OBSTACLES AND SOLUTIONS TO MAXIMISING URBAN BIODIVERSITY THROUGHOUT THE LIFECYCLES OF MAJOR DEVELOPMENTS IN ENGLAND

HELEN CHRISTINE BARBER

Doctor of Philosophy (by Research)

ASTON UNIVERSITY

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ABSTRACT

Thus far, achieving net biodiversity gains through major urban developments has been neither common nor straightforward - despite the presence of incentives, regulatory contexts, and ubiquitous practical guidance tools. A diverse set of obstructions, occurring within different spatial, temporal and actor hierarchies, are experienced by practitioners and render the realisation of maximised biodiversity, a rarity. This research aims to illuminate why this is so, and what needs to be changed to rectify the situation.

To determine meaningful findings and conclusions, capable of assisting applied contexts and accommodating a diverse range of influences, a 'systems approach' was adopted. This approach led to the use of a multi-strategy research methodology, to identify the key obstructions and solutions to protecting and enhancing biodiversity - incorporating the following methods: action research, a questionnaire to local government ecologists, interviews and personal communications with leading players, and literature reviews. Nevertheless, 'case studies' are the predominant research method, the focus being a 'nested' case study looking at strategic issues of the largest regeneration area in Europe 'the Thames Gateway', and the largest individual mixed-use mega-development in the UK (at the time of planning consent) 'Eastern Quarry 2' - set within the Gateway. A further key case study, focussing on the Central Riverside development in Sheffield, identifies the merits of competition and partnership.

The nested cases, theories and findings show that the strategic scale - generally relating to governance and prioritisation - impacts heavily upon individual development sites. It also enables the identification of various processes, mechanisms and issues at play on the individual development sites, which primarily relate to project management, planning processes, skills and transdisciplinary working, innovative urban biodiversity design capabilities, incentives, organisational cultures, and socio-ecological resilience. From these findings a way forward is mapped, spanning aspects from strategic governance to detailed project management.

KEYWORDS: Urban nature, mega-development, socio-ecological resilience, governance, project management.

DEDICATED TO:

My dear parents, for facilitating my early appreciation of nature, and always being at the end of a telephone; and Harshada Deshpande and Debabardhan Upadhyaya, for being the most supportive and kindest friends anyone could ever wish for.

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Thanks are also due to the numerous academics and professionals who spared their valuable time in pursuit of furthering the knowledge and applicability of this research. These individuals are included within the references as personal communications. To all of them, I am indebted, although some specific individuals provided illuminating theoretical or data contributions, which significantly shaped the research. The interview notes of these 'key' research interviewees are included in *Appendix three*.

I am also grateful to the following organisations: the Association of Local Government Ecologists (ALGE) who helpfully allowed me to access their contact records for a research questionnaire; the Man and Biosphere UK Urban Forum who were particularly helpful in feedback and research interviews, following a research presentation I delivered at their forum meeting; and Salford University's International Urban Nature Research Network, for providing related contacts, information and guidance.

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1 INTRODUCTION

1.1 CONTEXTUAL BACKGROUND

1.1.1 Global Biodiversity Loss and Human Density

We are currently living within the Holocene / Anthropocene extinction phase, which most scientists list as the 6th biggest extinction phase of *flora* and *fauna* known to the globe (Eldridge, 2001; Wilson, 1992). These extinctions are predominantly due to anthropogenic activity and have dramatically accelerated over the last 300 years, now known as the 'biodiversity crisis' (Kirch, 2005), with the last 50 years having seen the most rapid transformation of the biosphere ever occurring in human history (Steffen *et al*, 2004). Some experts calculate the rate at which species are becoming extinct at 1,000 to 10,000 times higher than would be the natural rate, without human impact (EUROPA, 2004), with approximately 100 species becoming extinct each day (Li *et al*, 2006 p.189).

The crux of this crisis has been the generally exponentially increasing human population density (Barber, 2009), with human population being greater than this rate from about 1400 to 1970 (Cohen, 1995). Within a 50 year period the human population has risen from 2.5 billion in the early 1950's to 6.2 billion by the new millennium (Li *et al*, 2007). Indeed, England already has the third highest population density in Europe (390 people per km^2, (ONS, 2007)), and this has been predicted to expand to a total population of 55 million by 2026 (Barker, 2006). The Office of National Statistics' (ONS) latest long-term forecasts envisage a total UK population of up to 85 million by 2081 (Gillman, 2007).

1.1.2 Urbanisation and Human Valuation of Biodiversity

The theoretical day where global population first became more urban than rural, was predicted as May 23rd, 2007 (Wimberley, 2007). However, in developed countries, approximately three-quarters of the human population resided in urban areas in 2005 (United Nations, 2006; Yli-Pelkonen, 2008 p.345). This ratio was pronounced in countries with the highest densities, such as England, which had 89.7% (United Nations, 2006).

Urbanisation was formally recognised as an issue, when the initial HABITAT conference was held in Vancouver in June 1976, which first placed it on the global development agenda (UN-HABITAT, 2006). The ongoing need for development, driven by the rate of urbanisation (whether residential, services, infrastructure, or other), results in habitat destruction and other detrimental effects to biodiversity through the causation and exacerbation of: climate change; pollution; depleted

resources; disturbance and fragmented habitats. The anthropogenic changes resulting from urbanisation, produce ecosystem dynamics that feed back to influence resource availability and human well-being (Grimm *et al*, 2008a).

Our responses to urbanisation can positively or negatively affect this biodiversity predicament, indicating a need to provide for biodiversity in 'all' new development schemes, in order to mitigate and redress the global balance, through collective local actions (i.e. 'think global act local'). Urbanisation is an important land-use change globally, with serious environmental consequences. Despite this, knowledge regarding ecosystem responses and socio-ecological issues related to urbanisation is limited, and currently based upon individual and often non-representative and anomalous case studies (Grimm *et al*, 2008b).

To a considerable number of countries, the direct link between human actions and the rapid rate of biodiversity loss and extinction, is untenable - enough to exert a moral obligation to halt this rate of loss. This is demonstrated by the fact that all of the Parties to the Convention on Biological Diversity (CBD) committed themselves to achieving the 2010 target to: 'halt biodiversity loss by 2010 and beyond' - adopted at the sixth conference of the parties to the Convention on Biological Diversity, at the Haugue, 2002. Moreover, in 2003 fifty one countries serviced by the United Nations Economic Commission for Europe (UNECE), adopted the 'Kyiv Resolution on Biodiversity' at the fifth Ministerial Conference "Environment for Europe", which 'reinforced' this objective (CBD, 2009). Furthermore, a significant number of UK residents hold ecocentric views (where the 'intrinsic' worth of biodiversity and nature is valued). This is evidenced, for example, through the membership of wildlife related charities, with in excess of 1 million members of the Royal Society for the Protection of Birds alone (RSPB, 2010); or through other examples of non-economic motives for Willingness To Pay (WTP) for ecological benefits (Spash, 2000; VALUE, 2010).

In addition to these ethical reasons for halting global biodiversity loss, there are also anthropocentric reasons, which relate to the services provided to humans by biodiversity and nature, e.g. air quality, food, pollination of food sources, medicines, recreation, timber and other materials, to name but a few. 'Urban' biodiversity in particular, provides humans with a wide-range of these ecosystem services (MEA, 2005). As urban areas increase, it is critical to the health of the communities of people who live within them, to accommodate survival opportunities for biodiversity. *Chapter four:* 'Urban Biodiversity' provides further contextual background and discussion upon valuation approaches.

1.1.3 Biodiversity and the Development Process

Concerns over: limited land supply; increased demand for land; availability of relevant professionals; and the efficiency of the development planning system, have resulted in a number of recent government reviews and reforms, such as: 'The Barker Review of Land Use Planning', 2006; Revisions of Planning Policy Guidance / Statements (PPG's & PPS's); Government White Paper: planning for a sustainable future (DEFRA, 2007); and the Egan Review, 2004. Consequently, developments need to fulfil an ever increasing and conflicting set of requirements, which relate to economic, environmental and social obligations of individual development schemes.

Cumulatively, these new development schemes could have great capacity to significantly contribute towards halting global biodiversity loss, whilst even potentially increasing the biodiversity present on a local authority scale. This is due to: supporting policies; the volume of developments (occurring and predicted); and the potential impact on a range of spatial scales. Within the UK there has been a profusion of underpinning regulations over the last two decades, which promote biodiversity protection and enhancement through development schemes. This, coupled with increasing evidence of the positive benefits to developers, which can include reduced 'whole-life' costs and marketing opportunities, should ideally equate to a smooth process of maximising biodiversity within developments.

However, professionals working within this field, frequently experience conflicts and obstacles with regard to different stages of development, which obstruct practical achievement. This is especially true within the urban context, where land pressure is greatest and development issues are most complex. *Chapter three* discusses these obstacles and *Chapter five*: 'Planning and Governance' further elaborates on the development context.

1.1.4 Biodiversity Paradigm Shift

1.1.4.1 Biodiversity paradigm shift defined and explained

Shifts in understanding within the sciences are a normal and ongoing process, as described by Kuhn (1996), who coined the term 'paradigm' and 'paradigm shift'. Currently, there is a paradigm shift related to our understanding of global biodiversity problems. The original biodiversity paradigm is based on protection and conservation. This is gradually being replaced by a somewhat different paradigm: that actively 'increasing, enhancing and repairing' biodiversity is necessary. This is because conservation and protection alone are not adequate to halt the current rate of loss.

The paradigm shift in our understanding of how to tackle the biodiversity crisis (from 'protection and conservation' to 'increase, enhance and repair'), is reflected in the UK today with a clear overlap within new national policies and legislation. The new paradigm of 'increase, enhance and repair' can be facilitated through urban development schemes - even where biodiversity baselines are zero (Barber, 2006). Actively encouraging species to re-colonise by providing habitat features; habitat creation; repair of fragmented links in green networks; and ecologically sensitive management, are examples of how this can be achieved.

1.1.4.2 What has fuelled this paradigm shift towards 'enhance, increase and repair'?

The following factors help explain the current shift:

1) Increasing evidence and research endorsing existing high extinction rates, as well as the likely future effects of climate change on further biodiversity loss (MEA, 2005)
2) General acquiescence regarding the human correlation to the current mass extinction phase (Holocene extinction), highlighting our own responsibility (Ehrilch & Wilson, 1991; Barnosky *et al*, 2011)
3) The presence of ecocentric values (see *section 1.1.2 & 4.6.3*), despite the anthropocentric actions of global society (Quaife, 1999); illustrating a democratic duty to resolve the high rates of biodiversity loss
4) A growing evidence base of local biodiversity increases, where positive action has been taken to increase biodiversity opportunities on individual development schemes

1.1.4.3 Implications of the paradigm shift and policy

Some policies still reflect the old paradigm of mere 'protect and conserve' e.g. the new Biodiversity Duty on Public Bodies in Section 40 of the Natural Environment and Rural Communities Act (NERC, 2006), whilst others reflect the new paradigm of 'enhance, increase and repair' e.g. Paragraph 14 of PPS9 (Planning Policy Statement 9: Biodiversity and Geological Conservation) (ODPM, 2005). Nevertheless, the government proposed that this latter policy, which conforms to the new paradigm, be amalgamated with several other environmentally related planning policies (Barber, 2010b - *Appendix two*).

Studying the literature, it seems the barrier preventing the new paradigm from permeating more freely into policy, is two fold. Firstly, our ecocentric valuing systems are not adequately being taken into account (see *section 1.1.2 & 4.6.3*), and secondly, the expression of value is being put into monetary terms, which can perpetuate anthropocentric decisions, leading to detrimental

affects to biodiversity (Bonnes *et al*, 2011; Conservation International, 2005; Craig, 1993; DEFRA, 2002; Harremoes, 2003; Lockwood, 1999; OECD, 1992; Papadakis, 2000).

To ensure biodiversity is affected positively, policy must reflect the new paradigm in clear, concise terms throughout all hierarchies (i.e. international; European; national, regional and local). Due to the aforementioned paradigm shift, some progress has been made towards gaining the theoretical policy and legislative framework necessary to support biodiversity enhancements. However, this must be furthered, in addition to tackling the more 'practical' obstacles to real achievement (discussed throughout the thesis), so that improved policies are effective. *Figure 1*, illustrates a simplified range of global biodiversity considerations, which theory and regulatory frameworks must address, in order to positively affect biodiversity at the local and individual development site levels.

1.1.5 Further Background Context

This introduction has provided the basic context in which the thesis' exploration of obstacles and solutions to maximising biodiversity are set. Further background context, which is part of the necessary meta-consideration of this research, is given in *Chapter four* 'Urban Biodiversity', *five* 'Planning and Governance' and *six* 'Socio-ecology' respectively. A brief summation of these chapters is provided in *section 1.3* of this chapter.

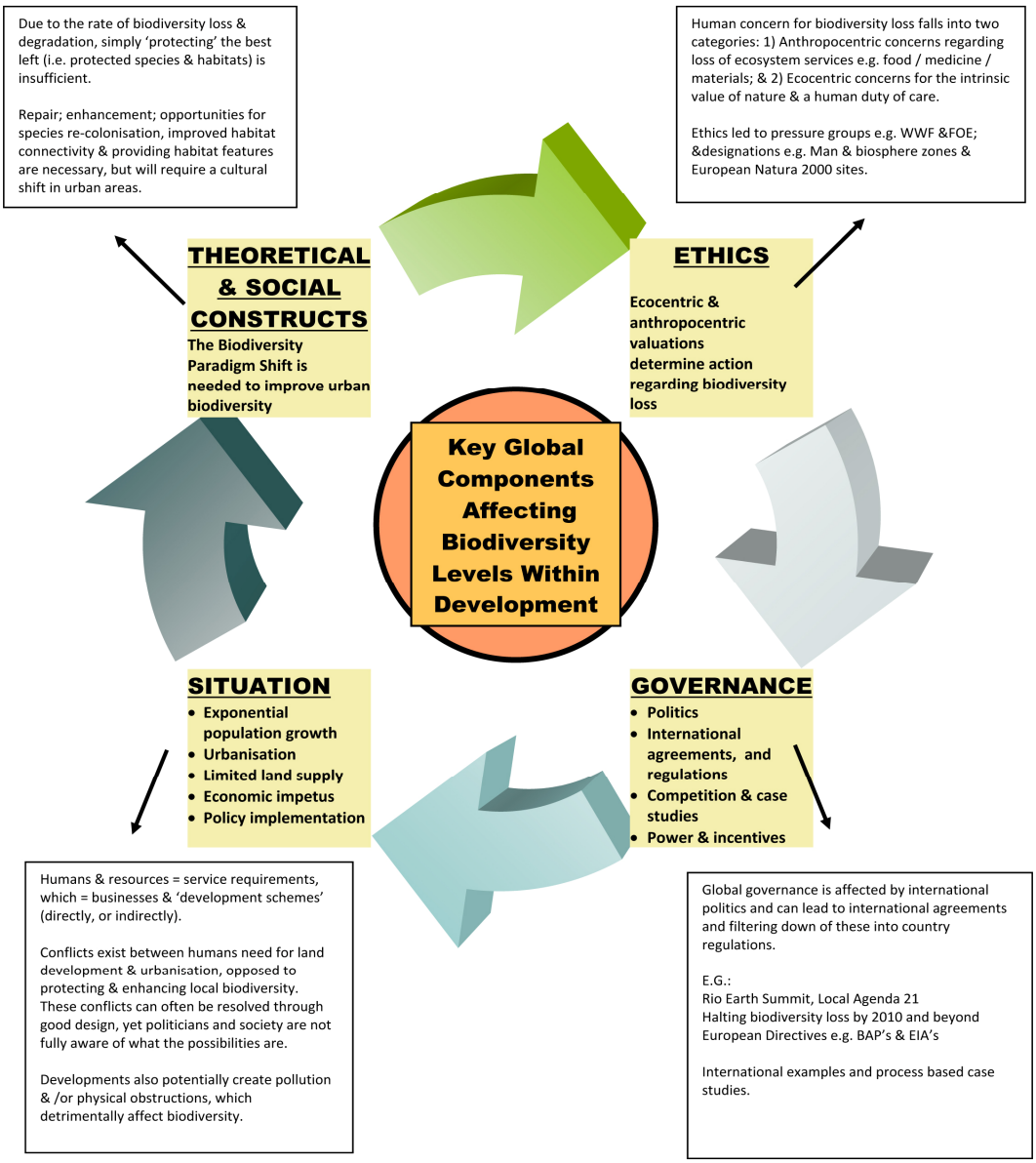

Figure 1: Illustrating the global components which affect biodiversity levels within developments, which must be considered at the theoretical level to ensure appropriate regulatory frameworks are put in place to address the paradigm shift (to enhancement, rather than just protection).

1.2 RESEARCH IMPETUS, FRAMEWORK AND ASPIRATIONS

1.2.1 Origin and Application

A portion of the research funding is provided by the ecological company: 'Middlemarch Environmental Ltd'. As a consultancy, they experienced various biodiversity process issues with certain development projects, which detrimentally affected their clients' ability to realise biodiversity protection and enhancements. This culminated in the identification of the research requirement. Simultaneously, the researcher, who prior to undertaking the research had spent a decade professionally working in several directly related fields, also discerned the research need from a predominantly Local Authority perspective. An article written by the researcher for the 'Planning' magazine contextualised the need to find solutions to maximising biodiversity through urban development projects (Barber, 2006).

The difficulties experienced with integrating biodiversity into development schemes was shared by colleagues and peers in a number of local authorities, private practices, and other organisations. This was evident during personal communications and attendance at relevant conferences and workshops and has been confirmed through questionnaire findings discussed in *Chapter three* 'Questionnaire Findings: Prevalent Obstacles, their Lifecycle Stage and Consequences'. Difficulties experienced were also not isolated phenomena, but widespread and common. Therefore, the research topic has vast practical applications in the development industry, and is directly relevant to a number of disciplines, such as: Landscape architecture; Ecology; Architecture; Urban design; Planning; Project management; Business; Economics; Structural engineering; Politics; Policy and regulations; and Academia.

1.2.2 Impetus and Distinctiveness

In order to enable the enhancement / maximisation of biodiversity in major urban development schemes, the more common obstacles at particular phases must be identified and understood in a holistic manner, to determine effective solutions. The obstacles constraining this maximisation are complex and tend to be due to process failures, which occur at, or between, various development phases, such as: inception; feasibility; design; planning; project management; and aftercare. Obstructions at any particular phase can prevent the flow of continuity throughout the entire sequence of a development's lifecycle. A 'lifecycle' approach, in combination with considering different spatial hierarchies within a systems approach, offers a distinct piece of research, as research and guidance to-date tends to focus on one phase, or one spatial hierarchy, or one aspect / obstacle, and does not look at the full range of all of these in a holistic manner.

1.2.3 Maximising Urban Biodiversity Potential Needs an Integrated Social and Natural Research Approach

There has been an increasing research focus on urban biodiversity per se (see *section 4.2.2* of 'Urban Biodiversity'). Nevertheless, having worked within the development industry for thirteen years, the author has noted that there has been very limited 'urban biodiversity and development process' research, which has been confirmed by literature reviews, research participants, and one of the funding organisations 'Middlemarch Environemntal Ltd'. This is discussed further in *section 2.2* and *Chapter four*: 'Urban Biodiversity', generally.

Possessing and comprehending knowledge pertaining to biological, geographical, and ecological sciences is a pre-requisite for comprehending biodiversity data implications; which in turn, is necessary for decision making, and drawing up technical specifications and policies in relation to conserving and locally increasing biodiversity. This is due to complex and intertwined ecological lifecycle requirements for particular habitats / species and their spatial and temporal implications.

However, Kaye *et al* (2006 p.192) have argue that traditional ecological models (concerning rural or wild environments) do not tend to transfer well to urban environments because they fail to represent human influences on ecosystems and their functions. Consequently, contemporary urban ecology paradigms and research have increasingly documented human influences. An example of this is the way in which plant species diversity, or vegetation cover, or avian diversity, or shifts in mammal behaviour, all correlate to human influences / impacts. Such human influences / impacts can be related to: population density, social-demographics and status, or political and professional practices and policies (Kaye *et al*, 2006 p.192; Goddard *et al*, 2010; Louwe Kooijmans & Kwak, 2010; Nilon & Warren, 2010).

'Urban' ecology is also far removed from the traditional focus of development and environmental professionals. For instance, a myriad of different professional fields and actors are now involved (directly/ indirectly) with biodiversity issues in urban schemes. The adoption of 'holistic system approaches' is only recently, yet increasingly, being advocated for a range of socio-ecological research, such as in this project. This is especially the case where an integrated knowledge base is necessary for judging future impacts of current decisions, and encouraging sustainable development (Li *et al*, 2007).

The successes and failures leading to biodiversity gains or losses, are fundamentally anthropogenic, hence the study of these processes becomes a predominantly social research topic, which integrates the natural sciences. Research in related urban ecology fields has attempted to integrate the two sciences over the past several decades, with varying degrees of success. This precipitated the rise in use of explanatory terms - two of which are predominantly used: 'Human Ecology'; and 'Socio-ecological resilience' respectively. Generally, *Chapter four* 'Urban Biodiversity' and *section 6.1.2* and *6.2.1* of 'Socio-ecology' discusses the history, effectiveness, opportunities and threats of integrating these sciences – when specifically relating to urban biodiversity, and indirectly to developments.

1.2.4 A Systems Approach and Meta-Consideration

Practical and academic biodiversity guidance, and research, is in a perpetual cycle of production - yet tends to be narrow in scope. Specific species or habitats, within a singular development lifecycle phase, are usually considered in isolation. Examples of such isolated species and development phases would be: tree protection during construction; Great Crested Newt translocation methods; green roof design; or wild flower meadow management. Moreover, the existing documentation often follows a very tightly bounded rationality, ignoring a wider systems approach and more outlying elements, which can nevertheless exert significant control over more immediate processes. The 'systems' approach adopted for this research is explained within the 'Develeoping Theory' *section 2.8*.

The existing guidance, whilst undoubtedly useful to specific scenarios, has limited ultimate effectiveness, since a host of process blockages often prevent the guidance from being followed, as this thesis demonstrates. Therefore, the outputs of this thesis do not intend to reinforce the existing pattern of guidance, but provide a novel kind of strategic 'meta' consideration and guidance. The research topic is interdisciplinary and becomes highly complex due to the varied spatial and temporal scales, and variety of actors and other variants involved. This equates to a very large and highly interconnected system operating at a range of levels. 'Systems thinking' allows identification of: some of the feedback loops; interrelationships between issues; 'system traps' and policy resistance (*section 2.8.2.4* & *11.5*).

The research is partially constructed upon generic findings within practice. Nevertheless, the research is unique and original in terms of the combination of 'lifecycle', 'systems', 'spatial hierarchy' and 'transdisciplinary' research approaches, which highlight theoretical approaches and

investigate the most salient points. The research then amalgamates these into a meta-theory, which can be constructed at various spatial and temporal scales – hence the use of nested theories and case studies within the thesis (see *sections 2.8 & 7.8*). This ensures the research becomes applicable to a variety of professional and academic scenarios.

1.2.5 Research Aims and Objectives

The ultimate objective of this research is to identify the obstacles and advantageous processes, which may affect different stages in a major development scheme's lifecycle, to enable maximisation of biodiversity potential within site project constraints. The research will focus on investigating solutions to the more common strategic and process obstacles identified, and investigating and retaining relevance to a range of actors (directly and indirectly involved). This approach is intended to maximise the potential applied benefits and assist in the realisation of maximised biodiversity in development schemes.

The specific aims of this research are listed below. The thesis offers relevant background information, research and recommendations to achieve these aims; and the concluding chapter sets out how they have been achieved. A formal research hypothesis was not deemed appropriate at the start of the research, as theory generation, testing and building, took a more grounded and iterative approach (explained in *section 2.8*).

A) **Discern 'what' and 'where' the key constraints / obstacles exist to achieving biodiversity protection and enhancements (within the various lifecycle phases).** This question applies to constraints faced by different types of actors, influencing major development schemes.

B) **Explore the complexity of enabling successful ecological works throughout all development lifecycle stages.** Initially, the research question related solely to the 'implementation' stage. However, this was quickly amended to explore 'all' lifecycle stages as they were equally important and inextricably linked to one another**.**

C) **Develop theories regarding process guidance, and recommend solutions to some of the key constraints.** This involves whole lifecycle consideration, including the earliest inception of a development scheme, to the handover period and management of the 'operational' phase of a development.

D) **Specifically identify mechanisms required for successful project management of biodiversity.** This query intends maximum application of the research, by assisting the

business community and specifically developers, in establishing effective biodiversity processes**.**

E) Identify and suggest responses to ineffective planning regulations and other legislative criteria. One of the suggested research outcomes first related to the conflict 'between' planning and other legislative criteria. However, no common, or significant, conflicts between specific planning and other legislative criteria could be isolated, or identified. Instead, following discourse analysis, and other research methods; planning policy, national law, their robustness, priority and enforcement, became the revised focus**.**

1.2.6 The Scope of the Research

Due to the breadth and complexity of the whole 'system' under investigation, it has been necessary to narrow the potential scope to seek the most applied benefit to biodiversity and developments. In an effort to achieve this, the following decisions have been taken:

1) The global and international context has been considered from a strategic perspective, and some conceptual international 'process' cases have been referred to. Nonetheless, regulations and planning policies differ between countries, even within the UK, so the bulk of the research and main case studies has been confined to English developments and regulations. Nevertheless, findings will generally be transferable to different national scenarios;
2) The research will only consider 'major' development scenarios. This focus has a dual purpose: to reduce the research scope to a more manageable size, whilst identifying numerous issues and obstacles to be solved, as larger 'major' developments tend to have greatest complexities.
3) Focus research on the urban context, as this will be most relevant to the majority of developments. Urban developments also tend to have a greater set of competing issues and complexities making it more difficult to achieve biodiversity benefits. They thus stand to gain most benefit from potential guidance and solutions.
4) Not all 'use classes' of development will be covered in the case studies. However, by including 'mixed-use' developments and covering the more common development types such as 'residential' (which is set to dramatically increase in terms of the number of developments over the next 20 years), research will have the most applied benefit.

1.2.7 Limitations

In addition to the meta-consideration, it was also advantageous given the applied nature of the research, to drill down to a more detailed inspection of specific issues. However, the more detailed analysis can not possibly cover 'all' of the eventualities and issues, within one thesis. It is therefore anticipated that the thesis could act as a 'framework document' for subsequent research projects.

1.3 THESIS ORGANISATION

An iterative approach has been taken with the thesis, whereby conceptual concepts are built as the reader progresses through the chapters. Within this incremental approach, the topic of urban biodiversity is dealt with as a cluster of concepts. For instance: the valuation and measurement of urban biodiversity; human ecology / socio-ecology; and socio-ecological resilience, within case studies; are all explored within different chapters - yet contain many three dimensional connections.

Chapters 1 & 2

Chapters one and two 'Introduction & Research Methodology' explain the necessity for the research and the multi-strategy research methodology. The latter describes the individual research methods and theory frameworks used, and why certain methodological decisions were made for this particular research project.

Chapter 3

Chapter three 'Questionnaire Findings: Prevalent Obstacles, their Lifecycle Stage and Consequences', discusses the results and findings of a questionnaire, which tests insights gained in prior action research, preliminary interviews, and literature reviews. The findings define the 'Key Obstacles' to maximising biodiversity in this research context, which helps the reader in discerning the relevance from the subsequent contextual background chapters.

Chapter 4 - 6

These chapters combine contextual background and research processes, which are amalgamated with theories and research (in the form of literature review, interview findings, and discourse analysis).

Chapter four 'Urban Biodiversity' will incorporate 'urban' biodiversity theories and practice through history, as well as further discussing the current context, issues, theories and practices. *Chapter five* 'Planning and Governance' offers an exploration of the development of ecology planning and the effectiveness of planning processes to deliver urban biodiversity maximisation.

By contrast, *Chapter six* 'Socio-ecology' investigates this particular branch of science and how its premises and central theories affect biodiversity within individual development schemes. Within this latter chapter, 'Green Infrastructure' is used as a key example of how the concept of ecosystem services and socio-ecological-resilience have been developed and understood over time. This example includes the threats and opportunities for achieving biodiversity maximisation on individual development schemes.

Chapter 7 – 9

These chapters investigate and discuss 'case study one' (The Case of the 'Eastern Quarry' [EQ2] mega-development, set within the contextual background of 'The Thames Gateway' Eco-Region) through a systems approach - ultimately providing nested theories for the largest regeneration area in Europe and the largest mixed use development in the UK. A further comparison mega-development (Barking Riverside), also within the regeneration area, is used to contrast and measure 'project management' findings. This study explores the complexity of the research topic and highlight how strategic issues affect individual development sites, and even individual species and biodiversity features within the development site/s.

Chapter seven 'Preface to Study One' provides the 'nested' context to this study and explains the relevance of the two key scales of consideration. *Chapter eight* 'The Thames Gateway: how strategic decisions and governance affect biodiversity within individual development sites' covers the regeneration level, and *Chapter nine* 'Eastern Quarry (EQ2): Biodiversity considerations of mega developments and project management', looks at an individual mega-development within the larger regeneration area, and is compared with another mega-development regarding project management.

Chapter 10

This chapter investigates and discusses 'case study two' 'Competition and Partnership: opportunities for biodiversity innovation'. It focuses on the Central Riverside development in Sheffield, and is complemented by two smaller studies. This highlights specific issues which are not covered in case study one and provides a longitudinal case study (as the researcher had involvement in all development phases, which are now complete (notwithstanding ongoing management), providing a comprehensive systems approach to the research process.

Chapter 11

This chapter discusses the key findings and recommendations, sets out how the research aims have been achieved, and concludes the research.

2 RESEARCH METHODOLOGY

2.1 INTRODUCTION TO METHODOLOGY AND METHODS

As the introductory chapter explained, a multi-strand research strategy was employed during the course of this research project to facilitate a holistic systems approach. This used a combination of quantitative (questionnaire specific) and numerous qualitative methods, whilst being rooted in case study research. The latter were predominantly used due to the social research nature of the topic, and the fact that the existing literature was limited.

Specialist insights, gained through a decade of action research within directly related professional fields, provided much of the preliminary research material and direction. Some of these insights had progressed to emergent theories by the start of the research project. A general literature review (discussed in *section 2.2*) was then commenced and discourse analysis was performed using literature from central and local government, QUANGOs and non governmental organisations, regarding biodiversity planning issues. Following the literature review and participation at numerous conferences, it became apparent that taking a 'systems approach' was a prerequisite for dealing with the complexity of the research topic. Therefore, the sole use of case studies, or an isolated desk study approach to the case studies themselves, was deemed inadequate. To achieve triangulation (Bryman, 2004 p.275), a number of additional research methodologies were utilised, including personal communications, which critiqued the representational nature of insights from action research (in addition to providing new insights and case specific data), which then informed a questionnaire (discussed in *Chapter three*), thus ensuring objectivity and removing bias as far as practicable.

The research methods are further discussed in the following sections, but in short, the following strategies have been employed within the project, in an iterative manner:

- **Literature review (including discourse analysis of literature from organisations)**
- **Case studies**
- **Interviews and other personal communications**
- **Action research (previous professional experience and during the research project)**
- **Questionnaire**
- **Theory generation and testing**
- **Attendance of relevant conferences, workshops and meetings**

Whilst the questionnaire was conducted a year and a half into the research, it is discussed within the following chapter: '*Chapter 3: Questionnaire Findings: Prevalent Obstacles, Their Lifecycle Stage and Consequences*', rather than after case studies. This is because the findings influenced the direction of some other methods (such as interview investigations and case studies), in addition to introducing the reader to the most prevalent obstacles to be solved.

An iterative approach to data collection, coding, theory generation, theory building and theory testing, was undertaken during the course of these research strategies (*section 2.8*). The individual methods and strategies will now be discussed in greater detail.

2.2 LITERATURE REVIEWS

Two types of literature review were conducted: a literature review concerning the general research topic; and individual critiques of the case studies.

A wealth of literature exists within the fields of 'biodiversity', or 'planning and development', when viewed respectively. However, available literature on these combined issues is rarer and generally confined to planning policies, regulations, and government or QUANGO guidance. This 'dual field' literature tends to focus on distinct phases of developments, specific species or habitats, or specific issues or actors, and is often viewed in isolation from the whole system, or even from any other major issues. This tends to render the guidance and information ineffective on a practical level, as other obstacles or conflicts (usually from a process perspective) prevent it from being undertaken.

Governmental guidance has attempted to tackle some of the 'generic' obstacles to quality design and project management in major developments, but not from a biodiversity perspective. This has included various reports and reviews, as well as setting up independent advisory bodies such as: the Planning Advisory Service (PAS) and Advisory Team for Large Applications (ATLAS). These are discussed in *section 5.3.4.2,* and ATLAS specifically considered in *Appendix 5.3*.

There are biodiversity development guidance documents which have been written by numerous local authorities, such as SPD (Supplementary Planning Documents) or adopted planning guidance, but none of these have specifically identified or significantly solved current process obstacles. There has also been some limited process work regarding Green Infrastructure (GI) guidance. This

has tended to revolve around the setting up of partnership organisations and accessing funding, which is further discussed in *section 6.4.5*.

To date, only two studies specifically relating to the 'processes' of maximising biodiversity within development schemes have been located (Elander *et al*, 2005; Ernston *et al*, 2005; Yli-Pelkonen, 2008), although these only considered specific isolated elements of 'development control' within Sweden or Finland respectively ('development control' and these papers are discussed in *Chapter five* 'Planning and Governance'). The author of this thesis conducted a series of personal communications with some of the authors related to all of the above papers, to fully capitalise upon the information, and eliminate replication.

The general literature review findings are discussed in *Chapters four, five and six*, whereas the 'case specific' literature is provided within the respective chapters.

2.3 CASE STUDIES

2.3.1 Context

An element of empirical reality, such as case studies, is necessary to develop valid theory for this project, due to the aforementioned limited coverage of the specific topic in academic literature. Eisenhardt (2005) notes that traditionally there have been tenuous links drawn between data and theory development, when researchers have limited observations to previous literature, professional judgement, and experience. Eisenhardt (2005 p.88) defines the important strengths of theory derived from case studies: "*such as novelty, testability, and empirical validity … it is particularly well suited to new research areas or research areas for which existing theory seems inadequate*".

Conversely, cases may also be created prior to the research process, by invoking theories, whether implicitly or explicitly, for justification or illumination (Walton, 1992). In this research, some cases were selected after emergent theories became evident - in order to illuminate and further investigate previously identified processes of import. Some cases also formed new emergent theories, or discredited initial theories during case analysis. Therefore, this research draws on the three aims of case studies described by Eisenhardt: to provide description, test theory, or generate theory (Eisenhardt, 2005 p.69).

Platt (1992) warns of ambiguity regarding these different uses of case studies. Therefore, in an attempt to prevent such ambiguity, each of the 'key' case studies within the research (which all tend to combine uses) will clarify when the case is acting as data in itself, or illustrating/ testing theories based on larger numbers of cases based on other research strategies.

2.3.2 Selection

A random selection of individual urban developments, for case studies, would have been unproductive as the majority of schemes do not yet adequately 'consider' biodiversity maximisation, let alone 'achieve' it (hence the need for this research). Developments which do not at least 'consider' biodiversity in the earlier lifecycle stages have little use as case studies. Instead, sites were selected from: previous action research; from the sponsoring company's (Middlemarch Environmental Ltd's) network of clients and projects; or through the research process itself – as a result of contacts. The presence of the following criteria influenced selection: original intentions of some actors to maximise biodiversity; opportunities to investigate a rich set of relevant processes; replicable contexts - illustrating common phenomena; and developments offering a rich source of data sets for triangulation. One major case was abandoned during analysis, due to a lack of ability for adequate triangulation.

To avoid the lack of variation and fixed preconceptions of case analysis that Vaughan (1992) warns against (such as, theorising disadvantages, which inhibit models, concepts, and theory discovery / development), case studies were sought that provided: a range of geographic locations, temporal and spatial scales, and 'use classes' of development.

2.3.3 Case Study Approach

After investigating a range of case study application approaches, one reported by Leonard-Barton (1995) was adopted. The method, described by Leonard-Barton, employs a real-time longitudinal study with retrospective studies about the same phenomenon, so is suitable for exploration and hypotheses formation; hence its employment in this research. Retrospective studies offer opportunities to identify patterns indicative of dynamic processes, and the longitudinal study provides a close-up view of patterns over time (Leonard-Barton, 1995). This combination can demonstrate theories are replicable and transferable to other developments.

Yin (2003 p.51) believes that when external conditions can produce a lot of variation, a larger number of theoretical replications are needed. These theoretical replications were noted during

the action research process, and resulted in the selection of particular cases to showcase common replicable phenomena. Due to the size and complexity of the key cases, it is neither appropriate, nor possible to describe them here, but they include many theories (regarding issues and solutions) which will be replicable to other developments.

The different types of case studies that have been utilised in the research include the following:

1) Site based case studies

   These are the main case studies. Individual development schemes are analysed, along with the perceptions of relevant actors and available documentation;

2) Processes as case studies

   Specific processes are analysed, which may illustrate common obstacles, or innovative and replicable solutions. These include studies from other countries, where the background context may not be transferable, but the general concepts are; and

3) Specialist professionals and academics as case studies

   Specialist senior professionals and academics are employed as case studies in their own right, where experience and credibility within specialist niche fields justifies this. They are able to offer reliable views on obstacles, solutions and unique phenomena. They are also used to reduce bias and test assumptions of emergent theories within the main case study methodology (Yin, 2003 p.61-62).

According to Yin (2003 p.83), and supported by Eisenhardt (2005 p.69), case studies typically combine data-collection methods for evidence, from six possible sources: documents, archival records, interviews, direct observation, participant-observation (such as questionnaires), and physical artefacts. Yin (2003 p.97-106) details three principles which maximise the benefits from these sources: 1) use multiple sources of evidence, 2) create a case study database, and 3) maintain a chain of evidence. Certainly multiple sources of evidence and a chain of evidence - in terms of any personal communications undertaken - have been used in the investigations. Software for case study data bases were trialled, but not taken forward (e.g. NVIVO – discussed in *section 2.8.2.2*).

Each case study used slightly different methodological approaches (summarised within individual chapters). This depended upon the context and lifecycle stage that schemes were at during the research phase. Nevertheless, the following describes the methods used for literature review and action research within the main case study (Eastern Quarry 2 – EQ2):

Literature was reviewed from the conventional range of academic, governmental, and professional sources. Nonetheless, in addition to gaining publicly available documentation, action research at the ecological consultancy (MEL) allowed access to, and analysis of, more privileged information. This included draft (in progress) versions of planning submission documents, consultancy documentation, and conversations. The latter being important in building and shaping research insights, as Yli-Pelkonen (2008 p.358) describes: "*Hokkanen and Kojo (2003) showed that unofficial communication in particular is an essential way to obtain verification of the interpretation made from the perception of other actors".*

Experience of the project during the research phase (a form of 'action research' - described in *section 2.5*), involved several instances of direct site involvement. In 2007, the researcher conducted a water-vole survey and a site meeting at the neighbouring Ebbsfleet mega-development. Subsequently (in 2008), a full week of ecological surveys was undertaken, relating to EQ2 (reptile and invertebrate) and incorporating a site induction and meeting the earthworks construction staff. Furthermore, the researcher was involved in preparing biodiversity related planning documentation for the ecological consultancy, such as: providing an internal consultation report on the draft green space strategy plan (see *Appendix six*), and writing a specific area ecological management plan within the site - following the company's template. Cumulatively, these experiences aided the researcher's knowledge regarding transdiciplinary working, communications, and working relationships, related to the EQ2 site (discussed within *section 9.8)*.

2.4 INTERVIEWS AND OTHER PERSONAL COMMUNICATION

2.4.1 Context

Interviews and other personal communication were employed to test or support theory generated through case study research. This approach of checking observations with interview questions is often used by ethnographers to determine whether misunderstandings have occurred (Bryman, 2004). Interviews were also used to investigate case studies and generate new theories. A list of individuals who were interviewed can be found in Appendix three. This list includes the roles and institutions of interviewees. Key interview notes are also included in Appendix three, allowing the reader to observe the interview protocol and themes tackled.

2.4.2 Style

Interviews were a hybrid of 'structured' and 'semi-structured' approaches. They had a 'structured' interview schedule, with a sequence of questions, which tended to have a specific frame of reference. However, interviewees were not given exactly the same context of questioning, as advised by Bryman (2004 p.110) for 'structured interviews'. This did not occur as each interviewee had very different roles within the context of development, so questions were tailored accordingly. Nonetheless, there was *"some latitude to ask further questions in response to what are seen as significant replies"* which Bryman (2004 p.113) describes as the terms of a 'semi-structured' interview.

2.4.3 Method of Data Capture

Verbatim transcriptions from recordings were not necessary, as critical discourse analysis was not needed for this type of research (as supported by Bazeley, 2007). The typed notes from interviews were instead sent back to individual participants to be corroborated. The key interview notes are available in *Appendix three* (specific emails and other notes are available on request), illustrating an 'auditing' approach and evidence dependability, as suggested by Guba and Lincoln and cited by Bryman (2004 p.275).

The credibility, transferability, dependability and conformability of respondents' views and accounts were analysed through a Foucauldian approach to discourse analysis, and in comparison against other research methodologies.

2.5 ACTION RESEARCH

2.5.1 Types

Bryman (2004 p.277) states that there is no single type of action research. In this research two types were employed: previous professional experience - directly related to the research topic; and, action research which occurred during the course of the research project, through a consultancy role with Middlemarch Environmental Ltd.

2.5.2 Previous Professional Experience

The researcher is, a chartered landscape architect, chartered town planner, ecologist, and certified arborist, and was employed as an environmental planning officer for over a decade (Barber, 2010a). Professional experience principally involved: a biodiversity planning advisory

capacity; environmental planning negotiations on major and mega developments; a policy officer role; and project management (Barber, 2010a). These roles were divided between public authority planning departments and private practice consultancies, which afforded a balanced view of how the same issues were handled in both types of organisation.

This experience fits Bryman's (2004 p.267) description of ethnographic research, through immersion in a social setting for some time. It allowed recognition of patterns, as well as insights and intuitions into various elements of the research topic, including the culture of a number of organisations involved in development and biodiversity. The ethnographic experience allowed access to be gained to otherwise 'closed settings' and privileged information.

Glaser and Strauss (1968) discuss crucial insights which can be cultivated from personal experiences prior to, or outside 'research'. They use the example of a sociologist who previously worked as a cab driver. They explain that the sociologist had taken no field notes during his previous employment and had got his principle ideas for a paper long after giving up the job - yet these principle insights were based on his personal experience as a cabbie. "*Some insights that formed the basis of later systematic theorizing undoubtedly occurred while he was still a cabdriver, and others – perhaps the major ones – occurred later when he reviewed his earlier experiences*" and they elucidate from this, that reflections on personal experiences should be deliberately cultivated (Glaser & Strauss, 1968 p.252). Reflective professional practice had been cultivated naturally throughout practice and writing the thesis, thus capitalising on the advantages of reflection described by Schön (1983) and Gravells (2011).

2.5.3 Consultancy Work on Case Studies during Research Phase

During the research phase, the researcher worked intermittently as an environmental consultant on several sites in the Thames Gateway (one of the main case studies). This allowed a heightened level of understanding of the phenomena being studied, as well as creating a deeper level of access, rapport and shared language with research informants and respondents to personal communications. At the same time, attention was paid to not significantly alter the phenomena and processes being studied, after seeking the advice of an experienced action researcher within the school of Engineering and Applied Science at Aston University: Louise Knight (Knight, pers. comm, 2008).

2.5.4 Advantages and Disadvantages

There are advantages and disadvantages with action research. On one hand Strauss and Corbin (1998 p.59) illuminate that: "*Experience and knowledge are what sensitizes the researcher to significant problems and issues in the data and allows him or her to see alternative explanations and to recognize properties and dimensions of emergent concepts"*. They further elucidate that systematically comparing two or more phenomena can sensitise a researcher to properties and dimensions within data, by, for example: "*comparing an incident in the data to one recalled from experience or from the literature*" (Strauss & Corbin, 1998 p.95). Certainly, the author's insights gained from experiencing thousands of different developments, assisted in: identifying key issues; generating theories and hypotheses; and intuitively selecting the richest case studies, for further investigations. This is consistent with experienced social scientists' views; that insights are: "*of no use to the theorist unless he converts it from being simply an anecdote to being an element of theory*" (Glaser & Strauss, 1968 p.254).

On the other hand, this type of action research can bring biases, beliefs and assumptions to the investigation. Strauss & Corbin (1998 p.97) emphasise that although it is not possible to be completely free of bias and that this is not necessarily a negative trait: "*The important thing is to recognize when either our own or the respondents' biases, assumptions, or beliefs are intruding into the analysis……we must be able to stand back and examine the data at least somewhat objectively*". Many writers of qualitative research methodologies, such as Bazeley (2007), advocate creating a journal, to document arrival at conclusions and to create an audit trail with dated content.

All consultations and reports written by the researcher, either in previous ethnographic research, or action research, during the research project have been dated and archived in local authority archives, or company project files. However, apart from an article written by the researcher during practice (Barber, 2006) which described some key theories related to this research, emergent theories were not dated during ethnographic research prior to the research project. During the research project, attempts were made to remove bias as far as practicable, through testing emergent theories objectively with peers, through presentation and personal communications with relevant professionals and academics.

2.6 QUESTIONNAIRE

2.6.1 Context

The questionnaire devised for the Association of Local Government Ecologists' (ALGE) members to complete, had a dual goal. Firstly, to test that insights gained in epistemological research, undertaken during previous action research, were geographically and professionally representative insights. This therefore allowed theoretical comparisons and the examination of the researcher's basic assumptions and biases (Strauss & Corbin, 1998 p.85). Secondly, to invite new insights from professionals with a range of experiences, through 'elicited texts', where research participants are involved in writing the data through open-ended questions. Open ended questions in the form of a 'free text box' were designed to provide this at the end of any 'closed ended' questions. Thus, adding richly to the quantitative, as well as qualitative data (Charmaz, 2006; Boynton & Greenhalgh, 2004).

The availability of existing questionnaires was researched, but the literature revealed only two indirectly related questionnaires. One was produced by CIRIA (2005), the other by ALGE (2007a). The methodologies and outcomes of both were evaluated to prevent any repetition of issues, and valuable lessons were learnt. During attendance at the second URBIO international conference in 2010, some further questionnaire and interview evidence was discovered (YLI – Pelkonen, 2008). This latter research was only related to a discrete section of this research project (ecological information for politicians during development control processes in Finland) and YLI – Pelkonen (2008) had approached planning officers and politicians, rather than ecologists. Therefore this research was not a replication of the questionnaire devised for this project, but complemented it, and is discussed *in sections 5.3* and *9.5*.

2.6.2 Sampling Selection

Local government ecologists were selected due to their 'frontline' involvement in achieving biodiversity enhancements on developments. Additionally, they are not bound by the same client confidentiality and PR issues, associated with private consultants and were ore accessible. ALGE were approached for names and contact details of all of their English members, who were then sent a ink to the questionnaire.

Vaughan (1992) warns that limiting sociological questions to particular organisational forms (in this case Local Authority views), tends to build on existing theory or generate new theory in

fragmented rather than integrative ways. To combat this, triangulation occurred in other research methodologies, to reveal the views of various consultants.

2.6.3 Questionnaire Type

An electronic questionnaire was selected for a variety of reasons, such as: ease of filling in, thereby increasing response rate; successfully providing the relevant information; and reliability of collation of responses and data.

Bryman (2004 p.481) cites Dommeyer and Moriarty, who compare 'embedded' versus 'attached' email questionnaires: "*The attached questionnaire was given a wider range of embellishments in terms of appearance than was possible with the embedded one*.". In their survey, the attached questionnaire was deemed as appearing better, easier to complete, clearer in appearance and better organised (Bryman, 2004). The ALGE questionnaire took this attached approach, using the 'Survey Monkey' software (Survey-Monkey, 2009), which was appropriate for the needs of the research.

