorts of technical decisions one might make, consultants would typically give examples around "U-values", "air tightness" or "the amount of PV" – other solutions such as CHP were rarely discussed, by consultants or local authority interviewees.

> "we're [CfSH] level four for water and energy [and] we are still applying our SPD which is an additional 15% energy reduction. … That generally means putting PVs on rather than anything else. Add-ons. But we're okay with that." (Planning Officer, Eastleigh)

As such, unregulated energy and often lighting, as well as effects from "energy efficient measures" (BRE 2012, 47; such as solar orientation) are not included in the final stage of this criterion, to quantify and commit to a percentage carbon reduction. One implication of this, is that these elements are enrolled in the planning application as "recommendations" for future design/planning stages rather than commitments. (As I have argued above, this relation to the OPP of planning permission is important to the mobilization of BREEAM Communities; a less prescriptive relation (a recommendation) may require additional work for these qualculative elements (e.g., solar gain) to be translated into a future development assemblage.) At the time of writing only two of the case studies have begun work on Reserve Matters applications and one was submitted as a full application, but the success of

this seems to vary. At Case A, the outline Energy Strategy did seem to inform future design, with the energy consultant describing it as a "brief" or "objective for the detail design to meet". However, at Case B the architect said of issues like solar orientation and microclimate,

> "I think [they] were just information that was required but I wouldn't have necessarily said we really did anything other than nodded our hat to it really and referenced it. But it really didn't have that much of an impact I don't think." (Architect, Case B).

And at Case E, solar orientation and overshadowing have been addressed in the detailed design, but with the aim of maximizing roof space for solar PV and not to increase passive solar gain or daylighting and so on. In other cases, as pointed out above, these recommendations vary significantly in their specificity and as such the object that might be translated into these future networks differs from case to case.

Summary

This chapter looked to answer the research questions by investigating BREEAM Communities interactions at development sites. This chapter has described how BREEAM Communities can be integrated into a project assemblage and go onto influence the work of development actors. It has also shown some of the resistance faced by the standard and assessor, which show similarities with experiences of building-scale schemes (Schweber and Haroglu 2014). It was argued that the work of implementing a BREEAM Communities assessment is characterised by consistent, hard work to problematize and enrol BREEAM Communities as a development actor and participant in decision making and project processes. However, this chapter also highlighted how, despite this hard work, BREEAM Communities' implementation seems to lead (generally) to small, incremental changes (although a further study of the outcomes of assessment will need to confirm this once more cases have been issued with permission and built out).

The assessor and their relations with BRE, their experience and tools, are an important actor in the work to define a specific arrangement of BREEAM Communities criteria as necessary

for obtaining planning permission or achieving sustainability in a particular development (problematization), and for setting out how the work required to deliver BREEAM Communities might be approached (interessement and enrolment). Regular face-to-face meetings, correspondence, and tools to help assign and track responsibility for work all contributed to increasing BREEAM Communities' agency across the development and through time, from project inception to reserved matters applications. However, there was not agreement on the best way to employ certain tools, legal agreements in particular. There was also often a lack of time or resources given to this work. This was felt particularly acutely in smaller cases, where they are not only limited through their ability to achieve some criteria (e.g., providing on-site facilities) but also through a lack of activities that break down silos and integrate BREEAM Communities (e.g., resources to hold team meetings).

In looking at the mobilization of BREEAM Communities and its criteria, and its influence on development processes and emerging plans, this chapter showed that there were some areas of work that interviewees stated would have not been done otherwise or might have been done in a significantly reduced form. It also was seen to lead to enhanced or more developed pieces of work. Moreover, BREEAM Communities could influence development actors to engage with issues earlier in the process, giving more time for sustainable solutions to be developed. There have also been some mentions of it being used to defend design decisions due to its framing as an obligatory compliance document for a planning application. It also permitted consultants to adopt a more "holistic" or "strategic" way of doing things.

However, many of the processes and requirements exist elsewhere in a development assemblage in some form or another (e.g., as planning policy or tacit knowledge) and BREEAM Communities can be obscured by this, with consultants not interrogating the Manual and reducing the assessment to a box-ticking exercise. This was also shown to occur when existing, embedded practices resisted BREEAM Communities' interventions. Late timing of adoption or integration into development processes can make altering these sometimes-obdurate assemblages more difficult. In other cases, limited calculability for some criteria (as shown among energy criteria) can reduce the ability of consultants and assessors to affect change. When faced with these resistant assemblages, BREEAM

Communities was shown to be aided by other, supportive and more embedded groups of actors. In Chapter 6, we highlighted the need to connect the standard to existing planning problems; This chapter showed the impact of aligning with planning obligations, Local Authority goals, the experience of technical specialists and assessors, and sometimes unexpected allies in the form of religious conviction or local family ties.

Finally, to explore in more detail how BREEAM Communities is mobilised in calculations and how it influences development plans, this chapter described how the cases developed their energy strategies. There seems to be variation between case studies regarding their implementation of the criteria within Assessment Issue RE 01. As discussed in Chapter 5 and the literature review, BREEAM Communities is shown to be populated by other nested standards and calculative prescriptions, which can be actors in themselves. While BREEAM Communities as planning permission compliance may problematize the overall criteria ('needing to produce an energy strategy'), this section showed how further work of energy specialists, assessors, planning policy, and communities of practice are required to translate these nested actors, enable calculations to take place, and the results of which to matter for the BREEAM Communities assessment and on-going design. This work includes adapting criteria to specialists' own methods and negotiating their meaning (in the context of developer ambition), aligning criteria with other standards, organising the energy strategy according to those criteria, and assessors encouraging early engagement.

Where this work did translate criteria, changing design processes and enrolling BREEAM Communities' prescriptions as "drivers" of the design (or in other cases, at least participants in it), it was shown that this lead to some elements (such as solar gain) becoming more visible in energy calculations. Which in turn seems to have led to identifiable changes in reports submitted for planning applications. Where this does not happen, although an energy statement is produced in all cases, they may not make reference to all prescriptions of the standard or those prescriptions may receive a "nod of the hat" rather than serving as "fundamental drivers" of the calculations.

Some of this variability may be explained by the large variety of qualculative requirements within the criteria, including as it does elements that are: qualitative and quantitative,

familiar or novel, with established networks of calculation or incalculable, site-wide and building-level, to be addressed ‘now’ or committed to later. Typically, those requirements which are quantitative, familiar, established, building level, and urgent are those which are well represented in the energy strategies; each comfortably addressing CfSH and Part L requirements. Those qualculative elements which don’t fall into these categories tend to find themselves excluded or relying on the assessor (and other sustainability champions) to negotiate their meaning, leading to calculations of different qualities being ‘assessed’ as equally sustainable (even when mandatory criteria seemed to be unachieved; i.e., receiving the same number of credits despite these variances. BREEAM Communities criteria also often overlapped with other, more familiar requirements, in particular CfSH. Targets set out in BREEAM Communities criteria became an output of calculations made for CfSH rather than a driver of energy improvements themselves. This possibly contributed to less attention being paid to qualculative elements that are not required by CfSH (e.g., site-wide considerations).

Chapter 9

Discussion and Conclusions

Introduction

The objective of this investigation was to **better understand how, as a voluntary framework, BREEAM Communities is adopted into policy and development projects; how it prescribes requirements for users in the context of those particular developments; and how this standard is implemented, adapted, or resisted in those developments?** The analysis followed three distinct, yet ultimately interconnected phases in the lifecycle of the standard: its fabrication and formal features, its translation into particular development projects (often obligated by local planning rules and guidelines), and finally its attempts to change development decisions, judgements, calculations, processes (and so on). Through this it hoped to increase our understanding of what the standard asks of development actors and why, how it is incorporated into planning policy and developments, the ways BREEAM Communities seeks to assess and improve neighbourhood sustainability, and how actors react to this new standard in practice. As such it has contributed to our understanding of how successful these sorts of third party, voluntary, market-led frameworks might be at delivering the improvements in the sustainability of new neighbourhoods.

The first section, a Summary of Findings will systematically set out and describe the main findings of this investigation for each of the three research questions outlined in Chapter 3.

The next section, a Discussion of Findings will discuss the relevance of these findings to the implementation of (these sorts of) standards and the evaluation of other sustainability frameworks.

Then, Implications for ANT – the theoretical framework – are discussed.

And finally, Recommendations, Limitations, and a Future Research Agenda are posited.

This final section will seek to bring together common threads that ran through the analysis of these questions and discuss their implications for theory, for practice, and for future research. It also gives a number of overall recommendations.

Summary of Findings

This investigation was guided by three research questions, which shaped the questions asked of informants and as such, the focus of the analysis. These were:

1. **How is BREEAM Communities assembled at specific sites of action?**
2. **How is BREEAM Communities translated (problematized, interessed and enrolled, and mobilized) (in)to sites of action? And how does this translation enable (or resist) BREEAM Communities' ability to act?**
3. **How are (calculative) requirements of the standard prescribed, enacted, and adapted by development actors?**

To answer the central research question and these three sub-questions, this study traced BREEAM Communities interactions across three sites of actions (as above).

In Chapter 5, and presented as background for the analysis, the formal features and prescriptions made by the standard were evaluated and discussed. This went beyond previous comparisons of these sorts of frameworks by looking closely at the prescriptions made by the criteria and evaluating what action they require of the user. The next section looked to understand how the framework was fabricated in order to shed light on how and why BREEAM Communities cam e to be assembled in a particular way.

In Chapter 6 this analysis traced the translation of BREEAM Communities into planning policy and development cases. This chapter followed how the standard was problematized in response to issues specific to each site and (in most cases) enrolled as necessary to obtain planning permission.

Chapter 7 followed the framework as it was again translated and distributed across 7 development cases. It looked at the ways BREEAM Communities was able to 'make a difference' in its implementation and how it was resisted by development actors.

Findings from each of these chapters contribute to the three research questions above. As such, I have brought together these findings in order to summarise how this thesis has answered those questions.

How is BREEAM Communities assembled at specific sites of action?

This question sought to illuminate what was acting when "BREEAM Communities" acts across various sites. This thesis began with a description of the structure, scope, and formal prescriptions set out in the BREEAM Communities manual. This moved beyond previous comparative analyses and looked at how the formal features of the BREEAM Communities manual prescribed physical and temporal boundaries of a BREEAM Communities assessment, how criteria required the incorporation of, and made visible, particular (groups of) actors, and how it required calculative actions from its users and made those actions calculable. This chapter also looked at the standards' fabrication. In other words, it investigated how the framework was assembled on paper and how it might seek to bring together and influence development actors. This exercise highlighted how the manual makes connections to existing assemblages of urban development in England, linking often to established methodologies, institutions, professional qualifications, and planning procedures.

Chapter 5 also sought to illustrate that the standard seeks to facilitate local decision-making, while prescribing (to various degrees) those processes and their participants. The following chapters showed how, as BREEAM Communities was translated in different sites of action (the creation of local planning guidance and development sites), the standard was defined by development actors according to site-specific problems. Chapter 6 showed how BREEAM Communities was constituted as an actor able to (or not) solve local planning problems. During this it was sometimes problematized as a single standard, with characteristics defined by BRE training, sometimes conflated with other BRE schemes, sometimes understood as a collection of criteria and compared in detail to planning policy; this chapter also showed the broad range of problematizations attached to the standard, suggesting it is a nonprescriptive, adaptable framework (as hoped for by the designers at BRE).

Chapter 7 described the work to define the set of criteria applicable to a development and understand its overlap with other standards, requirements, site constraints and opportunities, and so on. Here, those actors implementing BREEAM Communities is

expanded to include assessors, experience of previous schemes, tools, BRE training, other sustainability standards, individual criteria and compliance notes and so on. In implementation these criteria and compliance notes were shown to be interpreted and negotiated in various ways, further differentiating local manifestations of BREEAM Communities. In particular, this chapter showed the important role of the assessor (and their experience and knowledge) in assembling a site-specific version of the standard in relation to other site actors, including estimated implications of different arrangements of criteria.