2.6.4 Questionnaire Design

Questionnaire design was informed by research into effective questionnaires. Out of Foddy's (1993) list of ten past problems concerning questions used in social research, the following six were deemed applicable and considered in the questionnaire design:

- Small changes in wording sometimes produce major changes in the distribution of responses;
- Respondents commonly misinterpret questions;
- Answers to earlier questions can affect respondents' answers to later questions;
- Changing the order in which response options are presented sometimes affects respondents' answers;
- Respondents' answers are sometimes affected by the question format per se;
- Respondents often answer questions even when it appears that they know very little about the topic (Foddy, 1993 p.2-9).

Questions were designed to be as short as possible to reduce the likelihood of a number of negative response effects occurring (Foddy, 1993 p.47). The use of double negatives was also avoided, as they need to be translated into positives, which most writers counsel against Foddy (1993 p.49). Discussing contextual influences, Foddy (1993 p.75) states: "*We have learnt that*

respondents do their best to answer all questions that are put to them – even those they have trouble interpreting. It seems that when respondents have difficulty interpreting a question they use all available clues that might help them." Attention was therefore paid to providing appropriate clues in covering letters and question sequences.

Most methodologists control the biases occurring by respondents who are presented with long lists of response options, by varying the order of the options (Foddy, 1993 p.59). A facility for randomising such options was therefore sought and employed, during the design of the electronic questionnaire.

Foddy (1993 p.101) warned that social researchers tend to pay little attention: *"to establishing whether or not respondents actually have had the necessary experience upon which an assumed opinion or belief could be based*". Therefore, with credibility in mind, the respondent's level, length, and type of professional experience, formed the first question.

To avoid 'question threat', as explained by Foddy (1993, p.117), it was clarified to participants that identities would remain anonymous to their employers, or in research publications. Additionally, filter questions were employed, where respondents were able to select that they did not have experience in certain matters. This prevented respondents being 'forced' to make selections which did not collate to their experiences.

A prize of a £50 Marks and Spencer voucher (the winner to be picked at random from the respondents) was offered as an incentive. This is controversial amongst sociologists, as Bourque and Fielder (1995 p.112) explain that: one camp believes data collected in this way is unreliable - due to participants who would not normally respond, paying little attention to the 'import of the study'. Whereas the other camp believes: "*incentives is entirely credible and in some circumstances is the only way to obtain a satisfactory response rate…the incentive merely indicates to individuals that their time is valuable and worth compensation*" (Bourque & Fielder, 1995 p.112). It was determined important to value these professionals' time, as they are especially busy and under resourced. This proved the right approach in this instance, as all participants went 'above and beyond' prize requirements, by filling out 'open fields' in descriptive manners. Several also requested the prize be donated to a local wildlife charity.

2.7 DISCOURSE ANALYSIS

Discourse Analysis (DA) is summarised as being more than verbal or written statements, but the rules by which those statements are made meaningful (Buckingham & Turner, 2008).

Concepts and knowledge, which are part of environmental discourse, are also intertwined with practices, institutional capacities and technologies - having a material, institutional and historic basis, yet incorporating bias (Feindt & Oels, 2005). These discourses facilitate problem solving, by providing assumptions and contentions that form the terms for analysis, discussion, debate, agreement, and disagreement (Raik & Wilson, 2006).

Many qualitative researchers see discourse itself as a focus of inquiry. DA is not the focus of this research methodology. Nonetheless, it is an important component, and used in a number of different instances, such as in the following examples:

- Writing notes from interviews. This requires interpretation of the interviewee's meaning during the interview, and deciding the best format of translating into written form. Opportunities to misinterpret discussions exist, but are limited by asking confirmation questions during the interview, and later corroborating written interpretations with interviewees. The disposition of the interviewee is therefore closely reflected by the information presented and can be analysed when deciding on how to use and interpret the information given.
- In relation to policy, political decisions and prioritisation – here the rhetorical organisation of discourse is important in selecting one version of truth out of competing versions (Bryman, 2004). The research aims to decipher these decisions and the meaning upon the research topic. Institutional context is also analysed, as this co-determines what can be said meaningfully (Hajer, 2002).
- During case study analysis. Following Bryman's advice, DA is used to uncover the attribution of blame, presentation of a particular view, or reflecting a context (Bryman, 2004).

Much of the research data was sourced from: publicly accessible databases in planning departments; private companies' marketing literature; or government department and QUANGO documentation. These sources are likely to have been shaped by political and power influences, which select and develop certain constructs of environmental policy over others, or favourable PR angles.

A number of approaches and interpretations of DA exist. They can be broadly divided into two main camps: Foucauldian approach - sometimes referred to as Foucaultian (Graham, 2005); and Critical Discourse Analysis. The Foucauldian DA approach focuses more on 'knowledge' and the productive function of discourses and relation to power within all social interactions (Feindt & Oels, 2005). A more Foucauldian approach to DA has therefore been taken in this research, rather than Critical Discourse Analysis, which tends to focus more on linguistic features (Graham, 2005; Feindt & Oels, 2005). However, some elements of other approaches have also been taken (due to the diverse research methodology), creating a somewhat hybrid approach to DA. In his famous book: 'The Web of Life: A New Synthesis of Mind and Matter', Capra (1997) explains in a rather foucauldian manner, that "*A paradigm is a constellation of concepts, values, perceptions and practices shared by a community, which forms a particular vision of reality that is the basis of the way a community organises itself*". A fuller framework, or definition, for taking a foucauldian approach is provided by Sharp and Richardson (2001) in the Glossary (see Appendix 1).The analysis of available discourse, thus allows us insights into the values and perceptions of groups, which may otherwise remain implicit. A foucauldian consideration to discourse such as power interplays on strategic documentation is used in s*ections 8.3.5.2, 8.3.5.3, 9.3 & 9.6*.

All DA approaches consider the notion of 'absences'. These alert analysts, not only to how one way of putting something is preferred over another equally rational explanation, but also to the way relevant information may be excluded (Jackson, 2003). This becomes a focus of consideration within some case studies, such as the Thames Gateway.

Within qualitative traditions, data collection tended to occur without prior investigations of the literature. This was an attempt to avoid prejudice of emerging understanding. Nonetheless, Bazeley clarifies that there has been a shift back to valuing the literature, as a source of: stimulation; sensitization; or data for analysis in its own right (Bazeley, 2007). Bazeley also explains, that a Foucauldian approach to DA, assumes a thorough analysis of archival material in order to understand current knowledge and practices (Bazeley, 2007). This is consistent with the research process undertaken, which was sometimes proceeded by testing the researcher's emergent theories regarding different 'truths' and sources of selection power, on interviewees (e.g. regarding policy priorities).

Dryzek and Niemeyer (2008) explain and advocate discursive representation as a component of democracy, where selections of discursive representations are provided, for formal and informal contemplation in practice. Carter (2008 p. 195) indicates that several environmental writers, have been applying discourse analysis to the study of policy change and provides the following examples: Hajer 1995, 2003; Fischer 2003; Dryzek 2005.

"*A discourse is 'a shared way of apprehending the world. Embedded in language, it enables those who subscribe to it to interpret bits of information and put them together into coherent stories or accounts. Discourses construct meanings and relationships, helping to define common sense and legitimate knowledge' (Dryzek 2005: 9)"* (Carter, 2008 p. 195).

Feindt and Oels (2005 p.163-164) use DA, to illustrate how environmental problems are discursively produced, and rendered governable through policy making. They use the development of an aesthetic and ethical critique of modernity and industrialisation – for example, leading to valuation and protection of habitats and species since the late nineteenth century. Additionally, Jackson (2003) explains Watson's (2000) approach to policy informed by Foucault. Watson advised, that policy discourses should be interrogated to see what assumptions are embedded, as seemingly benign policy documents may have complex, contradictory effects which "*may create 'subject positions' which may not have been those initially desired*". This was considered whilst analysing biodiversity policies and guidance documents.

2.8 DEVELOPING THEORY

2.8.1 Iterative Triangulation

A conscious iterative process was employed throughout the research project, which analysed data with a 'lens', switching from micro-analysis to macro-analysis. This allowed a constant cycle of theory generation and theory building through the examination, expansion, or abandonment of emergent theories via a process of triangulation. The values underpinning the thesis topic cover many spatial stages, actor types, agendas, and temporal phases. This is why a range of methods are used in this iterative triangulation.

2.8.2 Theory Generation, Testing and Building

2.8.2.1 Validity and theoretical sampling

Reliability (replicable nature; and whether other researchers would reach the same conclusions) and validity (consistency between observations and theoretical developments; and degree to which findings can be generalised across different social settings) are as important to qualitative

research, as they are to quantitative, yet without the focus on measuring this (Bryman, 2004 p.273). Therefore theoretical sampling is to qualitative research, as probability sampling is to quantitative research.

Theoretical sampling can be described as gathering data driven by the need to develop evolving/ emerging theory. The purpose is to enable comparisons with a rich variation of concepts and to elaborate and refine categories constituting the theory through collecting, coding, and analysing until no new properties emerge (Charmaz, 2006; Strauss & Corbin, 1998; Glaser & Strauss, 1968).

Theoretical sampling was used in the research project from an early stage in the initial literature review and exploration of early case studies. Vaughn's suggestions, regarding qualitative case analysis, used to develop general theories of particular phenomena, were followed. This meant case's were: analysed sequentially; treated independently; with their unique idiosyncratic details respected, to maximise theoretical insight (Vaughn, 1992). Initial theories generated from case analysis and other research methods were presented in international conferences, or appropriate presentation forums, to test and reveal further concepts from feedback. This interplay between interpretation and theorising encouraged the kind of iterative exploration and comparative analysis, synonymous with theoretical sampling within a grounded theory framework (Bryman, 2004 p.270; Glaser & Strauss, 1968 p.1).

2.8.2.2 Grounded theory versus non grounded theory and coding

It has not been possible, or desirable, to suspend awareness of certain theories until late in the research stage, as is conformant with a 'true', or 'traditional' grounded theory practice. This was due to ethnographic experiences gained in the previous action research. As Miles and Huberman (1994 p.17) pointed out when discussing the drawbacks of highly inductive and loosely designed studies, not to 'lead' with the conceptual strengths of a researcher can be both self defeating and time consuming. Bryman (2004) also supports the practical difficulties of time regarding true grounded theory, and additionally explains that it is rarely accepted that theory–neutral observation is feasible.

However, attempts to cultivate an 'open' mind, to generate new theory and amend or reject previous theories, has drawn upon a number of grounded theory techniques within the thesis methodology. In addition to iterative processes, these include:

- Coding - numerous social scientists highlight the importance of 'coding': "*Constructing analytic codes and categories from data, not from preconceived logically deduced hypotheses'"* (Charmaz, 2006). Bryman (2004) criticises the fragmentation of data into discrete chunks through coding, due to the loss of context and narrative flow. Yet conversely, applauds coding procedures' constant comparison of phenomena under certain categories, allowing theoretical elaboration of categories to emerge. Glaser and Strauss (1968 p.71) encourage theoretical collection, coding and analysis to go on simultaneously to the fullest extent possible; and
- Sequential and interim analysis – Miles and Huberman (1994 p.85-86) advise that there should be many interim analyses to help reorient a view of the case: "*Their strength is their exploratory, summarising, sense-making character. Their potential weaknesses are superficiality, premature closure and faulty data. These weaknesses may be avoided through intelligent critique from sceptical colleagues*".

Glaser and Strauss (1968, p. 256) explain that comparative analysis is the chief safeguard against stopping theory development too soon: "*This gives a broad, rich, integrated dense and grounded theory*". Using these techniques, theoretical saturation was eventually reached. This occurred when sampling confirmed the importance of several different categories and the emergence of significant new concepts had ceased.

Focus was given to coding techniques within the research, following a meeting with Knight (pers. comm, 2008 a) to discuss 'Computer Assisted Qualitative Data Analysis (CAQDA)'. Discussing the relevant merits of different software packages available, the use of the software: 'NVIVO' was deemed the most appropriate to this research topic. However, following further research (Bazeley, 2007) and trial of demonstration software of NVIVO8, it was deemed that in this particular instance (with only one researcher), the relative benefits did not outweigh the additional time demands, as there is a: '*Steep learning curve: not intuitive to the uninitiated*' (Macer, 2008). Nonetheless, this exploration benefited the analytical and coding skills of the researcher.

2.8.2.3 Abductive reasoning

During a meeting with an experienced social researcher to discuss the theory generation methodology for this thesis, it was noted that the approach adopted thus far, was akin to that of abductive reasoning - a dynamic interaction between data and theory (Knight, pers. comm, 2008

b&c). This insight led to an exploration of abductive reasoning, to ensure the most beneficial methods were adopted.

Coffey and Atkinson (1996) quoted Kelle's (1995b) explanation that abductive reasoning, or abductive inference:

"We identify a particular phenomenon – a surprising or anomalous finding, perhaps. We then try to account for that phenomenon by relating it to broader concepts. We do so by inspecting our own experience, our stock of ideas that can be included from within our disciplines (including theories and frameworks) and neighbouring fields... There is thus a repeated interaction among existing ideas, former findings and observations, new observations, and new ideas".

Thagard and Shelley (1997) highlight an explosion of work in artificial intelligence in the mid nineties which have been characterised as abduction: e.g. medical and fault diagnosis, scientific discovery and legal reasoning. They critiqued several formal models of abductive reasoning, and rejected these approaches, instead advising the following aspects be taken into account (which the researcher has taken into account for this project):

- Explanation is not deduction; an abduction model requires an account of explanation that is richer than deduction. For example, it would not have been possible to capture the notion of Darwinian species evolution using deductive derivation logic alone, as the historical record is too sparse and biological principles are too qualitative and imprecise;
- Hypotheses are layered; Hypotheses sometimes explain other hypotheses (causes are often themselves effects);
- Abduction and hypotheses can be creative and revolutionary;
- Completeness is elusive and simplicity is complex; Requiring completeness only makes sense in limited closed domains such as simple circuits;
- Abductive reasoning may be visual and non-sentential (Thagard & Shelley, 1997).

2.8.2.4 Systems approach

To define and tackle biodiversity obstacles, enabling effective policies and positive change, the complexity of the intertwined elements of sociology and ecological systems must first be unravelled. Capra (1985 p.475) explains that systems theory is "*the ideal framework to express the emerging ecological paradigm*". Beck (1995 p.121) and Kay (2008 p.84) also both support the use of 'systems theory' to reveal the multiple contexts of varied socio-cultural values for biodiversity. Beck (1995 p.119-121) comments that: *"…the ecological issue seems oversized, disregarding national or professional boundaries*", and that: *"Systems theory, in particular, has advanced far*

ahead, having opened a path for sociology to the ecological issue through various innovations, such as its inclusion of chaos and turbulence theories from the natural sciences".

Cabezas *et al* (2005 p.455) note the value in humanity's efforts being inputted into environmental management – specifically: "*in linking measures of ecosystem functioning to the structure and operation of the associated social system*". They propose that indicators based on 'information theory' can bridge the natural and human system elements, and explore information which statistically measures variation for dynamic systems of many variables. Bell (2005 p.472), whilst noting that many welcome systems theory as a 'basis for a common theoretical language', also warns of the perils. He states that a great deal of the world is not very systemlike at all, and that the world is rife with: "*conflict, confusion, disconnection, and discombobulation*" (Bell, 2005 p.477). He concludes that there can be no one theory to rule all of this, although: "*Systems theories of the reflexive modernization and postmodern varieties have acknowledged to some extent the ragged edges and disjunctures in our social and ecological lives, and they have made some attempt to come to terms with this acknowledgment..."* (Bell, 2005 p.477). For this thesis, one theory or solution is not being sought (as there is not one obstruction) – more an accumulation of theories and solutions.

Complex sets of obstructions to achieving biodiversity enhancements are embedded within different process layers, various disciplines / actors, and at specific points within development lifecycles. Discussing similar environmental issues and problematic situations that have eluded traditional scientific solutions, Kay (2008 p.3) states: "*Complexity defies linear logic as it brings with it self-organization and feedback loops, wherein the effect is its own cause*". With increasingly complex issues, Meadows (2008 p.1-2) also explains that systems thinking: "*gives us the freedom to identify root causes of problems and see new opportunities*"**.** When considering this, the cumulative effects and causality which affects systems should never be underestimated. Perdicoúlis and Piper (2008) wrote of the need to include causal loops in methodologies for Cumulative Effects Assessment (CEA) for Environmental Impact Assessments (EIA). Whilst CEA and EIA deal with specific regulations, the theory of considering the cumulative cause-and-effect relationships of various actions, or projects, is relevant to this thesis. For instance, implementing one potential solution to an obstacle in maximising biodiversity on major developments may have little or no effect; but implementing a host of solutions (the cumulative effect) may reap great biodiversity rewards.

Meadows (2008 p.111) explains that 'system traps', or 'problematic behaviour archetypes', are systems: "*structured in ways that produce truly problematic behavior*". By taking a systems approach to data collection, emergent theories and theory building, this research project is more likely to provide meta-guidance, capable of effectively tackling some of the 'system traps' which have meant that our current 'system' seems to be resistant to maximising biodiversity.

A holistic understanding of the context and issues is necessary to yield effective solutions. Therefore, the selection of a single discipline, actor, development type, or area, was avoided. This averted the kind of 'bounded rationality' which Meadows warns against: where people make reasonable decisions based on imperfect information - not considering more distant parts of the system (Meadows, 2008 p.106).

Vaughan (1992 p.182) advocates nested theories, suggesting they can prove to be an advantage that is "*significant beyond the elaboration of any particular theory, model, or concept that we seek*". More information is supplied on the benefits of nested theories and their use in this research project, in conjunction with nested case studies in *Chapters five, seven, eight* and *nine*.

Having discussed the research approaches adopted, this will be taken for granted henceforth, except where further elucidation is deemed necessary.

3 QUESTIONNAIRE FINDINGS: PREVALENT OBSTACLES, THEIR LIFECYCLE STAGE AND CONSEQUENCES

3.1 CHAPTER INTRODUCTION

Successful practical applications, which maximise biodiversity potential throughout a development's lifecycle, are a rarity. Development exceptions do exist, such as some of the 'Centre Parks' woodland recreation holiday villages – which depend upon the presence of biodiversity value, for the development need in the first place. However, these are not urban schemes, and the rarity of successful examples, is due to a number of process obstructions which are particularly prevalent within 'urban' and 'major' development schemes. Identifying the key process obstacles is the focus of this chapter, which summarises the results of a questionnaire survey completed by local government ecologists in England. The analyses and discussion of the questionnaire findings, additionally draws upon insights from: action research, specialist interviews, and case studies, in order to reveal the key process obstacles and some preliminary recommendations to increase biodiversity.

A web-based questionnaire was emailed to all members of ALGE (The Association of Local Government Ecologists) from a list of contact emails provided by the ALGE secretary. The questionnaire was sent out in February, 2009 and was closed at the end of March, 2009. In total there were eighty one respondents, which represent almost 50 % of the provided contact emails. Eighty one respondents answered the first three questions (representing the first electronic page); sixty four respondents answered the next three questions; and fifty eight answered the final three. This decline in responses indicates that respondents either run out of available time to answer questions, or that there were technical misunderstandings in accessing subsequent pages.

Questions were either multiple choice or matrix questions, and also had an 'additional comments' field to capture additional insights. Questions were devised to test emergent theories regarding the key process obstacles obtained from previous action research, and initial case study and interview findings; whilst at the same time eliciting new insights and theories. The consideration given to the questionnaire design and various response issues, are described in detail in *Chapter two* 'Methodology'.

The main objectives of the questionnaire were to seek respondents' views of biodiversity within the development process, in relation to:

- The key obstacles to maximising biodiversity, and at which stages they occurred;

- How 'urban' biodiversity was being tackled;
- Testing emergent theories regarding: recording, enforcement, and the most prevalent obstacles to maximising biodiversity.
- Eliciting previously unidentified issues.

The research findings for each of the nine questions are summarised in *section 3.2* and discussed in *section 3.3.* Unless otherwise stated, statistics relate to the replies from eighty one respondents. Due to dual computer hardware technical faults following analysis of the questionnaire results and prior to completing the write up of the thesis, the raw data of open comments fields is no longer accessible.

3.2 RESEARCH RESULTS

3.2.1 Professional Role – Question One

Respondents were mostly general ecologists and biodiversity officers (41 %), followed by specialist planning ecologists (20 %), management/ team leader ecologists (15 %) and then 'other' related professions (24 %). 'Others' included: countryside officers; parks managers; a combination of ecologist with policy or similar; a countryside ranger; and a renewable energy project manager, who all had responsibilities for biodiversity and ecology.

3.2.2 Experience – Question Two

The majority of respondents (93 %) had over two years professional experience while 91 % had a degree/ higher degree, and half were members of professional institutions (the majority being: the Institute of Ecology and Environmental Management, or the Institute of Biology); this level of knowledge and experience of respondents lends confidence to the validity of the responses received to the questions. Out of the non ecology / biology institution memberships, the most common were chartered or associate members of the Landscape Institute (LI) (seven respondents).

Whilst the vast majority of local authorities (LAs) have urban areas within their boundaries, only half (51 %) of respondents had professional experience in 'urban' ecology while two comments on question nine (related to 'urban' biodiversity), admitted that Development Control (DC) officers were requesting urban biodiversity advice, but there was a lack of knowledge amongst ecology specialists upon the subject.

3.2.3 Planning Application Forms – Question Three

The Standard Planning Application Form 1APP was introduced in England in April, 2008 and has helped to streamline the planning system, by giving planning applicants greater certainty of requirements at this early submission stage. The new standardised '1APP' now contains questions on biodiversity from PPS9 (PPS9 is introduced in 1.1.4.3 & a fuller explanation is provided in 5.3.3.2), paragraph fourteen: Biodiversity and Geological Conservation, in the following format:

"Is there a reasonable likelihood of the following being affected adversely or conserved and enhanced within the application site, or on land adjacent to or near the application site?

a) *Protected and priority species:*
b) *Designated sites, important habitats or other biodiversity features:"* (Planning-portal, 2008)

Applicants are required to tick either: Yes or No, to whether there is interest 'on' or 'off' site. This then triggers whether ecological consultation or site surveys are required.

In the questionnaire respondents were asked how effective they thought the change to include biodiversity questions had been, to which 33 % indicated it had been ineffective and 36 % that it could be effective in the future (*Figure 2*).

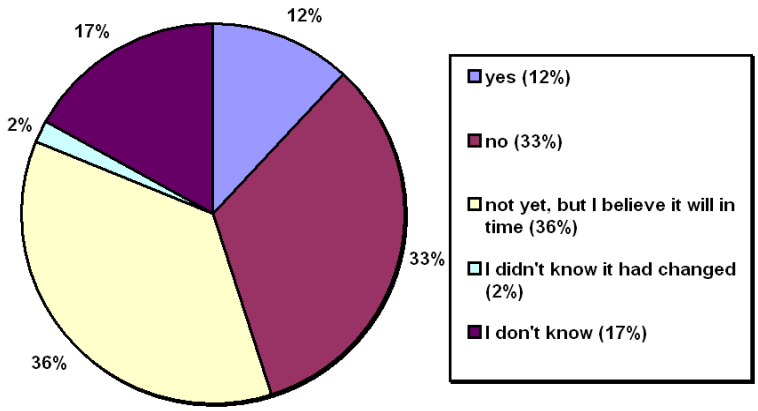

Figure 2: Pie Chart Illustrating Perceived Effectiveness of Standardised Planning Application Form

Further comments (forty one respondents) related to planning applicants inaccurately ticking 'no', when there 'were' features on site, which could lead to inaccurate validation of applications (sixteen comments). However, it appears that several local authorities are aware of this and are

attempting to tackle the issue by producing guidance sheets. Additionally, ALGE has produced draft pilot guidance on validation, which is downloadable from their website (ALGE, 2007b).

Several comments related to: seeing some improvements in survey requests "*but these are still being done at inappropriate times of year etc.*"; the need for stronger enforcement and strategic awareness; or raised issues regarding those local authorities who had no in-house ecologist, *"…or at least a call-off contract with an ecological consultancy, have very little chance of preventing or even minimising negative impacts on biodiversity…*".

3.2.4 Recording Biodiversity Agreements and Proposals – Question Four (sixty four respondents)

Respondents were asked to tick all possible answers (see key) with regards to 'recording' biodiversity agreements on individual development sites (*Figure three*).

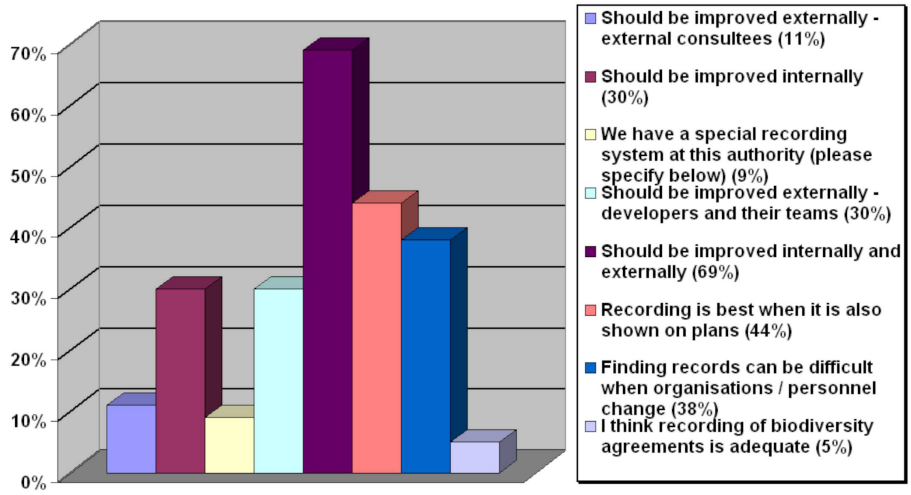

Figure 3: Respondent response with respect to question four - 'Recording of biodiversity agreements and proposals'

The results confirm that there is a significant issue in the way biodiversity proposals are recorded both internally and externally to the Local Authorities (LAs). This is in line with previous 'action research' which found general issues during construction and management phases, where biodiversity features had not been implemented correctly, or at all, due to not being shown on site master plans (as site staff did not possess, or had not read the ecological reports).

Unexpectedly, only 44 % of respondents believed records of proposals were best when also shown on plans, while in contrast, six of the seven respondents who were members of the LI, agreed that also recording on plans would be better (eighty six per cent). These results and the previous action research indicate that agreements being lost, misunderstood, or forgotten over

time, were key recording issues, sometimes related to personnel or organisational change. Furthermore, most respondents' comments suggested they knew that recording biodiversity agreements on development sites was failing in some way, but the task seemed too large to untangle within their resources.

3.2.5 Obstacles to Maximising Biodiversity and the Key Developmental Phases in which Obstacles Occurred – Questions Five and Six (sixty four respondents)

Obstacles (Question Five)

Respondents were asked '*If you had to choose, what would you rank as the top 3 obstacles to gaining biodiversity enhancements, which need to be solved?'* They were given comment boxes where they could write their: first (sixty four respondents); second (sixty one respondents); and third choices (fifty seven respondents). An analysis of the responses is shown in *Table one*. These results revealed the complexity of the issue, as many far-ranging reasons were given which related to the different phases and different actors involved in developments. However, common obstacles did emerge, as did some previously unconsidered points (such as the misdirection of biodiversity funds towards certain survey requirements, rather than enhancement – listed by four respondents). The 'ranking' column relates to whether the obstacle appeared as a first, second, or third key obstacle choice (combined with the number of responses, this indicates the relative importance which can be attributed to each key obstacle). The majority of the significant obstacles are related to 'prioritisation' of the biodiversity agenda.

RESPONSES	ISSUE	RANKING
24	Reluctant developers: lack of incentives / pressure	1,2 & 3
22	Knowledge, commitment, attitude & priorities of planners	1,2 & 3
16	Cost / Finance / Percieved cost by developer	1,2 & 3
14	Lack of monitoring & enforcement issues	2 & 3
10	Stronger, more robust legislation & policy needed (or more definite wording of planning statements, or policies, to determine the level of enhancements)	1,2 & 3
10	Lack of understanding of biodiversity enhancements	1,2 & 3
9	Lack of 'in house' planning ecologists, or specialist knowledge	1 & 2
9	Consideration not early enough / lack of design input	1 & 2
9	Long term management issues (often difficult to establish / agree / enforce / fears)	2 & 3
7	Politics (conflicting policies / lack of will)	2
7	Competing issues / biodiversity less of a priority in comparison to social issues	2 & 3
5	Lack of time to initiate & implement	2 & 3
5	Poor communication between parties (& lack of consistency)	1,2 & 3
5	Need for some kind of standardisation / method of quantifying upfront what enhancements should be – what is reasonable to ask for	1,2 & 3
4	Ineffective use of money for biodiversity enhancements / resource allocation. This related to too much money being spent on surveys at the sake of actual enhancements	3
2	No consideration unless already designated sites, protected species, or existing interest present	1
2	Lack of options due to site restrictions	1

Table 1: Analysis of responses to question five, with respect to key obstacles to gaining biodiversity enhancement

Development phases and obstacles (Question Six)

Respondents answered a matrix style multiple choice question listing development phases and possible obstacles, which they had to choose from. Key obstacles were selected by the author based on insights gained from both action research and research interviews. Results from the previous 'open' Question Five, reflect the key obstacles chosen in this question, which assigns credibility and validity to those selected.

The selected key obstacles used in Question Six are underlined below, with a summary of the lifecycle phases that respondents selected they were the most prevalent within:

- Lack of ecological consultation was highest at pre-app and planning application stages.
- Communication issues internally were significantly worse in the pre-app and application stages.
- Communication issues externally were not significantly greater for any particular phase of development.
- Poorest records of biodiversity agreements occurred between construction; completion/ handover; and management phases. The management phase was associated with the highest recording issues.
- Competing issues / prioritisation was highest between pre-app and detailed design.
- Ineffective Regulations and Policy were relatively high issues throughout the development lifecycle. However, regulations and policy had a significantly higher number of respondents at the management stage.
- Lack of incentives to off-set delays / costs were highest during construction, although they were also relatively high at the pre-application and application stage too.
- Lack of knowledge & guidance appeared to be high across all phases

3.2.6 Enforcement – Question Seven (fifty eight respondents)

This question assumed a negative stance towards biodiversity enforcement, in order to test previous action research and research interview findings. The question began with the following statement: *"Enforcement relating to biodiversity and developments is not always effective i.e. sometimes no enforcement action is taken; sometimes the enforcement action is 'dropped'; or even when enforcement action is fully taken, the resulting fines or procedures do little to put off offenders in the future"* Respondents were then asked to select as many of the possible answers as they felt relevant, from the choices provided. *Figure four* illustrates the findings.

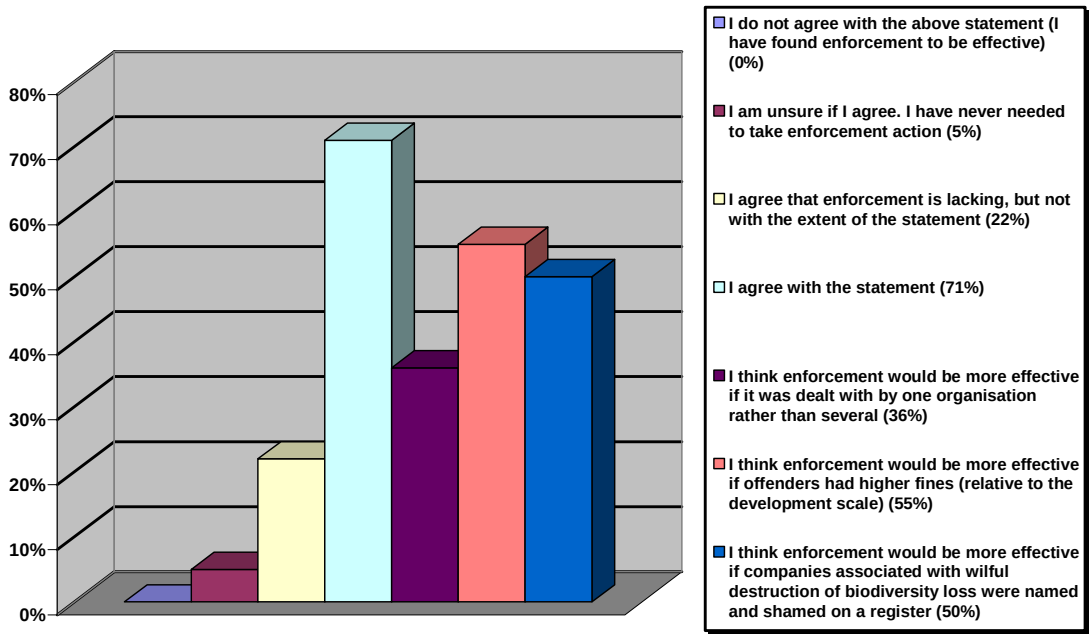

Figure 4: bar chart illustrating the level of agreement with the enforcement statement

Additional respondents' comments referred to the lack of resources available to police and LA enforcement officers (financial and staffing), leading to low enforcement and monitoring levels (five comments). However, respondents recognised there were enforcement issues across all areas of planning, but biodiversity (protection/ enhancement) was either more difficult to enforce, or suffered from a lack of will to enforce - more so than other planning issues.

3.2.7 Are the Developers and Their Agents who you Deal with Generally Able to Provide 'URBAN' Habitat/Feature Specifications to the Standard you Require? - Question Eight (fifty eight respondents)

In response to this question 40 % answered yes and 48 % no, suggesting that there is a significant issue with obtaining urban habitat and feature specifications. Furthermore, respondents commented that: green infrastructure raises the profile, but a more strategic approach to biodiversity enhancements is needed; as developers and consultants experience of urban habitat schemes increases, they illustrate a learning curve; specifications need to consider what locally present species can be attracted to a site; developers need to provide sufficient areas for habitat features; due to the range of spatial scales involved with biodiversity, many developments affecting sites of local value, are influenced by landscape architects with no involvement from ecologists; and, the science of urban biodiversity is misunderstood even amongst ecologists.

3.2.8 How do you think the Following Groups Understand 'URBAN' Biodiversity and the Potential for Improvement and Enhancement through New Developments? - Question Nine

(fifty eight respondents)

Respondents were asked to rate the understanding of the groups involved in new developments (*Table two*).

Group	Respondents comments
1. Forward plans /Local development Framework (LDF) policy officers	Best understanding of 'Urban' biodiversity (out of all groups in the matrix).
2. Developers/ developer's teams, and members/ planning board	Worst understanding of urban biodiversity.
3. Development control planning officers	The greatest improvement in understanding.

Table 2: Understanding of urban biodiversity (and the potential for improvement and enhancement through new developments) by different groups

While forward plans / Local Development Framework (LDF) policy officers' good knowledge is probably attributable to their work with green-network maps and PPS 9 on a relatively frequent basis, the encouraging improvement in DC planning officers' knowledge is generally reflective of the findings of the wider research. With regards to elected council members (*number 2 in Table two*), who hold the power to grant or decline planning permission, the results correspond with findings from action research and research interviews e.g. "*Members do not always understand planning policy. Their knowledge can be poor, as it is a voluntary position. How democratic decisions are maybe questionable for the same reasons. Enforced training [regarding biodiversity] would be helpful."* (Mansell, pers. comm, 2008). This indicates a requirement for Continuing Professional Development (CPD).

3.3 DISCUSSION

The major obstacles to biodiversity enhancements in major urban development schemes can be categorised under the following headings:

3.3.1 Knowledge and Experience

Reviewing the literature there is an increasing quantity of information available on urban biodiversity (theoretical, and applied). Protection and enhancement of urban biodiversity is certainly not a new concept. Indeed, further education modules covering the topic and influential textbooks, such as: The Ecology of Urban Habitats' (Gilbert, 1989) have been available for at least

twenty years. However, there has been increasing academic consideration, and increasing consideration of various social science realms, due to the inextricable links of humans and societal processes to ecological systems, such as 'Human Ecology' and 'Socio-ecological Resilience' (Elmqvist, pers. comm, 2009; Ernston, 2008), see *Chapter six* 'Socio-ecology'. Additionally, a number of groups promoting the science and practical application of urban biodiversity, or biodiversity planning exist, such as: the UK MaB urban forum (established since 1987); and ALGE. Furthermore, an increasing number of LA's have local BAPs or Supplementary Planning Documents (SPDs), which cover urban areas and brownfield sites.

It appears therefore that the issue of lack of knowledge, which was raised in the questionnaire, may well be more attributable to the accessibility of this knowledge, or the need for specialist training for certain groups, rather than the lack of available information. Despite the improvements in knowledge, the results of the questionnaire clearly indicate that there is still a general lack of understanding and experience of urban biodiversity within professions who deal directly and indirectly with biodiversity and development (including approximately half of ALGE members who answered the questionnaire). In particular the questionnaire results indicated that a small proportion of respondents did not deal with urban areas (12 %), while as many as 49 % actually had no urban biodiversity experience, indicating that ecologists are 'dealing' with urban biodiversity, but do not feel 'experienced' enough in the topic.

ALGE (2010) proposed a web based related 'biodiversity planning toolkit' is now available, whilst still being developed. This alleviates some of these issues, although the interactive map does not contain any significant urban guidance for large major mixed-use developments. Additionally, the former Commission for Architecture and the Built Environments (CABE) advocated *"seeing urban development as an opportunity for enhancing biodiversity through good design of both buildings and spaces"* (CABE, 2004). CABE has since been decommissioned, due to government spending cuts, but their website is still used as an information resource by many related professions.

The importance of case studies is illustrated in the wider research study, where successful 'learning curves' are evident. For example, two interviewees noted instances where once developers have provided urban biodiversity enhancements due to the regulatory system, they tended to be much more likely to want to provide biodiversity enhancements on subsequent schemes, even in the absence of regulatory requirements (Reed, pers. comm, 2008; Westfold, pers. comm, 2008).

3.3.2 Prioritisation

Prioritisation of biodiversity is required at the chief executive level of LA's, as effective change needs to be filtered down to all, to bring about a new understanding of biodiversity significance (other than protected species and habitats). This is compliant with the biodiversity duty placed on all public bodies through the NERC (Natural Environment and Rural Communities) Act (NERC, 2006). ALGE has attempted to tackle some of these issues through their publication 'Increasing the Momentum: a vision statement for biodiversity in local government (2004 – 2010)' (Oxford, 2004). However, real change will require intervention to foster better inter-governmental and societal perception and prioritisation of biodiversity issues, coupled with national training for planning officers and elected members who reside on planning boards. Training should focus on raising awareness of PPS9, and what is feasible in terms of biodiversity enhancements on urban developments, in various development scenarios. The need for training and guidance to elected members was re-iterated in the Government response to 'The Killian and Pretty Review' (DCLG, 2009a). This review advised government on creating a faster and more responsive planning application system (Killian & Pretty, 2008).

An additional tool used across Wales, is the assigning of 'Biodiversity Champions' among LA council members by chief executives / head of cabinets. The biodiversity training is provided and is supported by the Welsh Local Government Association (WLGA), and to date the Countryside Council for Wales (CCW) have found this to be an effective process (Robertson, pers. comm, 2008), suggesting that replication of this process should be investigated within England.

3.3.3 Specialists

A lack of in-house biodiversity planning specialists appeared to be a key major obstruction to gaining biodiversity enhancements. In the government's response to 'The Killian Pretty Review', they acknowledged the need to address general labour shortages and skills in planning (DCLG, 2009a). Where financial resources may not stretch to the salary, training and office accommodation of a new member of staff, the potential to buy-in specialist advice from appropriately qualified and experienced consultants on an ongoing contractual basis could be considered.

3.3.4 Policy

At present, most local policies do not adequately reflect national policies at a level of detail appropriate to the local scale. This is also being witnessed in Sweden, where researchers

identified a general lack of flow between national to various local biodiversity policies (the researchers looked at a number of different cities). The repetitive and vague local policies failed to add the necessary extra level of detail (from the national), rendering them relatively ineffective (Elander *et al*, 2005).

Policy must reflect the new biodiversity paradigm in clear, concise terms throughout all hierarchies. It is recommended that all LAs provide specific 'urban' biodiversity guidance to developers and write specific LDF policies with regards to biodiversity enhancements. LDF policies must be relevant and specific to the local context.

3.3.5 Misdirection of Funds

Question five (as discussed in *section 3.2*) highlighted the need to improve the direction of biodiversity funds in order to enable habitat enhancements, rather than just surveys. The objective should be to benefit many species, rather than only expensive translocations of small numbers of protected species - three respondent comments specifically related to misdirection of funds due to Great Crested Newt requirements. Engagement with Natural England to discuss possible solutions would be necessary. For example, one respondent to the questionnaire controversially suggested: *"By presuming presence of protected species in appropriate circumstances, more money could be spent on habitat provision rather than surveys".*

3.3.6 Recording and Communication

This research confirmed findings of the wider research project - that improvements need to be investigated for recording biodiversity agreements and proposals [*Question four*]. The questionnaire also highlighted that this is particularly necessary regarding developers handing over development sites after the construction phase [*Question six*]. Spatially recording biodiversity agreements on individual development schemes (i.e. on masterplans) should also be considered [*Question Six* and insights from several other questions].

However, greater partnering and co-operation between planners, council members, developers, ecologists and landscape architects is necessary. Ecologists may be able to assist planners in making more favourable recommendations for biodiversity, by providing: a summarising checklist of specific biodiversity features to select from; approximate costs - to assist in negotiations; a basic list and map of which species to encourage where (Local BAP's are often too large for

planners to assimilate, along with the host of other guidance documents) and technical specifications for common habitat features (Mansell, pers. comm, 2008).

3.3.7 Enforcement

As part of the wider research project a senior solicitor within the planning and environment field was interviewed (Harrow, pers. comm, 2009). Having worked at a number of LA's, Harrow believed there may be a flaw in the legislation, in that, the legal system (planning inspectorates and magistrates) tends to value biodiversity from a visual rather than a biological perspective. *"There tend to be better results in court when there is a link to visual amenity. Biodiversity tends to have to be linked to something else, before it is considered*". Harrow (pers. comm, 2009) also stated that he felt biodiversity fines tended to be unduly low and that: *"There is a wide variation in magistrate's benches with regard to fines relating to biodiversity*". This discovery led to investigating 'valuation' of biodiversity in *section 4.6*.

A significantly high proportion of questionnaire respondents had experienced a range of obstacles to taking enforcement action for biodiversity related offences [*Question seven*]. It is likely that the poor enforcement rates could also be correlated to poor developer incentives to provide biodiversity enhancements in the first instance. Therefore, the possibility for a lead authority to centralise all biodiversity enforcements should be considered, as should: magistrate training; greater fines; streamlining the evidence process and ensuring more effective monitoring of development sites at various phases.

3.3.8 Procedure

Early ecological consultation at the pre – application and application stage were highlighted as especially important by the questionnaire respondents. The wider research also found that with major urban developments, developers often invested so much time and effort in acquiring sites that they have to proceed with speed, in order to prevent cash-flow problems. If developers did not build biodiversity into their plans from the start, then it is almost impossible to get any major amendment (Frost pers. comm, 2008). Procedures should be investigated to trigger earlier specialist consultation.

Many comments in response to *Question five*, and throughout the research generally, relate to either the knowledge of planning officers, or the importance of the use of planning conditions and improvements needed to standardise them, as well as providing specific biodiversity conditions.

In a previous research interview Heeley (pers. comm, 2008) highlighted that: *"writing specific biodiversity conditions can be difficult, as planners are not experts in this area - so they need assistance in writing the planning conditions, but there is often a lack of understanding from consultees on what can technically be said in a planning condition. There needs to be an understanding of one another's technical language"*. Therefore, biodiversity conditions often do not become precise enough, or enforceable, due to the lack of technical knowledge when writing the condition. It ought to be possible to justify most biodiversity conditions within the scope of the 'six tests' - the formal tests a condition must pass (ODPM, 1995), if planners and ecologists write standard and non-standard conditions together.

The 'Killian and Pretty Review' regarding planning application processes, advised government to update the circular generally (Killian & Pretty, 2008). Improvements to model biodiversity conditions (standard and individual) should be sought through consultation on the revised circular 11/95.

3.3.9 Incentives and Promotion

'Lack of developer incentives and pressure' was cited as the most common key obstacle by respondents to *Question five*. Multifunctional benefits and other developer incentives should therefore be publicised and discussed in negotiations with developers during the planning stages of a new development project. The 'learning curve' associated with developers and consultants implementing urban biodiversity enhancements, clearly indicates the benefits which the promotion of successful case studies and technical specifications would have to furthering urban biodiversity enhancements.

The questionnaire also revealed that greater incentives to off-set issues, especially at the construction stage, should be investigated.

3.4 CONCLUSION

The survey questionnaire identified key and common obstacles to enhancing biodiversity on major urban development schemes. It also identified at which stages within a development's lifecycle the key obstacles are most likely to occur, as well as some of the key actors involved.

This information helps to prioritise areas for further investigation and theory building. Further research, through case studies and specialist interviews, therefore focuses on furthering the findings made during the course of the analysis and discussion provided under the subheading themes in *section 3.3* above.

The generally low prioritisation awarded to biodiversity issues uncovered in this study (particularly drawn from *Question 5* and discussed in s*ection 3.3.2*) - along with a lack of in-house biodiversity specialists, and ineffective enforcement; will certainly contribute to many of the obstacles in maximising biodiversity. A focus is therefore given to these particular issues during reflection, investigation, and solution finding, within the remainder of the thesis.

4 URBAN BIODIVERSITY

4.1 DEFINING AND INTRODUCING BIODIVERSITY

4.1.1 Basic Definition

Urbanisation and the key related consequences of development upon biodiversity, namely the extraordinary rates of biodiversity loss and extinction, are summarised in *Chapter one* 'Introduction'. Put simply, biodiversity is: *"'the variety of life', and refers collectively to variation at all levels of biological organisation"* (Gaston & Spicer, 1998). It is assumed that readers of this thesis will have a basic background understanding of biodiversity, nevertheless, the general understanding of the term 'biodiversity' is defined further in the glossary, which also lists some of the key environmental organisations (*Appendix one*). The terms 'ecology' and to a lesser extent 'nature' have a great deal of overlap with 'biodiversity'. However, 'ecology' for the purposes of this research refers to the study of individual species, communities, habitats, and ecosystems, including their lifecycles and requirements; in contrast, 'biodiversity' relates to a strategic agenda, incorporating the mechanisms which affect 'variety'. Biodiversity, in the context of this research, is further defined throughout *section 4.1.2*.

4.1.2 Introduction

4.1.2.1 Biodiversity and developments

As Feindt and Oels (2005 p.162) suggest, global environmental problems, such as biodiversity loss, are not self-evident, but imply complex and systemic interdependencies, which often build up over long time intervals and large spatial areas. To implement the maximisation of biodiversity within major new developments, an understanding of ecological sequencing complexities (temporally changing species / habitat requirements due to lifecycles and seasons), which tend not to match development work programmes, is needed. In order to maximise local and site biodiversity, the consideration and understanding of other interdependencies are also required, relating to urban developments, global science, and social sciences (such as economics, valuing systems, business, politics and regulatory systems). Consequently this research then becomes a highly complex systems topic.

In using the systems approach, the full scope of urban biodiversity consideration in relation to this research needs to be clarified. This chapter, along with *Chapter five* 'Planning and Governance' and *Chapter six* 'Socio-Ecology', draw out the most relevant aspects in this research context. Elements of the research findings, from interviews, literature reviews, and action research are also incorporated within these chapters. This particular chapter assists readers who may not be

familiar with the distinction between 'urban' biodiversity and non urban biodiversity issues. It also focuses on measuring biodiversity (in order to illustrate a 'maximisation' of biodiversity as per the thesis title); as well as valuing and incentivising at the individual development and city scale, in order to influence 'maximisation' processes.

4.1.2.2 Scale of consideration

Biodiversity can be considered within different biological, spatial and temporal scales, and there are often conflicts across these scales. Each of these types of scale will be considered below, but in terms of this research they interact theoretically through policies, legislation and agreements; and practically through transboundary issues and development and construction phasing. This is brought out in the case studies.

Interactions with ecosystem services and ecosystem responses to land changes between scales are also complex and poorly understood (IAP, 2010 p.2; Grimm *et al*, 2008b). However, knowledge gaps regarding socio-ecological processes and interactions may be due to data incompatibilities between different sources and approaches, rather than missing information. This illustrates a major challenge for different research communities trying to collaborate and overcome thematic, spatial and temporal scale incompatibilities between existing data (Lotze-Campen *et al*, 2008 p.114). It is therefore important to clarify the range of scales, which this research project considers.

Biological organisation

A three-level conceptualisation of biodiversity, from a biological perspective, has become commonplace and is adopted by the Convention on Biological Diversity (CBD). This includes the genetic, species and ecological/ habitat levels (Elander *et al*, 2005 p.285).

Elander *et al* (2005) also describe a more strategic 'fourth' approach, similar to a 'landscape scale'. The researcher of this thesis agrees that the physical features and networks allowing species to move, colonise / re-colonise, or provide links to a range of necessary habitat opportunities, are also very applicable to this research. Therefore, a development repairing fragmented Green Infrastructure (GI) would still be classed as 'maximising biodiversity', even if species increases were not measurable. This fourth scale is a hybrid of a biological and a spatial scale and it is necessary to consider these larger, planned elements within the urban context.

On individual developments 'population', 'communities' and 'genetic variation' may also be biological scales of consideration, e.g. planting with local provenance for genetic advantages to specific locales. However, species and habitat levels are the most common scales of denomination in terms of urban biodiversity and developments - reflecting the focus of Biodiversity Action Plans (BAPs) and the majority of policies.

Spatial scale

Biodiversity is viewed differently at a range of spatial scales (e.g. individual development site, locally, regionally, nationally, European, or globally). For instance, on a global level we can only try to reduce the alarmingly high rates of biodiversity decline, yet on a local level it is possible to increase the levels of biodiversity. Whilst this research takes into consideration the UK perspective of the global context, the two main spatial levels of consideration, which are demonstrated by the nested theories in *Chapters seven, eight* and *nine* 'Study One', are the individual development site level, in conjunction with the local level of administration (whether a Local authority/ city remit, or regeneration area). Increasingly, it is recognised that local action is a key component to answering the global crisis and that local problems must be framed in this way (Lotze-Campen *et al*, 2008 p.113; URBIO, 2010).

Temporal scale

On a local, and especially on a development site level, biodiversity constantly fluctuates over time, due to: species migration, lifecycle phases, population dynamics, unusual weather events, and human interventions etc. These temporal fluctuations can create difficulties with trying to 'measure' biodiversity losses and gains, and may mean greater emphasis should be placed upon 'intent' and processes employed in maximising biodiversity, rather than the actual biological data (see measuring - *section 4.3*). Updating ecological site surveys and 'monitoring' can assist management decisions and is sometimes necessary to combat these temporal issues of scale.

4.1.2.3 Recent initiatives for addressing biodiversity loss at the local level

Over the last four years, several biodiversity initiatives have greatly contributed to ensuring that "Cities and Local Authorities" become part of the solution in response to the biodiversity challenges that the world is facing. Examples of such initiatives include: the Curitiba Declarations (2007 & 2010); the Bonn Call for Action; the first CBD Decision on Cities and Local Authorities (Decision IX/28: Promoting engagement of cities and local authorities); the Erfurt Declaration URBIO 2008; the Durban Commitment; and the Nagoya declaration (CBD, 2010 a&b; URBIO, 2010).

Performing a coordinating role for these efforts, to avoid duplication and strengthen links, is the Global Partnership on Cities and Biodiversity, chaired by the Secretariat of the CBD. Collaboration is needed between Cities and Local Authorities, the Parties of the CBD, governments and various relevant partners, in order to reduce the rate of global biodiversity loss through adopting and implementing a post-2010 target (CBD, 2010 a&b; URBIO, 2010).

There are two fundamental proposals for the post 2010 target and tackling urban biodiversity: 1) 'Plan of Action on Cities, Local Authorities and Biodiversity' from 2011-2020; and 2) The Cities' Biodiversity Index (*see section 4.3.2.3*).

The 'Plan of Action' builds on local actions, providing suggestions to Parties on how to mobilise and coordinate CBD issues by engaging urban residents, and to bring national strategies and plans into the urban context (CBD, 2010a). A preliminary plan was distributed at the Second Meeting on Cities and Biodiversity, Curitiba, Brazil, in January 2010 and has since been going through a consultation process (CBD, 2010a). The convention encourages Parties, other governments, cities, local authorities and their networks, to implement the plan of action, in co-ordination with nationally determined priorities, capacities and needs. The convention also requests technical and financial support for the plan (CBD, 2010b).

The Nagoya declaration concludes that the adoption of these proposals by COP10 and its implementation would be a crucial step to halting the global loss of biodiversity (URBIO, 2010; CBD, 2010a).

4.2 URBAN BIODIVERSITY

4.2.1 Introduction

An introductory level to general biodiversity is provided by Gaston and Spicer (1998), but for a comprehensive overview regarding urban biodiversity, there are several recent text books available, such as: Douglas *et al*, 2011; or Muller *et al*, 2010. The understanding of 'urban' biodiversity is developing and becoming recognised as a distinctly different field from mainstream biodiversity due to the human social aspects, and this in turn is resulting in the emergence of disparate theoretical and practical frameworks.

Urban systems are complex and adaptive, consisting of many dynamic and nonlinearly interacting elements, and our challenge is to understand and beneficially influence these emergent patterns for biodiversity. Yet this is complicated due to the far removed traditional focus of relevant professions (Li *et al*, 2007). Scientists recommend the rapid development of the required 'new' science for sustainable development (see *Chapter six: Socio-ecology*), including cross-disciplinary collaboration within science and development policy (IAP, 2010 p.4).

Research and environmental issues of urbanisation must be tackled at local, regional, and global scales. This is because biotic and abiotic properties are altered within, and at great distances from, urban areas (Grimm *et al*, 2008a). As humans recognise the system responses of their impacts upon the environment, then changes to long-term forecasts could occur from these feedbacks between science and society (Grimm *et al*, 2008a), see *Chapter six* 'Socio-ecology'.

Gleeson and Low (2000) noted that the growing appreciation of the interrelationship between cities and nature was linked to the convergence of ecology with city planning disciplines. Yet, a decade later, James (pers. comm, 2010) confirmed in a research interview, that it was still difficult to find examples of good practice in urban biodiversity design and techniques. This was confirmed on a global level by Ignatieva (2010), who stated a similar lack of examples of designing for urban biodiversity.

4.2.2 Historical Summary

This summary illuminates historical trends of emergence of the distinct discipline of urban biodiversity, rather than aiming to provide a comprehensive chronological account of all events. With regards to the history of urban Green Infrastructure (GI) – this is dealt with in *Chapter 6.*

Some authors cite texts relevant to 'urban ecology' as early as:

- The Old testament (written anywhere between 1400 B.C – 400 B.C), which contains sections (e.g. Numbers 35: 1- 4), relating to the protection of land outside the city walls, which have early connotations to green belt and land protection (Correll *et al*, 1978 p.207; Osborn, 1946 p.167-180), although the intent is subjective;
- Plato (428/427 BC – 348/347 BC), the Greek philosopher and his various essays, which indicate early greenbelt theories (Correll *et al*, 1978 p.207; Osborn, 1946 p.167-180), and an appreciation of ecosystem services, such as the deforestation of Attica leading to soil erosion and the drying of springs (Mooney & Ehrlich, 1997, p.11); and

- Sir/Saint Thomas More (1478 – 1535) the English scholar, lawyer and statesman, who authored 'Utopia', describing an ideal city, published in 1516 (Correll *et al*, 1978 p.207; Osborn, 1946 p.167-180).

However, since these earlier times, there has been very little focus on the urban agenda, and conservation has generally been limited to rare designated habitats and species. Elander *et al* (2005 p.284*)* elaborate that: *"Both in practice and research, the application of the concept of biodiversity has been mainly addressed in a non-urban context"*.

As part of this research, the Emeritus Professor of Manchester University 'Ian Douglas', whose urban biodiversity career has spanned over forty years, was interviewed for his views upon the changing perceptions of urban biodiversity (See *Appendix three* for interview notes and details). Douglas (pers. comm, 2010) stated that there had been influential works regarding the ecology of urban areas long before his career began, and cited: 'The Natural History of Hampstead Heath (1905)' as one such example.

Douglas (pers. comm, 2010), who witnessed WW2 in London, noted that immediately following the war people began to notice significant landuse changes and wildlife re-colonisation in urban areas. Coinciding with WW2 and the rebuilding phase; research and documentation occurred regarding London's Natural history (Fitter, 1945; The London Natural History Society, 1957).

In 1959, forty countries subscribed to establish SCOPE (the Scientific Committee on Problems of the Environment), which was the first body looking at the global environment; including peri-urban environments, and eco-cities. SCOPE still provides direct advice to UNESCO and UNEP, but many other organisations later evolved from this, such as: IGBP, INI and the Millenium Ecosystem Assessment - MEA (Douglas, pers. comm, 2010).

The influential work by the Owens (Owen, 1976 & Owen, 1991), who documented species in an urban garden, brought UK attention to urban biodiversity (Douglas, pers. comm, 2010). Other influential individuals listed by Douglas, and how they were 'networked', are included in the interview notes in *Appendix three*. On the academic spectrum, Gilbert (1989) also contributed to urban ecology knowledge with his book entitled: 'The Ecology of Urban Habitats'.

The Urban Forum of MAB (UNESCO Man and Biosphere initiative) was established in 1987 by 'John Celecia' in Paris, to deal with urban ecology (Douglas, pers. comm, 2010). In 2000 an international MAB working group was established, which amalgamated with the IUCN (the International Union for Conservation of Nature) Task Force on Cities and Protected Areas, to explore the urban application of the Biosphere Reserve concept, limited numbers of which, have now been established outside major cities (UK MAB Urban Forum, 2010). The UK Urban Forum promotes new knowledge and awards the UK MAB Urban Wildlife Award for Excellence to key 'demonstration' projects and nature conservation sites. This was under review for international level adoption (UK MAB Urban Forum, 2010).

4.2.3 Urban Biodiversity Approaches and Knowledge Constructs

During a research interview, James (pers. comm, 2010) revealed that through research into 'eco-cities', he had noted that the two words: 'environmental and ecological' had become quite mixed up in general parlance. This was evident in various documentation regarding transport, waste and energy (James, pers. comm, 2010), reflecting the researcher' own experience from attending two Ecocity World Summits, and reviewing various documentation for this thesis.

There are also different approaches concerning urban ecology. These relate to the more traditional approach of he ecology 'in' a city; and the more modern approach, of the ecology 'of' a city (Picket *et al*, 2001; Cilliers, 2010). Ecology 'in' a city relates to levels of urban biodiversity, connectivity, and habitat features, whereas ecology 'of' a city relates to energy flows (Biogeochemistry controlled by societal interactions), socio-ecological systems and ecological footprints, which can impact upon biodiversity 'outside' of the city (James, pers. comm, 2010; Kaye *et al*, 2006 p.192; Alberti *et al*, 2003; Goddard *et al*, 2010 p.92; Yli-Pelkonen & Niemela, 2005 p.1951; Niemela 1999a; IAP, 2010 p.1).

One of the outcomes from the CBD's COP9, included the need for biodiversity consideration to incorporate cities (this was strengthened by COP10, as explained in *section 4.1.3*). Nevertheless, an interview participant from Natural England explained that translating CBD agreements to the UK scale maybe difficult, due to differing perspectives and scales of governance (Knight, pers. comm, 2009). This is discussed further in *Chapter five* 'Planning and Governance'.

4.2.4 Urbanisation Consequences to Biodiversity

In addition to the 'land-take', and habitat and species losses, described in the *Chapter one* 'Introduction', urbanisation also causes the following changes which affect biodiversity negatively: landscape fragmentation, disturbance, pollution, changing micro and local climates (e.g. urban heat island effect), changing soils, water and nutrient availability, and introduction of non-native species.

Habitat loss not only relates to the loss of an 'area' of landscape, but of the features necessary for different species survival: e.g. loss of old mature trees with holes for certain bat and bird species. Human disturbances, e.g. noise, lights and general adapted environments have also been proven to affect social aspects of certain mammals in urban areas. Examples of this include: birds making car alarm sounds and using vehicles on roads to crack nuts; and behavioural adaptation of urban mammals (BBC, 1998; BBC 2002; Parker, 2006; Parker & Nilon, 2008). Lundberg (2006) additionally elucidates, that landscape fragmentation and habitat loss can result in a disruption of gene flows.

Millard (2010) explains that the deliberate introduction of non-native species has been a major contributory factor to the diversity of urban flora and fauna generally. However, fragmented and severely disturbed urban landscapes may be more vulnerable to invasive non-native species, causing additional effects to biodiversity loss and impacting upon ecosystem services (Lundberg, 2006). Researchers note that some introduced species can become invasive and out-compete, or prey on more susceptible native species, which could otherwise adapt to urban conditions (Lundberg, 2006; Shochat *et al*, 2010). An example of this is provided by Shochat *et al* (2010), who use birds and spider data from urban centres to link diversity loss with reduced community evenness (of distribution) among species. The reduced evenness is believed to be caused by a minority of invasive species dominating the majority of the resources, consequently excluding native species.

Transference of pests, diseases and invasive exotic species, can also be easier in urban areas due to less resilient monocultures of planting, and increased mobility of pests along our transport routes, or transport modes, e.g. lorries carrying non-native scale insects, which are now causing major infestations with many of our trees (Reeves, 2001).

However, Nowak (2010) explains that the concept of 'native' in urban situations is something of a misnomer, and that with climate change many native species will be shifting their habitat ranges. Indeed, Nowak suggests that in certain instances it is desirable to use exotic non-natives in altered urban areas, due to their ability to outcompete natives (e.g. during prior action research, the researcher found non-native tree planting adapted best to city centre constraints, and were more likely to survive). Nonetheless, Nowak (2010) cautions that new plant introductions must ensure adaptation, survival, and avoidance of invasive issues. Therefore, decisions surrounding native or non-native planting, are not 'black and white' in urban areas, and depend upon individual sites, species and contexts.

4.2.5 What do we Want to Achieve with Urban Biodiversity Enhancements?

Urban areas are less about conserving (due to limited areas and features to conserve), and more about enhancing, increasing and repairing. Managing existing natural and semi-natural features and creating new ones, through well-tested aspects of green infrastructure – GI - (including the smaller scale networks, such as hedgerows) can enhance urban areas through linking habitats and increasing mobility (RCEP, 2007 p.56; Elander *et al*, 2005 p.287). This aspect is further elaborated upon in *Chapter six* 'Socio-ecology'.

Aside from GI aspects and creating new green spaces, the following goals can also achieve urban biodiversity enhancements: green roofs and green walls (i.e. vegetated); removal of invasive species; ecological management enhancement practices; provision of urban habitat features e.g. otter holts and kingfisher pipes along rivers, bird and bat boxes integral to buildings, hedgehog and invertebrate 'houses' (as supplied by a growing list of urban appropriate organisations and catalogues); appropriate street trees; drinking water sources; and innovative biodiversity design features.

Biodiversity can also be maximised spatially through Ecological Land-use Complementation (ELC), which is a synergistic approach where land-uses are planned and designed to interact through certain clustering and morphological combinations, which can be adopted to promote ecological resilience and diversity among functional species groups (Colding, 2007; Goddard *et al*, 2010 p. 92). Research has not yet progressed to a stage where any definite guidance to planners and urban designers has been formulated. Nonetheless, this is an emerging area which could complement GI guidance and delivery.

4.3 MEASURING

4.3.1 Introduction to Measuring

The CBD (2008) implies that biodiversity is a quantitative measurable variable, but the spirit of the Convention implies a more qualitative approach. Thus, in a planning situation, you must choose which interpretation of 'biodiversity' to favour - not necessarily the one that yields the highest scores of species richness (Gyllin, 1999).

The Secretariat of the CBD concluded in 2006, that there is no single convenient method of 'measuring' biodiversity (CBD, 2008). For example, the index used to measure species richness, could not also be used to meaningfully compare connectedness at the landscape level (Lister, 2008). Yet, the need to establish some form of quantitative evaluation system for biodiversity and provision of services is crucial for decision making, design, better management, monitoring, policies and assessment of progress towards halting biodiversity loss (URBIO, 2010; EUROPA, 2009; IAP, 2010 p.4).

For this thesis 'measuring' is necessary in terms of being able to illustrate a net increase on both the individual development and local scale (in the spirit of nested theories). Additionally advantageous, is the ability to rank the net increase in some way, to show whether this is a token or substantial increase (i.e. maximised biodiversity).

There is much current debate on 'how' biodiversity is measured, valued and preserved. However, despite the difficulties, it is still possible to indicatively measure biodiversity increases and losses. Firstly, there is measurement of the local scale, through a local authority Biodiversity Performance Indicator 'NI 197' (*section 4.3.2.1*), which is being promoted/ progressed by David Knight at Natural England (Knight, pers. comm, 2009), and also city competition and biodiversity indexes (*section 4.3.2.2 & 4.3.2.3*). Secondly, there is measurement at the individual development level through standardised and adopted indicator models, e.g. BREEAM ECO homes (*section 4.3.3*).

Unlike the measurement of species richness, indicators may measure the presence of functions, or intent, such as: landscape connectivity; indicator species; areas of previously hard surfaced land, which become planted; habitat features, or management plans.

4.3.2 Local and City Level Measurement

4.3.2.1 NI 197

Although currently under review, the local biodiversity performance indicator, NI 197 is one of approximately two hundred indicators, which all LA's report upon. Government expects performance of all indicators to improve year on year. However, approximately thirty are selected by each LA for particular focus. The detailed performance targets of each of the latter group are agreed locally, and although audit trails must exist, Natural England (NE) are keen to state that improvements on the ground are the most important aspect (Knight, pers. comm, 2009).

Part of the indicator 'NI 197' can be related to monitoring effectiveness of local designations and the proportion which are within active conservation management (DEFRA, 2009). These Local Sites are 'grass roots' designations, which many LA's have put a lot of resources into, so it makes sense to build upon this (Knight, pers. comm, 2009; South East England Biodiversity Forum, 2009). Other potential measures for NI 197 include: proportion of LA owned/ controlled land, which is managed for biodiversity; impact of development control decisions on biodiversity; and provision of accessible greenspaces. As these can be inherently complex to measure, and it is up to the individual LAs to decide upon what is suitable within their own contexts (Knight, pers. comm, 2009). Further information on NI 197 can be found at the following URLs: www.naturalengland.uk; and www.defra.gov.uk .

4.3.2.2 Greenest cities competition

Competition between cities to gain the title of 'the greenest' has been increasing over the years at both a country, and a global level. This is likely to be supported by decision makers as 'being green' is synonymous with liveability and linked to investment. Numerous lists have been devised, which rank cities' 'green' credentials and 'livability' (often published in the media through magazines or websites). However, with so many different components, definitions and understandings of what 'green' means, subjectivity is problematic, leading in part, to the term 'greenwash'. Here 'Greenwash' is used to describe public claims of 'green' credentials, when in fact the claims are largely unsubstantiated or illicit false impressions. To some, 'green' has energy connotations, such as: low carbon emissions from transport and infrastructure; building design and construction; or energy production. To others, 'green' has a more ecological foundation, such as the quantity and quality of green spaces, trees and biodiversity. Some have an even wider interpretation, which includes not only the former and the latter, but extends to other issues, such as waste recycling, and ecological footprints.

Take for example the City of Portland, USA. Portland had an estimated population of 537,081 in 2006 (U.S. Census Bureau, 2006), and is cited by many as America's greenest city, or at least ranking highly in these arbitrary lists. It was even ranked second Greenest city in the world by the online GRIST (Environmental news and Commentary) magazine, although their ranking criteria is contested (GRIST, 2007). GRIST list the following salient features: the approach to urban planning and outdoor spaces; plans to reduce CO2 emissions; green building initiatives; the system of sustainable transport; 92,000 acres of green space and more than 74 miles of recreational trails. Regardless of the ranking criteria, Portland is unarguably doing 'something right' to keep appearing on these lists.

Looking at Portland's history, it would appear that early strategic environmental planning and multifunctional design contributed in a large part to the success in the ranking. Portland was incorporated in 1851 and documentation supports the belief that pioneers planted many trees, with the first parks being set aside in 1852 (Portland Online, 2008). Portland's early land use planning controls created a partnership between business leaders and planners and a city plan was adopted in 1903, guiding the future development of the city and establishing a park and boulevard system, designed by the Olmsted brothers (John and Frederick) (Blackford, 1993; Sallinger, 2005). In their report to the park board authority, the Olmsted brothers anticipated the multifunctional use of green infrastructure (GI) when they noted the advantages of locating parks and 'parkways'. This included visual amenity, economy and attenuating surface water run-off, which was a cheaper and more visually stimulating solution than large underground conduits (Sallinger, 2005) (See *section 6.4* for further information on GI).

This example of Portland illustrates that, despite the varied 'green' and ecological credentials, it is impossible to measure, or compare Portland with other city contexts, or even for the city to track its own progression, without some form of standardised model, or index.

4.3.2.3 Cities biodiversity index

The development of an index to measure biodiversity in cities was proposed at COP 9, and the establishment of a CBD-led Cities' Biodiversity Index (CBI) was initiated by Singapore in collaboration with the Global Partnership on Cities and Biodiversity (URBIO, 2010). The aim of the city biodiversity index is to measure progress, through self-evaluation, on biodiversity at the local level of governance (CBD, 2010b). The CBI initiative was followed-up with a technical expert

workshop in 2009, and subsequently testing and supporting the CBI by a network of over 1,100 LAs working on environmental issues (CBD, 2010b).

The CBI is a tool for assessment and communication. City indicators with different weightings have been proposed for different elements, such as: characteristics; biodiversity; ecosystem services; pressure on ecosystems within; or dependence on ecosystems outside; and local action (COP10 CBD Promotion Committee, 2010). The nature of the indicators and proposals for improvement were presented, discussed and agreed at COP10 of the CBD. The CBI should instigate competition and biodiversity improvements within the cities who become involved in the index.

4.3.3 Individual Development Measures

For individual residential developments, several different models have emerged through sustainability assessment tools, e.g. BREEAM, Code for Sustainable Homes, EEQUAL, DREAM and LEED (UK-GBC, 2009), which attempt to measure biodiversity increases as part of the overall sustainability assessment. The UK Green Building Council studied all of these models and found there were no common approaches to assessing biodiversity gains and losses on development schemes (UK-GBC, 2009). The BREEAM EcoHomes (BREEAM, 2006) and Code for Sustainable Homes (Planning portal, 2006) are the two main benchmarking /auditing models in the UK. Although they are not directly comparable due to different measuring systems (Crook, 2007 p.27), they both measure the same ecological parameters: 1) ecological value of the site; 2) ecological enhancement of the site; 3) protection of ecological features; 4) change of ecological value of the site; and 5) building footprint (BREEAM, 2006; DCLG 2006). The use of these assessments will become increasing important due to national targets: "*2016 is seen as a crunch time for the industry. By then we have to be building homes that measure Code level six*" (Crook, 2007 p.27).

The parameters selected for a measurement scheme / assessment tool make contestable assumptions regarding the most important measurable features in protecting and enhancing biodiversity through development. The UK-GBC felt existing models could be improved to give more meaningful assessment and encourage the industry to monitor and maintain the habitats created (UK-GBC, 2009 p.3). However, despite their shortcomings, at the very least they provide the first measureable criteria for biodiversity net gains or losses, allowing some level of accountability, motivation and consistency of expectations. This in turn encourages developers to incrementally build up their skills sets and organisational processes. However, caution must be

exercised to ensure that innovation and creativity of more diverse solutions will not be suffocated due to a 'lack of points'.

4.4 RECORDS

National and local records of biodiversity are held across the country on a range of database systems, which are rationalised by the central hub 'the National Biodiversity Network Gateway' – which can be found on the following URL: http://data.nbn.org.uk/ . These records systems hold species and habitat information spatially, which can indicate whether certain species and habitats may still be present, or suitable for re-introduction / re-colonisation with appropriate features. Records are not comprehensive (so does not negate the need for recent surveys on sites to be developed), and once species have been identified through surveys, developers should be required to release this information to be recorded on the existing publicly accessible reporting systems (UK-GBC, 2009).

4.5 HUMAN ASSOCIATION AND CONFLICT WITH URBAN BIODIVERSITY

To slow, or halt, anthropogenic biodiversity loss we are largely dependant upon socio-ecological resilience and the valuation of biodiversity by 'the public', in order to pressure politicians to increase regulator and incentive systems for maximising biodiversity throughout development lifecycles. Currently however, the majority of the public have become highly dissociated from nature. For example, reading the prose of Thomas Hardy set in 19th century rural Britain, it is hard to believe that societies' awareness of nature has gone from such knowledge and appreciation, commonly referred to within general parlance, to such a dearth of understanding and awareness in the present day.

Several recent surveys into children's knowledge regarding food chains and nature have led to some sensational headlines, such as: "*Children believe sheep lay eggs"*, which introduced a predominantly rural survey of six to eight year olds by an insurance firm 'Cornish Mutual' (The Press Association, 2010). This particular study was conducted upon 1,000 school children, and additionally found that fewer than one in four believed beef burgers came from cows, with numerous other bizarre beliefs (The Press Association, 2010). A similar study, polling almost 3,000 people of varied ages, was conducted on behalf of the Home Grown Cereals Authority

(HGCA). This study showed that 29 % of teenagers thought oats grew on trees and 26 %, that bacon came from sheep (Telegraph, 2010).

During several experiences with environmental academics and professionals within the development industry, the researcher has witnessed fears with regard to urban biodiversity, for example: during an Environmental Science Symposium at Sheffield University, 2009; a presentation given to students at Aston University, 2008; and previous action research regarding numerous planning meetings with built development professionals. These fears all related to 'mess/maintenance, or physical fear' (e.g. bird guano, or stinging invertebrates). Urban Nature Professor 'Philip James' of Salford University, UK, was interviewed about his experiences with others' associations with, and perceptions of, urban nature: "*As far as most people are concerned biodiversity is dirty leaves dropping on the floor, or annoying birds which wake them up in the morning* [something to be irritated with]" (James, pers. comm, 2010). Regarding a student's survey involving hanging baskets correlated to urban bee populations, James described the student's fear of being sued if anybody was stung: "*Urban environments are now so sanitised and controlled, and society has become so risk adverse*" (James, pers. comm, 2010). Salford University are partially tackling this through education, media and certain programmes, e.g. 'artery for life' (promoting health) (James, pers. comm, 2010).

A number of studies, discussed by Millard (2010), described increased fears of crime and perceptions of danger were correlated to overgrown and unmanaged appearances of urban woodland, yet these areas could be managed [or designed] to reduce these negative feelings through maintaining lines of sight and making exits visible, etc.

Turner *et al* (2004) highlighted the consequence of poor biodiversity in urban areas, by suggesting: "*Billions of people may lose the opportunity to benefit from or develop an appreciation of nature"*. Furthermore, Sallinger (2005) quoted the writer Robert Michael Pyle (1998), from his book 'The thunder Tree': "*What is the extinction of the condor to a child who has never known a wren*". These quotes eloquently signal the urgent need for incorporating biodiversity within urban developments, both for human well-being, and to maintain and re-establish human connection of citizens to wildlife in cities.

A recent, and well publicised, example of biodiversity conflict is that of urban residents and foxes in the UK (Guardian, 2010; BBC News, 2010a). Following coverage of two fox attacks, where one attack led to two children being injured, in the national media, public panic ensued: "*As the*

children were treated in hospital, where they were in a serious but stable condition, the shocking story spread around the globe, triggering a new panic about urban foxes" (Guardian, 2010). This panic elicited support by politicians for control (via extermination or removal) of what the Mayor of London termed 'pests' (BBC News, 2010a). It is the societal value-orientations which result from ethics, rather than a strictly scientific basis, which underlie conservation 'motivation' (Lister, 2008; Lotze-Campen *et al*, 2008). Because conservation discourse is still dominated by the natural sciences, biodiversity-related conflicts and bad environmental management are not being addressed or properly informed (Lotze-Campen *et al*, 2008 p.107). Societal perceptions, associations, and conflicts with urban biodiversity must therefore be tackled, in order to influence urban biodiversity enhancement. This is now beginning to be recognised in the media: "*we need to tackle our sense of disconnection from the living world*" (BBC News, 2010b p.1).

A conservation society founded in 1902, the Audubon Society of Portland, USA, maps a way forward for conflict resolution. Sallinger (2005) describes how they initiated their 'Living with Urban Wildlife' Program in 2003, to protect and restore urban wildlife habitat through tackling both the micro and macro levels. At the micro level they have established an urban wildlife centre, which provides advice and resources to the public and organisations in an attempt to prevent and resolve human-wildlife conflicts. At the macro level they have established a multi-agency urban wildlife working group to develop model policies and manage species found in the metropolitan region. The society also provides useful information related to human-wildlife contacts on their website (audubonpotland, 2008).

4.6 VALUATION

4.6.1 Valuation Context

Valuation of biodiversity, like measurement, is contentious with no consensus academically, nor within practice. Nonetheless, valuation is highly significant to the research project. Valuing systems affect political will and hence levels of protection, biodiversity planning policies, legislation, regulations, and incentives - all influencing different development stages. 'How', and 'how much', biodiversity is valued is also important to developers for 'softer' reasons, such as: public perception, stakeholder issues, public relations and marketing.

Analysing the literature and research outputs, there seem to be four key valuation approaches to biodiversity, which may be linked: 1) prioritisation (in terms of priority given in relation to

competing issues); 2) intrinsic worth (ecocentric – ethical / moral duty of care to the natural world); 3) financial valuation (anthropocentric – actual monetary values assigned); and 4) ecosystem services (anthropocentric – utilitarian approach of human uses of biodiversity*). Section 1.1.4.3* touched upon the fact that our ecocentric valuing of intrinsic worth of biodiversity is not adequately reflected within policy, and that expressing value in monetary terms can perpetuate anthropocentric decisions. The immediately succeeding sections will now elaborate upon biodiversity valuation under the four subheadings listed above.

4.6.2 Prioritisation

A number of different sources (academic, practitioners and the media) have suggested that the climate change agenda, has 'hijacked' the biodiversity agenda (James, pers. comm, 2010; Douglas pers. comm, 2010; BBC News, 2009). The reasons for why this has occurred are varied, and will not be comprehensively discussed here, although it is believed that part of the problem is not being able to put a value on biodiversity. People need methods to compare different issues, and also to link the relevance to their everyday lives through more obvious immediacy (James, pers. comm, 2010). Hence, adequate valuation and positive social association with biodiversity are very important for adequate prioritisation (discussed further in *Chapter six* 'Socio-ecology'). Additionally, it is also important to reflect the links between biodiversity loss, climate change and ecosystem change within policy solutions (IAP, 2010 p.3).

4.6.3 Intrinsic Worth

In democratic societies, policies should reflect the general valuing system of that society for particular topics (Lockwood, 1999). Whilst individuals will place different values on biodiversity, there is evidence that society in general appreciates biodiversity for its intrinsic value, rather than just its use to humans (Harremoes, 2003; IAP, 2010 p.1). Craig *et al* (1993) interviewed a number of senior policy advisors to four European governments (including the UK), which led them to conclude that environmental policy could be improved if widely held environmental values were articulated and validated within the policy process. Of course, environmental valuation covers a wider remit than purely ecological valuation, and even with ecological aspects there has been some degradation of the meaning of 'eco' within strategic documentation (as discussed in *Section 8.3.5.3).* "*How biodiversity and ecosystem services are valued is critical for good policy*" (IAP, 2010 p.2). This indicates the importane of reclaiming the term 'eco', so that it clearly relates to biodiversity.

4.6.4 Financial Valuation

The financial valuation of biodiversity has come about as a response to market failures, which have resulted in biodiversity loss (Gray, 2006), and also due to difficulties in quantifying intrinsic value. The reason for these market failures may be partially explained by Harvey (1996 p.177) who investigated social and environmental change through looking at political values and environmental-ecological issues. He explained that there was incredible political diversity which influenced opinions, and noted that interesting findings can be obtained from enquiring into, and inspecting: "*arguments not for what they have to say about the environment or nature, but for what it is they say about political-economic organization*". Harvey (1996 p.177) also explains that such dominant systems of power can use a hegemonic discourse of: "*efficient and rational environmental management and resource allocation for capital accumulation (and to some degree even construct policies, institutions, and material practices that draw upon such discourses*)".

The Organisation for Economic Co-operation and Development (OECD) produced guidance on biodiversity valuation for policy makers in 1992. The handbook acknowledged that it was mainly concerned with economic valuation of biodiversity and included complex arithmetic approaches. It cited the CBD and specifically, the conference of the parties (COP) Decision IV/10, which discusses economic valuation as an important tool for incentive measures (OECD, 1992). The government document 'Working with the grain of nature: A biodiversity strategy for England', also discusses the importance of assigning monetary value to nature, whilst also highlighting potential problems (DEFRA, 2002).

A global biodiversity versus economics 'systems trap' is apparent. Previous action research and research interview participants (James, pers. comm, 2010; Henneberry, pers. comm, 2009) believe that biodiversity frequently loses out on the grounds of economic decisions, due to the market led approach of governance. The general public are aware of biodiversity loss, but planning and policy officers, decision makers and the business world are locked into a system which worsens the situation, due to the prioritisation of 'economics'. The world recession of 2008 (Imbs, 2010 p.327), and specifically the UK economic crisis (which was particularly highlighted in 2010, through the emergency government budget (BBC News, 2010c), illustrates the failure of extant economic and market theories. This economic crisis, coupled with the links of economics to the biodiversity and climate crisis, means that new, radically different, economic theories must be sought. Many professionals, academics and politicians may resist such radically different economic theories, due to the wide acceptance of traditional economic theories, for such a long

period of time, but as Popper (1963 p.320) famously stated: "*Even Newton's theory was in the end refuted; and indeed, we hope that we shall in this way succeed in refuting, and improving upon, every new theory"*.

Feindt and Oels (2005 p.162) explain that environmental discourse is not homogenous, because basic concepts remain contested, and the discourse is in competition with economic and development discourses and others. They use the example of the CBD (1992), which connects the use and protection of resources, by treating plant gene resources as a commodity, as a way of explaining that these broader discursive formations are critical to 'if' and 'how' a situation is understood, communicated and addressed. Lunn (2009), along a similar vein, explains (in relation to economics experiments) that faced with identical problems, people take different choices when the problem 'is framed in a different way'.

In May 2008, the 'European Communities' produced the TEEB report (The Economics of Ecosystems and Biodiversity), which was a major international initiative to draw attention to the global economic benefits of biodiversity (all TEEB reports can be found at the following URL: http://www.teebweb.org). Since then, many interconnected reports have been released, which are supported by the European Commission due to the development of the international post-2010 biodiversity policy to achieve new targets (EUROPA, 2009). The latest reports include 'TEEB for Local and Regional Policy Makers' in 2010 and 'TEEB in National and International Policy Making' in 2011.

The lack of market prices for ecosystem services and biodiversity means that the benefits we derive from these goods are often neglected or under-valued in decision-making. This can lead to actions resulting in further biodiversity loss, and negative effects upon human well-being. The post-2010 biodiversity policy frameworks will therefore need to take into account the value of ecosystem services. The TEEB report provides policy examples for achieving this (EUROPA, 2009), e.g. reform of subsidies, charges for resource use, or payments for ecosystem services. The key message of the report to policymakers is that biodiversity has an economic value, which should be invested in, and incorporated in future economic strategies. Indeed, various academic research groups are now investigating the economic value of biodiversity and habitats; such as the 'VALUE' project, which is explained in *section 6.4.4*: Major Developments and the Economic Value of GI.

Businesses must consider these economic strategies, and the UN Global Compact recommends that businesses should implement initiatives for greater environmental responsibility and encourage the development and diffusion of environmentally friendly technologies (GLOBAL-COMPACT, 2008). It is also a requirement that all FTSE 100 companies have a CR/ CSR department (Murray, 2008). Furthermore, Lunn (2009) highlights how vital it is to understand the behaviour of companies, if we want to gain more benefits from and less damage through economic development. He describes the need for change with traditional economic theory, as it contributes to an understanding of competition that overvalues cheapness and undervalues quality (Lunn, 2008 p.187) – reinforcing points made earlier in this *section*.

Lunn (2008 p.209) elaborates that in environments of constant change, successful firms innovate and that in an uncertain market, aiming to maximise profit may be a poor strategy. However, the "shareholder value" movement has recently placed greater pressure on companies to return higher profits. Surveys of CEOs illustrate that many believe that this pressure threatens companies, but shareholders are less likely to care about the firm's survival than profits, because most hold shares in many firms (Lunn, 2008 p.210).

Recent approaches and advances in valuing biodiversity through economic valuation, innovative discounting and cost benefit analysis should be developed and brought into the mainstream of economic analysis (IAP, 2010 p.4). However, not everything can be given a price tag. Markets are particularly poor at valuing things which are natural / unusual, especially externalities with uncertain future impacts (Lunn, 2008 p.233), e.g. biodiversity.

4.6.5 Ecosystem Services

Section 6.3.1 defines and gives further examples of a broad range of ecosystem services, but they are essentially the services which human beings receive from biodiversity, e.g. bees providing a pollination service which assists our food supplies. Securing, restoring and developing the capacity of ecosystems to generate these services is seen as a major incentive for biodiversity conservation and enhancement (MEA, 2005; Lundberg, 2006). Convincing policy makers to invest in biodiversity, increasingly depends upon demonstrating biodiversity value to humans through the concept of ecosystem services. Ecosystem Services are quite utilitarian / economistic in focus, which really indicates the links of the lack of biodiversity in urban developments as a 'market failure' (market failures and economics are discussed in greater depth in Sections: *(5.4.2 & 5.4.3).* Nevertheless, adopting this approach can neglect alternative arguments and strategies for valuing biodiversity.

Hence, the European Commission has stated it will examine the effectiveness of alternative approaches at a variety of spatial and temporal scales (European Commission, 2010).

The Interacademy Panel on International Issues (IAP) (a global network of science academics) explains that this kind of utilitarian perspective, values some kinds of biodiversity more than others, and that: "*maximising utilitarian benefits has often led to loss of overall biodiversity*" (IAP, 2010 p.2). Whilst the use and promotion of the ecosystem services approach has its advantages, it also places biodiversity under jeopardy of no longer being viewed as an important topic in its own right. The researcher has been witnessing this shift in views (biodiversity and ecology enhancements are no longer being regarded as 'important' enough in their own right, but must be linked to human health or another utilitarian service, to be implemented / funded) through action research, as well as through the concerns of research interview participants (Thompson pers. comm, 2010 & Hitchcock pers. comm, 2010). The IAP further elucidated, that not all of the goals of biodiversity conservation may be met by management for ecosystem services, and that: "*Biodiversity conservation must continue to have its own agenda*" (IAP, 2010 p.3).

4.6.6 Evaluating the Four Valuation Approaches

All four valuation approaches have advantages for particular reasons, but none offer a complete answer, and some can negatively impact upon the biodiversity agenda in certain scenarios. To remedy this, an index could be devised and developed over time, using all four approaches and clarifying which valuation method is appropriate for which context. Support for such a solution is illustrated by the IAP, who state: "*There is an emerging consensus among the science and policy community on both the necessity of monetary and non-monetary valuations of biodiversity and ecosystem services*" (IAP, 2010 p.1), but such a consensus is beyond the remit of this research.

4.7 INCENTIVES AND TOOLS FOR PROTECTING AND ENHANCING BIODIVERSITY

4.7.1 Regulatory Hierarchy: an Overview

The UN Brundtland Report (WCED, 1987), also known as 'Our Common Future', marked a pivotal moment in environmental history by defining sustainable development. Following on from this, the UN Conference on Environment and Development (UNCED / 'The Earth Summit') in Rio in 1992, listed biodiversity preservation as a key objective, providing strong support through the CBD and the Agenda 21 (Elander *et al*, 2005 p.288). This international treaty brought a proliferation of ensuing nature-related EU directives and strategies, adding to the pre-existing

Special Protection Areas (SPAs) from the 'Birds Directive' of 1979 (79/409/EEC; and recent addition - 2009/147/EC).

The new regulations included:

1) Protection: e.g. Special Areas of Conservation (SACS) through the Habitats Directive of 1992 (92/43/EEC); the Biodiversity Strategy, 1998; and the Natura 2000 Network (which is at the heart of both the European Birds Directive and Habitats Directive) - a programme for connecting ecological habitats in Europe through protection and other activities (EUROPA, 2009b) and specific EU protected species legislation. A series of programmes were developed to assist the implementation of Natura 2000. For example, the Natura 2000 Networking Programme, which focusses on communication, capacity building and the value of working in partnership to achieve nature conservation objectives (NATURA, 2010).

2) Development regulations: e.g. Environmental Impact Assessments and Strategic Environmental Assessments (*see Section 5.2.3.2*).

3) Enhancement and recovery: e.g. Biodiversity Action Plans; and the Malahide Conference in 2004 (Halting Biodiversity Loss by 2010) (EUROPA, 2008).

The European regulations were translated into a national context in 1994, providing a hierarchy of national interpretations through regulations, policy and guidance, and then updated in 2010 with the 'Conservation of Habitats and Species Regulations, 2010' (Legislation.gov.uk, 2010). These cover maintaining, and where appropriate developing, features of the landscape which are of major importance for wild *flora* and *fauna*, in compliance with Natura 2000. They also include policies, which encourage management of such features (Simpson, 2008). In implementing the CBD requirements, the government developed policy on Local Biodiversity Action Plans. Such `local plans' delivered national targets, in addition to broadening the range of actors involved, by including business and development representatives, along with specialist wildlife agencies (Goode, 2005). A host of other environmental legislation exists, prohibiting damage to certain species and habitats, or designations to encourage favourable management (covered by any general 'environmental law' text book, e.g. 'Ball and Bell on Environmental Law, 1997'). Much of the regulatory laws and policies relevant to this thesis, are related to planning, thus *Chapter five* 'Planning and Governance' will elaborate further upon the regulations, policies, planning tools and enforcement.

4.7.2 Urban Regulations

Implementation of the UK's Biodiversity Action Plan (BAP) and the designation of SSSIs currently provide less protection to urban sites than rural ones (RCEP, 2007 p.71). However, urban sites frequently contain habitats and species that are not generally found in rural areas and are poorly described in classifications, due to derivation from specialised conditions, e.g. post-industrial landscapes. Hence, although national conservation policies often fail to recognise the special nature of these urban habitats (RCEP, 2007), recommendations have been issued to address this. For example, Biodiversity Action Plans (BAPs) should be amended to include priority habitats of special urban character, including specific features of the built environment, such as green roofs (UK-GBC, 2009); and urban LAs should produce a Local BAP (LBAP) linked to their Local Development Framework (RCEP, 2007 p.72).

Two examples of urban LBAP strategies (London and York) highlight specific methods for success in urban areas, and these are summarised below.

Goode (previously the Head of Environment for the Greater London Authority) documents the processes of the London Biodiversity Strategy, illustrating the wider political and social nature involved in biodiversity gains at the local and development site scale (Goode, 2005). This includes:

- mainstreaming biodiversity as an element of urban design;
- identifying biodiversity deficient areas – where new areas need to be created;
- achieving political support from the Executive Mayor, by recommending he take the procedures which the London Ecology Committee had put in place, to form the basis of his statutory strategy, and to lead and co-ordinate the London Biodiversity Partnership;
- partnership working with the most important biodiversity stakeholders; and
- production of policies within the biodiversity strategy, to propose implementation and identify relevant partners for each sphere of activity.

York's Biodiversity Action Plan strategy incorporated the following attributes:

- a comprehensive urban habitat inventory;
- a site evaluation system - using specific urban criteria to determine conservation importance;
- implementation through the planning system; and
- expert ecological advice available to planners for individual development proposals and planning appeals (RCEP, 2007 p.72).

The kind of guidance and co-ordination illustrated in the above two examples is crucial for successful implementation of legislation. The legislative framework is a major incentive to protect and enhance biodiversity for developers, but even stronger enhancement legislation would have a positive impact (Farley, pers. comm, 2009).

4.7.3 Other Incentives for Developers to Deliver Biodiversity Conservation and Enhancement

Drivers to gaining biodiversity enhancements are not limited to fulfilling regulatory mechanisms. Research, and experience, has uncovered the following benefits and incentives.

4.7.3.1 FTSE index rating

One of the main incentives to very large developers, is the economic return for shareholders. On the FTSE indexes, the 'FTSE 100' is the economic monitor and the 'FTSE for good' is the social and environmental measure for ethical businesses. Farley (pers. comm, 2009), an interview participant relating to Case Study One, and possessing a depth of project management experience, explains that the financial incentive to get on the FTSE for good is a reduced 0.25% of borrowing. If this is negotiated correctly, it can cost half of that to get the saving, making a financially sensible option. Illustrating maximised biodiversity through protection and enhancement measures is one method of achieving this.

4.7.3.2 CSR (Corporate Social Responsibility)

A key incentive are the benefits CSR brings for publicity and marketing purposes (Farley, pers. comm, 2009), as well as to satisfy any ethical views shareholders may hold. Publicity and marketing are important economically, as bad publicity can create public opposition with economic impacts upon sales figures. Whereas good publicity, particularly of green credentials, can command higher sales figures, as illustrated *section 4.7.3.4*.

PR and marketing will have increased importance in areas where there is a high level of socio-ecological resilience (i.e. many supporting stakeholders of biodiversity, friends groups etc). Nevertheless, the importance of maintaining good CSR, PR and marketing has also led to increasing issues of 'greenwash' – discussed in *Chapter eight 'Thames Gateway – Study One'*. This, can in turn, lead to general public scepticism, which threatens to de-value CSR incentives. Therefore, issues of 'greenwash' must be tackled through accountability, and enforcement to

ensure that promises and proposals of biodiversity protection and enhancement are implemented and managed.

4.7.3.3 Gaining planning consent

Along with shareholder returns, gaining planning consent tends to be one of the greatest developer incentives, as gaining consent and development potential substantially increases the land value of a site (i.e. financial uplift), on top of the potential revenue brought by the development itself. Unfortunately, the incentives reduce considerably and therefore the time and financial inputs too, following planning consent. This is why prescriptive section 106 agreements and conditions must adequately capture biodiversity agreements and proposals. This is further elaborated upon throughout *Chapter five* 'Planning and Governance', and subsequent case studies (see for example *section 9.4.6.3*).

4.7.3.4 Hedonic effects and a setting for investment

It is in the developer's interests to produce a site which will be looked upon favourably by potential future residents, office workers, and entrepreneurs looking to acquire premises. Therefore, developments which have a positive setting and good ecological credentials, can achieve 'added value' and 'preferential pricing'.

There have been various modern hedonic analysis studies illustrating economic uplift linked to biodiversity, most commonly relating to increased residential prices linked to mature tree presence (Henneberry, pers. comm, 2009; KWT, 2010). Nevertheless, this is not a new phenomenon. An early hedonic exercise was conducted by the famous American Landscape Architect 'Fredrick Law Olmsted' during the planning and construction of Central Park in New York City. Olmsted charted the average increase in property value in the areas surrounding the park compared to other city areas between 1856 and 1873, and found that the areas surrounding the park had increased at a rate of over four times the value of the other areas (Tajima, 2003 p.644; Leinberger & Berens, 1997 p.27-28).

4.7.3.5 Miscellaneous benefits

Other benefits and incentives include: winning awards / funding bids; ethics; organisational ethos's; and multifunctional benefits. These will be discussed in subsequent case studies, which provide the relevant context to the benefits and incentives. For instance, in the Thames Gateway

regeneration area (*Chapter eight*), there are additional pressures for maximising and protecting biodiversity, due to the green goals of the 2010 London Olympics.

Politician's views can also influence the demands upon developers and affect site biodiversity (*e.g. see section 9.3).* Furthermore, maintaining ecosystem services and hence human wellbeing, is likely to become an increasing incentive to politicians, as illustrated by evidence from over 1,300 worldwide experts responsible for the Millennium Ecosystem Assessment (MEA, 2005), combined with the pressure politicians have from their constituents. The local level is therefore clearly affected by this, and LA officers have started to document the benefits to the health and human wellbeing agenda, in order to gain political support for biodiversity improvements (Thompson, pers. comm, 2010). *Chapter six* looks more closely at the social issues affecting the maximisation of biodiversity on development sites.

4.8 CONCLUSION

This chapter has looked at the particular issues associated with 'urban' biodiversity, which influence biodiversity decisions at the local and individual development site level (often filtering down from international and national agreements and regulations). This has included: a brief history of urban biodiversity and knowledge constructs; and a review of approaches to measuring / recording urban biodiversity, human associations, valuation, regulations and incentives for developers. The following planning chapter will now elaborate upon relevant planning processes, organisations, and the possibilities and constraints provided by the planning discipline, which affect all lifecycles of major developments.