In sum, this thesis has illustrated the ways in which BREEAM Communities is nested within, and comprising of, a multitude of other standards and standardizing procedures (such as the planning process) (Lampland and Star 2009; Rydin 2012). It has also shown how it is closely associated with the assessor and other 'champions', which act for, with, through, in place of BREEAM Communities. These, and other development actors, mediate the standard such that a local manifestation of BREEAM Communities is assembled at specific development sites.

How is BREEAM Communities translated (problematized, interessed and enrolled, and mobilized) (in)to sites of action? And how does this translation enable (or resist) BREEAM Communities' ability to act?

This question sought to understand how BREEAM Communities travelled from a standard on paper, to planning policies requiring its inclusion, to development sites in which it could be implemented. As described above, this investigation has shown that these translations involved multiple framings of the standard, its criteria and associated actors. Chapter 6 first described four cases where BREEAM Communities has been included in local planning regulations. Based on interviews with BRE and key planning officers, this chapter set out the work done by those key actors to problematize BREEAM Communities as a solution to specific local planning problems, allowing them to persuade colleagues and enrol the standard in planning guidance. It was shown that previous versions of that planning guidance could play an important role in problematizing sustainability on the

neighbourhood scale, allowing space for BREEAM Communities. This chapter argued that the main source of resistance for planners seeking to incorporate BREEAM Communities into planning guidance (and subsequent implementation) was often others within the local authority. Unlike those who would work to enrol BREEAM Communities, resistance by other groups (such as developers) did not engage with the specificity of the standard or its relation to local problems (instead citing generic objections), and as such were unable to disrupt its translation. On the contrary, resistance by other sustainability standards that were already enrolled to define sustainability proved more effective at undermining BREEAM Communities' claims to provide the optimal solution (Higgins and Tamm Hallstrom 2007) even if those at the centre of plan making acknowledged BREEAM Communities as a 'better' standard. I also highlighted the ways local planners had sought to mitigate potential weaknesses of the BREEAM Communities standard through linking to specific sites early and requiring post-occupancy evaluations.

The second part of this chapter described the ways BREEAM Communities was translated into specific development assemblages. It showed that strong planning regulation seemed to lead to relatively predictable adoption of BREEAM in a development context, but this movement still required work by local 'champions' to achieve. In other words, that association with that OPP did indeed problematize the standard as a necessary part of the development assemblage. However, this was not always straightforward and all initial translations seemed to be in some way voluntary (Timmermans and Epstein 2010); this chapter highlighted the important role of planning officers and long-term associations with the site in negotiating for its inclusion. It also showed that in cases without a planning requirement, BREEAM Communities is not adopted directly because of the strengths set out by BRE (such as benefits for marketing) but (again) because the leadership of development actors and specific local problems BREEAM Communities was positioned as able to solve (such as a need to consult local residents in a particularly robust way).

Chapter 7 showed how BREEAM Communities was again translated in finer detail: individual criteria were introduced and framed by the assessor as necessary to comply with an obligatory planning requirement; aspects of these criteria then enrolled as part of project management and design processes by exercises to compare criteria to other standards and

practice. This chapter also highlighted the importance of the tools, training and know-how, and professional biases of the assessors (in each case) to interpreting the BREEAM Communities standard for the particular site and circumstances of that development. Through these processes, criteria were transformed from part of BREEAM Communities to specific prescriptions with associated solutions that were relatively detached from the manual itself. Instead, they were mobilized through project management tools and intervention from the assessor (and sometimes project manager). The final part of Chapter 7 illustrated how this broad translation could lead to different implementations of the standard.

At each site of action, an individual (human) actor emerged as a sort of sustainability champion: a particular planning or sustainability officer at local authorities or (often) the assessor at development cases. The assessor was delegated agency through the adoption of the BRE standard (hired as a requirement of the certification) but were supported in that role often by an assemblage of evidence, project tools, training, and so on. Because of this, they were able to facilitate the translation of the standard, not only by interpreting and communicating between criteria and development actors or facilitating commitment (by enrolling BREEAM Communities in project processes for example), but also by participating in the implementation of the standard itself (by suggesting solutions and editing report text for example). This goes beyond the 'champion' role by not only managing and communicating with the BREEAM-network (Joss and Rydin 2018), but also co-developing the implementation of the framework. This investigation of the implementation also found that the standard seemed to have the most impact on development assemblage where it was able to translate new actors (such as an energy consultant and strategy) that would go on to themselves mediate the emerging development.

Finally, the thesis also showed the ways in which BREEAM Communities translation was resisted. Across sites of action, its problematization was undermined by other sustainability standards or 'good practice', often not because they had better claims to knowledge about sustainability but because they were better embedded in local assemblages (as the basis for an already developed plan (as in Bicester), more closely associated with planning permission (as with Eastleigh's planning guidance) or with a more established methodology (as with

CfSH)). Chapter 7 showed how it could also be resisted by ignorance, obduracy, or through being ignored. This seemed particularly important when the problematization as a planning obligation broke down, as in Case E where the planning committee did not endorse the standard, leaving it to be retrofitted after the plans were submitted for committee.

In sum, this investigation has traced BREEAM Communities' translation through sites of action. It has highlighted its embeddedness in planning processes, reliance on support of individuals and their experience of local (sustainability) issues, its multiple problematizations in various configurations (as the standard, a set of 70% of criteria, and individual calculative prescriptions), and work to implement the standard through integrating those element into existing development assemblages.. It has also shown how BREEAM Communities is resisted by that same assemblage, by calculating overlap with other standards or 'good practice', or when actors are able to simply ignore the standard in favour of other priorities.

How are (calculative) requirements of the standard prescribed, enacted, and adapted by development actors?

This final question looks to understand how BREEAM Communities, now translated to sites of action seeks to direct those actors in its implementation. It highlights the importance of calculation, both in the standards' implementation and in participating in the translation of the standard. Chapter 6 and 7 described comparisons to other requirements, to site, and to scenarios for "getting to 70%". This showed how calculation can be a tool of translation, with those maps, comparisons, other results of calculation framing BREEAM Communities criteria as particular and necessary parts of the development assemblage. These exercises also suggest that a first step in transcribing the knowledge contents of these balanced score-card frameworks into local context (Joss *et al* 2015) is determining difference between that local context and the standard. This (in many cases) leads to the minimising of that difference, and as such the distance any such transcription has to travel.

As discussed above, Chapter 5 showed how the standard makes relatively nonprescriptive requirements of its users that aim to facilitate local decision making. The following chapters also showed how, through linking to established calculative methodologies, efforts to

translate the standard to respond to local (technical) problems, sharing knowledge and experiences with similar schemes, and associating the standard with the OPP of planning permission those in support of the standard work to make the standard's prescriptions calculable (following Ehrenstein and Muniesa 2013). Through these steps, development actors were required and able to perform (in various ways) the prescriptions in the standard. This report also showed where this calculability was lacking for some elements of BREEAM Communities but could be assembled for other standards. For example, for CfSH, interviewees described having the knowledge and experience to "put forward guidance" to developers of "unusual schemes", and many interviewees had "typologies", "standard practices", or "best practice compliance documents". The tracing of these associations shows how the agency to implement BREEAM Communities emerges from long chain of relations across different sites of action. These standards would seem not just to be fundamentally social (Timmermans and Epstein 2010; Schweber 2013) in how they seek to organise consensus across a wide range of actors (in the case of BREEAM Communities, on a sustainable way to design our neighbourhoods), but also in how they are made implementable or calculable, with chains of association that reach beyond the standard and its 'users'.

Discussion of Findings

The above section summarised the key findings of research project. This section discusses further their relevance to the literature on the implementation of standards and urban sustainability assessment frameworks.

Many BREEAM Communities

First, as shown by the findings in response to research question 2, BREEAM Communities is translated by a wide range of problem framings and roles. Chapter 6 especially showed the wide range of problematizations created in response to particular, local settings. Moreover, it showed that where resistance to the standard failed to appreciate this specificity it was

unable to interrupt work to enrol BREEAM Communities (as in Chapter 6, with representations being made in opposition to generic "costs, time, paperwork" of *any* new standard, and easily rebuffed by the local authority). This study therefore suggests that not only are framings of BREEAM Communities co-constructed by actors situated in particular sites of action (Spinks 2015) but this multiplicity is important in how the standard is able to act. This finding is in line with previous investigations into standards: adaptability (Timmermans and Epstein 2010) or interpretive flexibility (Schweber and Harty 2010) is important in building the necessary alliances for the adoption and use of these frameworks, both in "particular setting[s] and across settings" (Schweber and Harty 2010, 667; also see Spinks 2013; Goulden *et al*. 2017). Indeed, the literature gives many examples of different the roles urban sustainability frameworks can undertake (Goh and Rowlinson 2013; King 2016). This study illustrates how this multiplicity seems particularly important in the *adoption* of these sorts of frameworks into policy and practice.

The findings also show, however, that in many instances, BREEAM Communities is not interpreted differently, but is comprised differently. The findings presented under Research question 1 show that BREEAM Communities is represented by various actors in these translations (the manual, the assessor, individual criteria, BRE, and so on). For example, in its adoption into planning policy the standard and the process is evoked, with interviewees commonly described BREEAM as a 'way to bring issues together' or a 'masterplanning process'; there is less focus on the formal content. Moreover, this complex, wide-ranging standard is then often inscribed in policy as a single sentence referencing the standard and a threshold at which it is to be applied. Then, when BREEAM Communities is drawn into association with a site through a planning application there is invariably an opening up of its technical content and association with individual criteria. From here, development professionals did not often interact directly with a "BREEAM Communities" but instead worked on bounded technical problems of which BREEAM Communities criteria were (varyingly) a part. Only rarely did interviewees describe stepping back to comprehend the prescriptions of the standard in a holistic way. This illustrates how the problematization and further translation of the standard and criteria as distinct actors permitted BREEAM Communities to be "legible in different domains" (Joss and Rydin 2019, 372). Many (versions

of) BREEAM Communities are engaged by local actors across particular local settings, allowing this standard to be implemented across various sites of action.

However, this multiplicity does not seem to apply in all settings. Chapter 6 argues that the ability of BREEAM Communities to persuade others to engage in its implementation rests upon one framing in particular: its initial problematization, and degree of association with, (in most cases) the OPP of planning permission. This is the case even where planning policy does not itself require BREEAM Communities (although the particular local characteristics of that requirement vary). This single problematization (as a planning condition) then allowed the mobilization of actors (often led by the assessor) in those further translations where BREEAM Communities criteria are defined for specific development actors and processes and interpretations and interactions once again multiply. This has implications for studies of these sorts of urban sustainability frameworks that view these as voluntary standards (e.g., Lee *et al* 2002, Darnall and Sides 2008, Schweber 2017) and not (as was the case for this thesis) closely tied to the regulatory planning framework.

Adaptability

Second, for the successful implementation of standards, a balance is required between "local erasure" (Timmermans and Epstein 2010, 83) that enables calculations and judgments to take place and an imperfect framing of those calculations to enable actors to "locally [add] value" (Callon 1998, 8). In other words, a balance between standardization and having a standard flexible enough to be adapted to local requirements (Wourter and Sandholzer 2018) without undermining the benefits of standardization (Storz 2007) or leading to non-compliance. As above and throughout this analysis it has been argued that BREEAM Communities requires significant intervention by development actors, which generates a large degree of flexibility in how the prescriptions set out in the standard are implemented. As described in Chapter 5, that the standard is non-prescriptive was a choice made by BRE in the design of the standard, allowing it to be applied to a range of developments and adapted by development actors. However, this thesis suggests that the extent of this adaptability may lead to unintended consequences.