5 PLANNING AND GOVERNANCE

"[economic self interest in the land community] assumes, falsely, I think, that the economic parts of the biotic clock will function without the uneconomic parts. It tends to relegate to government many functions eventually too large, too complex, or too widely dispersed to be performed by government" (Leopold, 1949 p.214).

5.1 INTRODUCTION

5.1.1 Chapter Introduction

As one of the most sophisticated systems of land use control in the world (Ball & Bell, 1997), the British planning system is virtually unique in its direction over the use, design and form of both the built and non-built environment. It therefore has a remarkable ability to influence biodiversity value through development, from the strategic level, right down to detailed design, implementation and management on the ground.

The UK has a markedly different governmental constitution to the rest of Europe and the USA. Undoubtedly, this has affected the evolution of the planning system. Most notably, the UK has less constitutional constraints and less emphasis on the protection of property rights than Europe and the USA (Cullingworth & Nadin, 1997 p.9). Unlike much of Europe, Britain's development regulation is an administrative, not a legal mechanism. Therefore, decisions taken by local politicians are advised by planning officials based on development plans and 'other material considerations' (Healey & Williams, 1993 p.704). As a result, the UK is far more flexible and discretionary in its approach to planning, allowing decisions to be made on a case-by-case basis. The UK System also has a wider role in balancing environmental, economical, political and social factors in a democratic context (Ball & Bell, 1997).

The planning discipline encompasses many different disciplines and knowledge domains. This, in addition to the flexibility and case-by-case consideration, means the system is highly equipped to maximise biodiversity through development schemes. However, there are issues with the theoretical translation into reality, due to competing agendas and policies, various obstacles faced by developers, and complexities within the implementation process. An understanding of the planning system is therefore 'central' to this thesis and solving these obstacles.

The basics of planning processes, history, and theoretical applications will be discussed in this chapter due to their relevance to the rest of the thesis. However, it is neither desirable nor possible to cover all relevant aspects of such a broad topic, so the reader should refer to relevant

textbooks should a more comprehensive coverage of planning history be required, e.g. Cullingworth and Nadin (1997), or Ball and Bell (1997).

To imagine realistic futures regarding biodiversity, it is first necessary to look at the planning system's evolution and roots, and the current system's processes and effectiveness. Governance, in relation to planning and biodiversity, is also considered. However, the social influences upon local governance - particularly socio-ecological resilience, are covered more fully in the following chapter: *Chapter six – '*Socio-ecology'. Specific planning processes, procedures and mechanisms are further discussed within the 'case studies' (*Chapters seven, eight, nine* and *ten*) and *Chapter three*, relating to the questionnaire findings.

5.1.2 Definitions

Several variations of terms are used to describe the 'planning' discipline and profession. In the UK, the term '*town planning'* is most common, with '*town and country planning', 'land use planning*' and more recently '*spatial planning*' also in use. In Europe the term 'spatial planning' is increasingly used and in the last decade 'territorial cohesion' has begun to be used to discus regional and transnational planning (Faludi, 2007).

For the purpose of this thesis, the term will be shortened to *'planning'*, as this is used in planning departments and by the profession generally. The term '*spatial planning'* shall also be used in general reference to 'strategic mapping' or 'forward plans' e.g. mapping of acceptable land uses. Where this latter term specifically relates to transformative strategic planning (e.g. *section 5.4.4: Risk Society and Strategic Planning*), this will be clarified.

'Major' planning applications are defined in 'The Town and Country Planning (General Development Procedure) Order (TCPO, 1995), and can be summarised as either:

- A residential development comprising 10 or more dwellings, or where the site is 0.5 hectare or more; or
- Any other use where the proposed floorspace is 1,000 square metres or more, or the site area is 1 hectare or more.

The major developments considered in this thesis however, are of a larger order – being in the region, for instance, of several hundred to several thousand residential units in mixed-use developments.

5.1.3 Planning is Relevant to all Temporal Scales of Development

For individual developments, the regulatory part of the planning system is often construed to be the planning application stage. In reality, planning guidance, planning policies and planning legislation, are often taken into account prior to planning application submission. For example: land-use allocation in local plans, and pre-application guidance and discussions. Regulatory elements also come into play 'post' planning permission and approval. For example: discharging planning conditions, management and enforcement. *Table three* below provides a more comprehensive list of examples to illustrate the importance of planning throughout development lifecycles.

DEVELOPMENT STAGE	EXAMPLES OF PLANNING INFLUENCE
Prior to inception	Land-use allocation plans; policies, laws & guidance; design briefs by LAs; selection of initial development team by developer
Inception / scoping / funding feasibility	Desk studies, surveys, requirements and costing; selection of initial concept design team; pre-application meetings between LAs & developer's team
Concept / design / masterplan	Initial masterplan, design and proposal documentation, survey reports and other requirements
Planning submission & decision	Development Control (DC) assessment of submission against policy requirements, other regulations & guidance; consultation & negotiation phase between LA, external consultees & developers team – which may now involve construction companies and cost engineers to assess feasibility of potential agreements; amendments; public right of objection; officers recommendation report with list of potential planning 'conditions' to council members on planning board; members consideration & decision; right of appeal (made against decisions, or lack of decisions)
Detailed design, proposals, & specifications	If the initial planning application was an 'Outline' application, rather than a 'Full' application, details need to be supplied as a second stage planning application (known as 'reserved matters')
Construction phase	Following permission being granted, construction teams commence on site. This maybe staggered. DC teams monitor construction progress against planning conditions, further information maybe supplied & agreed, or enforcement action taken if necessary
Completion & 'handover' to occupiers etc	Monitoring & assessment against proposals & conditions
Aftercare / management	Monitoring & assessment against proposals & conditions
Redevelopment	Potential redevelopment in the future (which should be considered in earlier stages i.e. flexibility and sustainability)

Table 3: Illustrating the relevance of 'planning' throughout a development's lifecycle

Some functions of the planning system occur throughout, or through several different phases of a development's lifecycle. For example:

- Planning policies. Policies are relevant to, and used in every aspect of planning and development, including biodiversity maximisation.
- Best practice guidance and quality related advisory services are available to developers and planning professionals throughout a development lifecycle and can be pitched at individual development phases.

5.1.4 Spatial Scales and Hierarchies

The planning profession considers all spatial scales. From the global perspective, right through to European, UK, English, regional, local (local administrative boundaries), areas / landscapes, individual development sites, development plots (where one large site is split into smaller units and developed by different developers), and detailed design / specification. *Figure five* illustrates the range of scales embraced by the planning profession. Decisions which are made at any one of these scales have implications for biodiversity on individual development sites. The continuation of biodiversity policies and agreements throughout this spatial hierarchy is also legally and practically important (as with any policy). The importance of this was illustrated by the launch of an investigation, following claims that the South West regional spatial strategy contained no biodiversity elements (Donatantonio, 2008b p.5). Theoretically, it would be logical that the most important scale of consideration would be the international / global scale - descending to the individual site. However, in practice, the researcher notes that it is first the national scale and then normally the local and individual area/ site which has the greatest influence on individual planning application decisions; although planning policies and public inquiries do tend to relate to the regional level more so than individual planning applications.

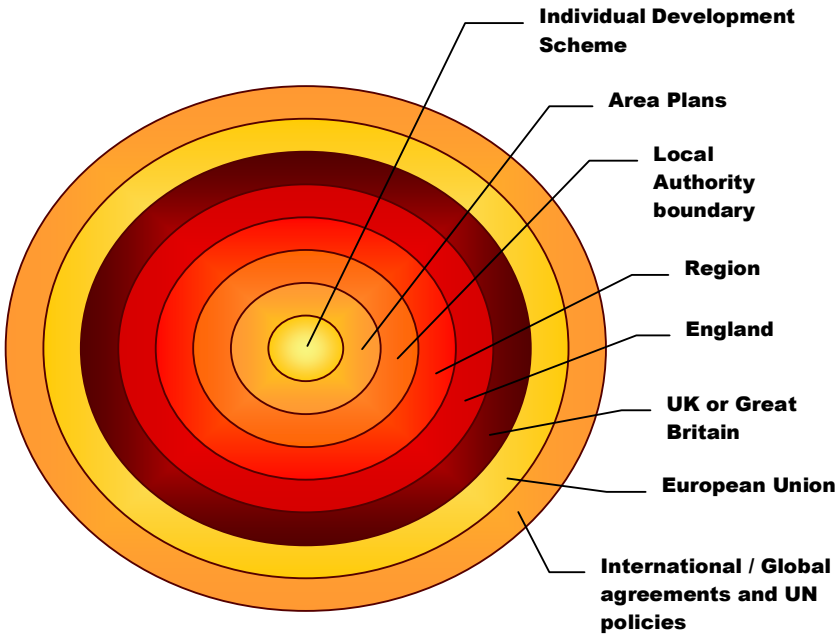

Figure 5: Target Diagram showing the 'spatial' hierarchy of policies / laws and guidance which an individual development must fit within.

5.2 HISTORY

The following section provides a 'thumbnail sketch' of planning – putting planning processes into context, illustrating the philosophies which planning has been built upon, its dynamism, and power in shaping the specific concerns of the research project.

5.2.1 Ancient Environmental Planning

Knowledge of ancient planning roots is valuable, as what has gone before can still influence the future, and maybe there are lessons to be re-learnt, re-evaluated, or re-framed. When reviewing planning related literature since the days of Mesopotamia, it is evident that urban nature has been valued and prioritised in many instances. Where it has not, we can also see there have, at times, been dire consequences.

Social and political constructs used to analyse or influence planning systems, have changed on a geographic and temporal basis. This same dynamism affects the current constraints and opportunities for maximising biodiversity within our own planning system. Thousands of years ago,

the built environment and surrounding landscapes were planned and designed. The documented travels of a Greek historian: 'Herodotus', to Babylon in around 450 BC, highlights the planned nature of Babylon as a town (Haverfield, 1913). Whilst Haverfield cautions potential conjecture with regard to details, such as Heredotus' measurements, he understands that the notion of a planned town has reasonable reliability.

According to documented sources, regarding the famous 'Hanging Gardens of Babylon', the Babylonian king Nebuchadnezzar (ca.600 BCE), ordered artificial knolls, hills, and watercourses planted with exotic trees, shrubs, and trailing vines, for his queen (Finkel, 1988). However, other studies have suggested different years and locations (Dalley, 1994). Despite the details and location of the hanging gardens remaining unsubstantiated by archaeological evidence (Polinger-Foster, 1998), there is enough documentation to indicate its existence. The creation of such wondrous gardens must have required substantial effort and technological resources for the time, illustrating a certain valuation of urban nature, at least by the royals. Moreover, the longevity of this value, at a more popular level, is evidenced by the adulation spanning the last two and a half millennia, culminating in its listing as one of the seven wonders of the ancient world.

In his prize winning lecture, and international bestseller, Professor Diamond (2003; 2005), contrasts the case of Easter Island with other ancient and modern civilisations, and their comparative reasons for success or failure. At Easter Island, pollen analysis and fossil records conclude it was a subtropical forest, which included the world's largest palm tree, for thousands of years prior to the Polynesian arrival (Diamond, 2005 p.102-103). Following inhabitation by Polynesians, the forest was gradually felled for canoe wood, rope, firewood, statue transportation and carving and all tree species were felled to extinction by 1400-1600. This led to losses of raw materials, food, the extinction of all native bird life, erosion, transport, cultural activities, quality of life and ultimately the human population - which collapsed in an epidemic of cannibalism leaving 90 % of islanders dead (Diamond, 2003; 2005 p.104-107&109). The question that most intrigued Diamond's students was: how could a society make such an obviously disastrous decision as to fell all of the trees upon which they depended? (Diamond, 2003; 2005).

Political, social and religious factors were behind the environmental impacts. For the Easter Island study, Diamond concludes: "*Easters isolation makes it the clearest example of a society that destroyed itself by overexploiting its own resources*" … "*the parallels between Easter Island and the whole modern world are chillingly obvious*" (Diamond, 2005 p.118-119). The example also

speaks volumes about 'prioritisation'. Diamond (2003; 2005) elucidates, that societal mechanisms responsible for causing disastrous decisions can occur for a whole sequence of reasons: failure to anticipate a problem; failure to perceive it once it has arisen; rational bad behaviour; failure to attempt to solve it after it has been perceived; and failure to succeed in attempts to solve it.

Nonetheless, many societies have anticipated, perceived, tried to, or succeeded in solving their environmental problems. Diamond (2003; 2005) provides examples of successful countries, explaining that they recognised the risks from deforestation, and adopted successful policies. For example, Japan's early afforestation strategy was launched in 1666 by the Shogun (top-down) to combat socio-ecological issues following deforestation and a fire, where the society was urged to plant seedlings, "*Beginning in that same decade, Japan launched a nationwide effort at all levels of society to regulate use of its forest*" (Diamond, 2005 p.300). Japan's early afforestation strategy resulted in: "*the First World country with the highest percentage (74%) of its land area forested, despite supporting one of the highest human population densities*" (Diamond, 2005 plate 20).

These decisions, which so dramatically affected civilisations, came about through ancient governance and planning systems. With the benefits of retrospection and reflection, this brief insight into ancient environmental planning, illustrates the importance of the links between valuing and prioritising nature, socio-ecological resilience and urban governance. These aspects have been reviewed within the previous chapter (*Chapter four*); this chapter (*Chapter five*); and *Section 5.4*, *Chapter six 'Socio-ecology'*. The chapters relating to *Study one,* shall further investigate governance within the modern context.

5.2.2 Historical Development of the British Planning System

Planning first 'formally' began in Britain during a time of numerous social reforms, and as a response to population growth and urbanisation creating unsanitary conditions for people to live in. Town and Country Planning evolved through efforts to mitigate public health issues through new developments and housing legislation in the nineteenth Century (Cullingworth & Nadin, 1997). The first act to apply the name 'town planning' was the: 'Housing, Town Planning, Etc Act 1909'. Newer ideals centred round the daily life of human beings in their domestic environment, and people began to demand that a number of issues, which previously lay outside the scope of legislation, such as: health, housing, food and public comfort, should be treated with as much consideration as more traditional political concerns (Haverfield, 1913). The Act provided LAs with

powers to control development in new housing areas. Nonetheless, these powers were not fully realised during the next few decades. Consequently, development was ad hoc.

The economic costs associated with addressing the public health problems, were probably another key driver leading towards the public health legislation. This is comparable to today's need for evidence associated with economic costs of climate change (Stern Review, 2006), and biodiversity loss (MEA, 2005). However, planning has not come about purely due to harsh economic realities. The modern planning system has also come about through long-term aspirations and ideals for a positive utopia, as More (1516) presented almost half a millennia ago (Turner, 1965). Successful experiments where public health and architecture met (e.g. Saltaire, 1853; Bourneville, 1878; and Port Sunlight, 1887) led to the progressive and influential ideas of Ebeneezer Howard and Patrick Geddes. Howard famously wrote the book titled: '*To-Morrow: A Peaceful Path to Real Reform'* (1898), and founded the internationally influential 'Garden City Movement', whereas Geddes, who is often cited as one of the founders of modern town and regional planning and environmental management (Grieve *et al*, 2005), wrote another pivotal book: '*Cities in Evolution'* (1915). These influential ideas placed pressure on local administrative bodies for town planning, and ensured an early consideration of environmental and ecological issues (discussed further in *Section 6.4.2.1*).

5.2.3 Evolution of Modern British Planning

5.2.3.1 Introduction

It was not until the post war 'Town and Country Planning Act, 1947' came about, which introduced the requirement for planning permission, that the UK planning system started to resemble what we know today. Development plans were prepared for every area of the UK and the Act also covered: compensation; development change; proper distribution of industry; New Towns; designation of National Parks and Areas of Outstanding Natural Beauty (AONB); the setting up of a Nature Conservancy to provide scientific advice on the conservation and control of natural flora and fauna, and to establish and manage Nature Reserves (Cullingworth & Nadin, 1997).

An increasing flow of legislation emerged following the Act of 1947. Most notably, this included green belt policy in 1955, to check the urban growth of the expanded house building programme. New powers were also granted to LAs for preserving amenity, trees, historic buildings and ancient monuments. These were not all controlled by the Town and Country Planning Acts (T&CPAs), but

separate Acts such as: the 'National Parks and Access to the Country Act', and the 'New Towns Act' (Cullingworth & Nadin, 1997).

Nonetheless, Development Plans began to be criticised for not answering all of the problems associated with a growing population and the pressure on land for development. The Planning and Advisory Group's (PAG) Report of 1965 and the 1985 white paper 'Lifting the Burden' criticised the speed and difficulty in plan review and updating, and although increased regional guidance was used as a method to overcome this, difficulties still existed (Cullingworth & Nadin, 1997). Development plans were also seen as costly and time consuming, suffering from a lack of public sector resources to write and implement, which resulted in many decisions not being based on them (Boon, 1997).

5.2.3.2 Environment

Healey and Shaw (1994 p.436) examine the way 'environment' was conceptualised within the British planning system between the 1940s and the 1990s. They identify a chronological shift from first viewing the environment as a 'setting', through a stronger interest in active 'environmental care', to emphasising 'marketable assets' and then 'environmental sustainability'. However, the post war planning agenda was still dominated by a utilitarian functionalism, which persistently enabled economic and material policy preoccupations to prevail (Healey & Shaw, 1994 p.436).

The impact of European directives saw statutory designations multiply in the late 80's and early 90's. With respect to biodiversity specifically, EC Directives are discussed in *Section 4.7.1*. In addition to these, the requirement of Environmental Impact Assessments (EIAs), related to major individual developments, or near to / within sensitive sites (Directive 85/337/EEC), Strategic Environmental Assessments (SEAs) have also been required for certain plans and programmes since 2004 (Directive 2001/42/EC). The SEA process involves evaluating, predicting and mitigating environmental impacts of policies and plans, such as LDFs for LAs. SEAs aim to identify the environmental consequences of proposed initiatives, and ensure they are fully included and addressed at the earliest stages of decision making, on a par with economic and social considerations (CCW *et al*, 2004 p.7). Biodiversity is an important aspect of consideration in SEA, which includes the 'precautionary principle' – here there is a presumption in favour of biodiversity protection, where detailed knowledge on which to base decisions is lacking (CCW *et al*, 2004).

5.2.3.3 Markets

This post war functionalism and economic domination of policy was exacerbated by the Thatcher government, following the recession of the early 1980's. An output of this neoliberalism was a series of circulars, e.g. 14/85, 2/86, 22/80 & 9/80, which reflected support of the free market and stressed the need to take account of market forces, enabling primacy of private sector development (Blowers, 1987; Ball & Bell, 1997). Ball and Bell (1997) describe this deregulation as weakening the role of planning. Certainly, it marked a stride towards a market-led approach to planning and governance, which is still evident to some extent in practical planning cultures today. This is despite the 1990 Town and Country Planning Act (DoE 1990), which clarified a pivotal change in priority, where planners were urged to base development control (DC) decisions on the development plan, rather than market forces, unless there was a good reason to the contrary (Boon, 1997). The recent international economic issues which came to light in 2008, and continue to affect the UK today, in addition to the increasing urgencies of the biodiversity agenda, are likely to change our conceptualisations of 'environment' in the context of planning again. Economic policy prioritisation and market-led approaches versus spatial-plan approaches are discussed further in *section 5.4*.

5.2.3.4 Current situation

The current English planning system is extraordinarily complex. For ease of understanding, the planning system has been summarised here, into five key components: 1) National planning policies, regulations and guidance; 2) Local planning for development: consisting of land-use allocation, plans and policies (now known as LDFs) and Supplementary Planning Documents (SPDs), which could include guidance on Local Biodiversity Action Plans (LBAPs); 3) Development Control (DC), where officers negotiate with developers, consult experts, make decisions based on the previous components, and report to a planning board; 4) Political decision; and finally 5) Enforcement.

The full ramifications of the 'Decentralisation and Localism Bill' (2010) for the planning system are also still unknown. Nonetheless, the government propose that the main benefits of the bill would include: freeing local government from central and regional control, abolishing regional spatial strategies and giving councils a power of competence (Coates, 2010). The RTPI, through the online 'planning portal' (www.planningportal.gov.uk) continuously offer updated information on this.

5.2.3.5 Improving planning practice

Practice based planning processes have always elicited strongly opposing views from critics and proponents. On the one hand the planning system is criticised due to lack of speed, bureaucracy, and seemingly random decisions (Elson, 1986; Gummer, 2008), yet on the other hand, the high level of planning control provides development with certainty, value, and support for profitability (Elson, 1986; Gummer, 2008). Numerous reforms and amendments have been made to planning processes, in attempts to improve the speed of review and transparency of spatial planning. Furthermore, the most recent generation of LDFs has attempted to overcome many of the criticisms. However, Thomas's (1997 p.94) warning from over a decade ago still holds validity regarding the temptation to simplify planning: "*paradoxically, attempts to simplify the UK development control system have led to complexity*".

Formal planning processes have now been in place long enough to provide a wide range of planning theories, which are capable of informing and shaping planning practice.

5.3 PRACTICE & THEORY

5.3.1 Links between Biodiversity Planning Practice and Theory

There is a general difficulty with integrating planning practice and theory, which has been acknowledged for some time (Cullingworth & Nadin, 1997 p.1). Kizek *et al* (2009) note that the different sources of information and knowledge available to professional planners do not have a clearly articulated role for planning-relevant research and the planning research does not impact heavily on practice.

Raik and Wilson (2006) discuss the benefits of incorporating 'technical rationality' within theoretical frameworks for applying theoretical principles to solving practical problems, and within the negotiation process; and Krizek *et al* (2009 p.459) suggest bringing theory and research knowledge more centrally into practice, using an 'evidence-based practice' (EBP) to alleviate some of the current problems. However, Krizek *et al* (2009 p.474) highlight that: "*It is difficult to locate, synthesize, and communicate research, and then to translate it into proposals for action. It takes time away from other activities conducted by planners. It also takes skill on the part of planners…*".

Within the field of biodiversity planning, there tends to be a wide divide between research and practice. This has been observed throughout professional practice and research by the researcher of this thesis, more so with biodiversity, than other planning related fields such as: landscape,

urban design or architecture. Raik and Wilson (2006) explain that this divide within biodiversity planning is due to the theoretical epistemologies, which rely upon specialised, bounded, scientific knowledge, which do not address or account for the uncertainty, complexity, content, uniqueness and value realities of professional practice.

Nonetheless, up-to-date ecological knowledge, concepts, and information is required in practice; particularly within strategic planning, where inappropriate or outdated concepts often continue to be used in the context of land use decision making (Yli-Pelkonen & Niemela, 2005 p.1959). Yli-Pelkonen and Niemela (2005 p.1959), although coming from a Finnish standpoint, also confirm that the application of biodiversity information in planning practice is hampered by the difficulties in providing appropriate information to planners and decision makers. They suggest that in order to facilitate this ecological knowledge transfer in the urban planning context, it is important to synthesize and communicate the research results to planners, managers and decision-makers in a language familiar to them.

The research findings in this thesis concur with the above observations and suggestions (discussed specifically in *section 3.3.1* and generally throughout *Study one)*. The questionnaire respondents of this research project believed there were issues regarding urban biodiversity knowledge, despite plentiful guidance documents. Whilst the recently created biodiversity planning tool kit (also discussed in *section 3.3.1*) may go some way to addressing the biodiversity knowledge gap as it is developed, there is no 'urban' focus to-date. Therefore, the knowledge issues raised in this thesis remain largely unsolved in planning practice.

5.3.2 Dynamism, Judgement and Balance

5.3.2.1 Dynamism

Planning is a highly dynamic discipline, constantly evolving and changing. Quartermaine (2008) reported that: "*On average there is a change in planning legislation every 8 days*". Furthermore, the constant dynamism was illustrated in the RTPI president's report for 2007 to 2008, which described a typical year, with a raft of new planning bills and legislation; proposed amendments for several Planning Policy Statements (PPSs); and reports, inquiries and consultations into housing, flooding, planning skills and the planning approval process (O'Neill, 2008).

Planning also affects many different social, economic, and environmental issues, which traverse numerous professions. There is therefore a constant battle in seeking balance and minimising

conflict between these three major sets of issues. This act of balancing, or 'prioritising', offers another form of dynamism to the planning system; as philosophies, knowledge, current affairs and urgencies constantly evolve to affect priority. Nevertheless, there are additional issues which influence biodiversity priorities and the balancing between other issues – discussed below.

Yli-Pelkonen (2008 p.347) explains that the planning process is inherently political, and as collaborations increase between local governments, business and society, each group attempts to advance their own interests. The importance of ecological planning information is assessed based on value judgements (Yli-Pelkonen, 2008 p.347). This is unfortunate for biodiversity, as value judgements are influenced by the local democratic wishes of the public and politicians, which are more closely aligned to 'immediate' and 'local' concerns of jobs and education, rather than national and global best practice, guidance and 'long-term', 'global' environmental issues (Mansell, pers. comm, 2007 & 2008). This view is supported by Meadowcroft (2002 p.169) who states that: "*There is widespread criticism of the 'short-termism' built into contemporary politics – that electorates are pre-occupied with immediate issues (such as the economy, crime or health care), while politicians rarely think beyond the next election*". Therefore, planners must endeavour to reconcile changing temporal and spatial pressures whilst being bounded by political and social constraint frameworks (an almost impossible task).

5.3.2.2 Development control balance

Johnson (pers. comm, 2009), the director of environment at ARUP and interviewed for this research, informs that whilst some clients are receptive to, and go a long way towards, maximising biodiversity on development sites, as they see it as an integral part of gaining planning consent: "*Developers are generally interested in maximising the short term return on their investment, gaining planning consent and offloading long term responsibility to others".* Johnson (pers. comm, 2009) elaborates that the biggest incentive is planning permission, with the most potential for gaining biodiversity value achieved earlier on in the development cycle (see *Figure five*). Whilst the achievement of biodiversity proposals occur during construction, as well as through the provision of appropriate management in the implementation / operational phases, Johnson (pers. comm, 2009) warns that considering biodiversity at these phases is far too l ate.

Development Control (DC) decisions, relate to the planning application process, and are discretionary. This means determining whether a decision is 'right' or 'wrong' or 'good' or 'bad', often without a gold standard against which to judge the decision (Willis, 1995). The actual DC

decision is made by the LA's Planning Committee (PC) based upon the DC officer's recommendation. This decision is made with reference to the statutory local development plan, central government guidelines, and any other material considerations (Willis, 2005 p.1068). The decisions reached by DC officers and decisions reached by the (PC) of local politicians are not independent of one another. The DC recommendation influences the PC decision; whilst DC, in making a recommendation, try to second guess the PC, as they can not be seen to be making too many 'wrong' decisions from the PC's perspective (Willis, 1995). Although members of the PC may choose to go against the recommendations of DC officers, their decisions must still be in line with the T&CPAs.

The cyclical diagram shown in *Figure five* provides a simplified view of the planning application process, and illustrates the cyclical nature - as schemes are often 'redeveloped' at later stages. The diagram illustrates the point at which the PC become fully involved.

Figure 6: Illustrating a simplified cycle of the planning application process and its remits

Two senior planning officers at Sheffield City Council (SCC) were interviewed regarding their understanding of the influence of the PC's appreciation of biodiversity upon DC decisions. Heeley (pers. comm, 2008), was keen to clarify that at SCC "*Members priorities do not affect planning recommendations, but they may affect the explanation in the report [in terms of level of explanation due to level of knowledge]*". However, Heeley (pers. comm, 2008) did admit that on occasion, "*officers may use [their] knowledge of members views as a negotiating tool*", which influences the 'discussion' within PC reports, rather than actual 'recommendations', and that "*Members lack of understanding may affect decisions*". DC decisions seek to ensure that planning applications conform to development plans (Willis, 2005 p.1065). Heeley (pers. comm, 2008)

stated that: "*Officers have to think whether a scheme would be 'refusable' if not containing the biodiversity enhancement / protection".*

Moreover, Heeley (pers. comm, 2008) and Baxter (pers. comm, 2008) commented that although the chief executive had 'sustainability' very high up the agenda, this was not always linked with biodiversity, and 'biodiversity' discussions did not significantly feature within PC boards. Baxter (pers. comm, 2008) clarified that it was "*really only the exceptional schemes, such as when 'interest groups, or community groups' have an interest"* that PCs are stimulated to consider biodiversity.

With regard to the different types of biodiversity information used to form value judgements on conservation value, Yli-Pelkonen (2008 p.346-347) found that in Finland DC officers rarely make clear distinctions between the different types of scientific environmental information used, either when disseminating this to the PC, who judge the importance at the local plan level, or during individual DC applications. Previous extensive professional experience (as a chartered town planner and chartered landscape architect) enables the researcher to concur that a similar situation exists in the UK. However, in the UK the degree of 'material consideration' (or importance) of various information, is usually highlighted to the PC. Summarising and disseminating relevant information is an important aspect of a professional practitioner's role in conveying information to non-experts, so a balance must be struck.

Healey (2000) explained that environmental objectives can only be given priority if those with the legitimacy to make the 'balancing judgements' are convinced that this is appropriate. Moreover, Healey suggests developing collaborative processes, where different types of knowledge are circulated around political communities, to enable more richly informed placement of political pressure and an appreciation of the judgemental dilemmas faced.

Willis (2005 p.1065) regards the cognitive continuum theory relevant for describing how DC decisions are made in practice. Willis (2005 p.1070) explains that the 'cognitive continuum' theory describes tasks people are capable of performing, and the modes of cognition employed. Certain professionals, such as planners or physicians, typically make intuitive judgements: "*Intuitive thought often involves unconscious, often rapid, data processing that combines the available information by averaging it. This is essentially the process followed in the planning officer's report, and by the planning committee*" (Willis, 2005 p.1070).

Willis (2005 p.1070) warns that: *"intuitive decisions tend to have low consistency, and are only moderately accurate*". However, Willis does also note that in some cases DC recommendations can be thought of as peer-aided, as groups of experts may be involved (Willis, 2005 p.1070). The researcher of this thesis has gained extensive previous professional experience within planning departments, and would agree that errors can occur in planners' intuitive judgement, although this is less likely on larger major schemes where the most experienced and capable DC officers are involved. Nevertheless, these observations by Willis and the researcher of this thesis, lend weight to the need for in-house biodiversity specialists within LA planning departments (raised in *section 3.3.3*), who would be able to negotiate proposals effectively with developers and present relevant biodiversity information to PCs - effectively informing the decision making process, and thereby further maximising biodiversity.

5.3.2.3 Planning discourse and power struggles

Planners are faced with the great responsibility of collaborating with others to ensure a democratic process, despite the difficult navigation through economic and politically driven power struggles (Raik & Wilson, 2006). Forester (1989 p.45) succinctly describes the dichotomous ways in which this 'power' can operate: "*By informing or misinforming citizens, power works through the management of comprehension, or obfuscation; of trust, or false assurance; of consent, or manipulated agreement; and of knowledge, or misrepresentation*". This has striking links with Foucault, who discusses the selection of different 'truths' and the locations of power. A foucauldian approach to DA has been used here in terms of interrogating discourses to see what assumptions are embedded (as explained in the *Methodology Chapter*, in the 6th & 7th paragraphs of *2.7*). Furthermore, planners were interviewed to investigate the level of influence (or 'power'), which Planning Committees have, on their reports (discussed in *5.3.2.4*).

Hajer (2002), using environmental discourse analysis, remarked upon the distillation of seemingly coherent problems out of a 'jamboree' of claims and concerns, which are brought forward by a great variety of actors. Healey (2009 p.452) describes the need for planners to obtain a holistic or comprehensive sensitivity, allowing a broad awareness of the multiple dimensions of the context of a problem, whilst selecting specific aspects and actions to guide current action. This was also reflected by Raik and Wilson (2006), who remarked that the social process of wildlife planning must negotiate power and interests amongst many different issues, whereas Foster's (2010 p.167) research reveals important ways in which the very concept of 'nature' becomes invested with power through planning. These research findings again (in addition to *5.3.2.2*) support the need

for in-house biodiversity specialists within planning departments (just as there are urban designers and building conservation officers), in addition to biodiversity 'champions', to ensure that biodiversity is given a 'voice' within these 'power struggles', as they ultimately influence policy prioritisation by decision makers. The effects of having a biodiversity specialist will be further investigated within *Study one,* whereas biodiversity champions are discussed in the following section.

5.3.2.4 Policy prioritisation

Biodiversity policies are discussed in *Section 5.3.3* of this chapter. However, this section relates to 'prioritisation' through political and professional balance judgements. Policy prioritisation occurs on three levels: 1) stimulus and priority of issues to create policy 2) policy discourse and 3) significance given to policies post creation.

The two senior planning professionals at SCC, discussed in *section 5.3.2.2*, were also asked what they believed were the common factors obstructing maximisation of biodiversity on developments. Their answers, summarised below, illustrate the impact of policy prioritisation upon the maximisation of biodiversity in individual developments:

Respondent A

- Developers wanting to maximise value [*Economic priority*]
- Developers get contractors to fill 'left over space' with plants. Biodiversity is not always consistent with beautifying a scheme – especially if selling on to someone else, so there is a tension there, as planners also want sites to look good [*Visual amenity priority*] (Baxter, pers. comm, 2008).

Respondent B

- Financial [*Economic priority*]
- Lack of developers agreement due to stubbornness, or don't believe it is 'necessary on a scheme', so difficult for us to 'push' it [*Lack of biodiversity priority*]
- Lack of knowledge amongst case officers. Many people understand benefits and significance, but seen as peripheral compared to access and building design [*Design and Access priority*]
- Bombarded by issues layer after layer, if historically it has not been important, it takes sometime to become ingrained and to see changes [*Temporal nature to prioritisation*] (Heeley, pers. comm, 2008).

The views of the planning professionals above, perfectly illustrate the shared views of academic researchers, such as Elander *et al* (2005) who advise transparency relating to policy priorities, as certain policies are implicitly given priority to the detriment of others: "*The ecomodernist belief that economic growth and ecological sustainability easily go hand in hand should not be taken for granted*".

Biodiversity champions can assist in raising priority levels. Respondents to a Swedish survey placed value on biodiversity champions and put forward the city gardener in Malmo as an example: "*the gardener has successfully moved green issues into the most powerful corridors of the city administration and thus made a viable green structure as one of five objectives for the urban development of Malmo*" (Elander *et al*, 2005 p.294).

5.3.2.5 Prioritising policy through discourse

Regarding discourse used in environmental policy, Feindt and Oels (2005 p.161) outline three theoretical considerations: 1) environmental policy problems are social constructions although they concern 'natural' objects; 2) deriving concepts, knowledge and meaning are an essential element of environmental policy; 3) environmental discourse has material and power effects, as well as being the effect of material practices and power relations. These considerations illustrate the relevance of socio-ecological resilience (discussed in *Chapter six 'Socio-ecology'*) and also of ascribing valuation frameworks (described in *Section 4.6*). In relation to these considerations, scientists have also recently called for improved biodiversity policies to be developed through existing frameworks, as they believe that current policy and management responses are missing a number of fundamental issues (IAP, 2010 p.1).

The environmental discourse of a particular problem may lack resonance amongst the relevant public, with other policy problems being considered more pressing. Articulation of the problem, therefore dictates if and how the problem is dealt with (Feindt & Oels, 2005 p.162). An example of this would be the different priorities given to the equally important mega risks of climate change and biodiversity loss.

The climate change agenda holds a hegemonic position, which tends to suffocate other equally important and imminent global mega risks - such as biodiversity loss. Whilst there is some overlap of the climate change agenda and the biodiversity agenda, in terms of biodiversity enhancements potentially forming part of the adaptation to climate change and climate change further affecting

biodiversity losses, the researcher of this thesis has always seen the two as separate environmental mega-risks. This theory was tested during an interview with Professor Thomas Elmqvist at Stockholm University, Sweden, who specialises in socio-ecological resilience. When asked what he thought about the priorities given to different global environmental mega risks such as climate change and biodiversity loss, Elmqvist (pers. comm, 2009) stated that: "*the two issues are not harmonious and many people do not see them as linked*".

Black (2009) reports the view of the head of a large UK environment group: "*If we want to talk about climate change, we can get a meeting with the prime minister. If we want to talk about biodiversity, we can't even get a meeting with the environment secretary*". So, if biodiversity loss is an equal mega risk to climate change, why is climate change so predominant? Black (2009) illuminates that politicians and leaders are enticed by global climate change, as it can be conveniently used and deployed at both the popular and political level. Furthermore, the time for decisive action can be pushed past the short-time periods of political leadership. Thus, allowing a smoke screen of blame for lack of action or accountability. In comparison, tackling biodiversity loss is a less convenient prospect, as required actions are more localised, imminently remediable (Black, 2009), and measurable. To truly maximise biodiversity within major development schemes, this prioritisation of mega-risks needs to be shifted nationally. This is discussed further throughout the thesis and within the conclusion.

Perhaps, as a response to the overshadowing of the biodiversity agenda by the climate change agenda, many planning related practitioners believe that national and local biodiversity policies need to be strengthened, including the following research interviewees: Baxter (pers. comm, 2008), Heeley (pers. comm, 2008), Hitchcock (pers. comm, 2010), and Johnson (pers. comm, 2009). These biodiversity policies are discussed in general terms in *Section 5.3.3* and specifically in *Appendix 2*. However, strengthening policies, or creating new policies does not provide a complete solution to policy prioritisation, as social and political attitudes and understanding must also be changed in order to re-prioritise the biodiversity agenda (discussed in *Chapter six* 'Socio-ecology').

5.3.3 Biodiversity Policies

5.3.3.1 Policy introduction

Section 4.7.1 & 5.2.3.2 should be referred to for the international context and European Directives, whereas *Section 5.3.2.5* discusses policy prioritisations, and *Appendix 2* provides an analysis of the

key national planning policies (*Appendix 2.1*), a consultation response regarding a proposed policy amalgamation (*Appendix 2.2*), and a process case study regarding the 'biodiversity duty' from the NERC Act (*Appendix 2.3*).

Developers can, and occasionally do, exceed biodiversity requirements due to a variety of incentives and benefits (see *section 4.7.3*). However, the vast majority of developers will only do what they must, through policies and regulations (based on the researcher's thirteen years of working professionally with developers). Therefore, effective planning policies (both national and local), along with other regulations and guidance are essential in providing a negotiating platform to maximise biodiversity, as is the prioritisation, implementation and enforcement of those policies. Barker (2006) listed the development of biodiversity policy as one of the major planning policy and process challenges within the land use planning review. The review also stated that ensuring policies and processes deliver the right level of protection and enhancement, was critical to the success and credibility of the system. Two years after this report being published, twenty five key biodiversity policy issues had been raised as being of future importance by the 'horizon scanning' research project (Sutherland *et al*, 2008), four of which are directly relevant to this research topic, and were ranked as having a high likelihood of occurring. These were:

- Nature conservation policy not keeping pace with environmental change;
- General decline in engagement with nature;
- Adoption of monetary value as the key criterion in conservation decision making; and
- Public antagonism to wildlife due to perceived human health threat (Sutherland *et al*, 2008 p.826).

The identification of new biodiversity issues is important, as policy makers need to articulate the issues which they may need to deal with in the future, for which they lack relevant information (Sutherland *et al*, 2008). The four policy considerations above are particularly related to urban biodiversity in development schemes and support the findings and theories discussed in *Chapter four* 'Urban Biodiversity' and *Chapter six* 'Socio-ecology'.

For any planning guidance documents to be considered a 'material consideration', they must be linked to appropriate national and local planning policies and laws. For these policies and laws to be effective, there must be both a clear continuum through policy hierarchies (i.e. links between local and national policies), as well as robust wording and clear meanings. Hitchcock (pers. comm, 2010) believes that the real issue with wildlife legislation is the interpretation. If anything, the

biodiversity policy needs to be strengthened and the priority raised, "*as PPS9 always seems to be the first ball that gets dropped, when balancing policies against one another*".

Similar to the UK context, local government in Sweden has a very strong potential for discretionary action compared to its counterpart in most other countries (Elander *et al*, 2005 p.290). A consequence of this substantial degree of discretion in the planning field is a great variation in policy implementation between LAs, which manifests with different approaches to Green Infrastructure (GI) planning (Elander *et al*, 2005 p.295). Thus, the findings from an empirical study of four Swedish cities' planning departments (interviews and desk studies), which is directly related to this thesis, may inform the understanding of our own system. Caution has been exercised to ensure compatibility between the two planning systems, as advised by Hambleton (2008). This involved checking that the Swedish planning system was similar enough to our own and visiting the key researcher (Ulf Sandstrom) in Sweden, to ask further questions about the research and Swedish planning process.

The Swedish study looked at biodiversity and green issues in relation to: planning and policy documents and their political weight; organisations and the importance of dedicated staff; and green structure planning (Elander *et al*, 2005 p.291). Five major conclusions in applying biodiversity in an urban context were that:
(1) all studied cities had adopted 'green' policies, including biodiversity. However, policies needed to be less abstract, more practice orientated, and relevant to local contexts;
(2) local coalitions in favour of implementing biodiversity have been established. These need co-ordinating champions who possess theoretical biodiversity knowledge and local practical context;
(3) there are tangible signs of spatial patterns and structures, favourable to biodiversity;
(4) many actors are unaware that biodiversity is an urban priority. Successful biodiversity implementation needs to be related to other priority policy values e.g. recreation;
(5) general biodiversity analysis should be complemented by an urban landscape approach and more specific biodiversity strategies (Elander *et al* 2005 p.283 & p.297).

Biodiversity in Sweden, according to Elander *et al* (2005 p.296), is conceptualised in a very general way at all planning levels, giving no clear guidelines, and leaving the task of translating these general statements to potential actors in the implementation process. This generalisation of biodiversity policy and lack of specific local, or even 'area' context is a similar issue in England, as observed in the researcher's previous professional experience within three LA planning departments, where attempts to amend biodiversity-related policies, or create specific LDF

biodiversity policies to the areas, was met with resistance. This tends to lead to local policies, guidance, area plans and design briefs which do little other than re-iterate national policy and that biodiversity must be protected/ increased – with no extra layer of detail or direction.

5.3.3.2 National and local biodiversity planning policies, regulations, and the organisations involved

The three key biodiversity related PPSs and the older version Planning Policy Guidance (PPG) documents, which are most related to urban biodiversity enhancements are: PPS1 (Delivering Sustainable development), PPS9 (Biodiversity and Geological Conservation), and PPG17 (Planning for Open Space, Sport and Recreation), although PPS9 is the most useful, being specific to biodiversity, and discussing enhancement of biodiversity on development schemes in Paragraph fourteen. These three national policies are discussed in greater detail in *Appendix 2.1*. There has been a government consultation regarding the amalgamation of the latter two planning policies with another policy and the researcher provided a research consultation to the research network 'Urban Nature'. This consultation is provided in *Appendix 2.2*, as the amalgamation is not certain at this stage. Additionally, PPG2 (Greenbelts), PPG18 (Enforcing planning control), and PPS 25 (Development and flood risk) are, to a lesser extent, related to the remit of this thesis. The following bulletpoints discuss the key biodiversity and GI (as GI assists biodiversity) related planning policies. Further discussion on GI policies is provided in 6.4.2.2).

- **Planning Policy Statement 1: Ecotown Supplement.** This policy supplement contains the need for 40% of an Ecotown to consist of Greenspace / GI: "*The space should be multifunctional, e.g. accessible for play and recreation, walking or cycling safely, and support wildlife, urban cooling and flood management*" (DCLG, 2009b p.10; Thompson, pers. comm, 2010).
- **Planning Policy Statement 9: Biodiversity and geological conservation.** PPS9 recognises the role of viable habitat networks for protecting biodiversity and providing stepping stones for the migration, dispersal and genetic exchange of species in the wider environment. It compels LAs to maintain networks [for biodiversity] by avoiding or repairing the fragmentation and isolation of natural habitats through policies. It also suggests that networks should be strengthened through development integration (KWT, 2010b; Simpson, 2008).
- **Planning Policy Statement 12: Local Spatial Planning** requires that the core strategies of each LA should be supported by evidence of the physical, social and GI needed to enable the amount of development proposed for an area, taking account of its type and

distribution. The Policy also requires LAs to provide evidence about who will deliver and manage the infrastructure and when it will be provided (KWT, 2010b; Simpson, 2008)

- **Planning Policy Guidance 17: Planning for Open Space, Sport and Recreation** requires LA's to 'maintain and protect an adequate supply' of green spaces and to 'seek opportunities to improve the open space network, to create open space from vacant land and to incorporate open space into new development'. The recognition of their role 'as wildlife corridors and havens for wildlife' is also emphasised (KWT, 2010b; Simpson, 2008).

Prior to the proposed amalgamated national planning policies, the RCEP (2007 p.83) advised that national Planning Policy Statements (PPSs) are amended to: reflect a broader definition of 'natural environment' in urban areas; promote GI; and provide a menu of options for planners and developers. The latter should include: the provision of GI, urban trees and woodland; using sustainable drainage systems (SUDs), e.g. green roofs, flood storage/ redirection; and restoring urban rivers. These documents should be underpinned by detailed information on case studies, costs, benefits and funding sources, whilst covering the different values of urban biodiversity, e.g. ecosystem functions and connectivity, and socio-economic and health benefits (RCEP, 2007 p.83). The researcher does not believe the proposed amalgamation addressed all of these points; indeed it seemed to weaken biodiversity policy (see *Appendix 2.2*). This, along with the call from practitioners for stronger biodiversity policy (*section 5.3.2.5*), illustrates the need for greater biodiversity prioritisation and policy consideration by central government.

Section 5.3.3.1 discusses the importance of creating more specific local policies, which 'flow' between national policies and detailed site briefs with greater consistency. The research interviewee and senior planning officer at SCC, Heeley (pers. comm, 2008), believes that specific local biodiversity policies would assist planning officers to negotiate and take decisions: *"The key thing is policy".* Baxter (pers. comm, 2008), another planning research interviewee concurs, adding that a general biodiversity policy for a city would be difficult – as there are lots of different habitats in different areas. Therefore, LDFs should link to local BAPs (Baxter, pers. comm, 2008). This approach would assist policies in becoming much more specific and related to local contexts.

In terms of recent regulations, the biodiversity duty within Section 40 of the NERC Act (Natural Environment and Rural Communities Act, 2006), requested that all public bodies, consider the protection and enhancement of biodiversity within all decisions. This new duty could have had a large impact upon biodiversity decisions within planning and development scenarios (Barber,

2006). However, the biodiversity duty within the NERC act has now had the opportunity to be tested in courts, due to the West Thurrock Marshes development site in south Essex (part of the Thames Gateway). Unfortunately, the Judge in this instance believed the duty was a 'weak one' in comparison to competing policies, and an 'internationally' important site for rare and protected invertebrates was allowed to be destroyed through development, in favour of 'local' employment benefits. This case again highlights that our current legislation and policies are not adequate to protect significant species and habitats, let alone ensure biodiversity enhancements on all developments. The case is further discussed with references, and an interview participant's recommendations for changes in favour of biodiversity, in *Appendix 2.3*.

5.3.4 Transdisciplinarity

5.3.4.1 Transdisciplinarity needed to tackle biodiversity

A basic explanation of this term is provided in the glossary. Wilcox and Kueffer (2008) discuss the diverse nature of definitions for 'transdisciplinarity', but note three recurring themes in an academic context: 1) transcending and integrating disciplinary paradigms (integration); 2) doing research in a participatory way (participation); and 3) orienting research towards real-world problems (problem-orientation). The 'Learning-for-sustainability' website (2010) additionally clarifies that the inclusion of the participatory approach in transdisciplinarity, allows the integration of academic research and non-academic participants to create a common goal of new knowledge and theory. Certainly, the Nagoya Declaration, 2010, stated that the success of biodiversity projects depends on close collaboration between the public and business sectors (URBIO, 2010), which therefore supports the use of a transdisciplinary approach.

Moreover, the Planning discipline itself overlaps a host of other disciplines, e.g. architecture, transport design, politics, ecology and engineering. It also, involves a host of different actors and organisations, during efforts to resolve, prevent, or reconcile development issues. Due to these inter-linkages in planning, these different disciplines, actors, and organisations can also affect biodiversity. Therefore, their methods of working together and understanding biodiversity issues, dictate biodiversity achievements. An adequate representation of ecological expertise within the planning environment (e.g. through the presence of in-house specialists in LAs and private practices), is therefore critical in developing common 'languages', understanding, and contributing to transdisciplinarity (Elander *et al*, 2005 p.284; Yli-Pelkonen & Niemela, 2005 p.1962-1963). This 'adequate representation' of ecological expertise could either mean the physical presence of expertise, or adequate 'communication' between ecologists and the other

planning participants. However, findings from this research illustrated in *Chapter three* and by others, e.g. Donatantonio (2008a p.10), illuminate a lack of ecological expertise present in LA planning departments.

In terms of design and implementation of biodiversity benefits, the landscape and ecology disciplines are both directly involved. In recognition of this particular inter-linkage, the International Association of Landscape Ecologists (IALE) was formed almost thirty years ago. One of the core objectives of the IALE (UK) describes cross-working which is concordant with the transdiciplinarity definition above (IALE, 2010).

When questioned about potential solutions to obstructions to biodiversity gains, two senior planning officers at SCC (Heeley, pers. comm 2008; Baxter, pers. comm 2008), listed a number of items which related to transdisciplinarity, such as: early consideration and pre-application meetings; specific training to change perceptions; profile raising by central government; experienced staff, or developers selecting appropriately skilled landscape consultants, who can promote biodiversity within planting schemes; producing guidance and raising understanding / 'opening the eyes' to the options of what can be achieved (Heeley, pers. comm 2008; Baxter, pers. comm 2008).

Sandstrom *et al* (2006) explain that ecologists need to learn more about the planning process and the tools available to the planner – including implementation costs and constraints - whilst also developing dissemination skills to explain the practical consequences of planning decisions upon biodiversity and ecology. Furthermore, Westfold (pers. comm, 2008), a senior Ecology Planner at SCC, was interviewed for this research. She stated that although planning officer awareness was crucial to maximising biodiversity on development sites, previous provision of biodiversity checklists were unsuccessful due to an increasing information overload upon all planning issues. Instead, Westfold suggested that good communications and relationships, through cross-working with teams in different sections and geographic locations, were imperative. *Section 9.4.5* also investigates transdisciplinarity at the site scale.

5.3.4.2 Key organisations involved in biodiversity planning and design

No single organisation takes responsibility for biodiversity planning and design, so actors who become involved in biodiversity planning, through transdisciplinary working, may become involved with a variety of organisations. *Chapter four* 'Urban Biodiversity' highlighted the

international relevance of the CBD and LA's and *Section 4.7.1* mentioned relevant directives from the EU. Nevertheless, much of the planning related guidance, design briefs and development competitions, are produced by central and local government in collaboration with relevant QUANGO's and development corporations.

There are many different organisations whose names and remits are frequently changing. Suffice to say, organisations broadly fall into one of the three categories:
1) independent organisations (e.g. FWAG and ADAS);
2) government related organisations (e.g. EA, NE, JNCC, DEFRA); and
3) trusts/ charities (e.g. Wildlife Trusts, Buglife, Bat Conservation Trust; RSPB; and the Pond Trust)
[acronyms are explained in *Appendix 1* and the organisation list is expanded in *Appendix 5.1*, with some of the key organisations' roles explained in *Appendix 5.2*]. Their individual degrees of influence are different within different LAs. This degree of influence is dictated by relationships, communication, and political and social nuances in different areas.

Four advisory organisations, particularly relevant to the topic of this thesis, are the:
1) Association of Local Government Ecologists (ALGE), who provide much relevant biodiversity and development guidance, and are discussed in *Section 3.1 – 3.3.3*;
2) Planning Advisory Service (PAS) who provide general and specific guidance on all planning topics;
3) Former 'Commission for Architecture and the Built Environment' who still have a valuable archived website; and
4) Advisory Team for Large Applications (ATLAS).

Despite the influence which ATLAS has over biodiversity related decisions, biodiversity was absent from ATLAS's web guide and other promotional documents and work (ATLAS, 2007; 2008a,b&c). In order to find out why biodiversity had been neglected by ATLAS, Evans (2010) - the 'ATLAS Environmental Sustainability Specialist' was interviewed. The findings from this interview, which generally equate to a low organisational priority of biodiversity, in comparison to say urban design (of the architectural variety) - due to a perception of traditional planning considerations; are discussed in greater detail in *Appendix 5.3.* This lack of biodiversity prioritisation is a pervasive issue throughout the findings of the thesis.

5.3.5 Negotiation and Biodiversity Information

Negotiation is an important skill, which improves with experience. For large developments, developers will commission experienced and highly skilled negotiators to attend planning meetings with the LAs. Therefore, in an ideal world, the LA should also have experienced negotiators, who can defend requirements and reach successful biodiversity agreements. In order to enable successful negotiations, appropriate and timely information are necessities.

Heeley (pers. comm, 2008) elaborates that when there is a lack of appropriate information on where to concentrate efforts and what measures would develop a successful scheme, officers struggle to negotiate appropriate biodiversity elements in schemes. Baxter (pers. comm 2008) confirms this by stating: "*Internal resources and expert biodiversity 'back up' in meetings and the pre-application discussions are important tools in gaining benefits*". Both practitioners suggest that web-based guidance may help (Heeley, pers. comm 2008; Baxter, pers. comm 2008). However, Baxter (pers. comm 2008) warns of information overload, with the pressures to gain more and more out of the planning system.

Yeang (pers. comm 2008), an international specialist in eco-architecture - also interviewed for the research, confirmed the importance of accessibility, form, and timeliness of ecological information during the planning process. Yeang (pers. comm 2008) stated that the biggest obstacle to maximising biodiversity from his perspective was: "*Getting the right ecological information on the site's ecology*". He listed the necessity of early ecological input at inception and masterplanning phases, and in reference to the researcher's suggested new approach to recording biodiversity information (*see section 11.4*) stated: "*Separate biodiversity information, recording and monitoring system will help a great deal*" (Yeang, pers. comm, 2008).

5.3.6 Enforcement

In the researcher's previous professional planning experience within three planning departments in England, Planning Enforcement Officers (who work within LAs) are often not equipped, nor trained adequately in wildlife issues (by their own admission) and it has been necessary for the researcher (in the role of an Environmental Planning Officer) to either accompany enforcement officers, or to solely undertake enforcement duties (through discussions with professional peers at conferences, this was a common occurrence). No external assistance was available in these three authorities to take any enforcement action for development related offences. In one public inquiry instance, Natural England (NE: Formerly English Nature) objected to the development, but

when the developer threatened a judicial review, they withdrew their objections due to a lack of funds to legally defend themselves (revealed during personal communications with NE in 2006).

LAs have the power to temporarily stop development works, or issue breach of condition notices, often associated with development delays and fines. They are also capable of prosecuting developers. However, in the researcher's direct experience, these lines of enforcement have never been fully taken advantage of, due to various leadership decisions (often relating to paltry fines if successful, and large legal expenses if not). *Section 3.3.7* offers further details on English enforcement issues and Study one discusses a lack of actionable enforcement on the Barking Riverside site in *Section 9.8.7.3*.

Under enforcement of planning law, this is seen as the weakest link in the planning chain and the issuance of enforcement notices has been reportedly decreasing (RCEP, 2007 p.155). Enforcement appears to be influenced by: economic considerations (it is less common in economically depressed areas); and the increasing collaborative processes between private developers and planning authorities (especially in larger developments). The removal of LA's enforcement discretion for major breaches, making such breaches a criminal offence, was proposed by the government as part of the planning reforms, but was rejected (RCEP, 2007 p.155).

Johnson (pers. comm, 2009), an environmental director of an international, multidisciplinary consultancy (ARUP) was interviewed for this research. He lists numerous key obstacles to maximising biodiversity on major sites, but most can be placed into two categories: 1) Various actors lacking education, experience, impetus, understanding, empowerment and capacity regarding biodiversity importance; and 2) a lack of enforcement action, or legally enforceable agreements, regarding greenspace, maintenance funding, or long-term management provisions.

In Wales, there is far greater support for biodiversity enforcement compared to that of England (Lloyd pers. comms, 2010), through dedicated Police officers working at the EA and other voluntary biodiversity champion policing. Further information is provided in *Appendix 4.1*, which draws on an interview participant's first hand evidence as a detective constable environmental crime officer – seconded to the EA in Wales. This interview participant also offers some practical recommendations.

To summarise this section: adequate biodiversity enforcement clearly involves a wide remit of consideration, and would deserve greater research focus in the future. As the carrot of incentives and benefits from biodiversity enhancements may dwindle after planning consent, the stick of enforcement becomes increasingly important: "*after the consent stage it is all about enforcement of agreed action, setting up and achievement of long term management and the funding / support mechanisms applied*" (Johnson, pers. comm, 2009). Elander *et al*'s research (2005 p.293) also indicates that if local biodiversity policies and regulations were stronger, and more likely to be adequately enforced, they would enjoy greater support.

5.4 URBAN ENVIRONMENTAL GOVERNANCE

5.4.1 Governance and transformative spatial planning

5.4.1.1 Introducing urban governance

The consideration of governance is important here, as planning is not only a function of regulatory policies dependant upon technical and scientific understanding, but also of politics and power. A basic understanding of the roles of politics and power, which affect development schemes i.e. governance, is critical in understanding the prioritisation (or lack of) of biodiversity issues and action responsibilities. The basic grounding set out here, is aimed for understanding the economic issues discussed herewith; as well as aspects of *Chapter Six: Socio-ecology* and governance aspects of the Thames Gateway (*Chapter Eight*).

Urban politics literature shows a shift from an era of 'government' to one of 'governance' (Davies, 2007 p.199; Hambleton, 2007 p.164). Hambleton (2007 p.164) defines 'government' as: formal institutions of the state, which make decisions within specific administrative and legal frameworks, using public resources in a financially accountable way. Whereas 'governance' involves government in addition to the looser processes of influencing and negotiating with a range of public, private and voluntary sector agencies to achieve outcomes. Gissendanner (2003) and Breda-Vazquez *et al* (2010 p.209) describe the diversity and experimental nature of urban politics and governance structures, as being: on the one hand, viewed as a fundamental condition of urban policies; but on the other, viewed as a problem.

The Nagoya Declaration at the Urban Biodiversity conference (URBIO), 2010, encourages the formation of governance to coordinate ecologists, civil engineers, landscape architects, planners, policy makers and citizens in the application of research outcomes to urban design (URBIO, 2010).

Certainly, urban environmental governance is influential in achieving biodiversity gains on major urban development sites, and as a concept, it draws together this chapter with the former *Chapter four* 'Urban Biodiversity' and the following *Chapter six* 'Socio-ecology', as it is capable of considering and managing all of the interconnected issues. An understanding of governance is especially necessary to consider *Study one*, which looks at the Thames Gateway and Eastern Quarry mega-development of this thesis (*Chapters seven, eight* and *nine*: Study one), as well as to provide a general framework to constraints and opportunities of maximising biodiversity in major urban development projects. Due to the complexities of governance within the Thames Gateway (numerous networks and layers), governance here has been termed by some - such as Allmendinger and Haughton (2009) - as 'meta-governance' (see glossary in *Appendix 1* for a more detailed definition).

The question of where, and with whom, the equitable ecological land use responsibilities and accountability should lie has been considered through different contextual frameworks and realities since civilisations began (see *section 5.2.1*). Diamond (2005 p.419) highlighted the relationship between urban governance, ecological disasters, and unsuccessful and successful civilisations. The complexity of organising environmental governance however has markedly increased in recent times (Meadowcroft, 2002 p.177). This has occurred in parallel to the increased scale and complexity of resolving environmental problems, which have social, political, as well as the physical, consequences (Meadowcroft, 2002 p.172 & 173).

Flitner and Heins (2002) discuss the new global conflicts facing species, including ourselves. They state that manufactured risks are becoming increasingly unavoidable, unlimited and hard to attribute to conventional politics, leading to a nation-state crisis. Nevertheless, this realisation by self-actualising individuals and collective globality, seems detached from the real-world activities of firms, and other organisations. They therefore argue for environmental governance to consider spatiality and social contexts (Flitner & Heins, 2002 p. 319 & 337).

New organisational frameworks may be needed to confront environmental issues, whose scale dimensions can not be adequately addressed by current institutions. In order to manage these environmental challenges, robust, flexible and continuously evolving mechanisms will be required at different scales (Meadowcroft, 2002, p.177 & 179). Meadowcroft (2002. p.177) recommends that: *"the most effective response may often involve drawing representatives from pre-existing*

bodies into a context where a collaborative response to emergent issue can be constructed" – a multi-level approach.

5.4.1.2 Multi-level environmental governance

The multi-level policy approach, which the CBD calls for to benefit biodiversity, is called global environmental governance (Elander *et al*, 2005 p.288). Elander *et al* (2005 p.288) discuss the multi-level phenomenon of global environmental governance which, depending upon the particular issue at hand, is located at one, or several spatial levels, with a wide range of actors whose complex interdependencies must be managed to collectively engage in interactive and responsible decision making.

At the local governance level, Davies (2007 p.199) elucidates that the interpretation of local governance underpins the case for partnership building. Analysing the rhetoric within the second World Summit on Sustainable Development in Johannesburg (2002), Davies (2007 p.200) highlights that: "*The word "partnership" occurs 137 times in the report, "local" 119 times*" suggesting that partnership is the dominant organising principle in global-local politics. Local 'government' aspects of local 'governance' (i.e. Development Control officers' and Planning committee political members' - who represent the public - value judgements), use of information, prioritisation and balancing of different agendas are discussed in *section 5.3.2.2* 'Development Control Balance' of this chapter. Yli-Pelkonen (2008, p.359) also concluded that local political decision makers must think about ecological issues on multiple levels. This 'government' element is an important component of 'governance' partnerships.

Judd and Smith (2007 p.151), note that although special-purpose authorities generally operate under the radar for most urban scholars and broader publics, this is certain to change. Theorists of urban politics have paid scarce attention to mega-projects, which are usually constructed by regional and state agencies. This has meant that urban scholarship has missed the most dynamic politics and the largest institutions which have been driving urban development for decades (Judd & Smith, 2007 p.151). Judd & Smith (2007 p.156; 157 & 160), also note that special authorities need to be made more accountable and transparent. These special authorities (e.g. development agencies) are discussed further in relation to Study one.

5.4.1.3 Transformative spatial planning

Adams & Tiesdell (2010 p.187) note a rich debate regarding the nature of spatial planning as the 'governance of place'. Yet, Adams & Tiesdell, 2010 p.203) also report that the economic role of

planning in these new governance frameworks is still bounded by more out-dated views: "*Unfortunately, much of the research we reviewed on the economic impacts of planning from the macro, urban land, and micro perspectives is specifically grounded in this narrower view [that the role of planning is a limited development control function], which predates the arrival of spatial planning*".

Skilful strategy making, of the kind to enhance urban futures, includes a need for "intellectual and political courage to engage in synthetic thinking, drawing together understandings and insights to imagine future trajectories and select specific pathways" (Healey, 2009 p.452). If approached with a political, economic and cultural imagination, which can grasp the relation between people and the governance of place, whilst understanding the formation of 'publics' and the qualities of polity ['polity' meaning a governance 'culture' of some, with a collective political identity (Healey, 2009 p.453)], then spatial strategy making can make a material contribution to those in urban areas (Healey, 2009 p.453).

Healey (2009 p.453) advocates the use of transformative strategy making, whilst cautioning for the distinction between this and routine 'strategy production', which merely responds to external demands for urban plans. Healey believes that transformative strategy making needs to become institutionalised within communities and should attempt to "*tie together elements of the building and dreaming that constitute part of the ongoing life of a polity*".

5.4.2 Land Tenure, Economics and Biodiversity Potential

Elinor Ostrom, the 2009 Nobel prize winner in economics, believed that the reason why the theories pertaining to ecological issues had moved on so much, yet practice had not yet followed this change, was due to 'land tenure' (Ostrom, 2007). Land tenure and economic contexts of land, can affect people's perceptions, enjoyment, valuation and management of both the land and the resources associated with the land. In turn, this has implications for the biodiversity potential of that land. This is true from the global scale, right down to the individual development scale.

Hardin's 'tragedy of the commons' influential discourse, outlined a world where the rational being was led to self-interest, and consequently destructive behaviour, by depleting resources to unsustainable levels when presented with common land (Hardin, 1968). Whilst he used the example of grazing animals on a common pastureland, this had intentionally obvious parallels to the global context of resource management. Ostrom (2007; 2009) built upon Hardin's theories -

believing in a less generalised approach, whereby 'tragedy of the commons' could indeed happen, but so too could co-operative resource management. For example, the Antarctic Treaty has for many years illustrated a positive example of ecosystem management and international co-operation (IAP, 2010 p.3).

New mega-developments, eco-towns and eco-cities, offer opportunities to redefine ownership – creating communal and common land. Major and mega-developments take private land (sometimes with no previous public access, or sometimes subsuming existing Public Open Space [POS]) and, unless purely industrial in nature, will usually provide public infrastructure and public/common spaces and features. These common spaces are not 'commons' in the true sense of the word, where individuals can use the land as they so wish (e.g. for the creation of profit or sustenance), but are 'common' to a prescribed enjoyment and use.

Urban POSs and Green Infrastructure (GI), which could provide significant opportunities for biodiversity, do not offer common/public resources in the clearly defined way that fisheries, or grazing lands do. However, they do potentially offer ecosystem services, e.g. food production, livability, recreation, flooding minimisation etc, which have value (economically and non-economically). Users usually do not have any financial ownership of the spaces or management responsibilities. Nevertheless, they may be involved in decision making processes or maintenance actions regarding the spaces, which can influence wildlife and biodiversity. They may even feel some level of spiritual affiliation, or ownership due to involvement and habitual use. This is an important consideration when considering socio-ecological resilience and land tenure, as people's valuation of something changes significantly whether they own it or not (Lunn, 2009).

Over the last seventy years, several seminal texts have taken differing standpoints regarding solutions to the problems of managing environmental resources. Aldous Leopold believed: *"An ethical obligation on the part of the private owner is the only visible remedy for these situations"* (Leopold, 1949 p.214), whilst Garrett Hardin (1968) discussed the 'tragedy of the commons' in relation to the eroding quality of national parks, pollution, and the over-population crisis. Hardin prescribed governmental solutions of privatising common areas, augmenting statutory law with administrative law and taxing as a coercive device rather than prohibition (Hardin, 1968). This coercive taxation solution was also brought up in the research interview with Farley (pers. comm, 2009). These earlier views contrast with the beliefs of Ostrom (1990) who takes a less prescriptive approach, due to the diversity of institutional organisations.

The key to Ostrom's argument is: "*that some individuals have broken out of the trap inherent in the commons dilemma, whereas others continue remorsefully trapped into destroying their own resources*" (Ostrom, 1990). In looking at what differences exist between those who have freed themselves of the commons dilemma and those who have not, Ostrom implies that differences may be due to factors 'internal' to a given group, e.g. no capacity to communicate, no trust developed, no sense of sharing a common future. Also, from both an internal and external organisational perspective, powerful individuals may stand to gain from the existing circumstances, or are indifferent, so they block the efforts of the less powerful to change the rules of the game. In this latter case, Ostrom suggests external assistance may be necessary to break out of the perverse logic of the situation. Additionally, external changes may be so rapid that there is insufficient time to adjust, or groups may suffer from perverse incentive systems (Ostrom, 1990). Many of Ostrom's views resonate with those of Diamond (*Section 5.2.1*).

5.4.3 The Market-led Approach and Land-value-capture

5.4.3.1 Changes with the market-led approach

The market-led thinking of past decades (described in *section 5.2.3.3*) has largely been discredited, although the 'culture' of market consideration in planning departments - with an over emphasis on economy and profitability remains to a large extent, as the researcher has observed through a decade of planning negotiations during previous professional planning experience. Plan-shaped markets can be a realistic alternative, however, where conversely; transformative spatial planning influences the market place instead.

In the case of large regeneration areas and the very large major urban developments, the market-led approach; can on the one hand be an innovative form of governance, by working outside the development plan framework to: produce a vision for the area; check the operation of land and property markets; bring key stakeholders together to co-ordinate resources at an appropriate time; and manage development expectations of the surrounding areas. Whilst some larger city local authorities have the capability to do this too, others, especially borough authorities, may not be used to assembling land and stakeholders to drive regeneration forward and respond to rapid market changes to site-specific events (Hull, 1998). On the other hand, there have been more recent criticisms of the market-led approach, in terms of failing to secure the necessary infrastructure (transport, schools, hospitals) in the right places for the longevity of developments

termed 'sustainable communities' (Dixon, 2007a). This obviously has implications for green infrastructure too and affects the capacity of individual developments to maximise biodiversity.

Adams and Tiesdell (2010 p.187) challenge the distinction between planning and the market, which is promoted by mainstream economists. They explain that markets are socially constructed and planners are market actors, intricately involved in shaping property markets (knowingly or not). Adams and Tiesdell (2010 p.202) argue for: "*greater academic advance on what it means for spatial planning to see markets as essentially socially constructed. Without such progress, planning remains in danger of slipping back into market-led modes of thinking*".

An example of how planning influences markets would be 'market capacity'. This is a 'commercial construct', influenced by a set of relationships between the state and the market. This market capacity determines the speed at which private residential developers construct housing estates (Adams & Tiesdell, 2010 p.202-203). As a greater appreciation is gained of the links between economic decisions and environmental consequences and vice versa, behavioural economics are beginning to be applied to policy making decisions. However, Adams and Tiesdell (2010 p.193) warn: "*Despite its current political attractiveness, there may be dangers ahead in attempting simplistically to apply behavioural economics to public policy making*".

5.4.3.2 Tenure and land-value-capture

In comparison to other European countries, the UK has less owner occupied commercial properties. *"In 2003, 61% of retail property was owned by investors [that is, was occupied by tenants]; the equivalent figure for other sectors was 63% for offices and 23% for industrial accommodation"* (IPF, 2005). Henneberry (pers. comm, 2009), a Professor of Property and Development at Sheffield University, explained in a research interview that this meant: *"the situation where the end user/ occupier is different from the main developer and from the property owner, is more frequently found in the UK. We are therefore more reliant on the market and have a more marketised and fragmented system".*

This has a number of implications for biodiversity. Firstly, investment developers gaining planning permission, but not occupying a site, will be less likely to benefit from reduced whole life costs and positive PR, unless they can find an occupier to appreciate this and pay a preferential price (preferential pricing). Secondly, there are greater opportunities for biodiversity information and management agreements to be lost, or miss-communicated. Thirdly, greater reliance on the

market means greater reliance on short term economic profits, rather than long-term socio-ecological benefits.

Henneberry (pers. comm, 2009) believes that: "*The current financial crash may result in a marked change in the private market model – which is partial [prioritising economic benefits over social and environmental ones] and short term. People may now be more amenable to an alternative approach, which is not just driven by money and profit, but takes a more holistic and long term approach*". However, Henneberry (pers. comm, 2009) further elucidated that, although the opportunity now exists to develop a new framework, it would require legislative change, which was doubtful due to the current political context.

Another prevalent English development situation, is where one developer buys land and applies for Outline planning permission and then, following consent, sells the land on (at a hefty profit) for others to gain detailed permission and construct. This has implications for gaining biodiversity enhancements, as the initial developer will not obtain any of the long-term benefits, e.g. reduced whole life costs of buildings with green roofs, or attractive settings to occupy. Therefore, they are only interested in gaining planning permission with as few requirements and conditions as possible, to maximise their profit. Thus, LA officers (such as the researcher in a previous professional role) often find that these initial developers resist robust commitment to quality by using 'weak wording' in planning documents, which therefore have no legal standing and will not have to be complied with (e.g. using 'could' and 'may', rather than 'will'). This leads to a weak negotiating platform (potentially ending in costly appeal situations) and constitutes a planning risk to biodiversity (and any other 'quality' related to a scheme).

Systems do exist in other European countries which combat this issue. For example, in the Netherlands, the government has mainly acquired sites themselves at the existing low use value, prepared the site with infrastructure and then sold on to developers at the new (higher) market value. The profit from this (development value/ value capturing), is used to pay for the infrastructure (Henneberry, pers. comm, 2009). This mechanism of direct value capture has reduced over the last two decades due to rising house prices making development less risky and more attractive to private developers. Due to this, and the fact that developers were effectively 'freeloading' by not providing the necessary infrastructure which their developments created a demand for, a tool for value capturing came about through the 'Grondexpoitatiewet' / 'Land Development Tax'. This came into effect in July, 2008, to help end uncertainty on costs, which the

municipality was to retrieve from the development. This was achieved by clearly setting items out in a fact sheet (DeWolff, 2007; VROM, 2007).

Value capture is the process by which either a portion of, or all of, land value increments attributed to the 'community effort', are recouped by the public sector. This either occurs through their conversion into public revenues through fiscal means, or more directly, in on-site land improvements for the benefits of the community. Three types of tools exist for value capturing: taxes, fees and regulatory instruments (for non fiscal contributions) (DeWolff, 2007).

In the UK, planning conditions, Grampian conditions, and planning obligations, such as Section 106 Agreements, or new development taxes/ levies (as described below), are all forms of value capture. These forms of value capture can all help ensure that biodiversity protection and enhancement occurs by providing appropriate mechanisms and accruing capital to fund protection and improvements. The Barker Review (Barker, 2006) discussed the proposed payment and valuing of Planning Gain Supplement (PGS), which was in the process of policy development at the time the report was written. Barker (2006) notes that the government's calculation of PGS was based on the uplift in value (the difference between the value of land before and after planning permission), and discounted by a PGS rate. Due to the contentious nature of PGS, it was scrapped by the government in 2007, and replaced by the Community Infrastructure Levy (CIL) in 2008. This levy places a charge on all development types (over a minimum threshold) to cover infrastructure requirements to support development (DCLG, 2008a; DCLG, 2010a). The CIL charge is based on size and character of development, and includes POS and green space within its definition of infrastructure (DCLG, 2008a p.30).

The CIL is applied by LA's and the new regime was due to begin in April 2010 to provide a greater certainty to developers and LA's, and largely, but not wholly, replacing planning obligations. Research leading up to the CIL had shown that the burden of funding infrastructure fell primarily on major developments - hence the new system aims at providing a fairer system (Planning Portal, 2010). The difficulty will lie in LA's setting the right level of charges. If the charge is too low, this may lead to much-needed infrastructure projects being delayed or not going ahead – potentially jeopardising further development. Conversely, if the charge is too high, this may prevent some much needed development e.g. on contaminated sites, from progressing (Planning Portal, 2010). Further clarification and guidance upon the new regime is expected in due course.

5.5 CONCLUSION

This chapter has illustrated the practical and theoretical relevance of the planning discipline for finding solutions to maximising biodiversity within major urban development schemes. It has summarised all pertinent elements of the planning 'system' and described how planning affects all phases of a development's lifecycle through direct (e.g. planning policy and planning processes) and indirect (e.g. prioritisations and philosophical framework) methods.

The ancient and historical planning sections illustrates the dynamism of planning (and the potential it may have to change, particularly in terms of ideologies), and how decision processes can either lead to ecological disaster, or recovery / avoidance through governance structures. The modern planning and governance sections illustrate the framework in which we operate, including the failings and opportunities. Any potential solutions to maximising biodiversity must slot within, or propose a realistic change, to this framework.

Certainly, the goals of biodiversity conservation and sustainable development remain elusive due to a failure of governance *"— both of institutions and of regulation — a failure of governments and a failure of the market*" (WWF, 2010 p.97). However, there are emerging solutions and the WWF (2010 p.97) suggest that*: "Far-sighted governments will see the opportunity to gain national economic and societal competitiveness through approaches such as valuing nature and allocating resources in a manner that provides societal prosperity and resilience".* The governance section within this chapter, in conjunction with the consideration of governance in the Thames Gateway (*Chapter eight*) have disentangled some of the biodiversity issues and considerations, necessary in order to start mapping a way forward.

The following chapter 'Socio-ecology' leads on to focus on the social components, which can lend a form of 'resilience' to biodiversity agendas and affect 'prioritisation' (one of the key obstacles to maximising biodiversity). It also uses the example of Green Infrastructure (GI) as a way of translating some of the more philosophical approaches described in this chapter, into reality; whilst providing necessary information in order to understand components of the main case study (*Study one*).

6 SOCIO-ECOLOGY

"*The problem is not changing people's consciousness - or what's in their heads - but the political, economic, institutional regime of the production of truth*"
(Foucault, 1994 p.133).

6.1 CHAPTER INTRODUCTION

6.1.1 Context

The 'Introductory' chapter of this thesis describes the significance of global human population, urbanisation and biodiversity loss, whereas *Chapter four: Urban biodiversity* describes the importance of valuation and social connection to biodiversity, whilst *Chapter five: Planning and Governance*, describes the influence of social and professional policy prioritisation. This 'Socio-ecology' chapter, with its component parts of 'Ecosystem services' and 'Socio-ecological resilience' – pulls together a framework for conceptualising and addressing these issues, whilst using GI as a practical example of implementing this framework to maximise biodiversity.

The development of theories and processes relating to ecosystem services are highly relevant to this research topic, as they directly impact upon individual development schemes, in addition to offering a strategic conceptual framework for re-prioritising the biodiversity agenda - which has been found throughout this research to be the key obstacle to maximising biodiversity within major urban development projects. Therefore, it must be addressed.

6.1.2 Socio-ecology and Other Terms

Socio-ecology is one term amongst many used to describe a remit of social and ecological considerations, with 'Human Ecology' and 'Socio-ecological resilience' being two of the most commonly used terms. The term socio-ecology has been selected for use in this research as it is a short hybridisation, which is clear in meaning. Socio-ecology is the study of the human and societal impacts upon ecology and biodiversity, and also the human dependency upon ecosystems and biodiversity for survival and quality of life. For the purposes of this thesis, the term is focussed less on humans and their environment (a more traditional social scientist remit), and focussed more on human impacts on the environment of other species (accepted urban biodiversity planning research considerations).

6.1.3 Evolution of Socio-ecology

Links between society and ecology became undeniably evident during the industrial revolution, due to the obvious human impacts. Research under the name of 'human ecology' first began at the Chicago school (Beck, 1995 p.121). However, the term 'human ecology' had been referred to earlier in the 20th century, but referred to different concepts regarding human social space (Beck, 1995 p.121); and when HG Wells stated: "*Sooner or later human ecology, under some name or other, will win its way to academic recognition and to its proper place in general education*" (Wells, 1934 p.159-165), Wells was referring to a human 'world brain' and global information systems.

There are two key international and transdisciplinary socio-ecology organisations: The Society for Human Ecology (SHE), which was established in 1983 (Borden, 2008); and the Resilience Alliance, which was established in 1999 (Resilience Alliance, 2010).

6.2 SCIENTIFIC UNIFICATION FOR THEORETICAL DEVELOPMENT AND PRACTICAL SOLUTION FINDING

6.2.1 Urbanisation Requires Increased Social and Natural Science Integration

Section 1.2.3 introduces the need for an integrated social and natural research approach in studying and understanding urban biodiversity, whereas this section expands on the developing advocacy for such an integrated approach, and specific considerations necessary for using such an approach in order to address the issues pertaining to this research project.

Within urban areas and particularly city centres, where complexities and conflicts of use are greatest; there are heightened social and ecological mixed interfaces. For example, the protection and enhancement of *flora* and *fauna* in cities is widely dependant upon politics, competing and conflicting policies regarding human 'quality of life' issues, organisational procedures, communication, and knowledge. Several years before general academic consensus was reached regarding socio-ecological consideration, Beck (1995 p.127) surmised this as: *"The environmental problem is by no means a problem of our 'environs'. It is a crisis of industrial society itself…."*.

Within the last decade, research has been produced which recognises and questions conventional conceptualisations, which externalise nature as 'environment' and as separate from humans and society (Buckingham & Turner, 2008). This questioning has been bringing about a gradual replacement of these conventional views, by more internalised views of nature, where human

dominated ecosystems emerge and evolve through the interactions between human and ecological processes, and where nature is constantly reconstituted (Alberti *et al*, 2008 p.143; Buckingham & Turner, 2008; Grimm *et al*, 2008a p.757; Newell *et al,* 2005 p.299-300).

Hedfors and Sandstrom, researchers at SLU University, Uppsala, Sweden were interviewed as part of this research in 2009, and described a flow of knowledge in planning and design processes, related to the multi-functions of blue-green infrastructure. They believed the knowledge-flow could be broadly divided into the two realms of 'social' and 'natural/ physical' sciences. Where dimensions relating to: biodiversity, environmental qualities and biotechnical solutions would broadly fit into the natural sciences, and dimensions relating to: recreation, cultural identity and city structure, would fit within the social science realm (Hedfors & Sandstrom, pers. comm, 2009). Whilst illustrating the different social and natural science aspects of the topic, they also agreed that the integration of the two were fundamental. This is particularly true for complex urban environments.

Newell *et al* (2005 p.299-300) state the necessity for discipline-based research on the one hand, due to the essential insights it provides into the mechanisms of our world, but on the other hand Newell *et al* (2005 p.299-300) and Alberti *et al* (2008 p.143) explain that this focus on sub-systems can not provide the systemic approaches that are needed to support the transition to sustainability and instead propose a more integrated framework (of natural and social science).

Elmqvist, a Professor at Stockholm University and the Resilience Centre, Stockholm, Sweden (interviewed for this research in 2009), is a proponent of the merging of social and physical sciences as a way of understanding the mechanics and solutions to tackling biodiversity loss. He is keen that strategies are developed for multifunctional use of green spaces and habitats, in order to develop cities which create a healthy environment for people. A successful example, cited by Elmqvist was the proposal and current progress in planting 1 million trees by 2017 in New York's urban areas. This proposal came about due to research which linked a doubling of street trees to a 25 % reduction of asthma in children (Elmqvist, pers. comm, 2009; Lovasi *et al*, 2008).

Grimm *et al* (2008a p.757) explain that the urban ecology discipline *"integrates natural and social sciences to study these radically altered local environments and their regional and global effects".* Nevertheless, attempts within current practice and policy making to integrate the natural and social sciences largely remain purely reductionist—using discipline based research and studying

humans and ecological processes as separate phenomena, or sub-systems (Alberti *et al*, 2008 p.143; Newell *et al, 2005 p.299-300;* Lotze-Campen *et al,* 2008 p.108*)*. Moreover, Lotze-Campen *et al* (2008 p.108) describe biodiversity discourse as: "*still dominated by the natural sciences*" and they largely put this down to the complexity and insufficient understanding of the links between society and nature.

Certainly, the social dimension needs to be fully taken into account, and integrated, to develop successful biodiversity strategies regarding major development schemes. Policy makers can thereby simultaneously address social and environmental concerns, where appropriate actors are held accountable – both locally and globally, and with property and use rights addressed (EUROPA, 2009).

6.2.2 Mechanisms to Assist Integration

The political prioritisation and valuation of biodiversity was discussed in *Section 1.2, 4.6* and *5.3,* but how we 'frame' and 're-frame' the issues are also of great importance: "*If we are to arrest and reverse the rates of species extinction, the challenges are philosophical as much as they are political or economic*" (BBC News, 2010b p.1). Wu (2008) argues for a scale of consideration, which is: "*large enough to include key ecological and socioeconomic processes and small enough to allow for detailed mechanistic studies*".

Newell *et al* (2005) describe knowledge integration as a key process of sustainability, which is now widely recognised. Globally, efforts to develop integrated (interdisciplinary and transdisciplinary) research approaches; have been leading to the creation of new subjects, such as human ecology (Newell *et al*, 2005 p.299-300*).* The creation of these new subjects provides a focus for partnerships and knowledge transfer, as well as a means of promoting wider integration.

Newell *et al* (2005 p.299-300) clarify that to enable development of a genuine shared language, mutual comprehension is a pre-requisite to integration, rather than an outcome. In order to provide an appropriate foundation for this integrated approach to socio-ecology, feedback systems and cognitive science (the study of how people conceptualise the world) must also be included (Newell *et al*, 2005 p.300). Future research must therefore focus on these issues of socio-ecology and transdisciplinarity, and the research case studies have considered these aspects where possible.

6.3 ECOSYSTEM SERVICES

6.3.1 What Are Ecosystem Services?

Ernston (2008 p.157) described the emergence of a new paradigm to nature and management in the late 1990's – called: an 'ecosystem services approach' (*Section 4.6.5* mentions ecosystem services as one of four key methods of valuing urban biodiversity). Ecosystem services became a central concept in the UN-initiated Millennium Ecosystem Assessment (MEA, 2005), which promoted the approach widely. The term is now commonly referred to by biodiversity related practitioners, as well as academics. Ernston (2008 p.157) summarises the four main categories of ecosystem services, which were listed in the Millennium Ecosystem Assessment (MEA): *"provisioning services (…like food and fibre); regulating services (…like air and water filtration); cultural services (…like spiritual enrichment; cognitive development; recreation, and aesthetic experiences); and finally the supporting services (…such as pollination, nutrient cycling and soil formation*)". During her Nobel Prize [Economics] Lecture, Ostrom (2009) described numerous ecosystem services within the following four categories: psychological, physical, resources, and services.

The implementation of 'urban biodiversity' enhancements can be broadly subdivided into two categories based on their physical forms: 1) areas (i.e. greenspaces); and 2) features. Individual biodiversity features, often provide services to humans (e.g. an urban tree – offering visual amenity, edible fruit and shade / shelter; a green roof on a private office building – providing visual amenity, food production, recreation and pollination; nesting boxes, or artificial burrows/holts/dens – supplying psychological benefits of the presence of nature and education opportunities). The general public perceptions of these two different categories are further discussed in *section 6.3.3*. Barthel (2008) explains the growing human dependencies on urban ecosystem services for human wellbeing (and *section 1.1* highlights the growing densities of urban areas, which will increase dependencies).

Much of the existing research on urban green areas has focussed upon the formal planning process (Ernstson *et al*, 2005; Yli-Pelkonen, 2008; Elander *et al*, 2005). This research is critical to ensure planning mechanisms do not cause obstructions to protection and enhancement of quality or quantity. However, two fundamental realisations have occurred, which have marked an increased focus on urban ecosystem services:

1) that policy 'prioritisation' must be tackled (see *sections 3.3.2, 4.6.2 & 5.3.2.4*); and

2) that in order to do this, biodiversity /nature and green spaces must be linked to 'Value' of both the fiscal variety, as economics remains the predominant focus of politics and business (influencing investment), and also the linkage to non-fiscal valuation and quality of life (see *sections 1.1*, *4.6* and *5.3)* .

The MEA concluded that the world's degrading ecosystems reflect a global crisis for many of the ecosystem services required for human wellbeing (MEA 2005). Therefore, knowledge and understanding of the role of urban landscapes in this context, needs to be developed (Grimm *et al,* 2008b; Barthel, 2008). Although it is now fundamentally accepted that a fragmentation and isolation of greenspaces leads to a loss of ecosystem services, there is a need to better understand the socio-ecological dynamics involved (Ernstson *et al*, 2008). Elmqvist (pers. comm, 2009) also explains that: *"Ecosystem services require viable populations. In Urban landscapes there are many challenges, such as peak oil and rigid infrastructure. We need functioning systems".*

A culture change in how we measure economic progress is needed*: "At the moment, we judge success basically in terms of how much economic growth we can achieve*" (Juniper, 2010). Nonetheless, there has been a rising international focus upon a 'green economy', which embraces people and the planet into economic thinking, over the last two years (WWF, 2010 p.94). Whilst, there are problems with valuing non-market benefits, and "*It is not possible to study all ecosystem services [due to their esoteric nature], but you can do the more important ones e.g. recreation etc*" (Liekens, 2010).

The health benefits of contact with nature in urban areas are also receiving increasing scrutiny and the positive influences upon psychological well-being have long been documented (Barker, 1997 p.25). Quality of life, life politics, and socio-ecological resilience, are therefore important aspects of ecosystem services, in terms of their valuation; and hence protection and enhancement by society. This in turn affects the levels to which regulations and incentives are set, to influence biodiversity protection and enhancement through development schemes.

6.3.2 Quality of Life and Life Politics

"[In] order to enhance our analytical capabilities, the concept of life politics [an emerging global agenda, defined by Giddens (1911: 214) as 'happening where the individual and the global meet and influence each other'] needs some critical injection from literature more sensitive to notions such as spatiality, locatedness and the lived contexts of social groups" (Flitner & Heins, 2002

p.319*).* Flitner and Heins may not have been referring to notions such as: 'quality of life', development schemes, and the planning discipline; but these elements of the research topic are of high relevance to the individual and to global interactions with the biodiversity agenda.

The government's 'State of the English Cities' report concluded that liveability and local environmental quality had been rising in public importance, which was reflected in numerous attitude surveys which placed the quality of parks and open spaces consistently among factors which residents wished to be improved (ODPM, 2006 p.176). A public survey conducted by MORI for CABE in 2004, also found that 91 % of people believed that public spaces created a better quality of life (Community Forest, 2008; CABE Space, 2009a).

In the last eighty years GDP (i.e. income and consumption) has been used as the main indicator of progress, prosperity and success. Nevertheless, as the WWF (2010 p.94) point out, this is not the full story: "*ultimately we should be striving for personal and societal well-being. Above a certain income level, more consumption does not dramatically increase social benefits, and further increases in income per capita do not significantly increase human well-being".*

There are concerns that in urban populations, opportunities to experience nature are declining. "*Access to green space within cities has been found to benefit many aspects of health and wellbeing, enabling local residents to cope better with the stresses of living in large urban areas*" (EDPHiS, 2009). In contrast to the trend in European cities as a whole, a recent UK study considering sixty seven densely populated cities, suggests that: "*residents will have less access to green space as cities grow, unless measures are taken to maintain access in future urban development*" (EDPHiS, 2009). The study also suggested that, in addition to formal green spaces, street trees, private gardens and allotments will become important green places for city dwellers; and tools for future city planning are called for to balance the benefits to biodiversity, human wellbeing and economic output (EDPHiS, 2009).

With this increasing evidence regarding both the environmental crisis of global biodiversity loss, and evidence regarding our human requirements for biodiversity and nature, one may ask "*why are we not doing more to solve these issues?"* Beck's (1995 p.1) seminal text on the politics of risk society, centred on this very conundrum, that: despite the existence of contemporary consciousness, regarding species loss and other environmental disasters; there were still

obstacles in addressing these problems, or even to discuss the obstacles, and how to overcome them.

Beck highlighted that ecological threats are '*externalised economically'* and *'minimised politically'* (Beck, 1995 p.2). Beck's work has been influential in providing a new understanding on the social politics involved in biodiversity loss (Scoones, 1999) and was referenced nineteen times in Flitner and Heins's paper (2002): '*Modernity and life politics: conceptualizing the biodiversity crisis'*. The text is certainly useful in understanding the obstacles to maximising biodiversity in major development schemes, in order to find realistic and effective solutions. Moreover, Beck (1995 p.3) elucidates: *"Given that many threats lack any sensory character, the only way that culturally blinded daily life can become "sighted" is through culturally meaningful and publicly exhibited images and symbols"* (Beck, 1995 p.3).

Beck (1995 p.9) describes the impacts of the subconsciously embedded social and moral structures, as a result of ecological conflicts and fears regarding changes to life quality: *"…a policy of lip service to ecology becomes completely indispensible; industrial self-damage may continue, but only unacknowledged, unaccountably, and with the full blessing of conservationists".* Beck also explains that out of those 'for' and 'against' ecological political consciousness; those generally 'for' are polarised into either a cosmetic and symbolic "for" - leaving causes untouched and inadvertently allowing obstructions (i.e. greenwash); or, a "for" that intends to avoid the consequences (Beck, 1995 p.9). Understanding societal obstructions to addressing ecological issues, such as biodiversity loss, will assist in finding solutions to enable greater societal and political support systems for increasing biodiversity in major development schemes. The concept of 'greenwash' is also considered in relation to the Thames Gateway regeneration area in Study one (*Chapter eight*). Furthermore, Shrivastava (1995 p.134) noted the roles which '*organisations*' had in '*destroying environmental value'*, and despite the development of environmental auditing mechanisms since then, Study one will also consider the role of organisational cultures and ethos' in maximising biodiversity within development sites (*section 9.8.5.2*).

6.3.3 Socio-ecological Resilience

Ernston (2008) defines resilience as: *"the capacity of a social-ecological system to sustain a certain set of ecosystem services, in face of uncertainty and change, for a certain set of humans."* Ernston (2008) then goes on to explain that this definition of system resilience, not only equates to good or bad, but good for some and bad for others. Political considerations are involved in the analysis

of how ecosystems are managed, and which ecosystem services are prioritised, and for whose benefit.

Ecosystem services which are associated with specific locations and greenspaces, can become commonly valued by groups of individuals. These groups often formalise themselves, and can become spatially identified through their chosen names e.g. 'the friends of 'X' park'. Previous professional experience of the researcher, particularly with numerous community groups, would suggest that this spatial configuration of socio-ecological resilience tends to relate to the proximity of the greenspace to residential areas of group members, although individuals may also support an area close to work, or where they visit for recreation / amenity.

Biodiversity 'features' on the other hand, are not always publicly accessible areas of greenspace, yet still provide ecosystem services (examples given in *section 6.3.1* above). Cumulatively, these ecosystem services can make a significant benefit to societies. Nonetheless, they do not have the same 'immediately evident' benefits to individuals, hence they often do not enjoy socio-ecological resilience, and the public 'protection' and support is lower. Conversely, well-connected greenspaces provide broader ecosystem services e.g. recreation and commuting, and the benefits are more easily recognised by individuals.

Socio-ecological resilience of biodiversity habitats and features is important throughout all development lifecycle stages as Chapters three and five illustrate (due to related political support and prioritisation of policies, which dictates the degree of pressure developers will be under to protect and enhance biodiversity through their schemes). Barthel (2008) highlights the importance of management practices of informal and formal actor groups with regards to the governance of urban landscape resilience and securing ecosystem services, and notes the development of adaptive co-management and adaptive governance, as two analytical frameworks for ecosystem management in multi-level governance contexts. Thus, arguing for a shifting focus towards socio-ecological resilience.

In order effectively to achieve this, Barthel (2008) and Ernstom (2008) explain that adaptive governance requires: trust, conflict resolution, knowledge integration, vision building, and creating and sustaining social relations in information sharing networks. Barker (1997 p.25) and Lundberg (2006) note that the engagement of local-level organisatons, and the support and understanding of involved local people, is needed to maintain and develop networks to support

ecosystem management and the use of ecosystem services. They also highlight the need to recognise the ambivalence people may have to natural landscapes, and that methods to engage and incentivise the public are needed (Barker, 1997 p.25; Lundberg, 2006).

The application of urban landscape ecology principles, mixed with ecosystem services and human ecology, to address habitat fragmentation and biodiversity loss, is now a burgeoning subject. It is recognised that strategies to improve multifunctional urban green networks, for people and biodiversity, will inevitably involve some essential compromises and resolutions to actual or potential conflicts (Barker, 1997 p.26; SNIFFER, 2008). The research findings of SNIFFER (2008) on urban networks show that although social needs are often the major 'driver' for urban greenspace development, trade-offs need to be made. This is particularly the case, where areas of significant biodiversity, clash with areas with greater social potential as illustrated in the West Thurrock Marshes case study in *Appendix 2.3.*

Walker *et al* (2004) discuss how the concept of resilience has changed since Holling's (1973) seminal paper. They explain that: "*Three related attributes of social-ecological systems (SESs) determine their future trajectories: resilience, adaptability, and transformability".* The first two attributes are relatively self – explanatory, whereas: *"Transformability is the capacity to create a fundamentally new system when ecological, economic, or social structures make the existing system untenable*". They further elaborate that this has implications for sustainability science in terms of: "*changing the focus from seeking optimal states and the determinants of maximum sustainable yield (the MSY paradigm), to resilience analysis, adaptive resource management, and adaptive governance*". This statement also illustrates the importance of the governance focus, which is taken within the key case study (Thames Gateway and EQ2) of this research.

The socio-ecological resilience of Swedish parks was illustrated as enabling a form of community policing, to assist in the enforcement of development activities (Ernston *et al*, 2008). This could potentially extend to preventing damaging acts to greenspaces and biodiversity features in the first place, due to fears of community disapproval. Indeed, Johnson - during a research interview (2008), states that: *"Where there are strong representations / objections from statutory agencies, local authorities and pressure groups about biodiversity, more is likely to be achieved overall, as this exerts pressure on the development team to find an acceptable solution and hence gain consent"*. However, Ernston *et al* (2008) highlights the: *'inherent double-nature of all social networks as they facilitate some collective actions, yet constrain others'.* Of course, there may also

be instances of disadvantageous socio-ecological resilience too i.e. if the social component makes uninformed, or selfish decisions.