The discussion above has shown how BREEAM Communities has a significant degree of adaptability in how it is problematized (albeit within the framework of local planning regulations). Chapter 5 also highlighted numerous ways criteria require decision making at specific, local sites of action. In Chapter 7, the various ways that this local definition was constructed were described, with the assessor introducing, problematizing and enrolling actors in the task; delegating agency to new actors (such as demographic data, energy strategies or local publics); and creation of an expanded definition of sustainability, one that gives a voice to local actors and seems to be appreciated by interviewees for being more meaningful to that place. These findings illustrate how, in practice, this standard is made and implemented relative to site-specific assemblages of 'users' and other actors (Lampland and Star 2009). This implementation is understood to require "tinkering, repairing, subverting, or circumventing prescriptions of the standard are necessary to make standards work" (Timmermans and Epstein 2010, 81). And indeed, where energy criteria were shown to be non-calculable to interviewees, the assessor and BRE allowed the standard to be circumvented in a way that allowed a version of the calculation to take place. In a similar way, the various ways in which the assessor worked with development actors to generate (simplified, locally contingent) responses to criteria is illustrative of local value added by navigating that necessary gap between what is prescribed and what can be implemented (Joss *et al* 2015).

However, as discussed in Chapter 5, there are also various elements of the manual that are worded to provide flexibility that could lead to unintended variability in application (if not "tip [the] standard into uselessness" (Timmermans and Epstein 2010, 81)). Following a similar analysis, Wangel *et al*. (2016b) are critical of BREEAM Communities on the basis that process-led criteria are difficult to assess robustly. Indeed, Chapter 7 showed how this adaptability could undermine the standard where credits are awarded for BREEAM Communities requirements that were simply repositories for existing evidence made to fit, were wholly adapted to project timetables (i.e., retrofitted or addressed in an *ad hoc* way), or limited to existing technical knowledge of development professionals. Looking closely at energy criteria suggest that this flexibility in defining and applying criteria could more often be found in other assessment issues that are more novel, difficult to calculate, site-wide,

and future facing. This led some interviewees to question whether the standard could be too flexible. For example,

> "I'm playing Devil's Advocate with my own role as an assessor [but one could ask]: "the design team have embedded resource efficiency", well, to what extent? They could say, "well we've thought about it and it's difficult and we're planning to use 5% recycled materials. We looked at the WRAP principals" – you could look them for two minutes! – "we've looked at the WRAP principals, we've embedded that a little bit". (Assessor, Case C and E)

> "I think there's quite a degree of flexibility within each criteria … to do a little bit and get the credits or be really thoughtful and do something really amazing and get the credits. So, you've still got all the credits, but you might or might not have put the effort into it. And it all comes back to the client and what the client wants." (Assessor, Case A and B)

Where the balance between adaptation and standardization is not met, standards can fail. This study has suggested that even though BREEAM Communities criteria struggle to make a difference it is still possible to 'get the credits'. Indeed, all cases studied were on track to receive an 'Excellent' score. Moreover, Chapter 7 highlighted where mandatory criteria may not have been met (for some of the finer detail; though that is not to say this would not have been picked up through certification). This suggests that BRE might wish to re-assess the degree of flexibility permitted by the standard and its current mode of implementation.

However, this study has also illustrated the range of activities engaged in as a result of its adoption in a project – some of which may not straightforwardly result in a credit but might make a difference for sustainability (such as being able to "step back" to reflect on the design holistically, having a sustainability item and expert at a regular team meeting, providing a local authority with a systematic checklist of sustainability issues, and so on). Further, it has also shown the broad degree of problematization of the standard across sites of action. The tension between adaptability and standardization is often presented as a linear axis (e.g., Timmermans and Epstein 2010; Joss and Rydin 2018). However, compared to assessing the non-compliance of more narrowly defined standards (e.g., where data is inputted non-compliantly into set fields (Storz, 2007)), the range of problematizations of BREEAM Communities suggests an equally broad problematization of adaptability (and as such non-compliance) may be required to investigate these sorts of urban assessment

frameworks. If BREEAM Communities seeks to be a “replicable, standardising mechanism for sustainable urban development” (Joss and Rydin 2018 372) then the analysis presented in Chapter 7 suggest it may be too adaptable to local conditions; if it seeks to (for example) be a checklist such that sustainability issues are taken into account (as many local authorities sought from it) then this degree of adaptability may be satisfactory.

This also has implications for the ‘comparison literature’ presented in Chapter 2. The broad problematization shows how a comparison based on an assumption of the meaning of the standard can be problematic. For example, performing a gap analysis between standards implies a certain objective that missing criteria might help to achieve. Moreover, the adaptability of BREEAM Communities suggests evaluations of sustainability coverage risk misrepresenting the extent to which these standards can deliver sustainability, as value is added to the standard at a local setting. This is not to suggest that comparisons can’t be useful tools in understanding similar standards. However, authors may wish to incorporate lessons from how they are implemented. For example, future comparisons might look to highlight and compare how deeply embedded criteria are in legal or professional guidance, which seems to have a bearing on how adaptable criteria are; second, they might compare how these standards contrast to (local and national) regulatory standards; third, they might pay attention to the perceived prescriptiveness of the requirements set out in criteria; finally, they might also look to compare the predicted roles of assessors (or similar) and supporting organisations to understand how training, materials, and other support might influence how the formal features of the standard are implemented.

Difficulty

Third, this thesis has highlighted the hard work required by planning officials and policy, assessors and project management tools, staff at BRE and the manual to enable BREEAM Communities to participate in a way that made a difference to these development cases. It also showed how the ability for BREEAM Communities to make a difference was clearest when this work was supported by strong, established relations with existing actors that strengthened the enrolment of BREEAM Communities as part of the development

assemblage. Illustrative of this is how BREEAM Communities' links to guidance, standards, and processes – and the work of the assessor and planning officials to negotiate, establish and map these links for other development actors (as discussed in Chapter 7) – generated agency and calculability for the standard (Ehrenstein and Muniesa 2013). Unlike the CfSH, which was brought into calculations despite not being formally required (and unsupported by BRE or government), this study has shown the constant work required by the assessor to keep BREEAM Communities enrolled in development processes and the difficulties faced in doing so. This demonstrates the "expected … skills and expertise" (Joss *et al* 2015 15), not to mention the "hard labor" (Bowker and Star 2000, 148), of those involved in implementing this framework.

As well as the 'tinkering' discussed above, much of this work can be categorised as attempting to transfer the figuration of actors in support of BREEAM Communities from human ambitions to the material. Assessors' work to include BREEAM Communities requirements in legal instruments such as S106, letters of commitment, minutes, memos and project management tools, as explicit text in reports that result in "locking in requirements" for future phases, and so on are examples of this. As predicted (Strum and Latour 1987) this work seems to stabilise that BREEAM Communities association, enabling it to mobilise action in the development. Moreover, this work seems to move these activities toward the relatively invisible (Bowker and Star 2000) as opposed to the noisier work of chasing consultants via phone or negotiating the inclusion/exclusion of criteria. This skilful and difficult stitching together of associations seems crucial to the ability of BREEAM Communities to act.

Going further, the importance of these personal-professional relations with each of the cases here suggest a lack of an impersonal, market rationale for adopting the scheme. Although described as voluntary (with similarities in this regard to other standards (Timmermans and Epstein 2010)) this thesis has shown the work done to frame it as necessary (as well as beneficial) rather than relying on incentives (Arora and Gangopadhyay 1995; Timmermans and Epstein 2010). In each case BRE are involved in the adoption of BREEAM Communities to planning policy: running workshops, educating planning officers, and supporting sustainability champions. Knowledge of the BRE and the training and

support on offer is also important particularly to those looking to introduce the scheme voluntarily. Similarly, that the majority of cases have adopted the scheme due to a specific planning requirement or to solve a particular local problem suggests that developers do not necessarily see the commercial value in pursuing certification. Instead, BREEAM Communities is problematized for each local authority based on locally contingent planning issues, with BRE playing an important role. Then it is often re-negotiated at each development site based on the strength of planning regulation and guidance, the support of local planning officials, the status of the local plan, and so on. This potential lack of market-led adoption has implications for the wider adoption of the scheme, given the finite resources available to BRE. This might also suggest that findings about the motivations and problematizations of other market-led standards (including to gain a competitive edge, marketing opportunities, or to generate a price premium (Carter 2014; Garde 2009; Spinks2013) might not (yet) apply to BREEAM Communities or other so-called voluntary frameworks that, in practice, are problematized through the planning regime.

It may be that the difficulties outlined above are exacerbated by conflicts left unaddressed by the manual. Broadly, a well-known problem enshrined in English planning rules is the conflict of interest between landowner and developer (who are incentivised to maximised short-term gain), and local residents (human and nonhuman) who see longer-term costs and benefits; as Callway *et al* (2019) point out, "sustainability intentions … often lack more immediate and tangible benefits that would incentivise a developer to take greater responsibility" (2500). The importance of this conflict seemed to be understood by BRE, who, in BREEAM Communities' supporting literature, look to describe the ways developers might gain from deviating from the assumed low sustainability standards that accompany short-term maximisation ("cost savings", "[progressing] proposals more efficiently through the planning system", "added value to the development", "promotional opportunities" (BRE 2013, 3). This conflict is also side-stepped by problematizing the standard as a legal requirement, and as such defining itself as a new minimum standard instead of something subject to a calculation balancing sustainability gains and added (monetary) value. As Chapter 7 showed, this can be successful and this problematization is crucial to its implementation in many projects.

Previous studies of the implementation of similar standards have shown that voluntary standards are limited in their ability to encourage this sort of longer-term decision making from developers (Schweber 2014; Callway *et al* 2019). This study suggests that despite being made mandatory by its association with a planning application, further translation is necessary to embed BREEAM Communities in decision-making. Moreover, it seems that it is most successful when this is supported by association with (material) actors related directly to the development that demand this new standard is adhered to. Chapter 7 showed this could be through alternative land-ownership arrangements that allowed actors with a longer-term view and different priorities to participate more strongly in BREEAM Communities calculations. This thesis also illustrated this support came through other routes, through a developers long-standing relationship with a local community (in Case F) and in one case through a belief in God, specific environmental interpretations of the Bible, and professional experience in developing 'environmentally friendly' developments (Case D). Ironically, this market-led standard seems to work best when some part of the decision-making is brought outside this market logic. Indeed, this may be necessary for standards to deliver sustainability improvements (Sharifi 2015, 23). However, outside of the examples presented above, BREEAM Communities seems to rely on actors (assessors and professional consultants) that are trusted to deliver higher standards implied by the sustainability standards without any meaningful way of extricating themselves from the pressures of delivering "value for money" and the "client's ambition" (which, in this study at least, seemed to be understand almost invariably is a euphemism for lowering standards).

Summary: A new normal?

In discussing zero carbon targets, Walker *et al* (2015a) criticise the mainstreaming of zero carbon housing on the basis that this "new normal … is a description of the new norms of building scientists … rather than those of the everyday life of zero-C inhabitants" (498). Similarly, Joss *et al.* (2015) question whether standardisation of sustainability within frameworks accelerates innovation to achieve "improved sustainable urban development" or whether it "perpetuates business-as-usual" (10). What then does this study imply about

the ability of BREEAM Communities to set a 'new normal' for sustainability of the built environment? I suggest this thesis has shown that BREEAM Communities can be a useful framework for decision making, but only when supported by strong, allied actors. When this isn't the case, the sometimes-weak formal prescriptions are not sufficient to allow actors to corral the resources they need to properly engage with the calculations prescribed; even alignment with the OPP of planning permission needs constant shoring up by the assessor for this to happen. At Case D, BREEAM Communities negotiates its meaning from a position of strength. It successfully conscripted (and was conscripted by) BRE, assessor, project manager, God, owner-occupier and these are translated into the qualculative event-space in which definitions are stabilised (in other words, they participate in the work of implementing BREEAM Communities). As such, the gap between the manual's prescriptions, the ideas that the scheme designers at BRE had about how the manual might perform, and the actions taken by the project actors is small. For example, in this case the term "the landscape and ecological strategy must be integrated" lead to a series of events (meetings, phone calls, emails) where design decisions are made in tandem between ecologist and landscape architect. In other projects, BREEAM Communities has less agency, the negotiations are more one sided, and the gap between ideal and action, prescription and conscription, seems larger. For example, in these cases, "integration" of landscape and ecology strategies may only involve a short email conversation between consultants.