To achieve socio-ecologically resilient systems, Ostrom (2007), suggests six key principles: 1) overcome panacea trap; 2) accept complexity rather than reject; 3) develop a multidisciplinary multi-tier framework to analyse ecosystems; 4) build nested theories at multi levels (that can take many variables); 5) comparable overtime data for testing theories; and 6) recognise the value of institutional diversity (Ostrom, 2007). Whilst predominantly strategic and academic in consideration and intent, these principles could lead to new practical conceptualisation frameworks for maximising biodiversity, so have been considered throughout this research project. One evolving conceptual and implementation framework which has been in existence over the last couple of centuries, is Green Infrastructure (GI). GI is considered in detail in the following section, due to the potential biodiversity and development impacts.

6.4 GREEN INFRASTRUCTURE (GI) AS A PRACTICAL EXAMPLE OF SOCIO-ECOLOGY

6.4.1 GI Importance

Green Infrastructure (GI), whilst having some similarities to greenbelt, in terms of the benefits gained, has quite different functional concepts. Greenbelt's focus is upon containing urbanisation and retaining a 'countryside' character outside of urban areas. The future role of greenbelt has been questioned in recent years however, and a different approach maybe considered (Natural England, 2008). The focus of GI on the other hand, relates primarily to connectivity throughout urban areas.

All 'major' developments should provide GI through the form of either: greenspaces, linkages between greenspaces, and /or GI features. Mega-developments should also supply GI Strategy documents, which comprehensively consider the strategic and detailed design, implementation and management of greenspaces and features across these large sites, and how they link into the surrounding GI outside the site boundaries (see *section 5.3.3.2* for statutory policies). Morris (2008 p.17-18) reports a major sustainability consultancy's (Faber Maunsell) recommendation that good planning approaches - for acting on climate change, should include "*the use of green spaces and large canopy trees to cool the air, renaturalisation of water courses, sustainable drainage and creation of flood plain forests*". Morris (2008 p.17-18) also reports a similar recommendation by the environmental charity 'GreenSpace'. Furthermore, some research

projects, such as GRaBS – '*Green and Blue Space: adaptation for urban areas and eco* towns'; and ASCCUE - '*Adaptation Strategies for Climate Change in the Urban Environment*' have been investigating the adaptation potential of GI in moderating climate change impacts. Handley and Carter (2006 p.9) summarise that: "*These functions of greenspace make it a key adaptation measure in a future for the UK that is predicted to be characterised by warmer summers and wetter winters*".

Nonetheless, previous professional experience has highlighted to the researcher that many of the consultants who are responsible for GI strategies and features, lack the appropriate skills and/or the understanding of the strategic importance. The natural environment should be at the heart of urban design and management - multifunctional and connected GI particularly being highlighted as solutions to current urban issues (RCEP, 2007 p.83). Furthermore, the Nagoya declaration of 2010 highlights the need to develop theoretical and practical methods, for planning and designing resilient ecological corridors [GI] (URBIO, 2010). Werner and Zahner (2010) also describe two quality levels with habitat networks [GI]: 1) 'Structural connectivity', which represents the spatial continuity and connectivity of habitats that are similar or the same, and 2) 'functional connectivity', which relates to the opportunities that organisms have for seeking out and using the habitat.

6.4.2 Historical and Modern Conceptualisations

6.4.2.1 GI history

Historic texts laid the foundations of urban ecology, and considered vital components of GI, such as: land protection, ecosystem services, human well-being and city living. However, prior to the 1950's, only Olmsted and Howard progressed concepts regarding 'linked' urban greenspace and ecological networks. Furthermore, only Olmsted identified multifunctional benefits above and beyond recreation, aesthetics and psychological well being (e.g. storm water holding capacities and economical uplift) up to this point (see *section 4.7.3.4* for Olmsted's economical uplift analysis). Since the 1950's, the concept of green networks and green belt developed further. GI focus has been very dynamic over the last couple of decades, and sometimes: "*There are new combinations to be made of old concepts*" (Barker, 1997); hence a consideration of the legacy of theories here.

Over the last couple of centuries, the following influential individuals had a direct link to the issues involved in GI, and are frequently referred to in modern GI literature: Humboldt (1769 –

1859) the German botanist and geographer was foundational to the field of biogeography and joined social and ecological issues (Young, pers. comm, 2009); Frederick Law Olmsted (1822 – 1903), the American journalist and founder of landscape architecture (Barker, 1997;); Ebenezer Howard (1850 – 1928), the English founder of the 'Garden City Movement'; Sir Patrick Geddes (1854 – 1932), the Scottish biologist and urban planner (Duany, 2002 p.253); Le Courbusier (1887 – 1965), the Swiss-French architect, designer and urbanist; Nan Fairbrother (1913-1971), the English writer and lecturer on landscape and land use; and Ian McHarg (1920 - 2001), the Scottish landscape architect and writer on regional planning using natural systems (Duany, 2002 p.254).

For ease of consideration, the influential individuals regarding urban ecology / GI from the last three centuries can be placed into three groups:

1) Humboldt, Geddes and Le Courbusier, who despite different backgrounds and approaches, all hinted at theories similar to that of greenbelt, considered open spaces as essential to human well-being and considered a strategic scale of greenspace.

2) Olmsted and Howard who had the greatest influence upon interlinked greenspace within urban areas, have been cited the most in modern urban ecological literature and had perhaps the most radical impact upon modern day greenspace.

3) Fairbrother and McHarg who progressed a landscape planning approach. All are discussed below.

1) Humboldt, Geddes and Le Corbusier

Humboldt, Geddes and Le Corbusier came from diverse disciplines and cumulatively spanned a period of almost two centuries, yet they shared a common interest in greenspace in relation to urban living.

Young discussed Humboldt's fieldwork in the Andes, which included approximate population calculations, and the necessary level of social and ecological inputs to support the Incan Empire's urban networks (Young, pers. comm, 2009), which provide an early consideration of ecological footprints. Geddes is most prominently identified as one of the founders of modern regional planning (Young, pers. comm, 2009), whereas Le Courbusier addressed the physical health of urban dwellers and attempted to preserve open space by providing high density residential towers in parks, which would now be understood as a sustainable planning approach (Milgrom, 2002). He also noted the need of urban man for the country and nature (Fairbrother, 1970 p.245).

Dummett (2008 p.1) described one of Le Corbusier's most deeply felt concerns during his career, which was to restore harmony between natural and human domains, by finding a formula for modern urban living. Le Corbusier implied the hopeless and dangerous alienation of the human and natural words from one another, when he warned that the future city must keep in view the aim of taking man back to nature, so bringing new light into the individual's life (Dummett, 2008 p.1).

2) Olmsted and Howard

Olmsted and Howard, both practicing an early combination of city planning and landscape architecture, furthered the notions of GI and the benefits to humans in city environments during the nineteenth century. Although contemporaries, Olmsted was 49 years old and his career was well underway when Howard went to America for several years at the age of 21. It is therefore not inconceivable that Howard may have been influenced by Olmsted.

Olmsted was the founder of American landscape architecture (Barker, 1997; Young, pers. comm, 2009), and the first greenway planner in the US (Fabos, 1995 p.3). He respected natural processes through his incorporation of existing watersheds and designed many parks and greenways, including the "*park and drainage masterpiece known as the Emerald Necklace [Boston] in the late nineteenth century*" (Tajima, 2003 p.641). It was in 1903 (the year of his death) that Olmsted defined his park concept of linking parks to one another and to residential neighbourhoods, to provide people with 'the beneficial influences of nature' which no singular park 'no matter how large and how well designed' could achieve. It was this which sparked the modern greenways movement (Benedict and McMahon, 2002 p.13). Olmsted joined together cultural and ecological aspects in both his analysis of urban landscapes and his designed landscapes, and identified urban green space as a necessary component of metropolitan development (Young, pers. comm, 2009).

Howard has been identified by historians, as a pioneer of modern city planning and the founder of the international garden cities movement (Young, pers. comm, 2009). Howard's garden cities consisted of a compact urban grouping of housing, surrounded by what we would now describe as greenbelt (Mumford, 1965 p.34), and his exploration of GI and the nature/society divide anticipated contemporary urban ecology by a century (Young, pers. comm, 2009). Howard's early attention to green-space access standards and ecosystem services for residents are clearly illustrated in his documentation. For example: diagram No.3 'Ward and Centre of Garden City' (*Figure 7* below), not only shows a garden at the very centre of the city - surrounded by civic

buildings, but also illustrates a 'Grand Avenue' described as: "*420 feet wide, and, forming a belt of green upwards of three miles long, divides that part of the town which lies outside Central Park into two belts. It really constitutes an additional park of 115 acres - a park which is within 240 yards of the furthest removed inhabitant*". (Howard, 1965 p.53-55)

Figure 7: Ebenezer Howard's Diagram No 3: 'Ward and Centre of Garden City' (Howard, 1965 p.53-55).

3) Fairbrother and McHarg

Fairbrother and McHarg, both landscape architects, furthered the theory and practice of landscape planning and landscape ecology around the middle of the twentieth century.

Fairbrother (1970 p.221) explored the potential multifunctional opportunities presented by the urban green belt, which would provide socio-ecological resilience: "*Recreation for instance would protect the inner Green Belt far more effectively than any legislation, for the public are ready in fierce defence of amenities they value*". Moreover, Fairbrother (1970 p.278-279) considered elements of GI - albeit using different terminology. In Fairbrother's most famous publication: '*New Lives, New Landscapes'*, she discusses the potential for road verges to act as informal nature reserves and calculates, at the time of writing, that they were far more extensive than all the reserves put together at 68,000 ha of verges in England and Wales. Fairbrother analyses their biodiversity and wildlife mobility, whilst also considering the design potential for other benefits, such as visual screening and favourable micro-climates (Fairbrother, 1970 p.278-279).

McHarg's seminal '*Design with Nature'* (1969) argued for a strategic and holistic approach to landscape planning. Nevertheless, Kambites & Owen (2006 p.483) note that with the exception of pioneering work in Warrington and Milton Keynes New Town Developments, their central message seemed largely ignored until the start of the new millennium which saw renewed advocacy for GI. McHarg urged urban designers to: "*evaluate and incorporate natural factors such as topography, drainage, natural hazards, and microclimate into their plans, rather than overcoming such constraints through technology-, often at great cost and with uneven success*" (Platt, 2006 p.318).

McHarg (1997) describes the difficulties in bringing together and applying ecological principles and information to the city, due to the perceptions and goals of ecologists. He describes the situation of ecologists seeking the wildest environments, and avoiding the inclusion of human impacts of the environment within research into animal and plant behaviour, as *"a poverty of human ecology*" (McHarg, 1997 p.188).

McHarg (1969) noted that an objective basis was needed to reinforce the link between environmental components, and health and pathology. McHarg highlights experiments on muskrats by Christian, who found that stress and social pressures, manifesting in stress diseases, were induced and increased by increasing numbers and density. In his own studies on people, he spatially mapped the incidence of 'per 100,000 population' of eight factors of physical disease and also social diseases (crimes and addictions) in Philadelphia, USA. The highest occurrences of these were concentrated in the city centre. The pattern of 'mental disease' was more diffuse, although there was still preponderance towards the city centre (McHarg, 1969 p.188-194).

6.4.2.2 Modern GI and statutory requirements

Shifting Functional Emphasis of Green Networks

Initially, the key considerations of GI were the social and ecological benefits, as discussed in the previous section. Nevertheless, the first modern European and national regulations promoted GI solely from a wildlife perspective. At a European level, the value of networks for nature conservation had been stressed as important (Barker, 1998 p.17). The European Directives and Natura 2000 Network are covered in *Section 4.7.1*.

Local planning departments - strongly influenced by regulations, initially promoted GI due to the ecological connectivity requirements for wildlife (with secondary social benefits, if mentioned) following the European regulatory cues. Nevertheless, the general development outcomes and local planning policies present at the time, illustrate the placement of low initial importance to this in planning and political spheres - in comparison to say economics. Therefore, the case for GI had to be strengthened. A report on green networks by English Nature observed: *"By serving a wide variety of environmental, ecological and societal purposes multifunctional green networks are readily defensible"* (Barker, 1997 p.25).

Current Definition

There are many definitions and interpretations of GI. Simpson (2008), an environmental lawyer, notes that perhaps two of the most legally significant definitions in England, are those found in Planning Policy Statement 12 (PPS 12); and 'The Essential Role of Green Infrastructure: Ecotowns Green Infrastructure Worksheet' (TCPA, 2008).

Natural England's definition of GI repeats the same points made in PPS12:

'*Green infrastructure is a network of multi-functional green space, both new and existing, both rural and urban, which supports the natural and ecological processes and is integral to the health and quality of life of sustainable communities'* (Natural England, 2009a p.7). Nonetheless, it additionally highlights the need for networks "*comprising the broadest range of high quality green spaces and other environmental features*" and the connection between urban built environments and their wider rural hinterlands, which should be delivered at all spatial scales (Natural England, 2009a p.7).

Rebranding and Multi-functionality

Historically, GI has been defined as providing a number of functional benefits, such as: surface water run-off flood attenuation, wildlife value, amenity value, commuting, and economical uplift in urban areas (as described in *section 6.4.2.1*). The last decade and a half has seen increasing importance placed upon GI multi-functionality, through recognition in policy and government documents. QUANGOs (quasi-autonomous non-governmental organisation), such as English Nature, began documenting and publicising the multifunctional and social benefits linked to GI in efforts to raise the status through linkage to the politically higher valued social benefits. George Barker's (1997) report for English Nature (now Natural England): 'A framework for the future: green networks with multiple uses in and around towns and cities', critically highlighted that where green networks serve a variety of beneficial functions, supported by 'evidence', they are less likely to be challenged because their values are likely to be respected by a wider audience (Barker, 1997).

The term 'GI' first came into prominence in the UK, following the work of the American President's Council on Sustainable Development (PCSD) in 1998, which was assimilated by the UK Urban Task Force and the Department for Environment, Transport and the Regions' (DETR) proposals' for Urban Renaissance in 2000 (Mell, 2008). This new term assimilated previous terms, such as: green networks, green corridors, wildlife corridors, green grid, stepping stones, and green links. This 'rebranding', which is now nationally and internationally recognised, served several purposes. Firstly, to rationalise the varied nomenclature; and secondly, to embed the needs of the natural environment into early strategic consideration, similar to 'grey' infrastructure, which had long enjoyed such consideration; and thirdly, to mark a change in understanding of these networks, to a more 'utilitarian' approach.

Thompson (2002 p.62-63) highlights the resemblance between the Urban Task Force's report and older conceptualisations, such as Ebenezer Howard's garden city models and Patrick Geddes' ideas. *"It seems that, despite all the rhetoric, we have not moved very far in the last 100 years in our ideas of what urban masterplanning should be".* Certainly, innovative design examples are still lacking, particularly those incorporating biodiversity values. Innovation is needed at a strategic visionary level, as *Chapters eight* and *nine* 'Study one' discuss.

Goode (2006) suggested the provision of new government guidance, in order to emphasise GI benefits, particularly in terms of the ecological services, and the demonstration of urban design and planning best practice. Goode calls for the promotion of the multi-functionality of greenspace,

and specifically notes: climate, water management, biodiversity and health. Goode also calls for an integrated, cross-cutting approach, and adequate coverage of these ecosystem services within planning guidance – which is not seen currently (Goode, 2006).

Most recently, GI has additionally been seen as a tool in adapting to climate change. In paragraph 24, in a section titled: 'Selecting Land for Development', the Climate Change Supplement to Planning Policy Statement 1, lists some of the contributions of new and existing GI to climate change. These are: "urban cooling, sustainable drainage systems, and conserving and enhancing biodiversity;" (DCLG, 2007e p.19). GI has also gained particular emphasis through links to the health agenda and economics (links to the health agenda and economics will be discussed in greater detail in *section 6.4.3*).

GI Remit

There are many organisations with GI remits. However, the main organisation responsible for GI in England is Natural England (NE), now that the former Commission for Architecture and the Built Environment (CABE) was abolished in 2010.

Natural England was advised by independent evaluators to take the lead role as national advocate for GI (Natural England, 2009b p.11). Building upon the success of the 'Vision for the Countryside In and Around Towns' (CIAT), which was developed by a partnership of: the Countryside Agency, Groundwork, the Forestry Commission, English Nature and DEFRA's Rural Development Service; Natural England aligned the work of the CIAT and GI, under their Sustainable Communities Project (Natural England, 2009b p.5).

From a wildlife perspective, Natural England recommends the following: adequate consideration of designations and BAP habitats or species; reversal of habitat fragmentation by creating new wildlife corridors to link existing sites; creating new habitats, relieving pressure on existing sites and achieving the ANGSt standards (discussed below); provide 'naturalistic' management through an integrated nature and landscape management plan; native and local provenance plant materials; and providing nature related educational resources for children (Natural England, 2009a p.62).

CABE was influential through their web resources, which are widely used by a range of planning and built environment professionals. Since CABE's establishment however, there had been a

surprising lack of GI and biodiversity guidance, or case studies for urban areas within their online resources, up until the last two years. CABE's launch of their 'Grey to Green' campaign in Nov, 2009, marked a changed level of focus.

Supportive National Policy

Simpson (2008) promotes creatively using existing policies and legislation, in the support of GI, whilst pointing out that there is currently very little statutory under pinning of GI, and no specific statutory requirement for GI policy. Simpson (2008) believes "*there really ought to be a specific duty or piece of legislation in place*", yet described a number of pieces of legislation, which could be linked to GI, such as: the 'Small Holding and Allotments Act 1908', due to particular aspects of GI.

The delivery of multifunctional GI is supported by national planning policies, which act as 'tools', rather than anything robust. These supportive policies act as presumptions in favour of development, which benefit GI. The key policies are summarised in 5.3.3.2, Some are due to be revised with a new policy (See *Appendix 2.3*).

Natural England's Accessible Natural Greenspace Standards (ANGSt) aim to address the spatial distribution of natural greenspace. The standards recommend that people living in towns and cities should have an accessible natural greenspace of: at least 2 ha in size within 300 m from home; at least one accessible 20 ha site within 2 km of home; one accessible 100 ha site within 5 km of home; and one accessible 500 ha site within 10 km of home; plus, Statutory Local Nature Reserves at a minimum level of 1 ha per thousand population (Natural England, 2009a p.51). These ANGSt standards are especially important for tackling the disassociation from nature in cities, discussed in the urban biodiversity chapter. For instance: "*There is overwhelming evidence that having the chance to play outdoors in relatively natural surroundings as a child is the biggest factor in developing a concern for the environment as an adult. How we reconnect adults is more challenging"* (BBC News, 2010b p.1).

6.4.3 Linking Biodiversity to Stronger Agendas through GI

6.4.3.1 Key agendas associated with GI

The importance of GI multifunctionality has been discussed in *section 6.4.2.2* This section discusses the more recent links to the health agenda and economics, which are receiving greater interest in academic spheres and research funding programmes.

This increased linkage of GI, human health, economics and ecosystem functions, is perhaps largely due to the connections made between both the highly respected global research document: 'The Millennium Ecosystem Assessment' (MEA, 2005); as well as the UK Government research report: 'The Stern Review' (Stern, 2005). Further academic literature concerning links between urban ecosystems and human health; have been reviewed by others – with a fairly comprehensive account being provided by Tzoulas *et al* (2007). Tzoulas *et al* (2007) highlight the importance of providing a coherent planning entity for GI through this review and discusses established theories of psychological well-being and reduced recovery periods for patients.

Regarding the health agenda and GI, another influential piece of work, is that of Louv (2005), who coins the term: 'Nature Deficit Disorder' and also reviews a number of research documents. Louv (2005 p.105-107) explains that although attention-restoration theory applies to everyone, regardless of age, it is particularly evident when studying children with attention deficit disorders and greenspaces. He discusses several studies involving children and improved cognitive-function with changes to greener environments; with the greener the setting – the greater the relief. Conversely, Louv (2005 p.156) also discusses attachment theory, where the protection of nature, at least partly, depends upon: *"the quality of the relationship between the young and nature – on how, or if, the young attach to nature*", thereby illustrating a positive feedback system: where nature benefits the health of humans, and those humans benefitting from nature, in turn, learn to protect nature.

Regarding the reasons for biodiversity being linked to the economy, this has been discussed in the urban biodiversity chapter (*section 4.6*), and the planning and governance chapter (*section 5.4*). Economical issues specifically related to GI are also discussed in *section 6.4.4* of this chapter.

6.4.3.2 The advantages and disadvantages of other agendas

Promoting biodiversity benefits by linking to other agendas, is important to this research, because it influences the prioritisation of biodiversity and local political decisions, as well as public perceptions of the issues, legislation, policies, and funding. This in turn, affects requirements and incentives for developers, to provide for biodiversity on individual sites. Additionally, it will also affect the design, implementation, and management details of GI spaces and features, dependant upon which agenda receives the focus.

The previous section discusses why biodiversity is being increasingly linked to the health and economy agendas. The advantages of doing this are that where, or when, biodiversity has low prioritision, the links to the economic and health benefits will strengthen the biodiversity arguments. This occurs in practice all of the time. For instance, Thompson (pers. comm, 2010) - an Ecology Manager in a LA - stated that: "*funding was initially declined for rare invertebrates, but a project which will assist invertebrates and is linked to health, has been approved. This seems to be due to political perceptions of what tax payers are happy to pay for*". Whilst this instance related to a publicly funded project implemented by the LA, it also reflects the researcher's own experience - with priorities for private developers. This is due to the same political priorities affecting the balancing of different planning policies, which are involved in gaining planning consent.

Despite the benefits, caution should be exercised in linking biodiversity 'too heavily' to other agendas. The researcher believes that by doing this, it 'could' and 'is' weakening biodiversity's 'own' agenda further - by losing its own 'voice' in submission to already 'louder' agendas. There is also a further issue to consider with multi-functionality: *"The trouble with multi-functionality, is that it runs the risk of achieving no great benefit to anything, as it tries to be 'too' multifunctional*" (Thompson, pers. comm, 2010).

There are now numerous examples in practice where the total loss of biodiversity as an agenda, or even a consideration in its own right, is now evident. Two such examples, within prominent documents follow:

1) In a regional GI document, endorsed by Peter Neal of CABE Space, where he states: "*it is important that strategic networks of green space are defined at the outset of development to maximise their functionality and environmental value…."* The important standard requirements of GI, which relate to amenity, recreation and additional features, are then listed. However, biodiversity is not included (RNRP, 2007). Also within this document: The River Nene Regional Park (RNRP)'s regional GI best practice guide (RNRP, 2007); general GI strategy guidance is provided, and a description for aspirations for strategic GI studies is given. Notably, the document makes several references to the national planning policy: PPG 17: Planning for Open Space, Sport and Recreation. Yet, it does not mention PPS 9: Biological and Geological Conservation. (RNRP, 2007).

2) EQOL (2005) (Milton Keynes and South Midlands Environment and Quality of Life Sub Group), summarises sixteen regional GI case studies, which have achieved different benefits (named 'principles' in the document). These benefits range from 'sport and recreation', to 'historic environment'. Wildlife permeates the document as a vague concept, and the biodiversity examples are associated with non-urban habitats e.g. a local nature reserve. In contrast, a case study regarding 'urban greenspace management' focussed on recreational amenity; and a 'design' case study did not list biodiversity anywhere amongst the thirteen urban design principles within the development brief.

These two examples are indicative of a wider problem, as many further examples have been found. Whilst biodiversity omissions in strategic documents maybe accidental, they illustrate a response to a lack of prioritisation. Omissions are likely to influence readers, who may also dismiss biodiversity. The results of a public attitude survey to biodiversity were published by DEFRA (2011 Table 2b). From this survey, the level of thought given to loss of biodiversity in the UK, 2007, 2009 and 2011, seemed relatively low, with 6-7% answering 'a great deal'; 14 – 25% answering 'a fair amount'; 25 – 40% answering 'a little' and 32 – 49% answering 'none at all'. Relating to non-published information from his same survey, it was reported: "*Recently, members of the public were asked what biodiversity is. The most common answer was "some kind of washing powder""* (BBC News, 2010b). Whilst the humour can be appreciated on the one hand, it is also very concerning on the other. The researcher believes that, whilst there 'are' multifunctional benefits, it is imperative that not only does biodiversity find its own 'voice'; but that it must be more proactively publicised. After all, the European Directives are clear that GI is to be established for wildlife connectivity.

The biodiversity agenda must be considered in a social theory framework of reflexivity – where the circular and bio-directional relationships of 'cause and effect' are considered. As Beck (1995 p.124) surmises: *"Cultural outrage selects among the "objectively" most urgent urgencies, and this selection is not guided by the damage but by cultural symbols and mass-media information"*. It is therefore imperative, that biodiversity needs to be re-prioritised as a 'key' element of GI, or it will become a 'lost' issue in major development schemes.

6.4.3.3 Evidence base of GI value for wildlife and biodiversity

One of the problems with re-prioritising biodiversity is the contradictions in scientific research, which weakens the case for biodiversity implementation.

For instance, Barker (1997) noted an over-emphasised need, by nature conservationist strategists and hence development plans, for continuous linear wildlife corridors. Barker believed this to be at the expense of close 'stepping-stone' habitat patches, which maybe as effective for many species, especially in disturbed urban areas. In Tzoulas *et al's* (2007 p.8) review, they note that "*Only a few empirical studies have shown the successful role of ecological corridors as conduits for wildlife"*, which has led to contested functionality of GI as ecological networks. However, GI has become a popular element of urban planning, due to the absence of any alternate strategies to address habitat fragmentation (Tzoulas *et al*, 2007 p.8).

Based on extensive practical experience, the researcher of this thesis understands that there are also many species, which find travelling between patches difficult, or impossible, within urban environments (either physically, or due to predators, or human disturbance). Therefore, GI is essential in maintaining viable populations and genetic health. Smaller individual, yet interconnected spaces, can collectively support populations normally associated with larger areas. For example: national wildlife surveys, conducted by the RSPB and others, confirm that for species such as: hedgehogs, frogs, songbirds and butterflies (to name a few), urban GI is now essential (CABE, 2009b).

A greenspace research review was undertaken by 'Greenspace Scotland' regarding the Scottish and UK evidence bases for five themes: 1) health and wellbeing; 2) social and community value of greenspaces; 3) economic value / impacts of greenspaces; 4) environmental value of greenspaces; and 5) planning and design. The report found that evidence bases for all five themes were increasing - especially 'health and wellbeing'. Nevertheless, surprising gaps existed within three areas, two being relevant to this research topic –'biodiversity values', and 'ecological connectivity in urban greenspaces'. The review concluded that these 'gaps' maybe due to a lack of 'robust evidence' - published in reputable sources, rather than a lack of evidence per se (Greenspace Scotland, 2008).

6.4.4 Major Developments and the Economic Value of GI

Section 5.4.3.1 lists the other relevant biodiversity and economics sections within this thesis. This section however, focuses specifically upon GI economic value, and as VALUE (2010 p.28) reports: "*Research on the impact of green infrastructure, especially in urban areas, has a broad historical tradition in economic literature. A wide range of analyses focuses on the relationship between utility, WTP [Willingness To Pay] and the development of open urban spaces*" (VALUE, 2010 p.28).

Early hedonic analysis was conducted by Olmsted during the construction of Central Park, New York, which showed economic uplift of properties associated with the park (see *section 4.7.3.4*). The Community Forest (2008) also highlights the 1970's advertising campaign for Milton Keynes, which *"recognised the importance of greenspace for selling development, due to an increased attractiveness to potential residents".* A growing body of evidence - related to the correlation between increased property values and increased GI features, due to quality of life benefits, has been noted (Community Forest, 2008; Rushe, 2010). In recognition of the importance to 'quality of life' the 'Barker Review of Housing Supply' (Barker, 2004) recommended that 10 % of its support for housing infrastructure should be allocated to GI projects.

Furthermore, a report titled 'Eco Chic or Eco Geek' by 'Sponge' (a sustainable development network) found that home buyers are willing to pay more for environmental features "*both upfront and in use*" (Masero, 2007 p.34). Sponge (2006) commissioned 'Ipsos MORI' to undertake the sustainability survey, in which 501 householders were quantitatively surveyed, in addition to qualitative methods. They found that: "*Home owners expect developers to build to high environmental standards, over half (52%) are prepared to pay more to, but nine out of ten people also think that the Government should provide incentives to encourage demand*" and "*Two thirds of homeowners would be prepared to pay a monthly charge for sustainability services*" (Sponge, 2006).

Yet, economics related to GI are not only related to individuals 'willingness to pay' - which affects property value increases, or to 'creating settings for investment', which are of obvious interest to developers. GI can also have positive local and national economic benefits through the provision of services, which would otherwise be very expensive to provide through non-natural means. For example, for a regulating service of water purification, an economic study was conducted in Europe, which illustrated that making a river more natural had a €3.8million yearly benefit (Liekens, 2010). Furthermore, KWT (2010a) cite the Cabinet Office Strategy Unit's report (2002) - '*Game Plan: a strategy for delivering Government's sport and physical activity objectives'*, which

states that: "*Provision of well-planned green infrastructure will offer many opportunities to reduce the cost of physical inactivity to the UK economy. Savings have been estimated at £8.2 billion in the UK, (£1.7 billion to the NHS, £5.4 billion in work absence and £1 billion in early mortality)*". Examples such as these, form part of the evidence base to support LA and central government funding, or for providing financial incentives for developers (as it makes good economic sense in terms of government responsibilities, in addition to developers' and shareholders' profits).

Despite the global recession and the UK government's spending cuts, which were announced in the 'Comprehensive Spending Review' in October, 2010; environmental economists remain optimistic about what this could mean for GI: "*The economic recession and social implications give weight to economic research into GI*" (Allin, 2010). Indeed, the Comprehensive Spending Review also listed 'flagship green projects', as an area of investment (HM Treasury, 2010). A large body of work is being conducted to see how a 'greener economy' could succeed, and as Juniper (2010) highlights: "*Social scientists are also beginning to better understand how the human psychology that so readily lends itself to consumerism might be harnessed instead for sustainability*". It is the personal view of the researcher that developing a better understanding into this area, could lead to greater socio-ecological resilience of both GI and individual biodiversity features.

A number of research projects have, or are, looking into the economics of GI. The Natural Economy Northwest £3million, three year programme ended in December 2009 – a partnership led by Natural England, the Northwest Regional Development Agency and SITA Trust (Natural Economy Northwest Programme, 2009). The 'VALUE' Project - a transnational European Collaborative project, describes the existing economic valuation tools for GI. It also analyses the development of different valuation tools between academics, practitioners and stakeholders and the design and management of GI investments through the use of several collaborative partnerships and the use of case studies in a range of European Cities (VALUE, 2010).

The VALUE repot (2010 p.28) report notes that results significantly differ depending on the spatial scale and research methods. The techniques used to determine economic value of GI are also changing rapidly, but tend to be related to 'quality of life' and 'quality of business environment', and are assessed using 'Cost Benefit Analysis' (CBA) tools. CBA is*: "an economic valuation method used to assess the economic return of a project to an investor*" (VALUE, 2010). The VALUE report lists the techniques and methods to value GI through a 'CBA Toolkit', which is summarised here:

1) Revealed Preferences Approach (observing actual consumer behaviour – based on 'real' market prices);
2) Stated Preferences Approach (measuring peoples' intended future behaviour, e.g. through questionnaires. This is the most common CBA used at the local level);
3) Cost-based Methods (if there are no market prices and no established demand-curves, then approaches based on the lack of the service/product are utilised);
4) Benefit Transfer (the application of results obtained from a particular case to another area);
5) Revealed Preferences Techniques (which focus on Hedonic Price Methods - 'HPM' which are very relevant to the economic valuation of urban GI, especially the estimation of its impact on real estate prices, as property prices are value indicators) (VALUE, 2010).

The difficulties with CBA's are that they rely on assumptions due to uncertainties, and often the monetisation is problematic (VALUE, 2010; Liekens, 2010). Nevertheless, the findings of these research projects and similar projects which investigate the economic value of GI are essential to increase prioritisation, incentives and implementation. Thereby influencing and assisting developers and their agents to design, plan, implement and manage effective GI and other socio-ecological features of development, which maximise biodiversity potential.

PricewaterhouseCoopers, a multidisciplinary international firm, undertook economic research for CABE, with regards to local government funding for GI. Using spending figures for 2008/2009, which listed LA spending on Grey infrastructure as £7.2 billion, in comparison to £1.1 billion on parks and open spaces, they surmised that a 0.5% shift from grey to green investment, would entail a 141% increase in LA green expenditure (CABE, 2009c). Despite being a basic calculation, with many potential variables as to what would make positive improvements upon the ground, it is nonetheless an important economic indication - illustrating the impact of a slight shift in LA budgets (provided the extra green finance is directed to GI implementation an management, rather than some other form of parks maintenance).

6.4.5 Practical Implementation and Mechanisms

6.4.5.1 Intention of procedural GI case studies

Major developers increasingly need to work with other development stakeholders to agree GI during the early stages of their development proposals (preferably at inception). Those better prepared for this, are more likely to find success in securing planning permission and successful schemes (for reasons explained in the section above), and have residential and/or commercial units which are promptly sold, or let i.e. 'reduced voids'.

There is no single GI strategy which can be held up as an exemplar model to follow, as all local areas operate under different circumstances; and a comprehensive GI review has also not formed part of this research. Nonetheless, several GI endeavors have been encountered, which illuminate particular successful elements: GI contributions; GI Delivery Plans; and GI Partnerships. These elements could, through further research, including more detailed epistemological studies and examples, form a future practical framework for GI on large major development sites. In addition to these examples, the Thames Gateway and Eastern Quarry case studies (*chapters seven* and *eight*) also discuss strategic aspects of GI.

Now, we will first look at GI contributions, then a delivery plan (for Norwich), then GI partnerships, and finally some photographic examples of successful GI in major cities.

6.4.5.2 GI contributions

A number of LA's began to develop and apply calculations for contributions from developers for GI during the planning application stages (via planning obligations and Section 106 agreements), prior to the 'Community Infrastructure Levy' (CIL), and Milton Keynes was a forerunner in this (DCLG, 2008a; Kitson, pers. comm, 2008). The CIL came into force in April 2010 and there has been some progress on guidance for the new levy (DCLG, 2010a). Nevertheless, uncertainties still prevail, with the Landscape Institute warning that the government's review of planning obligations will cut funding for green infrastructure (Morris, 2010).

Developer contribution and calculation methods are likely to evolve over time with application experience, more sophisticated guidance, and access to successful case studies. Findings from economic research described in the previous section could also inform such developer contributions for GI. We will now look at two different practical approaches for GI contributions: Mid Bedfordshire and Dudley.

Mid Bedfordshire

In personal communications for this research, Kitson (pers. comm, 2008), the GI officer for Mid Bedfordshire District Council (MBDC), describes how MBDC wanted to develop a new approach to GI contributions at the same time as publishing their Local Development Frameworks (LDFs are explained in *Chapter five* 'Planning and Governance'). MBDC's approach to funding, defined a tariff for each house being built, with negotiated contributions still being required through

commercial development. This means that depending on the location and size of the development, the developer contributes a predetermined amount of money (this is similar to 'open space' contributions for play and open space, which have been collected from numerous LAs over at least the last decade).

A strategic GI plan exists, which informs calculations of GI contributions, allowing a GI 'cost' per residential unit, which is then levied for each new development (Kitson, pers. comm, 2008; MBDC, 2008). How MBDC uses money derived from the contributions will be discerned through a local level GI plan, which will identify GI priority areas to help in prioritising funding directions: "*The beauty of the MBDC approach is that it is not restrictive; the money can be spent wherever and whenever (broadly speaking)"* (Kitson, pers. comm, 2008).

Kitson, (pers. comm, 2008) explains that the capital generated from standardised planning obligations would be for 'off-site' investment – providing a blanket approach (with no spatial differentiation). This provides developers with certainty that they are more likely to accept than with previous GI negotiations - where there was no baseline requirement. 'On-site' requirements will still be negotiated on an individual basis [with spatial differentiation], as part of the normal planning application process, so sensitive sites will still need to meet the requirements of planning policies and regulations, and may include items such as vegetated roofs; but the planning obligations figure provides the starting point (Kitson, pers. comm, 2008).

Dudley

During personal communications, Preece (pers. comm, 2009), the Ecological planner for the LA in Dudley, described a specific 'biodiversity' contribution for developers in the LA. The contribution was set at a low standard tariff: 50 pence per m2. This equated to £3,300 for a commercial retail development 'Lidl'. This contribution is a positive progression in achieving financial support for biodiversity improvements, especially as the contribution is expressly for 'biodiversity' (Preece, pers. comm, 2009). However, it is likely that this contribution calculation may require refinement in the future, to reflect land value, development value, and site sensitivity or land-use (as 50 pence per m2 may be too low in some instances).

6.4.5.3 Norwich delivery plan

Having a delivery plan, which consolidates previous work, provides an agreed vision, and indicates responsibilities, is critical for achieving early consideration and successful GI. The Greater Norwich

Delivery Plan (GNDP) consolidated and built upon a number of previous local GI projects, such as: a GI Study for the joint Core Strategy area (2007), the Norfolk Biodiversity Information Service Mapping Project, the Norfolk Ecological Networks Study, and the Green Grid Project in Norfolk City; whilst recognising and considering the major GI opportunities in the growth areas (Horlock, pers. comm, 2010; The Landscape Partnership, 2009; GNDP, 2010).

The plan covers a range of issues and is prescriptive where necessary, e.g. for funding requirements; providing a four-themed vision (theme 2, being 'Making space for wildlife'); detailing a governance strategy; providing a standardised monitoring approach to identify the relative values and progress of GI projects; and suggesting demonstration projects, community engagement, and maintenance mechanisms (The Landscape Partnership, 2009).

Yates (2010), who is responsible for the delivery of the plan and partook in personal communications for this research, describes the setting up of a GI Steering Group to help co-ordinate GI delivery within Greater Norwich. The main developers are represented on the Steering Group, along with LAs, statutory environmental agencies and interested wildlife NGO's. Yates (2010) believes that this should ensure that when planning applications are made for the major development areas, the GI elements will be well-considered and will fit into other GI plans for the surrounding areas.

Horlock (pers. comm, 2010), the Biodiversity Information Officer for the Norfolk Biodiversity Information Service, is involved in the evidence base for GI work and also participated in personal communications for this research project. Horlock (pers. comm, 2010) stated that although he was unaware of any specific GI aspects identified in S106 planning policies at present, a 'roof tax' similar to Bedfordshire's example to implement GI was under consideration. Horlock (pers. comm, 2010) also mentioned that the growth point funding, for a locally proposed eco-town (Rackheath) had been reduced, due to a lack of biodiversity prioritisation.

Thompson (pers. comm, 2010), the ecology manager at Norwich LA, is dealing with ecological advice for the Rackheath Ecotown and was contacted for this research regarding the financial aspects of GI. She confirmed that Broadlands were given £16 million of funding from central government (DCLG) for the ecotown; and much of this will go on carbon reduction and Sustainable Urban Drainage Schemes (SUDs). £250,000 has been ring-fenced for biodiversity and attempts will be made to use this to attract other funding, such as forestry commission grants for

woodland planting. Some of the biodiversity funding will go towards buying land for woodland and the rest will be put into a trust, to create revenue towards management (Thompson, pers. comm, 2010). Having a formal delivery plan will assist in illustrating to others, where all of the smaller projects and pots of funding fit together to deliver a central vision.

This example illustrates the importance of prescriptions and delivery plans to provide confidence and clarity to a range of stakeholders where different strands of GI work are being undertaken and require funding.

6.4.5.4 GI partnerships

GI Partnerships generally

Pro-active, spatially specific regional, sub-regional and local partnerships, are also critical components for successful GI. Several long-term partnerships have greatly assisted in increasing and enhancing GI. These partnerships have built momentum, raised local expectations and expertise, and often attracted significant funding too. Organisations involved in the 'River Nene Regional Park' (RNRP) - East Midlands, illustrate one such collaborative partnership. Whilst *section 6.4.3.2* refers to this case as an example of low biodiversity prioritisation; the RNRP has had great strategic and detailed success as a partnership organisation. The RNRP has involved academics and practitioners in information feedback loops; achieving various environmental character studies and GI strategies - which are to be mirrored in the wider Growth Areas (Phillips, pers. comm, 2008; RNRP, 2008; WNDC, 2008).

GI North West Partnership

The North West GI partnership in Merseyside and other parts of the North West is one of the most prominent and long standing examples of a GI partnership. This partnership significantly raised the local political profile of GI and created GI stimulus - through approaching the health of the whole system at a strategic level (ALGE, 2008; Barker, 1997; CABE, 2010) and further information can be found through their URL address (www.greeninfrastructurenw.co.uk). 'Operation Groundwork' in St Helens began the strategic greening initiatives in the early 1980's, and kick-started long-term capacity building (CABE, 2010). Further to this, two Community Forests were designated in the early 1990s, which facilitated change at the landscape scale (CABE, 2010). The Forestry Commission and NWDA's £59 million 'Newlands' programme aims to reclaim large areas of derelict land as community woodland. The programme is led by a regional partnership board of stakeholders and the private sector (CABE, 2010).

The funding and targeted investment by LAs and regional agencies, which attracted national and European funding - led to substantial regional capability to advocate for GI, which now includes:

- developmentally mature enabling organisations
- an environmental regeneration skills base
- intellectual activity in the region's universities
- an evidence based approach to site selection
- ready access to advisory services
- the provision of capital and finance
- socially inclusive strategies
- support for business-led activity (CABE, 2010; ALGE, 2008).

Success was also achieved through embedding GI into regional planning - through policy advocates; placing a regional value on GI (through economic GI research work, co-ordinated by: 'Natural Economy North West' (2009), which persuaded regeneration agencies to back GI; and, by advocating GI through consultation and marketing to produce a GI receptive environment (CABE, 2010).

From this example it is clear that successful partnerships have undoubtedly influenced the success of GI. For individual major developments such partnerships are also important in terms of resources, such as guidance, expertise and potential funding. Future economic research into GI should not underestimate or overlook the inclusion of GI partnerships within their CBA of local GI; as significant funding can be attracted into a local economy through a successful GI partnership. The Riverside Stewardship Company (a sustainable social enterprise) in Sheffield is another such example. This latter partnership draws upon so many other local organisations, that they have been very successful at attracting grants and European funding, such as Interreg (Horby, 2010).

6.4.5.5 Photographic examples of successful GI in major cities

Figure 8: 'The High Line' Manhattan, New York, USA (Photograph from www.thehighline.org)
*This strategic GI route was realised through a community group, who fought against the original proposals to demolish the old freight route, which ceased operation in the 1980's. The High Line Park was opened in 2009 and has gained extraordinary political, community and business acclaim since (*Thehighline, 2010*).*

Figure 9: The Green Bridge at 'Mile End Park', Tower Hamlets, London, UK (photograph by CABE)
The Green Bridge, designed by Tibbalds, TM2, is 25metres wide and contains: mature trees, cycle and pedestrians routes. It links two parts which were previously separated by a busy road, and incorporates shops within its structure. The "laying a green carpet over five lanes of traffic below, announcing the park to 75,000 drivers who pass under it daily" (CABE, 2006a)

Figure 10: 'Prommenade de Plantee', Paris, France. Planted aerial walkway along previous railway line route (photograph by Helen Barber, 2006).

Formal planting arrangements, including water features, public art and commuting for people (work, tourists and recreation), birds and invertebrates. It was built in stages from 1988 and incorporates most of the old railway infrastructure. It was designed by architect Philippe Mathieux and the landscape architect Jacques Vergely and incorporates different environments along the promenade by formal planting, whilst also allowing spontaneous vegetation to colonise and be preserved (Furiani Pedoja, 2000).

Figure 11: 'Cheonggyecheon River Restoration' Seoul, South Korea (Photograph taken in 2008 and published on Wikipedia)

One of the key campaign promises of Lee Myung-bak, when he was elected Mayor of Seoul in 2001, was to remove the freeway (which recovered the river) and restore the Cheonggyecheon River, which was completed in 2005 (preservenet, 2009). *The restoration project was seen as an important vehicle for improving the urban ecosystem and environment within Seoul, and promoting greater city competitiveness in the global market* (Len & Yuan, 2007).

6.5 CONCLUSION

A greater unification of social sciences within urban ecology is necessary if we are to overcome the current barriers to maximising biodiversity in development schemes, and foster greater appreciation of the benefits of biodiversity through ecosystem services.

Enhancing socio-ecological resilience can also be a powerful tool in increasing understanding, tackling current barriers, and promoting the relevance of 'quality of life' politics and new methods of measuring the success of cities and countries (e.g. competitive green cities – discussed in *section 4.3.2.2*). How socio-ecological resilience may be fostered and capitalised upon to protect, enhance and manage biodiversity features and spaces, requires further investigation, as *Chapter nine* will reinforce.

Furthermore, this chapter has explained the trade-off, which exists between the promotion of multi-functionality (in order to raise the prioritisation of GI); and the decrease in value and focus of GI for biodiversity issues (with biodiversity becoming a secondary incidental benefit - contrary to European clarity on the 'wildlife' function of GI). The researcher of this thesis also has previous direct experience / action research of this occurring through involvement in specific development projects and local policy formulations. The results of this trade-off will be further discussed in *Study one, section 9.6.2*. Study one also explores the specific socio-ecological resilience issues related to the very large major developments / mega-developments (see *section 9.3*).

GI and 'quality of life' and 'quality of business environments' are likely to become an increasingly important consideration for major developments at all development lifecycle phases. This will be in response to recent advances in understanding, regarding the economic and health agendas; in addition to the recent promotion of ecosystem services and human benefits within our increasingly urban environments - depicted within this chapter. Therefore, it is essential that biodiversity value, priority, and presence within GI, is reasserted and incorporated into these schemes. This will require input from central and local governments, as well as understanding and appropriate skills sets by actors involved in the developments themselves.

This chapter provides a form of guidance for practitioners, through the practical case study examples (s*ection 6.4.5),* which identify some of the key consideration for gaining successful GI, e.g. partnership structures; delivery plans; contribution calculations and funding. The funding of GI is a particular conundrum. In part, individual developers and local businesses should have a

duty to protect, enhance and increase GI related to their own sites. However, there also needs to be better investment in GI by government (central, local, and quasi government organisations, such as development agencies). Successful partnerships can also attract funding streams however.

Finally, to address the related remarks of Beck (1995) discussed in *section 6.3.2* (regarding the engagement of society, media and politics); society, politics, and institutions should be assisted in reasserting biodiversity prioritisation. Thus, lending weight to the biodiversity agenda, and reversing any negative stereotypes relating to 'quality of life' through images and case studies promoted through the media, to illustrate the opposite (i.e. an increase in quality of life). This offers a solution to the opening quote of this chapter by Foucault (1994); because promotion of successful images, case studies, and research, can change 'the production of truth'.

Not all major developments are in positions to be involved in a strategic scale of GI provision, enhancement, or management. Nevertheless, they 'can' contribute through smaller scale opportunities, e.g. urban hedgerows, individual green walls, green roofs, planting and water schemes - to name a few. The cumulative impacts of smaller scale elements can be significant for linking habitats; which provides opportunities for insects, small birds, and mammals to commute between habitats – with less exposure to predators or human disturbances; and for plant species to become successfully geographically dispersed. Contemporary urban biodiversity images, which provide these functions, are multiplying. Although innovative designs are still rare (further discussed in *Chapter nine* 'Study one – Eastern Quarry2' and *Chapter ten* 'Study two').

Nevertheless, it is the strategic images which capture the hearts and minds of the political, economic and institutional regimes, which are necessary to change the perceptions and focus of society at large. Whilst there may still be a general lack of innovative design and management solutions for GI and biodiversity within large urban developments, we do have several highly successful schemes around the globe, in which to draw upon. Several successful and strategic urban GI solutions are illustrated in striking images and noted in *section 6.4.5.5*.

The circulation and promotion of positive images and case studies within the media and institutional regimes, is one possible solution to one of the key obstacles in maximising urban biodiversity within major development schemes: 'prioritisation'. Prioritisation is discussed throughout the thesis, and investigated in greater depth within the following 'Study one' (*Chapters seven, eight* and *nine*).

7 PREFACE TO STUDY 1: THE CASE OF THE 'EASTERN QUARRY' (EQ2) MEGA-DEVELOPMENT, SET WITHIN THE CONTEXTUAL BACKGROUND OF 'THE THAMES GATEWAY' ECO-REGION

"embarking on the type of spatial strategy making that makes a difference is no easy enterprise. It is both an art and a craft. It has elements of both scientific analysis and of design science, but also involves a sensibility that is not cultivated in either" (Healey, 2009 p.453).

7.1 INVESTIGATION AIMS FOR STUDY 1: THAMES GATEWAY AND EASTERN QUARRY

As the largest regeneration area in Europe (CABE, 2009d; Farrell, 2009 p.6) and the largest UK mixed-use mega-development at the time of gaining planning consent in 2007 (Dartford Borough Council, 2009), the Thames Gateway and Eastern Quarry (EQ2) illustrate the strategic frameworks which all other major developments must also fit within, to equal or lesser extents. Due to their strategic nature, the obstacles and solutions to maximising biodiversity within such development schemes are largely political and governmental at the regeneration area scale, and associated with project management at the individual development scale. Consequently, as the largest case of its kind, this nested study provides an ideal platform to investigate strategic spatial decisions and their translation, throughout hierarchical documentation and organisational levels, to the individual mega-developments on the ground. A schematic diagram to illustrate the location of the regeneration areas within the Thames Gateway is provided in *Figure 12* in *section 7.8* and a map of the Thames Gateway, indicating the location of Eastern Quarry, is also provided in *Figure 13* in *section 8.1.2.*

This study aims to investigate the influences in obstructing and gaining biodiversity within both scales and to isolate individual mechanisms and procedures, which could be replicated or improved upon in future developments. Due to the size and media attention given to the regeneration area, available research information is ubiquitous and the case study is especially data rich in comparison to similar regeneration areas. Nevertheless, data rich study areas come with their own issues; such as how to select the most appropriate data and to discern patterns and relevant conceptual codes for theory generation amongst the vast sea of related information. A Foucauldian approach to discourse analysis (as explained in *section 2.7*) was taken regarding the documentation, as much of the information and visions for the Thames Gateway, as well as the development of the mega-development biodiversity strategies are influenced by power:

*"…environmental discourse has material and power effects as well as being the effect of material practices and power relations" (*Feindt & Oels, 2005).

One of the research funders, 'Middlemarch Environmental Ltd' (MEL), assisted in initially accessing key interview participants for EQ2 and providing a limited amount of 'current' action research opportunities, which lent the research some early direction. Findings from interviews of leading academics and professionals have been interlaced within the main discussion. An overview of interviewees and informants, in addition to key interview notes, can be found in *Appendix three*.

Nevertheless, the 'key' interviewees will also be listed here. These interviewees were selected for their direct roles in EQ2 and to ensure adequate triangulation. For instance, the lead planning case officer for EQ2 (Sonia Bunn) was interviewed in addition to other personal correspondences (telephone and email) during the course of research [giving the regulatory and generally an unbiased opinion on the development]; the lead environmental consultee (Sue Young from the Kent Wildlife Trust - KWT) [providing the biodiversity expectations and concerns for the site]; the developer's project manager (Keith Farley); and various personnel at the environmental consultant (MEL).

In terms of the Thames Gateway, the key interviewees were also Sonia Bunn from KWT (who worked across the Kent Thameside Area); Natural England's GI expert for the Gateway (Brian McDonald); Natural England's Development Control officer for the Gateway – particularly focussing on the London Olympics sites (Dominic Coathe); ARUP's Environmental Director (Paul Johnson) [as ARUP have been heavily involved in the Gateway]; and the Biodiversity Design Officer for Barking Riverside (Graeme Duckworth). The semi-structured protocol to interviews is explained in s*ection 2.4*.

7.2 CURRENT ECONOMIC IMPLICATIONS TO THE CASE STUDY

Of all of the growth areas in England, the Thames Gateway is "*unique in scale, aspiration and significance to the UK economy"* (Kerslake, 2009 p.80). Nevertheless, the UK and global recession which began in 2008, coupled with the government's spending review in October 2010, announcing serious funding cuts, has affected development progress within the regeneration area as a whole, although, as Pragnell (2009 p.16) states: "*it remains an attractive proposition to*

developers and businesses relative to other locations". Specifically, the EQ2 development was essentially put into 'hibernation' in 2008, due to the recession. However, the recession has not impacted upon the research of the Thames Gateway regeneration area, but, it has affected research of EQ2, particularly in terms of a more limited scope in which to conduct action research and to investigate the progress of project management.

Despite the impacts of the recession, it has still been possible to research the proposals for all lifecycle stages up until 2008, which as the construction phase alone was due to last for twenty years, is not too dissimilar from the original research intentions. It has also provided insights into a site in a 'holding period' and within organisational flux, which could have occurred to a development site for a host of investment reasons. The current economic impacts will be discussed further in *Section 8.1.6* with relevance to the Thames Gateway, and *section 9.1.4* with relevance to EQ2.

7.3 DEFINING A MEGA-DEVELOPMENT

Section 4.1.1 of the planning and governance chapter, discusses the general definitions for 'major' developments, which are over five residential units or equivalent for different land use classes. The developments discussed in this thesis are of a much larger order, more in line with the large-scale major developments defined by ATLAS as: 200 units or 4 hectares or more for residential uses and 10,000m² or 2 hectares or more for other uses (DCLG, 2007d). However, the lower limits of this definition do not sufficiently describe the kind of developments associated with this case study, nor other mega-developments. This is because developments with several hundred residential units do not require the same infrastructure, or complexity throughout the development lifecycles, as those which essentially involve the creation of new towns. There are no known definitions for mega-developments which are sufficiently endorsed at present. Therefore, a definition of 2,000 residential units, or more, shall be used for the purposes of this research. Such a development size would require significant infrastructure and phasing complexities and would necessitate a mixed composition of other use classes, such as retail and commercial floorspace.

7.4 INTRODUCING THE REGENERATION AREA AND THE DEVELOPMENT SITE

The Thames Gateway undoubtedly offers favourable circumstances to gain significant improvements, for environmental, social and economic aspects compared to the status quo. Hosting the Olympic Games in 2012, being hailed as the leading environmentally innovative regeneration area in the UK, and launched as an Eco-Region in November, 2008 through government support, the Thames Gateway has been touted as 'the world leading eco-region' (DCLG, 2007a; DCLG, 2008b; RUDI, 2008). High environmental and ecological standards are core objectives of the Eco-Region and a Thames Gateway Eco-quarter is proposed as a flagship area to spearhead ambitions. This is supplementary to the development of an Institute for Sustainability, which was also launched in 2008 (DCLG, 2008c).

With the presence of the eco-region, the new Institute, and the ambitions of the Olympic bid, the Thames Gateway seems equipped to illuminate the very best of environmental practice models. Nevertheless, there are still numerous risks to realising these environmental and ecological proposals and visions. For example, the Institute for Sustainability had no reported ongoing projects or news regarding GI or biodiversity in 2009, a year after its launch (Institute for Sustainability, 2009), nor any mention of GI on the sustainable infrastructure webpage in 2010 (Institute for Sustainability, 2010). It is also difficult to definitively forecast the future outcomes of the area with some of the mega-developments having construction phases of 20-25 years. This study will explore the risks to proposed visions for the regeneration area further, and incorporate a multi tier consideration, or nested theory, which Ostrom (2007) predicates is necessary for analysing ecosystems.

Eastern Quarry, the site of a previous limestone quarry, is set within the Thames Gateway and consists of approved mixed-use development proposals for a series of five urban villages and associated infrastructure. The pure size of the nested case study makes for a particularly intricate and complex study, in which to investigate and review a diverse range of biodiversity successes and impediments.

7.5 STRUCTURE OF STUDY ONE CHAPTERS

This study is comprised of two chapters; the first: *'The Thames Gateway: how strategic decision making and governance affect biodiversity within individual development sites'*, sets out the wider regeneration framework, which the EQ2 development site operates within. The second chapter:

'*The Eastern Quarry* (*EQ2) and comparison Barking Riverside (BR) cases: Strategic biodiversity considerations of mega developments'* then considers the next strategic tier down, relating more directly to project management and practitioner related constraints, opportunities and theories.

7.6 NATIONAL RELEVANCE OF THE CASE STUDY

The study encompasses the elusive strategic threats, opportunities and theories typically relevant to maximising urban biodiversity in major UK schemes, whilst providing a unique understanding of the strategic ecological issues involved in Western Europe's largest and most complex regeneration area. Inferences can then be drawn, to inform, or formulate frameworks, which other mega-developments may profit from.

The findings of the case study are highly pertinent to future developments. For example, 10,000 eco homes were due to be built by 2016 in four landmark eco-towns, constituting the first wave of eco-towns, along with growth area and housing market renewal, to achieve the government's 2007 proposals for three million new homes by 2020 (The Telegraph, 2007, DCLG, 2008d). Whilst the original target may be amended due to the economic recession and effects to the development industry, the burgeoning UK population must still be accommodated somewhere. DCLG published the Housing Minister's comments in 2007 regarding an injection of over £60million into the building programme. Yet, despite the rhetoric about green living, eco-homes and eco-towns, 'ecological' sound developments were not mentioned in DCLG's corporate news story. Instead, the focus was upon affordable homes, new 'green' jobs and home owners saving on energy bills (DCLG, 2010c). This will be explored further in subsequent chapters.

7.7 RELEVANCE TO THE INTERNATIONAL CONTEXT

Internationally, there are legislative and policy differences, as well as cultural 'quirks' which imply different prioritisations and valuations of biodiversity. Nevertheless, during attendance at several related large international conferences, the presence of strategically similar issues, despite differing local contexts, was all but too apparent. Parallel situations arise globally in terms of the size and complexity of new developments. For example, the proposed eco-city of Dongtan, China, and the eco-city construction of Tianjin, China (Singapore Government, 2009) are similarly large developments with ecological sensitivities and considerations (although the real parallels may be in terms of their PR). Parallels within these new global urban realities also exist, so some

international lessons can be highly pertinent to other nations when mindful of contextual differences.

The European Environment Agency published 'Biodiversity - 10 messages for 2010' and the Thames Gateway and Eastern Quarry 2 are directly pertinent to one of these messages: 'Message 6 – Urban Ecosystems'. This message particularly relates to 'Quality of Life', ecosystem services, GI and the opportunities and threats for biodiversity (EEA, 2010). This study explores these elements (especially GI) in both of the study scales. Therefore, the case studies are very relevant to biodiversity research considerations and priorities in the EU.

There is also an increasing focus on international awards for existing green cities and designations (see *section 4.3.2.2*). These highly sought after accolades, position cities globally for investment and marketing, which 'ramp up' city expectations to become 'greener'. Therefore, the future net biodiversity gains or losses of mega developments could affect the competitive measuring of one city against another globally.

A web of external influences affects all development schemes, acting outside their immediate scope and control (e.g. cultural perspectives, politics, governance, and business strategies). Hitherto, research has not identified the effect these influences have had over net biodiversity levels achieved on development sites. Yet, the relevance of this influence is cumulatively of great global significance to the mega-risk of biodiversity loss.

7.8 SPATIAL LOCATIONS AND NESTED THEORIES

The Thames Gateway is located between London, South Essex and North Kent (see *Figure 12*). The Eastern Quarry development site (EQ2) is situated within the Northern Kent section (Kent Thameside) of the Thames Gateway. The Barking Riverside development (BR) which is contrasted with EQ2 in *Chapter nine*, as well as the West Thurrock Marshes (WTM) development, which is discussed in *Appendix 2.3*, is not within the Kent Thameside section, but do also sit within the Thames Gateway.

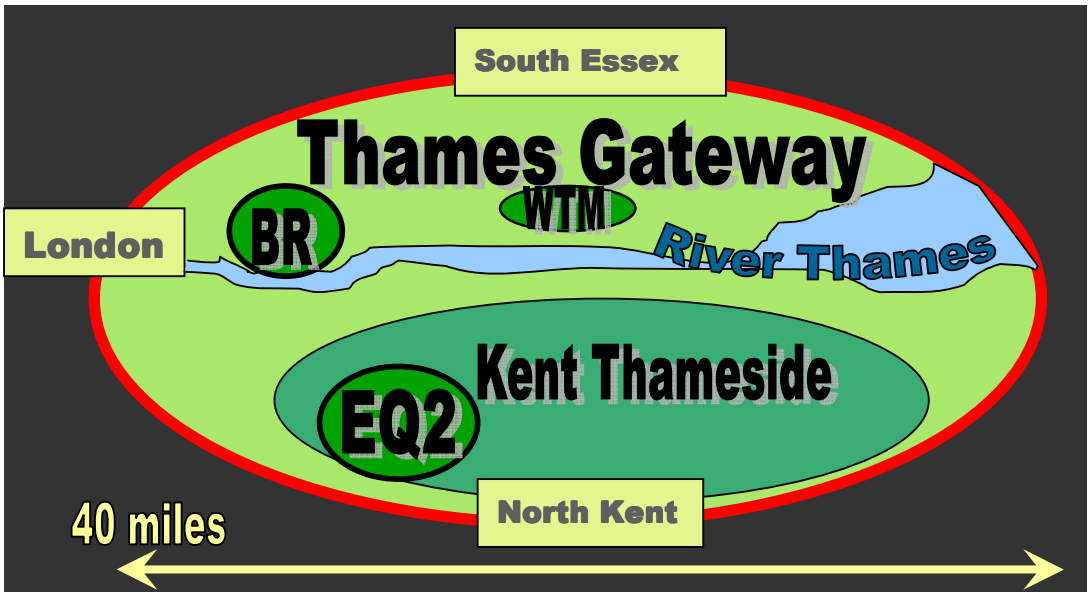

Figure 12: Schematic diagram of the locations of the regeneration areas and the three individual development sites (EQ2, BR & WTM), which are all spatially nested within the Thames Gateway.

Study one is 'nested'. It is nested in both a spatial (illustrated by Figure 12), as well as a theoretical sense (the latter being related to a different range of theories within the study, which are framed by the spatial scale under consideration). The key theory themes, which the nested study teases out, are illustrated in *Table 4*. The table differentiates which level (regeneration area, development site, or both) the theory themes operate through colour-coding. It also lists the principal phases within a development's lifecycle, which the themes relate to. Such use of nested theories are advocated by Vaughan (1992 p.182) – discussed in *section 2.8.2.4*, and Ostrom (2007) - discussed in *section 6.3.3*. More detailed lifecycle information is provided within the main body of the chapter texts.

No	Key theory theme	Primarily related to phases:
1	Societal and political prioritisation of: economy, social, and environmental issues (and between environmental mega-risks)	All phases
2	Governance approaches	All phases
3	New complexity threshold reached	All phases
6	Vision and review	Inception, Pre-app, App & Detailed design
7	Relationships within & between biodiversity implementation proposals (EIAs, BAPs, GI, masterplan, & detailed design)	All phases
8	Project management styles	App, Detailed design & Construction
9	Specialist knowledge (acquisition and managing)	Inception, Pre-app, App & Detailed design
10	Long development lifecycles & phasing complexities (turnover of actors, records)	Detailed design, Construction & Management
11	Deterrents to prevent 'green wash' (accountability, responsibility, clarity of actions, enforcement, & prescriptions)	All phases
13	Socio-ecological resilience	All phases
14	Transdisciplinary and transboundary issues	Inception, Pre-app, & App
15	The importance of Green Infrastructure (GI)	All phases

Table 4: Indicating the key nested strategic issues and theories brought out by this study and the phases of a developments lifecycle which they affect. Issues are colour coded to determine which chapter of the study they relate to**.**

- Purple issues = Thames Gateway spatial scale (*Chapter eight*);
- Green issues = EQ2 and BR spatial scale (*Chapter nine*);
- Pink issues = General to both spatial scales

8 STUDY 1(A) - THE THAMES GATEWAY: HOW STRATEGIC DECISIONS AND GOVERNANCE AFFECT BIODIVERSITY WITHIN INDIVIDUAL DEVELOPMENT SITES

"The Government wants this regeneration [The Thames Gateway] to lead the world in terms of environmental sustainability and low carbon footprint growth." (NAO, 2007)

"how long will it take us to understand that we need to regenerate areas like this with the natural world just as much in our sights, in our thoughts, as the improvements to the social conditions of people in this part of the world [Thames Gateway]." (Porritt, 2006)

"Power is everywhere; not because it embraces everything, but because it comes from everywhere" (Foucault, 1998 p.93)

8.1 THE THAMES GATEWAY IN CONTEXT

8.1.1 Research Origin

It has always been a research intention to investigate one of the 'growth areas', in order to gain a perspective on how extremely large scale complex developments tackle biodiversity issues. Initial progress had been made on a different growth area (West Northamptonshire Development Corporation – WNDC), but this ended due to an organisational setback in accessing non-public information. Nevertheless, initial research into EQ2 soon revealed that the Thames Gateway offered an ideal exemplar, to illustrate how biodiversity matters are handled within such strategic levels of development complexity. This was due, in equal measures, to the special prominence of the regeneration area, the richness of available data, and the potential to build nested theories with dual development scales. The Thames Gateway also made an attractive case study due to the number of individual mega-developments incorporated within it, which were at various developmental stages.

Owing to the sheer size and complexity of the regeneration area, this chapter can not capture all relevant information. It must instead summarise enough context to understand the key cogs which drive the Thames Gateway regeneration, whilst highlighting the most pertinent biodiversity opportunities and threats.

8.1.2 Location and Scale

Spanning forty miles, or sixty kilometers, along the River Thames, the Thames Gateway is the largest regeneration scheme within Europe (CABE, 2009d; Farrell, 2009 p.6). It traverses three major administrative boundaries, London, South Essex and North Kent, each being further sub-divided into different local authorities (see *Figure 13*). In total, the Thames Gateway spans nineteen different local authorities (Greenwood & Newman, 2010 p.110).

Figure 13: Map of the Thames Gateway (DCLG, 2008b)

8.1.3 The Impetus and Origins of the Thames Gateway

Government (central and local) had seen the opportunities linked to regenerating the Thames Gateway early on. The initial focus was for housing part of the forthcoming population explosion in the South East, economic regeneration, enhancing London's position as a major European and World city, and attracting investment and social benefits to the area (LSE London, 2008).

Compared to the rest of the Greater South East region, the Thames Gateway considerably underperforms (Church & Frost, 1995; Farrell, 2009 p.7). Dunn (2009 p.29) describes the two hundred year legacy of decline in the Thames Gateway, which features higher than average levels of deprivation, unemployment and lower levels of skills. Yet, if these social issues were tackled, then it is believed this could "*add £12 billion per annum to UK GDP*" (Dunn, 2009 p.29). Farrell (2009 p.7) also points out that "*without growth, London will slowly lose its "world city" status*".

Although contestable, the earliest dates given for the conception of the Gateway are almost forty years ago, in the early 1970's: "*success in the Thames Valley was planned for in the government's 1971 South East Plan and was based on attracting high-value, hightechnology industries. Four decades later, this is still in the process of maturing*" (Farrell, 2009 p.8). The Strategic Plan for the South East identified the part of the Gateway in South Essex as a major growth area (Church & Frost, 1995). In a response to job losses in declining manufacturing and port sectors, London authorities developed a coordinated planning framework for the Gateway area in the early 1970's in its Tower Bridge to Tilbury study (Church & Frost, 1995) and a number of authorities, particularly North Kent, made efforts to address the socio-economic problems of industrial dereliction in the early 1980's (Liston-Jones, 2009 p.20; Church & Frost, 1995). However, many cite the early 1990's as the time that the Gateway initiative really caught alight with the East Thames Corridor Study commissioned in 1991 following the Secretary of state for the Environment's (Michael Heseltine) announcement of the government's interest in the scope for development and environmental enhancement in the area (CABE, 2009d; Church & Frost, 1995). Since then, the locations of the international stations of Stratford and Ebbsfleet were announced in 1993 – which were predicted to 'alter the transport geography of Europe fundamentally' (CABE, 2009d). And, by 1995 the Thames Gateway Planning Framework was launched which, for the first time, identified the whole of the Thames Gateway area as a priority area for change (Liston-Jones, 2009 p.20; NAO, 2007).

8.1.4 Recent Regeneration Progress

In 2003, the Sustainable Communities Plan allocated the first structured funding programme to accelerate the speed of housing delivery in the Thames Gateway and promoted the 'gateway' to both London and Europe (NAO, 2007; CABE, 2009d). Although 'the department' has changed names a number of times over the years, more recently from the ODPM to DCLG, it has led this funding programme on behalf of central government, and provided £673million between 2003 and 2008 (NAO, 2007).

The investment had already helped to deliver 24,000 homes between 2001 and 2005, job growth of six per cent, and considerable investment in transport infrastructure, which is seen as the key obstacle to development (NAO, 2007). However, this investment has largely been directed to key strategic locations and to support key strategic priorities such as land remediation, assembly, and infrastructure (NAO, 2007; Dixon, 2007c p.61). The National Audit Office's assessment and report on the 'Thames Gateway: Laying the Foundations', found a lack of capability to demonstrate that

resources had been directed to the most transformational projects, or that the management of the programme so far, had added more value than the projects themselves (NAO, 2007).

However, the Thames Gateway dogma, enshrined in official publications, propose the Gateway will become the leading place for environmental innovation and change in the UK (Farrell, 2009 p.10). Nevertheless, much of this environmental innovation primarily relates to reducing carbon emissions (Farrell, 2009 p.10) and secondary issues, such as, local waste reprocessing, rather than tackling biodiversity loss.

8.1.5 Duration of the Regeneration Programme

The size and scale of the Gateway necessitates a long-term regeneration programme with some individual mega development construction programmes spanning several decades alone. Farrell (2009 p.8) also points to relevant international experience, such as Emscher Park in the Ruhr, Germany, as a current growth and regeneration example, which has had a successful long-term landscape programme spanning two decades. Certainly, there are lessons to be learnt from other long term regeneration programmes. Although, none may have quite the same temporal programming required for the Gateway: "*the Thames Gateway could be thought of as a 70-year journey, which we are but a fraction of the way through*" (Malik, 2009 p.3-4).

8.1.6 Effects of the Current Economic Situation

Prior to the government's 'Spending Review' of October 2010, which illustrated just how badly the UK's government funding sources will be affected by the recession, Pragnell (2009 p.14-15) warned that to keep momentum with less direct support "*We must innovate to avoid falling over the funding cliff edge*". He explained that work by the Institute of Fiscal Studies revealed the increasingly stringent fiscal position of the UK government due to the recession, which will prompt an almost halving of public-sector capital expenditure programmes, and that the economic ailments are likely to last for a decade or more (Pragnell, 2009 p.14-15). Pragnell believes that In terms of innovation, there is a clear role for government in 'place-making' and balancing economic growth with sustainability and specifically within the Thames Gateway, there will be a consolidation and streamlining of delivery structures, "*so that the administrative overheads are proportionate to the scale of the capital programme being delivered*"(Pragnell, 2009 p.15). Additionally, in the short-term, the Thames Gateway is likely to be affected by a more risk-adverse and capital constrained private sector investment community (Pragnell, 2009 p.16). Certainly, this is already evidenced through recent communications with the Dartford Planning

Case Officer for Eastern Quarry (Bunn, pers. comm, 2010). Many developments, such as Eastern Quarry2 (EQ2) have gone into a development hibernation phase due to financial uncertainties (*see section 9.1.4*) and LA, central government and QUANGOs had their budgets slashed in 2010, resulting in reduced funding for a number of agendas (which may include biodiversity and GI) – hence the need for innovation in funding mechanisms, economic theories and development processes.

The senior GI growth advisor at Natural England (NE) believes that in the short term, the economic crisis will be a negative influence on achieving GI and biodiversity. However, in the long term the effects of a slowing in planning and development will possibly be positive, if GI can help adaptation (McDonald, pers. comm, 2009).

There to assist LAs and regions in making difficult investment decisions and priorities in this tough public expenditure climate, is the Homes and Communities Agency's (HCA) dynamic and iterative process, 'Single Conversation', which North Kent (of the Thames Gateway) is in favour of (Liston-Jones, 2009 p.25). The 'Single Conversation' is an umbrella term for the preparation of investment plans and agreements, which encapsulates the agency's "*most important business process"* (HCA, 2009 p.2). This process is only at the 'pilot' stage so far, so there are not yet any meaningful measures of success. How the process will affect the biodiversity and GI agendas are affected will depend on the HCA's prioritisation of these agendas. The HCA was formed out of several previous organisations (including the former 'English Partnerships') and they are a key organisational 'player' in the Gateway, so will be discussed further throughout this chapter.

8.1.7 Strategic Environmental Priorities in the Gateway

8.1.7.1 The socio-economic need for development is directing environmental priorities

The increasingly scarce land availability for large-scale new developments is driving mega-developments to be built on land previously avoided - often for environmental or technical reasons. A review of available literature has revealed the development of four key environmental priorities in the Gateway to date, which dynamically change in response to external and internal Gateway influences. Literature from academic, government, or governmentally related documentation, paints a picture of prioritising strategic environmental obstacles, which need to be solved in order to physically develop the land. Hence, 'land contamination' and 'flood risk' have featured highly in environmental discussions since the inception of the Gateway. 'Ecological connectivity', in the form of GI, or the locally 'branded' term of 'the green grid', has also been a

prominent issue, although less so in academic and government documentation - coming more from the Wildlife Trusts literature. More recently, GI has become a more prominent environmental prioritisation, but has taken a different functional slant - largely due to 'The Parklands Vision', which is discussed in s*ection 8.2.6*; but essentially involves a shift away from ecological functionality, towards visual amenity and human recreation. Clearly, such a functional change will have a detrimental impact on maximising biodiversity.

Finally, a fourth key environmental focus came to light in the last decade due to increasing realisation and pressure to tackle 'climate change'. This most recent focus has subsumed all of the previous environmental focuses in terms of aspirational documents and visions. Whilst biodiversity is mentioned in its own right in strategic documents, and is linked to the other priorities (e.g. part of climate change adaptation and GI), it unfortunately has not yet been given the 'power' of being considered a 'key strategic priority'. However, this could change over the next decades of Gateway implementation.

8.1.7.2 Land remediation

The Thames Gateway has some of the most contaminated land in the UK, which has been contaminated in diverse ways during and since the industrial revolution. Therefore remediation has been a primary environmental consideration on brownfield land and takes a large proportion of the development budgets. This has led to the concept of Added Environmental Value (AEV) being put forward as a measure of the relative environmental impact of land-remediation processes (Burton, 2007).

The director of infrastructures and utilities of the Olympic Delivery Authority has reportedly claimed that the enabling works and remediation for the 2012 games has a higher budget than any of the venues (at £325m, with total site preparation and infrastructure costing £1.7bn), illustrating the scale of the issue (Klettner, 2009). Taking the Olympic Park as a recent and well documented example of this, Higgins (2009 p.61-62) describes that: *"The clean-up of the Olympic Park site, which began three years ago, is almost complete*". Over 80% of 800,000 cubic metres of industrially contaminated soil has been cleaned and reused, and over 75 million litres of contaminated groundwater has been treated (Higgins, 2009 p.61-62).

8.1.7.3 Flooding

Under current climate change guidance, we could be seeing the number of times the Thames Barrier closes to prevent flooding rise to around 30 times a year by 2030 (Burnham, 2007). Closing

the Thames Barrier affects river and road traffic, as well as increasing the impacts to the river ecology due to interupting the natural tidal processes that flush the estuary on a more regular basis (Burnham, 2007). Furthermore, Lewis and Kelman (2009) make a case for unsustainable development proposals in the Thames Gateway, based on the likelihood of housing provision becoming damaged or destroyed by flood risk. There are approximately 1.25m people living and working within the tidal floodplain already, so engineering changes to the defenses through the century will be necessary, as well as looking at other flood control opportunities (Burnham, 2007).

8.1.7.4 Ecological connectivity (GI)

In the Thames Gateway, GI is referred to as the 'Greengrid', which is terminology specific to the locale. The Greengrid areas were mapped during the development of the Regional Spatial Strategy (RSS) in the mid 1990's "*as a means to enhance greenspace networks and the environmental image of the area*." (Thurrock Council, 2006 p.3). A range of organisations were involved, the key ones being: The Wildlife Trusts (who have been particularly proactive in the Thames Gateway); LAs; the EA; the Groundwork Trusts; and English Nature and the Countryside Agency (now Natural England). The countryside agency drew up the best practice for this at the time: *"The [countryside] agency had the remit for Green Infrastructure, but not so much for an 'urban' focus'"* (McDonald, pers. comm, 2009). McDonald, the senior growth adviser for GI at NE, explained that when NE was formed in 2006, this formalised the urban GI remit. However, English Nature was also involved in GI within the Thames Gateway prior to the formulation of NE, as evidenced in English Nature's local newsletter 'Patchwork', which explained that the Greengrids were developing from existing projects (English Nature, 2003). McDonald (pers. comm, 2009), who describes the Thames Gateway GI, as a model of intergovernmental working owing to its cross-cutting nature, saw the growth areas as a great opportunity as*: "They had to provide GI strategy as part of the policy, which greatly assisted in pushing GI forward".*

Initially the financial resources were there due to Growth Area funding – 10 % of all CLG/ ODPM finance was to be spent on GI. However, this has now been demoted to a 'key objective' and the local level has been given the prioritisation decisions for GI expenditure (McDonald, pers. comm, 2009). The effects of that decision have not been assessed and McDonald (pers. comm, 2009) believes it would be interesting to see if there has been a decrease in GI as a result of the loss of that prioritisation and funding mechanism – perhaps an area for future research.

The importance of GI in 'placemaking' has been recognised by the government through it's commitment to providing high quality greenspace throughout the Gateway. The concept of 'green infrastructure' was *clearly established in the DCLG strategy 'Creating Sustainable Communities: Greening the Gateway' (2004) as a key environmental component in the delivery of the Thames Gateway* (Gravesham LA, 2008; Thurrock Council, 2006 p.3).

Greengrids have also been proposed for the three main administrative subdivisions of the Thames Gateway (East London, North Kent and South Essex). The East London Green Grid (ELGG) was launched in 2007 and overseen by the London Development Agency (LDA). It consists of six grids, each with their own plan, supporting over a hundred Greengrid projects through its partners (CABE, 2009e; Legacy London, 2009; Landscape Institute, 2008). ELGG won the Presidents Award and the Strategic Landscape Planning Award of the Landscape Institute in 2008, recognising the ELGG as the top landscape architecture scheme in the country (Landscape Institute, 2008). Whereas, the South Essex Green grid is used as a case study in CABE's document 'start with the park' (CABE, 2005 p.37-54), an analysis of the discourse used in 'The South Essex Green Grid' webpages, reveal that it was wildlife conservation, rather than the newer paradigm of wildlife enhancement, which was the focus (Greengrid, 2010).

The 'Greening the Gateway' document (an implementation plan) and sub-regional strategies, combined with a review of local policy through the Local Development Framework process, has provided support for LA's to develop their own local Greengrids, providing a finer framework grain (Thurrock Council, 2006 p.3). *Section 8.2.6* discusses this topic in more depth.

8.1.7.5 Climate change

Climate change has subsumed the other three priorities in recent years. This has gathered momentum over the last decade, with the increasing public and political concern towards climate change, and for the Thames Gateway in particular since winning the 2012 London Olympic Game bid, which is strongly focused on reducing carbon footprints. Williams (2007 p.32) was commissioned to write a report on the role of the HCA in using funding and procurement to achieve quality in the Gateway 'The Commission on the Design of Affordable Housing in the Thames Gateway'. His definition of sustainability was focussed on the context of attracting communities to the Gateway and reducing carbon.

8.2 STRATEGIC BIODIVERSITY OPPORTUNITIES

8.2.1 Biodiversity in the Gateway

The remediation and development of brownfield land in the Thames Gateway is a double-edged sword for biodiversity. Contamination and transport issues prevented development for periods of time, creating a sanctuary for many species to thrive (due to the limited human disturbance). Development, on the one hand, will cause disturbance and losses to habitat and species populations (despite protection measures), yet remediation and development may also offer many opportunities. Such opportunities include: repaired and enhanced habitats and features, creation of new habitats, and ecological management of existing sites and species. The art will be in minimising the losses and maximising the gains - to create net biodiversity gains; through sensitive and innovative design, and construction and management processes.

The opportunities for biodiversity in the Thames Gateway can be broadly categorised into the following list:

1 Protection
2. Removal of invasive species
3. Influencing biodiversity through supply chains
4. BAPs – identifying focuses
5. GI and connecting fragmented habitats
6. Enhancement and integration of ecology within and throughout developments
7. Funding and long-term management
8. Media and social engagement and interpretation
9. Political championing

Out of this list, BAPs and GI illustrate exemplars of nested theory frameworks, which work at different spatial hierarchies of consideration. Both are also discussed in the following chapter of this study. Each item on the above list will now be elaborated on.

8.2.2 Protection

Development should afford protection of species and habitats during site preparation / construction and operational / occupational phases of development (including many of those species and habitats which are not specially designated or protected by individual laws). In some instances this may mean a higher level of protection than that of the status quo, i.e. if development had not occurred some valuable habitats could be lost through natural succession or

flooding (meaning that biodiversity could naturally decline in some instances if not sensitively managed). The most important strategic form of protection at this regeneration area scale, is that of skilled ecologically-led landscape planning, locally descriptive and relevant policies, guidance and visioning.

8.2.3 Removal of Invasive Species

The removal and treatment of invasive species can be costly and timely, but if not tackled, the problems often become amplified. Throughout the Thames Gateway the threat of invasive species, such as Japanese Knotweed, is of great concern to developers (Booy, 2007 p.62). In the Olympic Park clean-up alone, the equivalent of ten football fields has been cleared of the invasive Japanese knotweed (Higgins, 2009 p.61-62).

8.2.4 Influencing Biodiversity through Supply Chains

The materials used in development sites can affect biodiversity off-site, and even globally, through the supply chain. This large topic can not be covered in any depth in this research project, yet its ramifications should not be ignored.

An obvious example is the use of timber. The timber industries promoted the use of timber in the Olympic construction, through a cross-industry campaign: 'Wood for Gold'. The campaign was widely supported by top politicians due to perceived sustainability credentials of lower carbon impacts, in comparison to other materials. The Greater London Authority (GLA) also considered ecological sustainability, and originally announced that only Forest Stewardship Council (FSC) certification would be accepted. Unfortunately, due to lobbying, the GLA's resolve weakened and they made the following statement regarding timber procurement: "*s…, will be obtained from recycled or reclaimed sources, or one of the independently certified sustainable sources listed below wherever practicable…. Where this is not practicable, good reason must be provided*" (Ramsay, 2007). This is extremely weak wording, effectively rendering the certification of timber a voluntary exercise, with less credible certification schemes.

Diamond (2005 p.479) explains how many other certification organisations do not require independent third-party certification, nor uniform standards, and that they lack chain-of-custody certification "*so that any product of a sawmill that receives both certified and uncertified timber becomes certified*". This substantial opportunity to protect global biodiversity was ignored with

potentially devastating impacts on overseas forests. Nevertheless, future developments in the Gateway do not have to follow suit.

Development processes could address part of the issue, e.g. an additional point of consideration could be included on BREEAM Eco-homes and Code for Sustainable Homes certification criteria, so that appropriate certification of certain products is considered.

8.2.5 BAP – Identifying Focuses

Like the majority of the UK, Local Biodiversity Action Plans (LBAPs) have been devised for the regeneration area. These list a number of species and habitat types to focus protection and enhancement, accompanied by targets (usually selected from the larger National BAP list, yet considering local conditions) and guidance. The information from the LBAPs focuses biodiversity opportunities, which feed into other local and site specific documentation, including site BAPs and management documents. The partnership of Wildlife Trusts in the Thames Valley, were pivotal in achieving the LBAPs and publicising the conclusions (Young, pers. comm, 2008).

LBAPs can be influential in obtaining biodiversity opportunities, as they are linked to strong national and EU legislation (see glossary for further information), and their concepts are widely accepted and understood in multidisciplinary planning circles. Their function of highlighting local species and habitats most in need of attention is a useful planning, design and management tool, particularly for creation of new habitat within development schemes. In the experience of this researcher, LAs differ in the extent in which they may use LBAPs, which is likely to be dependant on a planning departments contact with in-house ecological consultees. LBAPS can also be translated into 'site BAPS' for major development schemes offering more biodiversity implementation opportunities.

Within the Olympic Park, a site biodiversity action plan (site BAP) has been implemented, which included extensive: species translocation; riverside enhancements; and newly created wildlife habitat (Higgins, 2009 p.61-62). *Chapter Eight* will further investigate an LBAP at EQ2.

8.2.6 GI and Connecting Fragmented Habitats

8.2.6.1 The importance of Gateway GI to biodiversity

The Socio-ecology chapter discusses general GI context and the following EQ2 chapter will discuss the specific mega-development level of GI planning and design. This chapter provides the link

between the Socio-ecology Chapter and the EQ2 chapter's coverage of GI. *Section 8.1.7.4* discusses GI development in the Gateway, and this section reviews potential opportunities to re-prioritise biodiversity through strategic planning and guidance within the growth area.

Dominic Coathe, a senior DC planning adviser for NE in central London, deals with a variety of areas in the Thames Gateway, and believes that whilst the "*core threatened biodiversity is designated or protected through site protection through NE",* requiring GI *"is a positive way of protecting biodiversity generally*" (Coathe, pers. comm, 2009). The ecotown supplement to PPS1 (discussed in the Socio-ecology chapter) is particularly relevant here, as it requires 40 % of an ecotown to be allocated to green space, of which half should be public (DCLG, 2009b). The policy also contains several biodiversity policies, which aim at ensuring a net gain in local biodiversity; accompanied by a requirement for a biodiversity strategy to outline this (DCLG, 2009b). GI offers one of the best opportunities for maximising biodiversity within mega-developments. This is owing to the capability of mega-developments to 'design in' quality, strategic GI from inception; with site masterplans and strategic documents allocating space provision, connectivity and specific biodiversity policies and parameters.

8.2.6.2 Contemporary GI visions and priorities

Indicating their awareness that certain GI and biodiversity needs are not currently being met within mega-developments, Natural England (2009c; 2008) advises that the statutory GI requirements for Growth Areas and Ecotowns should incorporate 'stringent environmental standards' to ensure genuine exemplars of environmentally sustainable development. Furthermore, they point out that GI should be designed into major developments from the outset, and that there needs to be provision for long-term maintenance, in addition to creation (Natural England, 2009c; 2009d; 2008).

In addition to the specific GI area guidance, which has been planned, or produced by LA's as part of the greengrids initiative (see *section 8.1.7.4*); GI strategies have been developed for the Gateway (*section 8.1.7.4* first introduces GI in the Gateway). Key responsibilities for these strategies have lain with CABE (who produced 'The Thames Gateway Design Pact'), and Sir Terry Farrell, who was appointed in 2007 as the Thames Gateway parklands design champion by the DCLG. As part of this role, Farrell's practice produced the 'Thames Gateway Parklands Vision' (2008). Farrell (2009 p.6) explains that he worked in collaboration with the public and private sector "*to develop the idea that improving the quality of life in the Gateway is critical to its future*

success", and that the intentions of the vision were that: "*regeneration within the Gateway should be based on landscape and environmental improvement as the first step in attracting investment and improving the quality of life for its 1.5 million residents*" (Farrell, 2009 p.6).

However, Farrell (an architect and urban designer) does not define what 'landscape' is, or elaborate 'who' landscape is for. Furthermore, neither ecology nor biodiversity are included in the key objectives of this visioning document. Instead, the most substantial biodiversity references are confined to agricultural descriptions and a rather hollow statement in the final explanatory paragraph: "*Parklands will boost Thames Gateway's rich biodiversity*" (Farrell, 2008). The Parklands visionary statement sets the tone for the rest of the document, which talks of transport infrastructure (with no reference to GI or biodiversity) and is peppered by many references to economic investment, economic power and economic competitiveness. Furthermore, a significant lack of ecological understanding and 'grasp' of the biodiversity issues and opportunities at hand, is illustrated when 40 % of the Thames Gateway is described as 'wilderness' (Farrell, 2008), and green and open spaces appear to have been allocated the sole function of human recreation.

Greg Hitchcock, of Kent Wildlife Trust (KWT), believes the Parklands document is a good visionary document. However, due to time constraints put on central government departments, there are some holes in the document in terms of a lack of background information and consideration of the habitats regulation assessment - being more social and economy orientated (Hitchcock, pers. comm, 2010).

The lack of biodiversity, or ecology, prioritisation in this visionary document is damaging to the potential biodiversity opportunities, not least because other documents, such as 'The Thames Gateway Design Pact' [consultation draft] (CABE, 2008), reference it repeatedly in relation to GI, seemingly undermining the vast amount of positive work done by many other oganisations, in relation to the necessity for biodiversity and ecological gains. Despite 'The Thames Gateway design pact' still being of 'draft' status, its published nature on the CABE website, equates to a 'material consideration' to various professionals who frequent the web-resource. The terminology of the document and it's title, 'parklands', also promotes a utilitarian and formal approach to GI and greenspace strategies, which is contrary to the 'eco' ethos of the eco-region, thus minimising ecological opportunities.

CABE's draft Thames Gateway design pact (in association with the Department of Communities and Local Government (DCLG) and Homes and Communities Agency (HCA)), attempts to set out development standards and approaches to high-quality places (CABE, 2008). The strengths of the design pact are in the assignment of responsibilities and enabling actions to government, regional delivery agencies, local delivery vehicles, local authorities and developers; which would aid accountability and realisation of the vision.

The Design Pact includes constructive recommendations that central government: should ensure *"design champions are in a position to influence schemes at all levels*" and drive GI standards and aspirations; that public sector land be protected by binding, but flexible masterplans and design briefs, prior to disposal; that developers assign multi-disciplinary design teams for the project's life (CABE, 2008 p.6); and significant schemes to be submitted to regional or national design review panels (CABE, 2008 p.7). Unfortunately, the weaknesses of the design pact for the biodiversity agenda, are that it subscribes to 'The Parklands Vision' to build on the greengrids, and that it advises the commissioning of masterplanning consultants, who demonstrate a strong understanding of landscape planning and design [and does not explicitly include biodiversity or ecological understanding] (CABE, 2008 p.8).

The CABE website stated that 70 % of respondents to their consultation questionnaire supported the principles of the draft pact, yet "*the range and complexity of the comments raised in the consultation indicates that further work is needed*" (CABE, 2008). The lack of agreement in order to finalise the document, by the time the CABE website was archived in January 2011 (following part of the government spending cuts of 2010), is indicative of the difficulties in attaining accountability, which is possibly hindered by the complexity and organisational overlap.

In summation, the opportunities for maximising biodiversity, through GI provision in the growth area is great. The greengrids, guidance documents, and recent planning policy supplements seek to achieve this. Whilst a number of influential documents, which have originated through a different ethos, may water down and jeopardise this potential, the lifespan of the Gateway means that it may not be too late to supersede these visions and strategies, to re-prioritise biodiversity and positively influence other schemes.

8.2.7 Enhancement and Integration of Ecology within and throughout Developments

Discussing the Thames Gateway to the BBC, Paul Outhwaite of the RSPB stated that: "*Too often, we talk about balancing development and conservation. That implies separating the natural environment from built development – that bit's yours for wildlife; this bit's ours to develop. That approach is way too simplistic…."* (Outhwaite, 2007).

This echoes the researcher's own sentiments based on urban development experience. Instead of such separation, biodiversity areas and features must be woven into our ever growing urban spaces, in addition to specific spatially mapped GI. Cumulatively, features are just as important as areas of GI for biodiversity itself, as well as 'quality of life' in urban areas. To achieve this, innovative design is required from architects, landscape architects, engineers, planners, and ecologists; to maximise biodiversity throughout development schemes. These biodiversity features (such as those suggested in s*ection 4.2*.5) can be achieved through regulatory mechanisms and incentives described in the *Chapter five* 'Planning and Governance'; although the key tool in ensuring a net gain of biodiversity in the Gateway is cited as 'planning policy statement 9 (PPS9)' (Hodgson, 2007).

Peter Head (Director at ARUP), chairs the Sustainability Institute in the Gateway. Whilst limited communication with Peter Head has occurred through personal communications, his colleague, Paul Johnson (the environmental director at ARUP), cited a number of key impediments to maximising biodiversity on major and mega-developments. These included:

"*uninformed developers, local councillors and planning inspectors; architects / urban designers who maximise spatial use of development plots without any apparent thought to biodiversity, greenspace and their value to human health and wellbeing; uninterested planners, overworked and inexperienced local authority advisory officers and statutory agency officers, unempowered local residents, communities and greenspace managers who prefer tidiness over biodiversity; lack of legally enforceable agreements on provision of any greenspace (never mind biodiverse greenspace)" (*Johnson, pers. comm, 2009).

Many of the impediments listed by Johnson (pers. comm, 2009) also reflect the findings discussed in *Chapter three*, and the researcher's own action research. They are also strongly correlated to prioritisation issues. It would therefore seem that tackling 'prioritisation' of biodiversity would be the key solution to maximising biodiversity in the Gateway, and then ensuring accountability and enforcement; so that proposals are implemented appropriately.

8.2.8 Funding and Long-term Management

Responsible, sensitive management of existing habitats and proposed greenspace is another key opportunity for increasing biodiversity in the Gateway. Unfortunately, the CPRE (Campaign to Protect Rural England) produced a report on the Thames Gateway (CPRE, 2007), which identified five failing trends of concern to the government. "*But the particularly poor record in green space management presents a powerful challenge to the Thames Gateway Parklands project"* (Newport, 2007). This must be due, at least in part, to the fact that good management requires funding, as does biodiversity protection and enhancement. *Section 6.4.5.2* unravels some of the economic links to maximising biodiversity. In the Thames Gateway, the Greenwich Millennium Village Ecology Park provides an example for focusing regeneration and the image to investors through greening former brownfield land (Kent Wildlife Trust, 2010).

"An equally difficult hurdle is how to provide the finance necessary for infrastructure, development and housing. The sources of these funds is disparate and often uncertain." … "Most commentators agree that the funds available upfront for infrastructure are simply inadequate" (LSE London, 2008).

Despite the current economic situation depicted in *Section 7.2*, long-term funding and management responsibilities are still a biodiversity opportunity within the Gateway. In the experience of Hitchcock (pers. comm, 2010), GI in major developments is generally funded through developer contributions through LDF policies, which is explained in *section 6.4.5.2*. However, for such large and strategically important regeneration areas, there also has to be governmental investment. DCLG have funded GI by £30million in the Thames Gateway, with Kent gaining five funded projects through this (Hitchcock, pers. comm, 2010). Nevertheless, Hitchcock (pers. comm, 2010) believes that considering the ecosystem services provided by GI, this sum spread across the Gateway is paltry in comparison to other funding, such as the 'Kickstart' housing funding from the HCA, which has provided £207 million for 97 projects, "*The money is part of a larger, phased package worth £635 million*" (Fulcher, 2009). The Williams Commission Report (2007) describes how the HCA had a grant-funding formula, which rated quality and deliverability, amongst other things. Nonetheless, ambitions for a quality approach were undermined as providers had: "*been allowed to deliver lower quality on the ground than they promised through a system of waivers"* (Williams, 2007 p.31).

The Williams Commission Report (2007) suggests that in order to become a provider for the HCA, the use of a high-quality threshold should be used, and that those who are approved deliver a 'programme' of schemes. It is also suggested that any firms persistently delivering poor schemes

be removed from the panel (thereby using procurement to achieve quality). This proposal is also later reflected by Simmons (2009 p.55-56). However, the 2007 report also sets great store on appointing "*great architects"* (Williams, 2007 p.32), unfortunately this again misses the necessity for transdisciplinary working for successful 'place-making' and 'place-keeping' i.e. management (similar to Farrell's concentration on 'urban design' described in *section 8.2.6.2*). Other financing arrangements include the government's tax relief and stamp duty exemption proposals, as measures to encourage 'green' homes, and proposed powers to LAs to reduce tax bills on low-carbon properties as an incentive, and to encourage banks to offer 'green' mortgages (Crook, 2007). Whilst concentration here is on carbon, the same mechanisms could be used for biodiversity enhancements and management.