These limitations are not helped by significant overlapping standards and a lack of knowledge (and others, as described in Chapter 7) but also hampered by a sometimes-deliberate attempts by development actors to resist changes in already forming/existing ways of organizing, designing, consulting, and so on. I have suggested above that this may be because BREEAM Communities fails to address central conflicts in sustainable urbanism, but more research is needed to confirm this (as outlined in the limitations section). Despite the apparent success of problematizing BREEAM Communities as an important actor in solving site-specific problems (including gaining planning permission, central to development progress), in these cases it continues to be one of many competing issues. The work to identify criteria scenarios that are close to standard practice and the seeking out of already existing evidence or familiar simplifications of criteria suggest that even if BREEAM

Communities manages in some aspects to "monopolize … what counts" (Schweber and Harty 2010, 668) as sustainability, this definition is often constructed locally in such a way as to limit major changes to development plans.

An observation made by many interviewees is that BREEAM Communities often helps deliver "good practice". This is perhaps best illustrated by the alignment of many energy strategies with the achievement of a CfSH level 4 or 5, a (well established, good practice) improvement over building regulations yet only scoring 2 of a possible 11 credits for carbon emissions reduction. This is despite the abandonment of the CfSH as a standard supported by national government and its publishing institution. This also ties into other findings set out in Chapter 7, that the criteria selected by the design team for assessment are done so on the basis of minimal disruption to existing plans. This suggestion is perhaps also illustrated by the description in Chapter 5 of the fabrication of the standard. This chapter showed, through their absence, actors and groups that were excluded (or not included) in these processes. There seems to be no input from lay people for instance, nor from groups that were outside a relatively small group of institutions (whose outputs likely form part of what many consider as 'good practice'). As such, ideas from elsewhere about how a sustainable neighbourhood may come about are effectively excluded. This helps to explain some choices of criteria, such as decisions to shy away from those that might challenge current paradigms of urban development such as difficult discussions about density, site selection, or ownership models.

Going further, Rydin (2013) has argued that *growth dependent planning* is embedded within the various institutions of contemporary planning practice, including central government policy (such as the NPPF), local plans, planning regulations, and community engagement. Given the prominent place of local manifestations of these institutions in fabrication process of BREEAM Communities, it might not be uncontroversial to suggest that BREEAM Communities also likely has encoded within it assumptions of growth dependence (Joss *et al* 2015). Indeed, the description of growth dependence offered by Rydin can be equally applied to BREEAM Communities. Social and environmental gains are arranged, agreed, set, implemented, realised through negotiations of planning gain, S106 agreements, and calculated on the basis of a profitable development. Economic (or other) criteria do not

acknowledge alternative paradigms, for instance no credits are available for community-led or non-profit developments. This embeddedness of the growth paradigm can be seen in the workshop discussions (described in Chapter 5). For example, discussions about development viability from a traditional, developer led approach are present throughout; other models for development funding are considered at the beginning of the process but do not seem to have been considered beyond 2011 (according to workshop read-outs). It is also implicit in BREEAM's logic of voluntary certification, where levels of achievement (*Pass, Very Good, Excellent*, etc.) are judged against marketing opportunities, again with funds for sustainability being negotiated against expected profits. Furthermore, the fees associated with certification are often justified by comparing them to the overall cost of a traditional, large-scale, developer-led development.

The above discussion suggests that, although there are plainly benefits to applying the standard, BREEAM Communities in its current form may be unable to disrupt an 'old-normal' way of doing things and generate a paradigm shift to a more sustainable understanding of community-scale development.

Implications for ANT

This study has aimed to show that an ANT approach, one that pays attention to an assemblage of human and nonhuman actors and attempts to follow and replay their specific relations, can valuably describe how a framework like BREEAM Communities attempts to define urban sustainability and mobilise that claim to knowledge via a series of translations, from standard to policy to calculative prescription. This is particularly important when studying a new standard (like BREEAM Communities) where actors are developing innovative ways to interact with it. It is also important for a standard that is focused itself on assessing procedures and guiding how its users act, make decisions, and perform calculations. I believe it has also shown the usefulness in using the same theoretical basis throughout an investigation across different sites of action, from its development, through embedding in plans, to various construction projects. This ability to use a common language has made it possible to identify the chains of association that make the standard

implementable in development cases. It has also made it easier to identify common threads throughout the analysis and move between sites of action in this analysis and discussion.

Turning to nonhumans, a great deal is written about their enfranchisement by ANT. A key question therefore should be, does this study succeed in producing a radically relational account of human and nonhuman actors in association with BREEAM Communities? I would suggest it has been partially successful. It has taken seriously the work done by the standard and its qualculative prescriptions, by planning documents and the nonhuman actors they often seek to represent, by project management tools and processes. However, there are other nonhumans that have in some ways become 'contextual' in ways that likely underplays their actual relations with BREEAM Communities and the development. The characteristics of each site is one example. The study identifies multiple times where the site is shown or presumed to have agency in the progress of the BREEAM Communities assessment but the specific, material relations that this then implies were often difficult to describe for interviewees. As noted below, interviewees often resorted to reducing these relations to aphorisms like "the devil in the detail" rather than being able to work through them specifically in the interviews. This is possibly partly due to a lack of 'props' for the interview (e.g., maps of the site to refer to). And party a reliance on interviews over other types of data capture. For example, a lack of opportunity for observation limited the possibility of an analysis of the materiality of meetings, workshops, and decision-making, and a lack of site visits and access to maps and surveys (and the technical knowledge to interpret them) may have limited the ways the site was brought into the analysis.

This investigation has also highlighted a potential limitation in the use of ANT for studying these sorts of standards that are designed to deliver marginal changes to development procedures and decisions.

Meek Actors

Chapter 3 discussed how ANT's treatment of meekness may be a limitation to a study of a sustainability framework that seemed to be as likely to be ignored as heroically resisted. As that discussion cautioned, "ANT may encourage the following of heroes and would-be

heroes" (Sissmondo 2010, 89). I posited that following actors through successful or failed translations could leave un-investigated 'grey areas' where the instead BREEAM Communities might fail because of *weakness* rather than the strength of anti-groups' resistance, where translation of an actor simply fizzles out (an email is left unanswered, a task forgotten or brushed aside, an issue implicitly deprioritised, and so on) instead of being halted. The language of ANT, with its obligations for (safe) passage, "trials of strength" (Latour 1987, 74), allies and anti-groups, "battles" in which "system builders must fight against "counteractors"" (Alcouffe *et al* 2008, 3), and so on, leads the researcher to look for these controversies and uncertainties, which does not necessarily provide the tools to investigate actors that quietly slip away rather than rage against the dying of the light, as it were.

For this study, the former seems to be the experience in some instances. Rather than fierce resistance to the standard, it can be met with indifference and many of the descriptions of difficulty presented in Chapter 6 and 7 illustrate this: assessors' emails and calls are sometimes ignored or meetings are not scheduled, consultants may not take time to read the manual, planning committees do not ask the question, overly technical language is used to obfuscate non-compliance rather than 'battle' the standard, small numbers of representations made to object to the standard being included in planning policy were rebuffed using stock responses, and so on. These findings were identified through the framework set out in Chapters 3 and 4. They were also reliant (often) on interviews with the assessor, who tended to be both experts in the field and incentivised to pay attention to the fate of the standard (in contrast to other interviewees who, sometimes, did not seem to pay attention to "boring" (Lampland and Star 2009, 11) things like sustainability standards). If a meek actor did not have such an ally, these sorts of findings may have been difficult to unearth. Can this be addressed within ANT? Or might we need to step outside the theory to better understand the meekness of some actors?

First, let us consider that a meek actor could be defined as one that is made passive or disconnected through inaction, inattentiveness or indifference rather than active resistance. ANT reminds researchers to not assume passivity but to look for how entities have been made passive (Callon and Law 1993). As such, ANT sets out numerous ways the researcher

might bring traditionally quiet actors to the fore and trace their location in chains of associations that generate action. However, these are primarily discussed as methods to describe the mediating role of otherwise hidden actors (often nonhumans) in events, where their agency might be obscured by 'social forces' or mistaken for human intention by researchers. What to do if instead of being obscured, these chains of association become too weak or diffuse to leave (much of) a trace?

If an actor or association does not leave a trace it cannot be justified for inclusion in the network based on a strict interpretation of 'follow the associations'. As suggested in Chapter 3, a likely way of approaching this might be through work from the researcher to re-imagine or re-create that breakdown in a chain of associations in a way that highlights for informants that (meek) actors' exit from the action, and allows that indifference or inattentiveness to be recognised and re-told by informants. For example, this might require the researcher to seek out absences and re-construct counterfactuals of events where an actor might be expected to be. By replaying the (non)controversy for informants such the moment the (meek) actor disappeared may be identified. This necessarily recreates a controversy which may not have taken place in quite the same way before research began. Here, the researcher becomes a key component in that meek or silenced actor's assemblage, forcing it to the fore through their research activities. There are potentially two ways this is problematic. From a theoretical perspective, the status of re-creating controversy does not seem clear in ANT. If ANT requires describing a specific network of associations, expressing a counterfactual does not seem to correlate with that central rule of following the associations. In ANT, actors *are* their associations in a particular assemblage at a particular time. So, to generate an account of an arrangement of associations in a way counter to that assemblage seems difficult to align with ANT (Harman 2018).

If comparing informants accounts to possible absences or counterfactuals is potentially problematic from a theoretical perspective, it may still be a useful tool in prompting interviewees. However, there are also practical or methodological concerns. First, in looking for absences where traces of meek actors may have been, the researcher must be careful not to bring their own biases into play. This is something that the mantra of "follow the associations" aims to reduce but is now a risk as the researcher is no longer only following.

Moreover, to do this work the researcher must have some expertise to identify what might be missing from the network. For the study of new assessment frameworks like BREEAM Communities, this will be constrained by the relatively limited about of literature describing the implementation of neighbourhood sustainability frameworks. Indeed, ANT is thought to be particularly useful for studying new and innovative arrangements of actors where there may be smaller amounts of relevant research. Further, in this way is ANT perhaps limited in studying these sorts of voluntary assessment standards that may do "invisible work" (Lampland and Star 200, 148), appear to act in the margins (Garde 2009; Spinks 2013), and are designed to (meekly) nudge developments a little further than standard practice (as described in Chapter 5).

Recommendations for Practice

This project aimed to understand the implementation of BREEAM Communities such that recommendations for practice could be made. In Chapter 5 I presented a limited analysis of the fabrication and make-up of the standard which will inform the recommendations below. From Chapter 6, recommendations are made for those wishing to incorporate BREEAM Communities into local planning guidance. Finally, from Chapter 7, I present recommendations for those wishing to implement BREEAM Communities.

Recommendations for Adoption

This chapter has illuminated some of the ways BREEAM Communities comes to be associated with a development project. There are some things that seem to contribute to success:

- **Strong planning policy backing** – Eastleigh was the only local authority to consistently deliver BREEAM Communities developments and interviewees noted a strong policy backing, through inclusion in the Local Plan as an important factor.

- **Sustainability Champion** – adoption by a development was rarely the straightforward application of planning policy and negotiation led by a council officer, assessor, or developer was often necessary.

- **Wider support and helpful characterisation** – These negotiations were only successful where the sustainability champion (with support from BRE and evidence of BREEAM Communities' benefits and/or limited costs) enrolled relevant local authority actors in support of the standard. Also important was the way in which BREEAM Communities was characterised, with Authorities' viewing it as valuable but onerous struggling to gain wider support.

- **Long-term interest** – whether through council ownership or the desire for long-term stewardship of the site by the developer, a long-term interest by a key set of actors was often necessary. It's value in the short-term for-sale housing market did not seem to be established.

- **Clear planning guidance** – BREEAM Communities seems to have been undermined in several cases by inappropriate or vague planning guidance. Allowing equivalent standards without defining the terms of that equivalency has led to BREEAM Communities being undermined by less stringent assessments. Assigning thresholds for applying the standard based around its impact rather than the size of a site (often 100 dwellings) without defining 'impact' had led to variable interpretations. The multitude of ways BREEAM Communities defines the 'scale' of a development as described in Chapter 5 do not seem to have been incorporated into planning guidance. Lack of clarity about how BREEAM Communities interacts and overlaps with other sustainability standards allowed others to question its value and reject its usefulness.

- **Embeddedness in strong local assemblages** – more generally, to overcome the reluctance to enrolling BREEAM Communities into development projects the standard needed to be embedded in strong assemblages connected to the specific development site and the achievement of planning permission for that site. Even in sites where Communities was not a planning requirement, those in support of the

standard worked to associate it with the achievement of a particular local planning obligation (consultation and co-development at Case F, building sustainability at Case D).

Given the above, what does this mean for those wishing to promote the use of BREEAM Communities? First, it suggests that the barriers to including the standard more widely in planning guidance may be a lack of information and/or resources by local councils, rather than formidable opposition. The BRE also seem to play and important role and perhaps more structured intervention here would be helpful. For example, directly approaching more authorities and providing more evidence to persuade developers of Communities' value. Caution is needed, however, as this investigation has focused on those authorities where BREEAM Communities has been included in some way, and a broader study is required to better understand the lack of update among other planning authorities.

Second, it suggests the way BREEAM Communities is adopted into planning guidance is important. There is a balance to be struck between a nuanced policy and a more prescriptive requirement. Policies that allow flexibility between standards, that require Communities for sites based on their impact or significance rather than a hard limit (e.g., a size threshold seem to increase the risk of BREEAM Communities not being adopted by particular development projects, even if they seem like the *better* policy. Thought needs to be given to how BREEAM Communities could be challenged in its adoption. Thought also needs to be given as to how it interacts with other sustainability standards. This investigation has shown the risks of other standards with different scopes being used to undermine the position of BREEAM. Much effort in academia has been given to comparing neighbourhood planning schemes to each other, but there seems to be a potential gap in understanding how different types of sustainability standard can be best combined. For example, how should councils best combine Building for Life 12 or the Homes Quality Mark with BREEAM Communities or other neighbourhood plan schemes? How do these interact with areas of concern already within local planning guidance? And how can BREEAM Communities best be used to support other planning activities such as site selection or neighbourhood planning?

Thirdly, the ways BREEAM Communities is characterised within the council seem to matter. Both Eastleigh and Bristol produced calculations suggesting that Communities would not be difficult for developers to achieve; interviewees also seemed to believe that. In Weymouth and Bicester, interviewees seemed to characterise Communities as a more difficult feat. This may have contributed to their inability to persuade planning applicants to include it. Producing that evidence, persuading colleagues, and negotiating for Communities' inclusion in planning policy and applications clearly also requires resources, expertise, good relationships within and without the council, and so on, which is likely to affect the ways those tasks are approached. Building evidence in support of the costs and value of BREEAM Communities that can be easily accessed by local authorities and (importantly) can be adapted to different local contexts seems and important and fruitful endeavour.

Recommendations for Implementation

As with the last chapter, this investigation highlighted possible interventions that could improve BREEAM Communities' implementation.

- **Future facing criteria.** First, it is recommended that a greater number of criteria are explicitly linked to later design or development phases, such that actors are more strongly prescribed to bring future (resident) actors into current decision making, challenging otherwise obdurate assemblages. This would challenge the short-term thinking that often leads to conflict in urban development in the UK and unsustainable outcomes. This could mean: more consistency on how Step 1 criteria are linked to later ones (e.g., letter of commitment, section 106, through Compliance Notes in the manual, and so on); a greater number of requirements for 'on-site' control (beyond the site ecologist); the inclusion of post-occupancy certification and life-cycle analysis.

- **Good practice.** To more effectively problematize BREEAM Communities over other competing interests BRE and other could develop publicly available examples of good practice, particularly around the detail of weakly prescribed criteria rather than overarching 'case studies' (such as those available on the BRE website), and an increased commitment from BRE to increased scrutiny; this might also be helped by

removing conflicts of interest from the assessor and bringing them 'in house' at BRE. In this way they may be able to more robustly challenge decisions that are not "in the spirit" of the framework.

- **Local Authority engagement.** It is clear that the Local Authority has a role in defining not only an overall level of certification, but also the quality of that certification. It also can provide resources for the implementation of some criteria (for example, evidence for the Economic Strategy is gathered primarily from Local Authority sources). Local Authorities could engage more thoroughly in the implementation process to maximise their impact here.

- **BRE and assessor strictness.** There is evidence (in particular in the development of energy strategies, but also elsewhere) that BREEAM Communities is being retrofitted or improperly applied. This could be because of a lack of knowledge. However, a stricter, more muscular intervention by BRE (and assessors) in these cases may also help.

- **Post-Occupancy.** Eastleigh's commitment to an estimate of the final score on completion of Step 1 and a post-occupancy assessment should be replicated by other councils and considered by BRE within the next update to the Technical Manual.

- **Clarity on legal instruments**. Finally, guidance from BRE (built on best practice from current and past cases) on the most appropriate use of letter of commitment, S106, and other legal instruments might allow assessors to more strongly argue to bring forward decision making. As discussed in Chapter 5, this could also be improved in the Manual itself.

These recommendations are made in the hope that they might influence an update to the BREEAM Communities standard. However, it is hoped that these recommendations may also be of interest to those developing or implementing other similar, nonprescriptive, voluntary assessment frameworks.

Limitations

The Methodology (Chapter 4) discussed some possible limitations to this study and mitigations made against those. Here, I would like to discuss those issues that emerged during the course of the study (or those that I identified early and, unfortunately, correctly). I hope the reader will agree that these limitations do not significantly impact the usefulness of the research presented above. And that instead, overall, they provide useful lessons for future research.

ANT-like focus

This study has been primarily concerned with following the interactions of BREEAM Communities in its inclusion in particular planning policies and guidelines and its attempts to influence and assess urban development. This focus has allowed interviews to follow in detail the subtle ways BREEAM Communities acts (or fails to act). It doesn't allow, however, this to be set against a broader analysis of the development in question. Although this is in line with the theoretical framework followed, ANT does not preclude the casting of a wider net to identify possible relations – so long as those links are subsequently shown to be material. For example, the assumptions, calculations, models, and so on made by developers and contractors around land value and sale prices of completed dwellings likely provides a key consideration for decisions made about BREEAM Communities. Although keenly aware of the financial implications of technical decisions, interviewees nonetheless did not link decision-making around sustainability to cost directly, preferring to speak about technical considerations and developer 'ambition'. Despite my efforts, it proved difficult to develop these conversations further (beyond more euphemism) and access to financial documentation was not possible. A more comprehensive understanding the broader context of these development activities in a case might have led to alternative links being made. Or, an investigation that had greater direct access to economic decision-making, perhaps through more observations at key meetings and shadowing consultants as designs were drafted, would have allowed this (and other potentially as-yet unearthed links) to be analysed more robustly. And this access may have allowed difficult interviews to take a

different direction as specific questions could have been posed based on observations. To mitigate this, I asked probing questions regarding possible 'contextual' factors such as site size, ownership, financial arrangements, future plans, and so on. These conversations were occasionally fruitful. However, as proved with the close look at energy in Chapter 7, more detailed access to this information would have hopefully produced more interesting results here.

In a similar vein, a focus on BREEAM Communities criteria delivers an investigation of its role in a development across a range of issues. However, it does not present a rounded view of those issues, of which BREEAM Communities is but one part. An analysis of decision-making around one technical issue might have shone a different light on BREEAM Communities' interactions with the various guidance, regulations, rules of thumb, and so on that is it made to co-exist with. However, hopefully this study is a useful starting point for future researchers interested technical issues within the scope of BREEAM Communities.

The Devil is in the Detail

BREEAM Communities covers a very wide scope, comprising some 40 assessment issues at some depth – interviewees often remarked that for BREEAM Communities, "the Devil is in the details". Moreover, BREEAM Communities' impacts on development assemblages were often subtle and nuanced. This meant that some of the more fruitful aspects of this investigation has been exploring, in detail (at the level of individual criteria or even compliance notes) the small work done by BREEAM Communities and assessors to shape design decisions and calculations. In contrast, discussions about "BREEAM Communities" could be frustrating as interviewees struggled to speak about specific ways the standard intervened in their work (sometimes resorting to the above aphorisms). In some ways, this has delivered an investigation that is able to move between actors as they are invoked by interviewees, analysing interactions with "BREEAM Communities" or shifting to look at individual criteria, a landscape strategy, an assessor, and so on. It is hoped this approach has mitigated this to some degree, however, future studies might go further by focusing on one or two issues in greater detail, which would allow for more focused interviews.

A Future Research Agenda

This thesis has sought to better understand better the various ways BREEAM Communities acts and is acted upon. It has also highlighted many avenues for potential future research. Possible areas for further investigation include:

- **Outcomes of BREEAM Communities.** This study has brought to light the ways BREEAM Communities influences emerging designs and future design decisions (through "letters of commitment" and so on). This could be pursued further, looking at how it influences more detailed design phases, construction, and post-occupancy features and performance.

- **Conflicts.** In the discussion I argued BREEAM Communities seems to leave significant conflicts unaddressed. As such, it may fail to impact decision making in favour of sustainability. Some authors have sought to frame the implementation of these sustainability frameworks in an understanding of these wider politico-economic contexts (K. M. Davidson *et al*. 2012; K. Davidson 2014; Schweber 2017). Future research may test assumptions I have made above and identify ways neighbourhood sustainability frameworks might better overcome these conflicts.

- **Comparison with other (international) neighbourhood frameworks.** BREEAM Communities has been shown to have been developed primarily in the context of the English planning system (with mainly English stakeholders, Chapter 5). Future research should test whether the findings here are applicable to other frameworks. Moreover, this might suggest solutions to the limitations of BREEAM Communities identified in this study.

- **Community of Practice.** I have argued of the importance of strong supporting assemblages for BREEAM Communities. This includes the professional experience of assessors and their ability to learn lessons from past BREEAM Communities projects in solving contemporary problems. This is particularly important in BREEAM Communities because of the reliance of the framework on professional expertise in

mediating its definitions of sustainability. Similarly, assertions from BRE that improvements in sustainability should not cost more if win-win solutions developed early requires professional expertise to deliver. Although it was difficult to bring out precisely how actors' understanding and engagement with problem solving had an impact on sustainability outcomes, there were numerous examples of 'lip service' being paid and low levels of knowledge about BREEAM Communities. In most cases, these development projects were interviewees first encounter with the standard. Given the importance of this aspect of working with BREEAM Communities, future studies may wish to pay greater attention to the role of learning, experience, knowledge and know-how in the implementation of the standard. One way of more thoroughly investigating this might be to approach the study through the lens of the communities of practice literature. Following her own study on the implementation of BREEAM (at a building scale), Schweber (2017) has also shown how a Foucauldian framework may be used to investigate the embeddedness of BREEAM in and across specific communities of practice. However, there may be no need to divert from the ANT approach (see Fox 2000).

- **Procedural Criteria?** There does not seem to be agreement on the best sort of criteria or indicators for neighbourhood-scale sustainability. Wangel *et al*. (2016b) and Larsson (2016) are critical of the preponderance of 'process' criteria, arguing they undermine a meaningful assessment of sustainability. This might suggest a future version of the standard should focus more strongly on 'performance' and 'feature' type indicators (as defined in Chapter 5). Neuman and Churchill (2015) instead argue for *more* process factors but based on life-cycle accounting techniques, prescribing calculation stages in detail, "for example, is the rate of replenishment of the local water supply (aquifer, for example) of the structure the same after construction as before? Can the rate of waste production (carbon dioxide, trash, construction debris, etc.) be assimilated by the environment without harming it? Is the waste production converted to resource production, by using the wastes as inputs to other processes?"(Neuman and Churchill 2015, 475). This research, however, suggests that process-led criteria are important ways to enrol

actors that might not have had agency otherwise (particularly in consultation but also across many other ecological, economic, and social criteria). An alternative might be to develop a framework based on process-led Criteria that more strongly prescribe the terms by which a wide range of actors can contribute to the emerging definition of sustainability. This might mean removing qualifiers that weaken BREEAM Communities' ability to delegate agency (such as "as far as it possible", "should be", and so on). It could also mean setting clearer expectations of how information in Step 1 should be used in later design stages (instead of asking that designs "take into account" previous strategies or "integrate" parts of the design without defining the degree of integration). Lastly, it might include clarity in areas (such as unregulated energy, density, and shared streets) where criteria are less calculable. A future research project may wish to investigate how to balance this with the necessary adaptability of these sorts of standards.

Autobiographical reflection

Undertaking this study has been an invaluable learning experience in terms of my understanding of both the research process and the theory and implementation of sustainability, and of my personal and professional beliefs and practices.

Although there is some way to go, I have made leaps in my understanding of the nature of research. Some of the most useful advice I received was to not expect perfection but instead to see this PhD as an apprenticeship on my way to becoming a researcher; as much a process as a product. Looking at it in this way made making mistakes more palatable! But also allowed me to be more reflective on what I was learning as I progressed through this sometimes messy, frustrating, interesting, testing, fun, repetitive, rewarding experience.

I have also learned a great deal about the many difficulties of implementing improvements in sustainability as well as the dedication and passion of those involved (and the indifference of others!). Not only has this thesis (hopefully) been a valuable contribution to knowledge generally, it has also given me many lessons to apply to my professional practice in sustainability policy development. The importance of bringing together diverse groups of actors, for example, of the importance of solving the right problems, of the necessary hard work to form useful networks, and the valuable contribution of nonhuman allies in propagating and stabilising those networks.

Finally, it is worth saying that this has been the most difficult thing I have ever undertaken. It has exposed my strengths and weaknesses (brutally at times) under the (often self-imposed) pressure of creating something worthwhile, while learning how to conduct interviews, collate and analyse qualitative data, and write coherently and persuasively (often the most difficult task of all). Ultimately, it has been hugely rewarding. The generosity and patience of my tutor, colleagues, interviewees, friends and family has been affirming and at times humbling. In particular I'd like to thank my wife, Alex, who has been consistently supportive, comforting and encouraging over these last 5 years.

Bibliography

Abdalla, Gaby, Ger Maas, and Jules Huyghe. 2011. “Criticism on Environmental Assessment Tools.” 2nd International Conference on Environmental Science and Technology 6: 443–46.

Ahvenniemi, Hannele, Aapo Huovila, Isabel Pinto-Seppa, and Miimu Airaksinen. 2017. “What Are the Differences between Sustainable and Smart Cities?” Cities 60: 234–45. https://doi.org/10.1016/j.cities.2016.09.009.

Akrich, Madeleine, and Bruno Latour. 1992. “A Summary of a Convenient Vocabulary for the Semiotics of Human and Nonhuman Assemblies.” In Shaping Technology/ Building Society Studies in Sociotecnical Change, edited by Wiebe Bijker and John Law, 259–64. The MIT Press.

Alcouffe, Simon, Nicolas Berland, and Yves Levant. 2008. “Actor-Networks and the Diffusion of Management Accounting Innovations: A Comparative Study.” Management Accounting Research 19 (1): 1–17. https://doi.org/10.1016/j.mar.2007.04.001.

Ali-Toudert, Fazia, and Limei Ji. 2017. “Modeling and Measuring Urban Sustainability in Multi-Criteria Based Systems. A Challenging Issue.” Ecological Indicators 73: 597–611. https://doi.org/10.1016/j.ecolind.2016.09.046.

Ali, Hikmat H., and Saba F. Al Nsairat. 2009. “Developing a Green Building Assessment Tool for Developing Countries – Case of Jordan.” Building and Environment 44 (5): 1053–64. https://doi.org/10.1016/j.buildenv.2008.07.015.

Altomonte, Sergio, and Stefano Schiavon. 2013. “Occupant Satisfaction in LEED and Non-LEED Certified Buildings.” Building and Environment 68 (October): 66–76. https://doi.org/10.1016/j.buildenv.2013.06.008.

Alwaer, Husam, and R. David Kirk. 2015. “Matching a Community Assessment Tool to the Requirements of Practice.” ICE Proceedings.

Ameen, Raed Fawzi Mohammed, and Monjur Mourshed. 2017. “Urban Environmental Challenges in Developing Countries—A Stakeholder Perspective.” Habitat International 64: 1–10. https://doi.org/10.1016/j.habitatint.2017.04.002.

Ameen, Raed Fawzi Mohammed, Monjur Mourshed, and Haijiang Li. 2015. “A Critical Review of Environmental Assessment Tools for Sustainable Urban Design.” Environmental Impact Assessment Review 55: 110–25. https://doi.org/10.1016/j.eiar.2015.07.006.

Arora, Seema, and Shubhashis Gangopadhyay. 1995. "Toward a theoretical model of voluntary overcompliance." Journal of economic behavior and organization 28.3: 289-309.

Asdal, Kristin. 2008. “Enacting Things through Numbers: Taking Nature into Account/Ing.” Geoforum 39 (0016): 123–32. https://doi.org/10.1016/j.geoforum.2006.11.004.

Atlas.ti. 2015. “ATLAS.Ti: The Qualitative Data Analysis and Research Software.”. http://atlasti.com/.

Berardi, Umberto. 2013. “Sustainability Assessment of Urban Communities through Rating Systems.” Environment, Development and Sustainability, no. Ipcc 2007 (May). https://doi.org/10.1007/s10668-013-9462-0.

Berker, Thomas, and Stig Larssæther. 2017. “Two Exemplar Green Developments in Qualculation and Non-Qualculation.” In Actor Networks of Planning, edited by Yvonne Rydin.

Biernacki, Patrick, and Dan Waldorf. 1981. “Snowball Sampling.” Sociological Methods and Research 10 (2): 141–63.

Boelens, Luuk. 2010. “Theorizing Practice and Practising Theory: Outlines for an Actor-Relational-Approach in Planning.” Planning Theory 9 (1): 28–62. https://doi.org/10.1177/1473095209346499.

Boelens, Luuk. 2010. “Reflection on Yvonne Rydin’s Response to ‘Theorizing Practice and Practicing Theory.’” Planning Theory 9: 269–71. https://doi.org/10.1177/1473095210368769.

BRE. 2008. “BREEAM for Communities: Stage 2 Technical Guidance (2008) Manual” (May).

BRE. 2010. “Guidance for Local Planning Authorities Incorporating BREEAM and the Code for Sustainable Homes within Planning Policy.” (April).

BRE. 2012. “BREEAM Communities Technical Manual 1.1:2012”.

BRE. 2013. “BREEAM Communities - Integrating Sustainable Design into Masterplanning.” http://www.breeam.org/page.jsp?id=372.

BRE. 2014. “BREEAM UK New Construction 2014 Scheme Document”.

BRE. 2018. “BREEAM UK New Construction 2018 Scheme Assessment Timeline.” https://www.bregroup.com/brebreeam/wp-content/uploads/sites/3/2018/08/GN37_BREEAM_UK_New_Construction_2018_Scheme_Assessment_Timeline_v1.0.pdf.

Bristol City Council. 2011. “Climate Change and Sustainability.” http://eprints.soton.ac.uk/170561/.

Bristol City Council. 2019. “Bristol Local Plan Review: Responses to 2018 Consultation.”

Callon, Michael. 1986. “Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St. Brieuc Bay.” Power, Action, and Belief: A New Sociology of Knowledge 32: 196–223.

Callon, Michael, and John Law. 1997. “After the Individual in Society: Lessons on Collectivity from Science, Technology and Society.” Canadian Journal of Sociology 22 (2): 165–82. http://www.jstor.org/stable/3341747.

Callon, Michel, and John Law. 2005. “On Qualculation, Agency, and Otherness.” Environment and Planning D: Society and Space 23 (5): 717–33. https://doi.org/10.1068/d343t.

Callon, Michel, and Fabian Muniesa. 2005. “Peripheral Vision: Economic Markets as Calculative Collective Devices.” Organization Studies 26 (8): 1229–50. https://doi.org/10.1177/0170840605056393.

Carter, Timothy L. 2008. “Improving Development with Green Certification Programs.” Georgia: River Centre Basin.

Chandratilake, S.R., and W.P.S. Dias. 2013. “Sustainability Rating Systems for Buildings: Comparisons and Correlations.” Energy 59 (September): 22–28. https://doi.org/10.1016/j.energy.2013.07.026.

Cherwell District Council. 2016. “North West Bicester Supplementary Planning Document.”

Chrysochoou, Maria, Kweku Brown, Geeta Dahal, Catalina Granda-Carvajal, Kathleen Segerson, Norman Garrick, and Amvrossios Bagtzoglou. 2012. “A GIS and Indexing Scheme to Screen Brownfields for Area-Wide Redevelopment Planning.” Landscape and Urban Planning 105 (3): 187–98. https://doi.org/10.1016/j.landurbplan.2011.12.010.

Cidell, Julie, and Miriam a. Cope. 2013. “Factors Explaining the Adoption and Impact of LEED-Based Green Building Policies at the Municipal Level.” Journal of Environmental Planning and Management, no. October 2013 (October): 1–19. https://doi.org/10.1080/09640568.2013.835714.

CLJSPC. 2017. “Central Lincolnshire Local Plan.”

Cole, Raymond J., and Nils Larsson. 1997. “Green Building Challege ´98.” Proceedings of CIB 2nd International Conference on Buildings and the Environment 1: 19–29.

Conte, Emilia, and Valeria Monno. 2012. “Beyond the Building-centric Approach: A Vision for an Integrated Evaluation of Sustainable Buildings.” Environmental Impact Assessment Review 34 (April): 31–40. https://doi.org/10.1016/j.eiar.2011.12.003.

Darnall, Nicole, and Stephen Sides. 2008. “Assessing the Performance of Voluntary Environmental Programs: Does Certification Matter?” The Policy Studies Journal.

Davidson, Kathryn. 2014. “A Typology to Categorize the Ideologies of Actors in the Sustainable Development Debate.” Sustainable Development 22 (1): 1–14. https://doi.org/10.1002/sd.520.

Davidson, Kathryn M., Jon Kellett, Lou Wilson, and Stephen Pullen. 2012. “Assessing Urban Sustainability from a Social Democratic Perspective: A Thematic Approach.” Local Environment 17 (1): 57–73. https://doi.org/10.1080/13549839.2011.631990.

Department for Communities and Local Government. 2012. “National Planning Policy Framework.”

Dicicco-Bloom, Barbara, and Benjamin F Crabtree. 2006. “The Qualitative Research Interview.” Medical Education 40 (4): 314–21. https://doi.org/10.1111/j.1365-2929.2006.02418.x.

Doak, Joe, and Nikos Karadimitriou. 2007. "(Re) development, complexity and networks: a framework for research." Urban Studies 44.2: 209-229.

Eastleigh Borough Council. 2009. “Environmentally Sustainable Development: Supplementary Planning Document.” Eastleigh.

Eberl, Sebastian. 2007. "DGNB vs. LEED: A comparative analysis." Conference on Central Europe towards Sustainable Building.

Edwards, Richard, and Katherine Nicoll. 2004. “Mobilizing Workplaces: Actors, Discipline and Governmentality.” Studies in Continuing Education 26 (February 2015): 159–73. https://doi.org/10.1080/158037042000225191.

Egan, John. 2004. “Skills for Sustainable Communities.” The Egan Review 2: 1–21, 103–4. http://dera.ioe.ac.uk/11854/1/Egan_Review.pdf.

Ehrenstein, Véra, and Fabian Muniesa. 2013. "The conditional sink: counterfactual display in the valuation of a carbon offsetting reforestation project." Valuation Studies 1.2: 161-188.

Eichholtz, Piet, Nils Kok, and John M Quigley. 2009. “Doing Well by Doing Good? Green Office Buildings,” (August).

Elgert, Laureen. 2016. “The Double Edge of Cutting Edge: Explaining Adoption and Nonadoption of the STAR Rating System and Insights for Sustainability Indicators.” Ecological Indicators 67: 556–64. https://doi.org/10.1016/j.ecolind.2016.02.051.

Farias, Ignacio, and Thomas Bender. 2010. Urban Assemblages: How Actor-Network Theory Changes Urban Studies. Edited by Ignacio Farias and Thomas Bender. Routledge.

Farrell, Terry. 2010. “Growing Existing Communities. An Holistic Approach.”

February, Consultation. 2018. “Bristol Local Plan Review,” (February).

Fischer, J., and Simon Guy. 2009. “Re-Interpreting Regulations: Architects as Intermediaries for Low-Carbon Buildings.” Urban Studies 46 (12): 2577–94. https://doi.org/10.1177/0042098009344228.

Fox, Stephen. 2000. “Communities of Practice, Foucault and Actor-Network Therory.” Journal of Management Studies 37 (September): 853–868. https://doi.org/10.1111/1467-6486.00207.

Fuerst, Franz, and Patrick McAllister. 2011. “The Impact of Energy Performance Certificates on the Rental and Capital Values of Commercial Property Assets.” Energy Policy 39 (10): 6608–14. https://doi.org/10.1016/j.enpol.2011.08.005.

Garde, Ajay. 2009. “Sustainable by Design?: Insights From U.S. LEED-ND Pilot Projects.” Journal of the American Planning Association. https://doi.org/10.1080/01944360903148174.

Goh, Cheng Siew, and Steve Rowlinson. 2013. “The Roles of Sustainability Assessment Systems in Delivering Sustainable Construction.” In 29th Annual ARCOM Conference, 1363–71.

Gouda, Amr Ah., and Houshmand E. Masoumi. 2016. “Sustainable Transportation According to Certification Systems: A Viability Analysis Based on Neighborhood Size and Context

Relevance.” Environmental Impact Assessment Review 63: 147–59. https://doi.org/10.1016/j.eiar.2016.10.005.

Goulden, Shula. 2016. “Constructing ‘Green Building’: Heterogeneous Networks and the Translation of Sustainability into Planning in Israel.” In Actor Networks of Planning2, edited by Yvonne Rydin and Laura Tate, 27–43. Taylor and Francis.

Goulden, Shula, Evyatar Erell, Yaakov Garb, and David Pearlmutter. 2017. “Green Building Standards as Socio-Technical Actors in Municipal Environmental Policy.” Building Research and Information 45 (4): 414–25. https://doi.org/10.1080/09613218.2015.1116844.

Grandclément, Catherine, Andrew Karvonen, and Simon Guy. 2014. “Negotiating Comfort in Low Energy Housing: The Politics of Intermediation.” Energy Policy, 1–10. https://doi.org/10.1016/j.enpol.2014.11.034.

Grant, Cynthia, and Azadeh Osanloo. 2014. “Understanding, Selecting, and Integrating a Theoretical Framework in Dissertation Research.” Administrative Issues Journal 4 (12): 12–26. https://doi.org/10.5929/2014.4.2.9.

Grant, J., and S. Tsenkova. 2012. New Urbanism and Smart Growth Movements. International Encyclopedia of Housing and Home. Vol. 5. Elsevier Ltd. https://doi.org/10.1016/B978-0-08-047163-1.00494-X.

Green Building Council of Australia. 2013. “Green Building Council of Australia The Value of Green Star - A Decade of Environmental Benefits,” (May).

Guest, Greg, Arwen Bunce, and Laura Johnson. 2006. “How Many Interviews Are Enough?: An Experiment with Data Saturation and Variability.” Field Methods 18 (1): 59–82. https://doi.org/10.1177/1525822X05279903.

Guy, Simon, and John Henneberry. 2000. “Understanding Urban Development Processes: Integrating the Economic and the Social in Property Research.” Urban Studies 37 (13): 2399–2416. https://doi.org/10.1080/00420980020005398.

Guy, Simon, and Andrew Karvonen. 2010. “Using Sociotechnical Methods: Researching Human-Technological Dynamics in the City.” In Understanding Social Research: Thinking Creatively about Method, 120–33.

Haapio, Appu. 2012. “Towards Sustainable Urban Communities.” Environmental Impact Assessment Review 32 (1): 165–69. https://doi.org/10.1016/j.eiar.2011.08.002.

Haapio, Appu, and Pertti Viitaniemi. 2008. “A Critical Review of Building Environmental Assessment Tools.” Environmental Impact Assessment Review 28 (7): 469–82. https://doi.org/10.1016/j.eiar.2008.01.002.

Hagen-Zanker, Jessica, and Richard Mallett. 2013. “How to Do a Rigorous, Evidence-Focused Literature Review in International Development.” London: Overseas Development Institute.

Hamedani, A Zeinal, and F Huber. 2012. “A Comparative Study of ‘DGNB’ Certificate System in Urban Sustainability.” In WIT Transactions on Ecology and the Environment, 121–32. https://doi.org/10.2495/SC120111.

Harman, Graham. 2018. Object-Oriented Ontology: A New Theory of Everything. Penguin Random House UK.

HC WS. 2019. “Planning Update: Written Statement 1408 13 March 2019.” 2019. https://www.parliament.uk/business/publications/written-questions-answers-statements/written-statement/Commons/2019-03-13/HCWS1408/.

Healey, Patsy. 1991. “Models of the Development Process: A Review.” Journal of Property Research 8: 219–38.

Healey, Patsy. 1992. “An Institutional Model of the Development Process.” Journal of Property Research 9 (1): 33–44. https://doi.org/10.1080/09599919208724049.

Higgins, Winton, and Kristina Tamm Hallström. 2007. "Standardization, globalization and rationalities of government." Organization 14.5: 685-704.

Hoffman, Andrew, and Rebecca Henn. 2008. “Overcoming the Social and Psychological Barriers to Green Building.” Environmental Studies 21 (4): 390–419.

Hojem, Thea S. M., Knut H. Sørensen, and Vivian a. Lagesen. 2014. “Designing a ‘Green’ Building: Expanding Ambitions through Social Learning.” Building Research and Information 42 (February 2015): 591–601. https://doi.org/10.1080/09613218.2014.905168.

Hommels, Anique. 2010. “Changing Obdurate Urban Objects: The Attempts to Reconstruct the Highway through Maastricht.” In Urban Assemblages: How Actor-Network Theory Changes Urban Studies, 139–60.

Hooper, A. 1992. “The Construction of Theory: A Comment.” Journal of Property Research 9: 45–48.

Heuts, Frank, and Annemarie Mol. 2013. "What is a good tomato? A case of valuing in practice." Valuation Studies 1.2: 125-146

Ismail, M.H., J. Doak, D. Nicholson, R. Yao, and A. Yates. 2012. “Sustainable Community Tools: What Do Tool Users Really Want?” 2012 (April 2012): 1–15.

Jacobs, Jane. 1992. The Death and Life of Great American Cities. 1961. New York: Vintage.

Joss, Simon. 2012. “Bellagio Conference Report.” In Tomorrow’s City Today Eco-City Indicators, Standards, and Frameworks., edited by Simon Joss. University of Westminster.

Joss, Simon, Robert Cowley, Martin de Jong, Bernhard Muller, Soon Buhm Park, William Rees, Mark Roseland, and Yvonne Rydin. 2015. “Tomorrow’s City Today: Prospects for Standardising Sustainable Urban Development.” London. https://ecocitiesorg.files.wordpress.com/2018/07/frameworks-7178_tomorrowscitiestoday.pdf.

Joss, Simon, and Yvonne Rydin. 2018 "Prospects for standardising sustainable urban development." In *Routledge Handbook of Sustainability Indicators*: 364-378. Routledge.

Kaur, Harsimran, and Pushplata Garg. 2019. “Urban Sustainability Assessment Tools: A Review.” Journal of Cleaner Production 210: 146–58. https://doi.org/10.1016/j.jclepro.2018.11.009.

King, Lester O. 2016. “Functional Sustainability Indicators.” Ecological Indicators 66: 121–31. https://doi.org/10.1016/j.ecolind.2016.01.027.

Kochan, Ben. 2002. “ODPM: Housing, Planning Local Government and the Regions.” Parliamentary Committees Archive: Committee on the Office of the Deputy Prime Minister. 2002. http://www.parliament.uk/business/committees/committees-archive/odpm/021003/.

Komeily, Ali, and Ravi S. Srinivasan. 2015. “A Need for Balanced Approach to Neighborhood Sustainability Assessments: A Critical Review and Analysis.” Sustainable Cities and Society 18: 32–43. https://doi.org/10.1016/j.scs.2015.05.004.

Kyrkou, Dimitra, and Roland Karthaus. 2011. “Urban Sustainability Standards: Predetermined Checklists or Adaptable Frameworks?” Procedia Engineering 21 (January): 204–11. https://doi.org/10.1016/j.proeng.2011.11.2005.

Kysh, Lynn. 2013. “What’s in a Name? The Difference between a Systematic Review and a Literature Review and Why It Matters.” In Poster Presented at Medical Library Group of Southern California and Arizona (MLGSCA) and the Northern California and Nevada Medical Library Group (NCNMLG) Joint Meeting. La Jolla, CA. https://libguides.sjsu.edu/c.php?g=230370andp=1528399.

Lam, Patrick T I, Edwin H W Chan, C S Poon, C K Chau, and K P Chun. 2010. “Factors Affecting the Implementation of Green Specifications in Construction.” Journal of Environmental Management 91 (3): 654–61. https://doi.org/10.1016/j.jenvman.2009.09.029.

Lampland, Martha, and Susan Leigh Star, eds. 2009. Standards and their stories: How quantifying, classifying, and formalizing practices shape everyday life. Cornell University Press.

Larsson, Nils. 2016. “Moving Performance Analysis from Buildings to Small Urban Areas.” In International Initiative for a Sustainable Built Environment.

Latour, Bruno, Philippe Mauguin, and Geneviève Teil. 1992. "A note on socio-technical graphs." Social Studies of Science 22.1: 33-57.

Latour, Bruno. 1996. Aramis or The Love of Technology. Illustrate. Harvard University Press.

Latour, Bruno. 1999. "Circulating reference: Sampling the soil in the Amazon forest." Pandora’s hope: Essays on the reality of science studies: 24-79.

Latour, Bruno. 2005. Reassembling the Social: An Introduction to Actor-Network-Theory. Oxford, UK: Oxford University Press.

Lave, Jean, and Etienne Wenger. 1991. “Situating Learning in Communities of Practice.” In Situated Learning: Legitimate Peripheral Participation.

Lee, Guerin, S. Young, and A. Denise. 2010. “Indoor Environmental Quality Differences between Office Types in LEED-Certified Buildings in the US.” Building and Environment 45 (5): 1104–12. https://doi.org/10.1016/j.buildenv.2009.10.019.

Lee, W. 2013. “A Comprehensive Review of Metrics of Building Environmental Assessment Schemes.” Energy and Buildings 62 (July): 403–13. https://doi.org/10.1016/j.enbuild.2013.03.014.

Lee, W., and J. Burnett. 2008. “Benchmarking Energy Use Assessment of HK-BEAM, BREEAM and LEED.” Building and Environment 43 (11): 1882–91. https://doi.org/10.1016/j.buildenv.2007.11.007.

Lee, W., C.K. Chau, F.W.H. Yik, J. Burnett, and M.S. Tse. 2002. “On the Study of the Credit-Weighting Scale in a Building Environmental Assessment Scheme.” Building and Environment 37 (12): 1385–96. https://doi.org/10.1016/S0360-1323(02)00006-9.

Li, Yuanyuan, Xiaochen Chen, Xiaoyu Wang, Youquan Xu, and Po-Han Chen. 2017. “A Review of Studies on Green Building Assessment Methods by Comparative Analysis.” Energy and Buildings 146: 152–59. https://doi.org/10.1016/j.enbuild.2017.04.076.

Lindberg, Kajsa, Alexander Styhre, and Lars Walter. 2012. Assembling Health Care Organization: Practice, Materiality and Institutions. New York: Palgrave Macmillan.

Lovell, Heather, and Susan J. Smith. 2010. “Agencement in Housing Markets: The Case of the UK Construction Industry.” Geoforum 41 (3): 457–68. https://doi.org/10.1016/j.geoforum.2009.11.015.

Luederitz, Christopher, Daniel J. Lang, and Henrik Von Wehrden. 2013. “A Systematic Review of Guiding Principles for Sustainable Urban Neighborhood Development.” Landscape and Urban Planning 118 (October): 40–52. https://doi.org/10.1016/j.landurbplan.2013.06.002.

Lützkendorf, Thomas, and David Lorenz. 2011. “Capturing Sustainability-Related Information for Property Valuation.” Building Research and Information 39 (3): 256–73.

Lynch, Tony. 2000. “Writing up Your PhD.” San Francisco Jung Institute Library Journal 18 (3): 55–73. https://doi.org/10.1525/jung.1.2000.18.3.55.

Mann, Peter H. 1985. Methods of Social Investigation. 2nd ed. Oxford: Basil Blackwell.

Marshall, Catherine, and Gretchen B. Rossman. 1989. Design Qualitative Research. Sage.

Mason, Mark. 2010. “Sample Size and Saturation in PhD Studies Using Qualitative Interviews.” Forum: Qualitative Social Research 11 (3): Art. 8. http://nbn-resolving.de/urn:nbn:de:0114-fqs100387.

Metzger, J. 2011. “Dispatches from a Time Capsule? Moving the ANT, Normativity and Democracy Discussion Ten Years down the Road: An Intervention in the Boelens-Rydin-Webb Debate.” Planning Theory 10: 288–95. https://doi.org/10.1177/1473095210393422.

Morton, Timothy. 2013. Hyperobjects: Philosophy and Ecology after the End of the World. University of Minnesota Press.

Nassar, Khaled. 2011. “Developing a Green Building Rating System for Egypt.”

Neuman, Micheal, and Stuart W. Churchill. 2015. “Measuring Sustainability.” Town Planning Review 86 (4): 457–82. https://doi.org/http://dx.doi.org/10.3828/tpr.2015.28.

P3Eco Group. n.d. “P3Eco Projects.” P3Eco Group Web Page. http://www.p3group.co.uk/nw_bicester.php.

Patton, Michael Quinn. 2002. Qualitative Research and Evaluation Methods. 3rd ed. Thousand Oaks, CA: SAGE.

Pickles, Eric. 2015. “Written Statement Planning Update March 2015.” Department for Communities and Local Government. 2015. https://www.gov.uk/government/speeches/planning-update-march-2015.

Pineo, Helen. 2012. “BREEAM Communities 2012 Presentation.”

Planning Resource. 2018. “Garden Village Judged out of Line with Plan Policies.” PlanningResource.Co.Uk. 2018. https://www.planningresource.co.uk/article/1457032/garden-village-judged-line-plan-policies.

Retzlaff, R. C. 2009. “The Use of Leed in Planning and Development Regulation: An Exploratory Analysis.” Journal of Planning Education and Research, August. https://doi.org/10.1177/0739456X09340578.

Rutland, Ted, and Alex Aylett. 2008. “The Work of Policy: Actor Networks, Governmentality, and Local Action on Climate Change in Portland, Oregon.” Environment and Planning D: Society and Space 26 (4): 627–46. https://doi.org/10.1068/d6907.

Rydin, Yvonne. 2007. “Re-Examining the Role of Knowledge within Planning Theory.” Planning Theory 6 (1): 52–68.

Rydin, Yvonne. 2010a. “Actor-Network Theory and Planning Theory: A Response to Boelens.” Planning Theory 9 (3): 265–68. https://doi.org/10.1177/1473095210368772.

Rydin, Yvonne. 2010b. Governance for Sustainable Development.

Rydin, Yvonne. 2012. “Using Actor-Network Theory to Understand Planning Practice: Exploring Relationships between Actants in Regulating Low-Carbon Commercial Development.” Planning Theory 12 (1): 23–45. https://doi.org/10.1177/1473095212455494.

Rydin, Yvonne. 2013. The Future of Planning: Beyond Growth Dependence. Bristol: Policy Press.

Rydin, Yvonne, and Laura Tate, eds. 2016. Actor Networks of Planning. 1st ed. London: Routledge. https://doi.org/10.4324/9781315714882.

Säynäjoki, Eeva, Riikka Kyrö, Jukka Heinonen, and Seppo Junnila. 2012. “An Assessment of the Applicability of Three International Neighbourhood Sustainability Rating Systems to Diverse Local Conditions, with a Focus on Nordic Case Areas.” International Journal of Sustainable Building Technology and Urban Development 3 (2): 92–100.

Schindler, Sarah B. 2010. “Following Industry’s LEED: Municipal Adoption of Private Green Building Standards.” Florida Law Review 62 (2): 285–350.

Schweber, Libby. 2013. “The Effect of BREEAM on Clients and Construction Professionals.” Building Research and Information 41 (2): 37–41. https://doi.org/10.1080/09613218.2013.768495.

Schweber, Libby. 2017. “Jack-in-the-Black-Box: Using Foucault to Explore the Embeddedness and Reach of Building Level Assessment Method.” Energy Research and Social Science 34 (August): 294–304. https://doi.org/10.1016/j.erss.2017.08.005.

Schweber, Libby, and Hasan Haroglu. 2014. “Comparing the Fit between BREEAM Assessment and Design Processes.” Building Research and Information 42 (3): 300–317. https://doi.org/10.1080/09613218.2014.889490.

Schweber, Libby, and Chris Harty. 2010. “Actors and Objects: A Socio-technical Networks Approach to Technology Uptake in the Construction Sector.” Construction Management and Economics 28 (6): 657–74. https://doi.org/10.1080/01446191003702468.

Sharifi, Ayyoob. 2015. “From Garden City to Eco-Urbanism: The Quest for Sustainable Neighborhood Development.” Sustainable Cities and Society. https://doi.org/10.1016/j.scs.2015.09.002.

Sharifi, Ayyoob, and Akito Murayama. 2013. “A Critical Review of Seven Selected Neighborhood Sustainability Assessment Tools.” Environmental Impact Assessment Review 38 (January): 73–87. https://doi.org/10.1016/j.eiar.2012.06.006.

Sharifi, Ayyoob. 2014. “Neighborhood Sustainability Assessment in Action: Cross-Evaluation of Three Assessment Systems and Their Cases from the US, the UK, and Japan.” Building and Environment 72: 243–58. https://doi.org/10.1016/j.buildenv.2013.11.006.

Shen, Li-Yin, J. Jorge Ochoa, Mona N. Shah, and Xiaoling Zhang. 2011. “The Application of Urban Sustainability Indicators – A Comparison between Various Practices.” Habitat International 35 (1): 17–29. https://doi.org/10.1016/j.habitatint.2010.03.006.

Silverman, David. 2012. Doing Qualitative Research: A Practical Handbook. 4th ed. London: SAGE.

Sismondo, Sergio. 2010. An Introduction to Science and Technology Studies. Chichester: Wiley-Blackwell. (Second Edition).

Spinks, Martine. 2011. “Adoption of a Network Approach to Sustainable Building Standard Process, Not Product: A Response Column to ‘A Political-Ecology of the Built Environment: LEED Certification for Green Buildings’, Cidell, 2009, Local Environment, 14(7), Pp. 621–633.” Local Environment 16 (1): 87–92. https://doi.org/10.1080/13549839.2010.541232.

Spinks, Martine. 2013. “Understanding and Actioning BRE Environmental Assessment Method: A Socio-Technical Approach.” Local Environment 0 (0): 1–18. https://doi.org/10.1080/13549839.2013.838212.

Strebel, Ignaz. 2011. “The Living Building: Towards a Geography of Maintenance Work.” Social and Cultural Geography 12 (3): 243–62. https://doi.org/10.1080/14649365.2011.564732.

Strum, Shirley S., and Bruno Latour.1987. "Redefining the social link: from baboons to humans." Information (International Social Science Council) 26.4: 783-802.

Sykes, Judith. 2017. “University of Bristol Temple Quarter Enterprise Campus Sustainability Brief September 2017.”

Tait, Malcolm. 2002. "Room for manoeuvre? An actor-network study of central-local relations in development plan making." Planning Theory and Practice 3.1: 69-85.

Timmermans, Stefan, and Steven Epstein. 2010. "A world of standards but not a standard world: Toward a sociology of standards and standardization." Annual review of Sociology 36: 69-89.

UK Government. 2015. “2010 to 2015 Government Policy: Building Regulation.” UK Government Website. 2015. https://www.gov.uk/government/publications/2010-to-2015-government-policy-building-regulation/2010-to-2015-government-policy-building-regulation.

Venou, Athina. 2014. “Investigation of the ‘BREEAM Communities’ Tool with Respect to Urban Design.” Masters Thesis. Stockholm.

Vuokko, Riikka, and Helena Karsten. 2007. "Working with technology in complex networks of interaction." IFIP International Working Conference on Organizational Dynamics of Technology-Based Innovation. Springer, Boston, MA.

Walker, Gordon, Andrew Karvonen, and Simon Guy. 2015a. “Reflections on a Policy Denouement: The Politics of Mainstreaming Zero-Carbon Housing.” Transactions of the Institute of British Geographers 41 (1): 104–6. https://doi.org/10.1111/tran.12104.

Walker, Gordon, Andrew Karvonen, and Simon Guy. 2015b. “Zero Carbon Homes and Zero Carbon Living: Sociomaterial Interdependencies in Carbon Governance.” Transactions of the Institute of British Geographers 40 (4): 494–506. https://doi.org/10.1111/tran.12090.

Wallhagen, Marita, Mauritz Glaumann, Ola Eriksson, and Ulla Westerberg. 2013. “Framework for Detailed Comparison of Building Environmental Assessment Tools.” Buildings 3: 39–60. http://www.researchgate.net/profile/Marita_Wallhagen2/publications.

Wallhagen, Marita, Tove Malmqvist, and Ola Eriksson. 2016. “Professionals’ Knowledge and Use of Environmental Assessment in an Architectural Competition.” Building Research and Information 3218 (March): 1–17. https://doi.org/10.1080/09613218.2015.1118264.

Wangel, Josefin, Marita Wallhagen, Tove Malmqvist, and Göran Finnveden. 2016b. “Certification Systems for Sustainable Neighbourhoods: What Do They Really Certify?” Environmental Impact Assessment Review 56: 200–213. https://doi.org/10.1016/j.eiar.2015.10.003.

WDDC, and WPBC. 2015. “West Dorset, Weymouth and Portland Local Plan, 2011-2013 (Adopted October 2015).” https://www.dorsetforyou.gov.uk/article/421631/West-Dorset-Weymouth--Portland-Adopted-Local-Plan.

Wenger, Etienne. 2003. “Communities of Practice and Social Learning Systems.” In Knowing in Organizations: A Practice-Based Approach, edited by D. Nicolini, S. Gherardi, and D. Yanow, 176–99. New York: M.E. Sharpe, Inc.

Wenger, Etienne. 2006. “Communities of Practice: A Brief Introduction.”

Woolgar, Steven. 1991. “Configuring the User: The Case of Usability Trials.” In A Sociology of Monsters, edited by John Law, 58–99. London: Routledge.

Wouters, Marc, and Maximilian Sandholzer. 2018. "How an industry standard may enhance the mediating capacity of calculations: Cost of ownership in the semiconductor industry." Management Accounting Research 39: 47-63.

WWF-UK. 2006. “One Million Sustainable Homes, Moving Sustainable Homes from the Fringes to the Mainstream of UK Housing. Project Number 2236/December 2006,” no. August.

Yaneva, Albena. 2009. “Making the Social Hold: Towards an Actor-Network Theory of Design.” Design and Culture 1 (3): 273–88. https://doi.org/10.2752/174967809X12556950208826.

Yin, Robert K. 2009. Case Study Research: Design and Methods. Sage. (4th edition).

Zhao, Jie, and Khee Poh Lam. 2012. “Influential Factors Analysis on LEED Building Markets in U.S. East Coast Cities by Using Support Vector Regression.” Sustainable Cities and Society 5 (December): 37–43. https://doi.org/10.1016/j.scs.2012.05.009.

Zuo, Jian, and Zhen-Yu Zhao. 2014. “Green Building Research–Current Status and Future Agenda: A Review.” Renewable and Sustainable Energy Reviews 30 (February): 271–81. https://doi.org/10.1016/j.rser.2013.10.021.