LA's will resist 'adopting' new greenspaces or biodiversity features within development schemes, due to low funds to maintain existing greenspaces, even prior to the economic downturn and spending review. Instead, there is a general trend for major developers to take on responsibility, in the form of allocating management companies, which can in some instances be funded by ongoing payments by residents and occupants. As new development schemes come on board, advice will be needed on funding strategies and assistance with selecting or creating appropriate management companies or consortia. This advice will be required to ensure a standardised approach to quality and availability of appropriate skills sets, enabling biodiversity to be continually maximised.

8.2.9 Media, Social Engagement and Interpretation

Building a connection between people and nature to live together amongst the gateway is essential for the longevity of biodiversity enhancements and to provide support for future projects. *Chapter four* 'Urban Biodiversity' and *Chapter six* 'Socio-ecology' discuss socio-ecological resilience, social engagement, and education as a means of prioritising and valuing biodiversity, and reducing potential conflicts. Therefore, positive media coverage, local engagement, and interpretation are important components required for realising biodiversity opportunities.

Nevertheless, two specific points regarding socio-ecological resilience within the Gateway must first be considered and tackled:

1) Research into socio-ecological-resilience predominantly focuses on 'existing' greenspaces and communities. However, the Gateway largely involves 'new' communities and greenspaces, or existing greenspace with no previous community access (owing to the prior industrial nature); and

2) Social demographics of the Gateway further confound socioecological resilience, as most social involvement in local greenspaces tends to relate to middle class demographics (particularly those who are retired) (Hitchcock, pers. comm, 2010). Yet, regeneration is occurring in the deprived areas, where there is not enough involvement.

Bennet and Morris (2006) noted that the IPPR (Institute for Public Policy Research) report, which interviewed 56 prospective and existing residents in the Gateway, listed GI as a key issue (out of 5-7 key issues respectively), relating to both prospective and existing residents. This included a strong consensus about the "*need for neighbourhoods to have access to a wide range of local private and public amenities, transport links and green space*." Additionally, there was a fear that: "*housing growth was likely to take accessible green space in and around existing settlements*" (Bennet & Morris, 2006). Despite the small sample number, this report provides useful insights of social valuation of greenspace, for both existing and prospective residents.

To promote community resilience to negatve GI actions and support for improvements; local communities must be 'engaged with new, or newly accessible spaces, and encouraged to value features for intrinsic wildlife value, and the range of ecosystem services provided. For example, the formation and establishment of local community support, friends, pressure groups, or educational media. A particular instance where local communities were actively mobilised within the Gateway by NGO's, was the Cliff Marshlands Peninsula (Hitchcock, pers. comm, 2010). This occurred due to an airport proposal, where NGO's raised awareness in a number of ways (Hitchcock, pers. comm, 2010), leading to significant socio-ecological resilience (BBC News, 2002).

Beck (1995 p.122) sketches out two lines of inquiry to answer the question of how to make the ecological issue become 'culturally significant'. These lines of inquiry include the conditions for: 1) sociocultural resonance to the ecology issue, and 2) institutional attentiveness to it. As Beck (1995 p.124) points out, social selection of the "*most urgent urgencies*" is not guided by the level of damage, but by "*cultural symbols and mass-media information*".

8.2.10 Political Championing

The number of boroughs in the Thames Gateway who have a councillor nominated to champion high design quality had increased, to just over half of the boroughs (CPRE, 2007). However, there is no evidence to show that any councillors had been nominated to champion biodiversity, as is

the case with all LA's in Wales. Changing this situation therefore represents a major opportunity within the Gateway.

8.3 CRITICISMS AND COMPLEXITY

8.3.1 Summarised Criticisms of the Gateway

Criticisms of the Gateway's approach to regeneration have generally been leveled at: slow progress; lack of true sustainability; governance being too complicated; and confused priorities. All of these criticisms affect development quality - including biodiversity. Nevertheless, a number of methods to improve the likelihood of realising quality within the gateway have been put forward. This section will now consider some of these key issues and attempt to detangle those most likely to influence biodiversity gains.

8.3.2 New Complexity Threshold

Greenwood and Newman (2010 p.106) explain that UK planning reform has created an increasingly complex planning framework, with confused and unaccountable policy-making processes. They describe this confusion as perhaps "*nowhere more evident than in the regeneration of the Thames Gateway*" (Greenwood & Newman, 2010 p.106).

Individual mega-development projects in today's urban context have passed a new threshold of complexity (see *Figures 1, 5* and *6*). This is due to a web of interlinked issues, such as:

- the sheer number of actor types and size of organisations involved;
- legislative and regulatory complexities;
- development phasing and programming;
- global mega risks, and increasing pressure to perform in a sustainable manner;
- the shift from an economically biased set of criteria, to a complex balance of economy, social and environmental criteria; and
- the transdisciplinary and transboundary nature of effective solutions.

In addition to this general complexity of mega-developments, those actors involved specifically in the Thames Gateway, encounter a profound policy maze (Catney *et al*, 2006) and a far greater level of complexity (BBC News, 2007a). A plethora of different stakeholders and organisations seem to have led to a large degree of overlap and duplication (BBC News, 2007a), unclear

boundaries and responsibilities, promoting competition between organisations rather than collaboration, and a lack of accountability (Shand, 2009).

The numbers of actors and organisations involved in the Gateway have steadily increased over the years. Moreover, this has proliferated since the London Olympic bid for 2012 in 2005, was won on its green credentials (Coath, 2009; Raftery, 2008; BBC, 2005a; Hayes, 2008). The LSE London (2008) state that: "*Perhaps the most fundamental challenge facing the key institutions with the responsibility for delivering an improved Thames Gateway is the number of strategies, plans and institutions involved*". This vast array of guidance documents, policies and agendas exist and work at different spatial and temporal hierarchies with varying degrees of authoritative influence. Shostak (2009 p.74) notes that: "*Today the Gateway is well known for having more visions than your favourite religious leader and more pilots than British Airways".* A particular issue for the Thames Gateway Framework is that, due to the number of stakeholders involved, roles have been duplicated (Dixon, 2007b).

Shostak (2009 p.74) advises achieving simplification of proposals through leadership from local and central government. However, this is not as simple a solution as one might wish, as in addition to the sheer number of actors and strategies, the level of restructuring and reform of both the planning process and key organisations, has further confused delivery in the Gateway. For example: "*The sponsoring Whitehall department - currently the Department for Communities and Local Government – has itself had five different names since the area first became a focus of activity"* (LSE London, 2008). These issues have led to incoherency in implementation and some of the more intractable regeneration issues, which create the most fundamental challenge to the key institutions responsible for delivering the regeneration (LSE London, 2008).

Around sixty years ago, Leopold (1949 p.225) neatly summed up this kind of increasing complexity of 'land ethics', which he described as a product of 'social evolution':

"Conservation is paved with good intentions which prove futile, or even dangerous, because they are devoid of critical understanding either of the land, or of economic land-use. I think it is a truism that as the ethical frontier advances from the individual to the community, its intellectual content increases".

Today, this early view supports the need for transdisciplinary working and systems approaches to solution finding, not only for the biodiversity agenda, but for all elements affecting 'Quality Of Life' and developments on the land.

8.3.3 Confused Leadership

Critics of the Gateway often bring up the issue of confused leadership, so it is important to give this consideration. Shand (2009) suggests that it is partly down to the sheer size of the mega-developments, which are too large and unwieldy to be managed by such a diverse and large number of actors in the governance network. The ensuing confusion consequently leads to central government interfering and driving regeneration (Shand, 2009). Attempting to plot the networked hierarchy of all key organisations involved in the Thames Gateway, is too large a piece of research work for this case study. Nevertheless, a basic framework is provided by: Catney *et al* (2006) (who investigated the Thames Gateway governance), which depicts some of the key 'players' (see *Figure 14*). The hierarchy illustrates the central government scale at the top, to the site level at the bottom [note that 'architects' are the only professionals mentioned here].

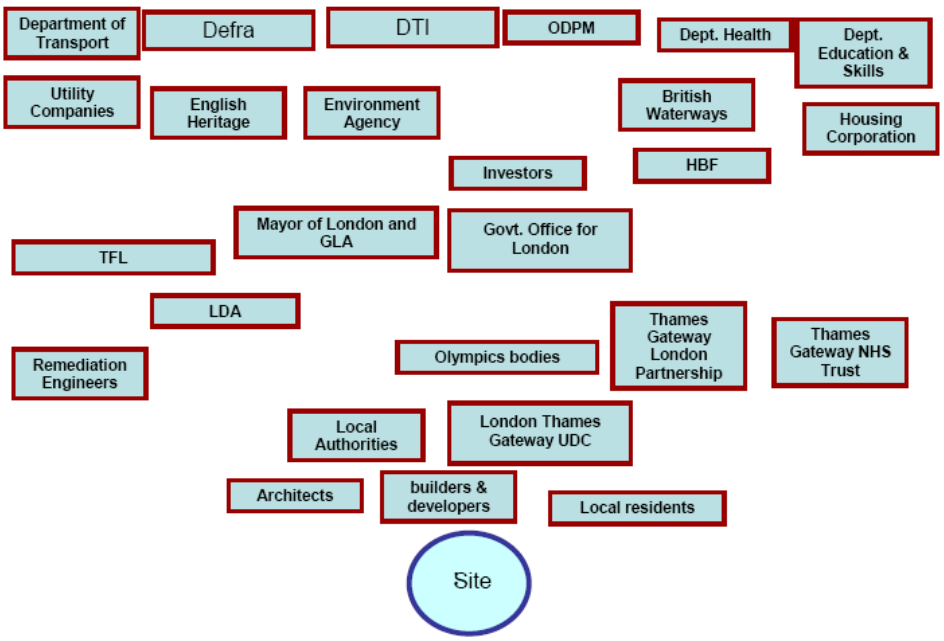

Figure 14: Thames Gateway Governance - reproduced from Catney *et al* (2006).

Whitehall is essentially the top decision making body in central government, and although DCLG leads the Thames Gateway programme, the National Audit Office (NAO) reported several years ago, that DCLG were not yet perceived by local stakeholders to have sufficient strategic influence to solve obstacles within Whitehall that were blocking success (NAO, 2007). DCLG was also criticised for 'weak' management in a report by the *Public Accounts Committee on the Thames Gateway (2007). The report argued that the "programme lacked 'comprehensive', 'measurable' objectives and was suffering from an "unclear" delivery chain (p.2)"* (Greenwood & Newman, 2010

p.110). It is probable that this report led to initiatives such as the Thames Gateway Design Pact (discussed in *section 8.2.6.2*).

Simmons (2009 p.55-56) believes that in the Gateway: "*the key to putting quality first is leadership*". Farrell (2009 p.7) also highlights the key leadership role of the government as addressing the previous 'market failure' and ensuring this does not happen again, through supporting a transformation in quality of life, due to the increasing importance of 'place' in the world's economy (Farrell, 2009 p.7). Prior to these publications, the NAO commissioned a report to investigate the laying of the foundations for the Thames Gateway. The report recommended better leadership across central government by DCLG and cautioned that the ambitions for the Thames Gateway will require effective cross-government working and strong central leadership (NAO, 2007). The report also highlighted the need for: a joined-up implementation plan, and for plans to keep pace with increasing environmental aspirations; for all Gateway aspirations to be translated into quantifiable objectives, against which progress can be measured and achieved; devising a joint risk management strategy for the Gateway – assisting partnerships and assigning responsibility for individual risks; and, encouraging earlier engagement of relevant public bodies with spatial planning (NAO, 2007).

There are numerous other government departments, e.g. DEFRA, or QUANGOs (such as the HCA, NE, or the EA) and development agencies and consortium, which have a great influence over the Thames Gateway regeneration, and its environmental issues. Discussing network analysis models and policy networks (regarding cases in Thurrock and Barking) of the Thames Gateway, Shand (2009 p.19) lists the most important actors and hypothesises that the network governance model has failed, as the centre [central government] is bypassing the network model in some respects [other stakeholders], leading to a multi-level governance [no clear hierarchy / leadership] (Shand, 2009 p.23). It is likely that due to confused leadership this is also happening in other areas of the Thames Gateway and this can affect biodiversity decisions and prioritisations (as illustrated in the BR case study in s*ection 9.8*).

Milbourne *et al* (2003, p.32) clarify that multi-agency partnerships, in policy terms, are: "*constructed and promoted as solutions to existing service failures, intended to act as change agents, injecting 'newstreams' into mainstream services (Kanter 1989), as well as to bridge service divisions*". Milbourne *et al* (2003, p.33) also note that policy problems can be difficult to resolve in the complex organisational context of short-term multi-agency partnersips. They suggest that to

achieve the desired collaborative solutions, a complex and nuanced understanding of the often ambigous problems posed by new policies, is required surrounding partnership working; and that these problems must be solved in context.

Whitehead (2003 p.13) investigated governance in a different regional area, through the Government Office for the West Midlands, Advantage West Midlands and local partnerships. The concept of meta-governance was used to illustrate how new forms of macro-organisational power, were emerging alongside new governance structures. Whitehead (2003 p.13) found that the shadow of hierarchical power was both assisting the formation of local political networks (enabling the political and economic changes through governance in a context of changing patterns of state power, strategy and intervention; and breaking down the definitions of government and governance to create a hybrid form of both (Whitehead, 2003 p.6-7)), whilst simultaneously threatening and inhibiting the autonomy of these networked structures. Thus, political coordination deserves a central consideration in contemporary political and economic devolution, particularly so with recent town planning changes with the Localism Bill.

8.3.4 Complexity and Uncertainty Affect Net Biodiversity Gains

8.3.4.1 Investment

LSE London (2008) discusses the general fears amongst stakeholders that the complexity of the network may deter investors from engaging with the regeneration programme. This is because the complexity of the decision-making and delivery chains makes it difficult for potential investors, as well as other development stakeholders and government, to understand the programme and how investment is integrated as a whole. Stakeholders pinned their hope on the HCA to make the partnership network more investment friendly, by providing information on what each partner is doing in the Thames Gateway and bringing the different elements together, to partly remedy the issues of confused leadership (LSE London, 2008; Shand, 2009 p.24). Whilst progress may have been made, the fear of putting investors off has yet to be allayed. This could also be an added contention to achieving biodiversity maximisation in the Gateway, if it is seen as further complicating stakeholders and delivery plans.

8.3.4.2 Multi-layered policies

Catney *et al* (2006) – in their Thames Gateway SUBR:IM report - note the diametrically opposed positions between the government's theoretical endeavour to rationalise and simplify the policy

process, and the practical situation of complex, multi-dimensional policy problems, which defy 'simple' policy remedies and do not match the functional structures of urban governance. Furthermore, Catney *et al* (2006) accused government of "*creating ad hoc policy responses to problems as they arise*" and particularly with brownfield regeneration, government is said to have created "*a burgeoning regulatory maze which has become unwieldy and, at times, incoherent*". They also note that with the proliferation of initiatives in the Thames Gateway, regulatory congestion is occurring with a dense layering of policy structures and regimes, which may undermine delivery. Catney *et al* (2006) suggest that part of the cause of this congestion is the 'institutional architecture', which has numerous organisations with specific policy responsibilities, causing considerable confusion and extensive development negotiations.

Catney *et al* (2006) conducted interviews with stakeholders who stressed the need for: "*greater 'joining up' and 'weaving' of planning policy at national, regional and local levels of government*". They also noted the research of Parsons (2004), who suggested 'policy mapping' and 'policy weaving' as two methods of building policy capacity and coherence within the Gateway. Catney *et al* (2006), explain that these two processes would essentially entail government 'mapping' all of the relevant policies and organisations and illustrating a course for 'good' implementation, as well as government 'weaving' policies together, by " '*integrating competing and opposing forms of knowledge and coordinating the multiplicity of organisations and interests*". However, they point out that these two suggested processes are "*superficially appealing but they are also problematic*". This researcher would additionally argue that the suggested simplified processes, are not 'processes', but the desired 'outcomes'. Nonetheless, adopting the principles of policy 'mapping' and 'weaving' are suggested for greater coherence within the Gateway (Catney *et al*, 2008).

8.3.4.3 Infrastructure

A range of actors responsible for housing delivery in London have expressed concerns about whether the necessary 'infrastructure' (i.e. schools, roads, parks) would be in place and suggested that there needed to be 'one guiding hand' (BBC news, 2007a). These strategic issues within the Gateway, will have a knock on effect on strategic elements of mega-developments, such as the GI: "*in the Thames Gateway, infrastructure issues are hampering the efforts to regenerate the area in a holistic way and governance structures provide a maze which developers find difficult to navigate through, despite the strong focus on sustainability in UK planning policy*" (Dixon, 2007b).

In his keynote presentation to the Thames Gateway Forum, Porritt (2006) laid down three simple conclusions regarding the focus required on climate change, sustainable development and the Gateway. These were: climate change mitigation; climate change adaptation; and biodiversity enhancement. Discussing the latter, he stated that the Essex, Kent and London Wildlife Trusts had expressed their concern that enhancing biodiversity would "*get lost in the scrum as new developments are brought forward*" and that although the government had set up a special 'green and biodiversity' projects fund for the Gateway, in the region of £26 million, there were considerable concerns: "*we are not addressing ourselves strategically to the importance of maintaining those green lungs for this part of the world, those critically important areas of conservation value which will make such a difference to people who move into this area*..." (Porritt, 2006). With regards to this thesis, this really illustrates the need for both leadership on GI and re-prioritisation of biodiversity in relation to sustainable development.

8.3.5 Governance

8.3.5.1 Traditional and new governance in the Gateway

Relationships between different scales of government are going through continual change (Greenwood & Newman, 2010). However, central government has been accused of undermining leadership in the Gateway, due to its constant ad hoc and incoherent intervention, which has resulted in congested and fragmented governance structures (Catney *et al*, 2008).

Allmendinger and Haughton (2009) recognise that both spatial planning processes, and state restructuring processes, are changing and becoming increasingly intertwined in the Thames Gateway. They believe this is creating a new generation of 'soft spaces' (between strategy and delivery) and 'fuzzy boundaries' (of sectoral and professional boundaries) in the emergent planning system, which highlight complexity, evolution, and political struggle, included under the umbrella term 'metagovernance' (Allmendinger & Haughton, 2009). Brownill and Carpenter (2009) note that the Gateway has an increasing emphasis on social, economic, democratic and environmental integration within planning practice, and that newly emerging forms of networked governance are revealing conflicts and tensions between these different elements. These conflicts and tensions are occurring between horizontal, networked governance, which requires hierarchical leadership, and a delivery and participatory governance focus (Brownill & Carpenter, 2009). As a uniquely large and complex regeneration area, the Gateway is essentially offering experiments in different forms of governance.

Greenwood and Newman (2010 p.106), explain the differences between 'traditional' and 'new' or 'spatial planning' processes. With 'traditional' processes, the market model is based on hierarchical structures and decisions, which conform to formal, legally defined vertical boundaries. 'Spatial planning' on the other hand, has greater emphasis on partnership and collaboration between private and public actors, *"with a more networked polity and emergence of horizontal connections*" (Greenwood & Newman, 2010 p.106). Greenwood and Newman's (2010, p.107) list of three key roles for actors involved in new spatial planning, can be summarised as: 1) coordinated and integrated decisions; 2) collective action with public participation; and 3) increased prominence to certain policy goals, such as sustainable development.

Nevertheless, Greenwood and Newman (2010 p.106) point out that "*Decision-making on large projects reveals a market-driven planning process",* which they argue "*circumscribe strategy-making and the choices left to spatial planning*". Traditional planning has maintained a decisive role in the complex meta-governance of the Gateway, with continuing strong central direction clearly visible in relation to mega-developments, and the range of emerging solutions to transdiciplinary and transboundary issues, which add uncertainty into the new spatial planning system (Greenwood & Newman, 2010 p.108-116). Furthermore, Greenwood and Newman (2010 p.117) believe that although traditional planning will slowly become replaced by new practices, the continuing separate decision making process for large developments will continue, along with confused sustainable development definitions, participation and effective planning. Dixon (2007b) noted that research into the Gateway, suggested that a balance between strong leadership and collaborative working was needed for success with partnership vehicles (such as joint ventures): *"These require a sense of 'vision and leadership*" (Dixon, 2007b).

Thus, in order to promote the biodiversity agenda in the Gateway, it will be important to re-link biodiversity as a key sustainability goal with central government, and that public awareness of biodiversity issues and values are engaged.

8.3.5.2 Environmental focus or green wash?

Large regeneration schemes and developments are often criticised for 'green wash', rather than proposing and implementing with a true environmental focus. Interest in the Thames Gateway's environmental credentials has been fuelled by London's successful bid to host the 2012 Olympics, and there has been a drive to achieve low carbon development, due to the awareness of serious environmental obligations surfacing from climate change (CABE, 2009d). Some organisations (e.g.

CPRE) and governmental representatives believe that the Olympics will help achieve development goals and gain public backing (BBC news, 2007a), and that this will "*accelerate the introduction of environmental considerations across public policy*" (Hayes, 2008). The focus on the low carbon agenda versus the biodiversity agenda is discussed in s*ection 5.3.2.5*.

The London Olympics is of particular relevance to biodiversity in the Thames Gateway for two reasons. Firstly, the games will primarily be held within the regeneration area. Secondly, during the mid-1990's the International Olympic Committee (IOC) announced that, alongside sport and culture, 'environment' was to be the "third dimension" of the games (Hayes, 2008), and the IOC especially noted London's bid due to a strong emphasis on integrating environmental considerations (BBC, 2005a).

There will be numerous organisations and stakeholders watching to see if the London Organising Committee for the Olympic Games (LOCOG) will live up to its 'green' promises. With a television audience of more than 3 billion viewers, and the memory of the damning reports on the environmental impacts of the Athens games produced by the WWF and Greenpeace (Hayes, 2008), LOCOG will be keen at least, to be 'seen' to deliver the green agenda. As Jenny Jones, a Green Member of the London Assembly put it, when speaking of the visitors and film crews to the games: "*They will be testing whether the reality matches the brochure*" (Sustain, 2007 p.23).

Nonetheless, question marks over 'green wash' have already begun (Hayes, 2008). A damning report on the low environmental standards being set has been written by the London Green party (TimeOut: London, 2007), albeit, no doubt contestable. Action research carried out by this researcher during arboricultural surveys in Hackney Marshes in 2009, revealed that at least some of the local community and one environmental community group were extremely cynical about development proposals, which they do not seem to be consulted upon, or informed about. Furthermore, during the course of a research interview, a member of one of the environmental QUANGO's also noted that "*any fears raised regarding biodiversity issues were immediately quashed, and there was a distinctly strong impression that the Olympics developments were not to be criticised*" (Annon, 2009).

Discourse analysis of documentation across the Gateway, highlighted a potentially inadvertent, yet pervasive tendency for 'green wash'. This was characterised in website information, company and departmental literature, and specific case study literature, by biodiversity proposals which

used generalist and evasive phraseology, terms and descriptive nouns to describe intent. These general proposals never materialised into more detailed information stages. As Meadows (2008 p.14) says "*If a government proclaims its interest in protecting the environment but allocates little money or effort toward that goal, environmental protection is not, in fact, the government's purpose. Purposes are deduced from behavior, not from rhetoric or stated goals*". Nevertheless, it still remains to be seen whether the Gateway, as a whole, will live up to the high expectations, as success or failure will only be fully realised over the coming decades. It is nonetheless increasingly obvious that for true ecological and biodiversity success, there will need to be a shift in true prioritisations and greater prescriptions and details afforded to stated biodiversity goals.

8.3.5.3 Prioritisation

Prioritisation of Economic, Social and Environmental Aspects

Dixon (2007b) describes how, despite existing government definitions, stakeholders have developed an array of terminology, such as 'liveability' and 'neighbourhoods of choice', to contextualise their goals, which reflect their background and roles. The resulting inconsistent approach, leads to both confusion and sustainability remaining a contested approach. It is therefore a major challenge, to define more closely what 'sustainable communities' really comprise (Dixon, 2007b).

Terms from the late 1970's, which promoted a sense of what is 'good', positive and desirable, (for example: efficiency, competitiveness, the 'economy'), represent misnomers in terminology, evolving to manage clashing value practices in "*the requirements of capitalist priorities in an increasingly marketised, socially polarised and environmentally unsustainable world*" (De Angelis, 2008 p.68). This was known as '*neoliberal governance' and "What today is called 'governance' is the name given to the neoliberal version of what Foucault called 'governmentality'*" (De Angelis, 2008 p.68). Governance seeks to embed the market values of competiveness through the method of addressing the vast array of social and environmental problems (De Angelis, 2008 p.68). It promotes societal participation in political processes.

Reading much of the literature commissioned by the government, or government bodies (e.g. Parklands), the layperson and even planning professionals could be forgiven for believing that the 'Eco' in 'Eco region' stood for ECOnomy, rather than ECOlogy. Even the Eco region prospectus for the Thames Gateway stated the following:

""Eco" can mean both "economic" and "ecological"…. We see the Thames Gateway eco-region as a place where economic and social development take full account of the imperative of ecological sustainability, and where environmental projects are designed and delivered in an integrated way, bringing maximum social and economic gain as well as ecological value" (DCLG, 2008b p.11).

In an Australian survey, Individual sustainability leaders from twenty five councils listed eleven key reasons for their respective Council's resistance to sustainability initiatives. In the experience of the researcher, all of these reasons were also applicable to the UK context, but the most relevant to this chapter was: *"Lack of political understanding, and ownership, of sustainability issues*" (Critchley & Scott, 2005 p.149) [i.e. accountability]. Critchley and Scott (2005 p.152) elaborate that, with the exception of the occasional 'green development', the fact that most developments fail to meet basic tenets of sustainable urban design, is testament to government's reluctance to address accountability. Methods to achieve accountability are therefore an important component of solving obstacles to the maximisation of biodiversity.

Prioritisation between Different Environmental Aspects

The prioritisation of environmental risks and the narrow focus on carbon has become a global problem, and is illustrated in the Gateway through various strategic documents and visions described in this chapter. *Section 8.1.7* and s*ection 8.2.6.2* describe the pervasive prioritisation of the 'carbon' agenda over the 'biodiversity' agenda within the Gateway over the last decade. This unwarranted prioritisation must be addressed and some of the reasons for the selection of these priorities are discussed in s*ection 5.3.2* of Chapter five 'Planning and Governance'. This strategic level of prioritisation then affects all of the mega-developments which sit below the Gateway's strategies – effectively constraining professionals in respect of producing developments with net biodiversity gains.

8.3.5.4 Achieving high quality biodiverse developments through strategic leadership, governance, accountability and prescriptions

Decision making regarding strategic priorities, described in the preceeding sections, can have important implications for achieving maximised biodiversity gains. The effects of such strategic priorities will be common on other individual major and mega-developments across England. This is why the consideration of this scale of regeneration and governance; along with priorities, accountability and leadership, is so important.

Navigating successful biodiverse development proposals around such development/regeneration complexities is no mean feat. It requires a re-prioritisation of policy, where biodiversity and

ecology are provided elevated positions (in reflection of global urgencies), and cohesive leadership provides a strong voice to the biodiversity agenda through effective governance structures. This could then push forward much needed innovative and radical design and management solutions. Changing prioritisation would effectively change everything else. This re-prioritisation of biodiversity would need to equally occur within: politics, culture, governance, legislation, and enforcement.

Kerslake (2009 p.83) states that no one agency, or government, can single-handedly be responsible for the Gateway reaching its full potential, but the role of the HCA in the Gateway is to: "*cultivate a collaborative and mature partnership approach – one in which partners share the vision and the responsibility*". In order to strengthen their strategic approach, the HCA have established 'the Thames Gateway Strategic Partnership Executive Group' - to guide pan-Gateway decisions (Kerslake, 2009 p.83). Kerslake, who is responsible for the HCA, was essentially positioning the HCA for a leadership position over the Gateway with this statement, but since this statement the government has ordered substantial restructuring of the HCA, as part of its spending review in 2010. Consequently, the effects of the proposed re-structuring could again affect delivery within the Gateway. McDonald (pers. comm, 2009) of Natural England, believes that solutions to some of the key obstacles to maximising biodiversity in mega-developments within the Gateway, include: maintaining good networks of communication and relationship management, along with an understanding of power and control, and involving chief executives in solution finding.

This researcher believes that biodiversity prescriptions are necessary, yet they also need to be flexible at this strategic level. In describing successful strategic frameworks in the Gateway, the NAO – the National Audit Office - (2007) encapsulate this idea perfectly: "*it also needs sufficient flexibility to allow local agencies and partnerships to react to local conditions and to encourage innovation and investment from the private sector, rather than deter it with too much bureaucracy"* (NAO, 2007).

8.4 KENT THAMESIDE: ONE OF THE TRANSBOUNDARY INITIATIVES WITHIN THE GATEWAY

Kent Thameside is one of the smaller sub-regeneration areas of the Thames Gateway. It is at a spatial level between the Thames Gateway and the Eastern Quarry development (EQ2). EQ2 is

located within Kent Thameside, which itself is located within the Thames Gateway. This spatial hierarchy is illustrated in *Figure 12*. As it sets the regeneration context, it is useful to consider this bridging / nested hierarchy here, prior to looking more closely at EQ2 in the following chapter.

EQ2 fell into the regional context some fifteen years ago, and the 'anchors' for development first occurred with the construction of both the adjacent 'Bluewater' retail development, followed by the Ebbsfleet International Station (Farley, pers. comm, 2009). Liston-Jones (2009 p.22) explains the significance of the new high-speed rail service accessed at Ebbsfleet International station, which significantly reduced journey times across North Kent; and to central London and European cities. Furthermore, the new urban mega-development at Ebbsfleet, which is physically separated from EQ2 by an existing road (see *Figure 15*) is another development driver, and is envisaged as the international commercial centre (SEEDA, 2009; Dartford Borough Council, 2009). The Ebbsfleet urban centre will create 20,000 jobs and 10,000 homes, with the first residents already moved in (Liston-Jones, 2009 p.22).

Figure 15: A diagrammatic representation of how EQ2 (to the left of the plan) and Ebbsfleet (to the right) relate to one another. The plan was produced by Land Securities (BBC News, 2007b).

Particularly related to the announcement of the construction of the Ebbsfleet international channel tunnel station (see *Figure 15*), was the creation of The Kent Thameside Partnership (KTP) in 1993, to capitalise upon the changing development opportunities in North West Kent. These opportunities also included the emergence of the Thames Gateway regeneration programme (SEEDA, 2009; TGKP, 2009; DCLG, 2009c). Kent Thameside covers the jurisdiction of Dartford and Gravesham Borough Councils, as well as the more overarching authority of Kent County Council.

The partnership began informally with: LA representatives; the largest developable land owner 'Blue Circle Industries' (BCI), who owned 1,000 ha; the University of Greenwich and London; and Continental Railways (Dartford Borough Council, 2009). Over 24,000 residential units are targeted here between 2006 and 2026 in the South East Plan (TGKP, 2009).

Kent Thameside illustrates a typically 'Market-led' approach to governance and development decisions. This is because BCI, as the majority landowner, used their position of power to lobby central government for the international station at Ebbsfleet, and to influence a pro-growth focus in Regional Planning Guidance (RPG) Note 9A (GOSE, 1996). In terms of ecology and biodiversity, the partnership produced a consultation document, 'Looking to the Future', published in 1995 (KTP, 1995). One of the five 'principles of sustainability' referred to in this document was: "*A green place – where, for example, proper regard is given to nature conservation*" (KTP, 1995; Hull, 1998). Within Kent Thameside the Kent Wildlife Trust (KWT) assumed the strategic overview for biodiversity. KWT specifically used GI as a vehicle for achieving strategic success, following from the wider 'green grid' initiative. KWT developed a suite of four guidance documents relating to GI and biodiversity, which although they have not been formally adopted by the LA (due to consultation requirements), is viewed as a material consideration and has been distributed widely by the Trust (Young, pers. comm, 2008). There are also other partnerships with interests in 'greening' the area, although less biodiversity focused; for example, the 'Greening the Gateway Kent and Medway' Partnership (GTGKM, 2009).

Regardless of the presence of this regeneration partnership, the consideration of strategic biodiversity was only partially evident. For instance, an area wide ecological survey and BAP was present, yet two sites (Ebbsfleet and EQ2) did not have consistent requirements for 'Site' BAPs, due to being located within different LA administrations (EQ2 has a site BAP, and Ebbsfleet does not) - despite LA representations within the partnership (Smith, pers. comm, 2009). This implies that biodiversity issues were not wholeheartedly prioritised by the partnership.

8.5 CONCLUSION

Through the investigation of the Thames Gateway regeneration area, it has become clear that all of the key obstructions to gaining biodiversity at this strategic level are related to prioritisation and accountability. The decisions to select and prioritise particular policies and agendas over others have been established through the production of strategic documents and regeneration area visions.

Furthermore, the contextual frameworks of governance in the Thames Gateway have led to these prioritisation decisions (albeit also influenced through a lack of social and political appreciation of the global ramifications, or indeed the local ramifications of biodiversity loss in some instances), and have been responsible for a lack of accountability. The type of governance affects the following: planning processes, power interplays, degrees of transdisciplinarity, visionary concepts, funding decisions, and socio-ecological resilience. In turn, these mechanisms all affect the likelihood of maximising biodiversity on individual sites.

On the other hand, the two most influential strategic biodiversity related strategies, which are apparent at the Gateway and the Kent Thameside spatial levels of consideration, are: GI and BAPs. These conceptual frameworks have successfully woven through spatial hierarchies and will now be investigated at the individual mega-development level (EQ2), which fits within the Kent Thameside area of the Thames Gateway region. *Table 6* located at the end of *Chapter nine,* summarises the Study One findings, from both this chapter (Study One (A)), as well as those from *Chapter nine* (Study One (B)).

9 STUDY 1(B) - EASTERN QUARRY (EQ2) AND BARKING RIVERSIDE: BIODIVERSITY CONSIDERATIONS AND PROJECT MANAGEMENT FOR MEGA-DEVELOPMENTS

"It is also clear that the projects with which the developers are engaging today are complex, have long life cycles and involve peoples' homes, jobs and future lives."
(Dixon, 2007b)

9.1 CHAPTER INTENTIONS

9.1.1 Intentions and Methods

This case study investigates a mega-development set within the framework of the larger regeneration area of the Thames Gateway; and the impacts to biodiviersity from the professional, political and social prioritisations integrated within such a development. *Table four* in *Chapter seven* lists the key theory themes, which will be covered in this chapter. These include:

- Vision
- Biodiversity and GI proposal documents
- Deterrants to prevent 'green wash' and low socio-ecological resilience
- Specialist knowledge and transdiciplinary and transboundary issues
- Phasing and project management issues

The case study also offers an appropriate degree of 'triangulation' amongst the overall research methods, owing to its varied and related development context. In addition to uncovering new insights, one of the key objectives of the chapter is to test and explore some of the findings from the ALGE questionnaire (See *Chapter three*), for example:

- the low prioritisation of the biodiversity agenda;
- the effects of biodiversity specialists and detailed knowledge being present / absent;
- enforcement;
- policy and procedures (e.g. timing of ecological advice);
- mis-direction of funds;
- recording and communication; and
- incentives and promotion.

Interviews also provided an effective form of triangulation within the case study, as diverse views were captured. A list of interviewees is available in *Appendix 3*, and key interviewees are depicted in s*ection 7.1*.

9.1.2 Limitations of the Study

9.1.2.1 Market effects on the research methods

The economic environment and associated site hibernation, has limited the amount of action research undertaken during the research period. However, this in itself was a useful process to consider, as large projects often go into hibernation for a variety of financial reasons, or changes in the market. For example, the price of prominent building materials may have substantial fluctuations e.g. steel, requiring periods of further investment negotiations. *Section 9.8* and *9.9* discuss the 'hibernation' effects to the development programme, the biodiversity proposals, and the future risks. Whilst these hibernation effects are considered, the case study focuses on the progress and agreements reached prior to this phase.

9.1.2.2 Scale

Due to the development's sheer size, it is not feasible to discuss all of the detailed development processes and data. In order to highlight and select the most pertinent elements, with the most far-reaching and replicable capability (to inform similar future developments), the following measures were taken.

Firstly, a review of all of the site biodiversity and planning literature was undertaken. This included draft proposals and indirectly relevant surveys and reports from other disciplines. The researcher's professional skills in identifying areas of concern, or conflicting proposals within development documentation, were capitalised upon during this process. Subsequently, a 'snag list' of potential difficulties was identified and planning and project management mechanisms for achievement were analysed. Prominent points in the 'snag list' then formed the basis for questions in initial interviews, with both the planning case officer for the LA (Bunn, pers. comm, 2007), and the statutory ecological consultee at Kent Wildlife Trust (Young, pers. comm, 2008). The findings from these interviews began to focus the lines of future inquiry, and an iterative process of ongoing data analysis, and interview and action research insights ensued. The research methodology is described in *Chapter two* and s*ection 2.3.3* explains particular case study methods used with this particular study.

9.1.2.3 Development Phases

Prior to the initiation of this research, the development had gone through the inception, feasibility, outline design and planning submission process, which meant that these phases could be analysed retrospectively. During research, significant earthworks were underway in

preparation for the main construction phase and the beginning of more detailed design and management proposals, which meant that these phases could be analysed longitudinally. Whilst, the full construction, detailed design, completion, and management phases of development have not significantly commenced, the preparation of a management company and management plans, planning conditions and professional opinions concerning these future phases, allows analysis of the projected 'intent'.

9.2 EASTERN QUARRY (EQ2) DEVELOPMENT CONTEXT

9.2.1 Location and Site Context

Situated within the Thames Gateway, the Eastern Quarry (EQ2) mixed-use development is influenced by the decisions and governance frameworks present in the wider regeneration area. The extent of this influence will be explored (summarised in *section 9.10*), in parallel to identifying biodiversity obstacles and solutions which are unique to this spatial level.

The development site is within close proximity to the River Thames (see *Figure 16*), and is approximately one square mile in area (DCLG, 2008e). It will provide 6,250 residential units alone (Dartford Borough Council, 2007a), and was classed as the largest scheme of its kind to gain planning permission in 2003 (Smith, pers. comm, 2005; DCLG, 2007a; RUDI, 2008), with the final development costs expected to run into billions of pounds (RUDI, 2003). The development is situated within the Ebbsfleet Valley, Kent Thameside and administered by the Dartford LA. EQ2 constitutes one of two mega-developments within the Ebbsfleet Valley, the other mega-development being based around the Ebbsfleet International Station, and administered by Gravesend LA, as explained in s*ection 9.1.3* and illustrated in *Figure 15*.

Figure 16: Aerial photo depicting the site boundary for the original development proposal (EQ1) via a yellow line, and the proximity to the River Thames (Rand, 2003 p.12). The later omission of the electric substation (in the bottom right hand corner of the site outline) created EQ2.

Prior to development, EQ2 was a 'part active' chalk quarry, until operations ceased across the whole of the site in 2008 (Farley, pers. comm, 2009). There has been a long history of quarrying on site, with clay first being extracted by hand in the 1900s, and chalk excavation beginning in the 1930s (BBC News, 2007b).

As a consequence of the site's previous quarrying activity, chalk cliffs extend up to the equivalent of ten double-decker busses in height (BBC News, 2007b). The extreme topography and quarrying activities, has formally restricted public access to the site on safety grounds, for around a century (RUDI, 2003). Consequently, this limited access will have affected the ecological services provided by the site to the local community, and hence impact upon socio-ecological services which could be provided by the site, thus impacting also on socio-ecological resilience (see *section 9.3*). The exception to this is an area named 'Craylands Gorge' – which is conspicuous on the site outline in *Figure 16* as a 'dog leg' running towards the River Thames. Here, limited illegal activities, such as fly tipping are evident. Nevertheless, the restricted public access and associated dog walking, has effectively provided a site 'sanctuary' to areas outside the 'active 'quarry workings.

Although the planning brief for EQ2 confirmed there were no statutory or non-statutory wildlife designations, numerous strategic assessments and detailed surveys have uncovered a multitude

of ecologically important habitats and species on site. These include a number of protected, rare, and uncommon species, ranging from birds - such as kingfishers and black redstarts - to reptiles, amphibians, invertebrates, mammals and diverse assemblages of flora. The distinctive range of landscape features, from the steep sided cliffs and quarry waste, to the alkaline water retained in large pools, has enabled the evolution of atypical habitats within and around the quarry workings. Furthermore, the white colouration of the cliffs and quarry floor have accounted for a large degree of reflected solar energy, creating a 'heat trap' which benefit ectothermic (cold-blooded) animals, who rely on external heat sources; thus accounting for the relatively large reptile population. The planning brief advised that surveys should explore locations for the creation of new environmental capital; and where possible, support targets in the Kent Biodiversity Action Plan (Dartford Borough Council, 2002 p.9). Notwithstanding the site's former use for chalk extraction,

Therefore, 'protection' of existing biodiversity is a high priority for site development. Regrettably, this entails the translocation of specific species to newly created or temporary holding areas. Nevertheless, biodiversity enhancements and de-fragmentation of habitats, through new habitat creation and provision of GI are advantageous. This, coupled with sensitive ecological management of the site, will provide opportunities to move from a biodiversity 'balance' (following the implementation of protection and adequate compensatory measures), to a net biodiversity 'gain'. However, this willl only occur if the site is designed, implemented, and managed appropriately, which illustrates the importance of the existence of a site BAP.

9.2.2 Development Context and Initial Design Concepts

The development 'anchors' for EQ2 are explained in Section 8.4 (Kent Thameside).

Initially, central government influenced the site at EQ2, by land allocation in the Regional Spatial Strategy. The Kent Structure Plan's Third Review outlined the future development of an urban village in the Ebbsfleet Valley, requiring the release of 260ha from the green belt, and involving 15,100 new homes in Dartford and Gravesham Boroughs (Hull, 1998). EQ2 was then LA led through the Dartford Development Plan and agreement with the landowners, 'Lafarge' (Farley, pers. comm, 2009). In 2002, the LA adopted supplementary planning guidance to provide a brief for site redevelopment (Dartford Borough Council, 2002). This document referred to the Local Plan Review Second Deposit Draft, which identified the site for a 'predominantly residential mixed use, public transport orientated development', and also the Kent and Medway Economic Board's Action Plan. This action plan promotes three key aspects, which included 'Green Growth': "*that*

promotes sustainability through greater public transport use, innovation in design, reduced waste and increased recycling" (Dartford Borough Council, 2002 p.6). The inclusion of 'innovative design' is particularly relevant to the biodiversity proposals on site, and will be discussed further in this chapter.

EQ2 was amalgamated with the Ebbsfleet development in the original masterplanning exercises, by the accomplished American architect Eric Kuhne, who was keen to create an environment which was organised around resident wellbeing (Smith, pers. comm, 2005). Kuhne's background was in art and architecture and his masterplan drawings in 2001 reflected this with seductive graphics and interesting 'built' massing and form around the Ebbsfleet centre (CivicArts, 2001). This is illustrated in *Figure 17* and *18*, which combine both mega-developments. At this time, a higher density of 10,000 residential units was being considered within five urban villages and these new homes were envisaged as providing a 'resort character' (CivicArts, 2001).

Figure 17: Kuhne's original masterplan for the whole of the Ebbsfleet Valley (CivicArts, 2001).

Figure 18: Kuhne's graphic representation of the 'Ebbsfleet City' (CivicArts, 2001). The apartment blocks and parkland in the bottom half of the illustration are within EQ2, but the parkland area to the River Thames side of these blocks is not part of EQ2.

In terms of biodiversity value and visioning, the original conceptual masterplans, drawings, and ethos' promoted a formal historic parkland landscape. For instance, in *Figure 18* illustrating the 'Ebbsfleet City', traditional parkland is inferred by the graphics, and also in the prose where Kuhne has stated that "*large lakes and an "exuberance" of parks and civic displays. Triple rows of trees will line either side of a dedicated bus route called Fastrack*" (Smith, pers. comm, 2005). Kuhne also proposes that EQ2: "*will restore the spirit of the English Town out of the detritus of an industrial wasteland*" (CivicArts, 2001). This kind of formal traditional landscape (with the exception of the large lakes – required for reasons of topography and flood issues) are suited to vast, open areas, but seems inappropriate for a high density urban environment, which requires multifunctional spaces in relatively compact areas. Furthermore, a 'parkland' approach to landscaping will not enable vegetative screening functions, or adequate 'cover' for the movement of many species. Nevertheless, this imagery is conflicted by Kuhne himself, when he states that EQ2 will be "*putting more emphasis on commerce and education instead of open space and distance*" (CivicArts, 2001).

It is clear from the literature that biodiversity considerations did not inform EQ2's early concept masterplans and that Kuhne had been commissioned partly on the strengths of his design at the neighbouring 'Bluewater' shopping mall (Smith, pers. comm, 2005; CivicArts, 2001): a very different landuse type from EQ2, with less design considerations. From previous professional

experience, these 'concept' schemes have a history on smaller 'major' development projects, of being drawn up by creative architectural practices, which can have great advantages for the aesthetic style and form of the built environment. This creative freedom is aided by the lack of consideration for certain constraints, such as detailed planning policies and site data. Masterplans are then progressed into more realistic schemes by new teams, who start to 'unpick' the details and take constraints into consideration, whilst attempting to remain true to the concept scheme. This particular approach of visualising a specific future and then working / designing backwards, is one method of designing (named: 'anticipatory') out of a possible eight identified by Professor Steinitz of Harvard University (Steinitz, pers. comm, 2011a) – although five key methods are described in his online video (Steinitz, 2010).

Other urban design theorists were considered in examining the approach at EQ2 (such as the famous urban designer, Kevin Lynch – who analysed and wrote about numerous city design 'theories'). However, there were no other explanations of design 'processes' as well developed as those by Steinitz, who has been developing his list over the last forty years through extensive practical and academic explorations (Steinitz, 2010).

The anticipatory concept design approach at EQ2, led by an architectural firm, was not the best design approach for ensuring biodiversity protection and enhancement. When this should have been one of the key considerations for such a large scale scheme with greengrid priorities and the need for 'place-making' for thousands of future occupants. Whilst these 'concept' or 'anticipatory' designs may work well on much smaller 'major' schemes, the number of considerations to be taken into account on one of the largest major developments would really deserve a 'combinatorial' approach to design. This could also consider the inclusion of elements of 'constraining', and 'optimising' design approaches, as described by Steinitz (2010). Steinitz (2010) quotes Galileo, who states that "*Many devices which work on a small scale do not work on a large scale*", and notes that this is true of design methods - they are not always appropriate for different scales. Steinitz (pers. comm, 2011b) also notes, in personal communications, that:

"*the opening game is the most important to get right, and that the opening way does matter. I also think that one needs some level of consistency (probably only one or two ways) and that this is to be decided by the collaborators in a study. What I am sure of is that in a collaborative study no one should decide for him/her self on an idiosyncratic basis*".

Steinitz's general design observations above are confirmed at EQ2 through the comparison of the concept scheme masterplan (*Figure 17*) with the masterplan which gained planning approval

(*Figure 19*). It is clear, that despite the reduction in the number of residential units (resulting in three villages instead of five), the general concept layout pattern (the opening game) remained the same (illustrating the importance of decisions made in the initial scheme). Due to the size of the scheme, a collaborative study/design process had to be at least present in the second stage of masterplanning in order to satisfy the LA that necessary planning policies had been taken into account prior to permission. Nevertheless, by this point, the design foundations and priorities had already been laid. For this scale of scheme and type of development, it would have been advantageous to use a combinatorial approach, to ensure that the 'right' decisions were made at the beginning. In terms of biodiversity, this may have affected GI siting and associated physical attributes, then also affecting habitat function, species mobility and diversity.

Following Kuhne's concept masterplan, Barton Willmore (an integrated planning and design consultancy) took over and spent five years working up the EQ2 masterplan, prior to a second 'Outline' planning permission being granted in 2007 (Barton Willmore, 2008). In 2003 'Outline' planning permission was first granted (the largest consent awarded in the UK at the time) for EQ1, which was a 300 hectare site (Smith, pers. comm, 2005). This first consent was modified to a slightly smaller application, as agreement could not be reached upon the financial compensation for relinquishing the 'National Grid' station, which had taken up a small part of the site (Farley, pers. comm, 2009). An application was then submitted to amend the application boundary, to exclude this area and form EQ2, which was awarded planning consent in 2007 (Farley, pers. comm, 2009; Bunn, pers. comm, 2007). The substation site, now known as: Northfleet West Sub Station site (NWSS), is being developed by 'Second Site Property Holdings' and received an 'Outline' permission for a mixed-use development in 2005 (Dartford Borough Council, 2005a).

Bunn (pers. comm, 2007), the Dartford Planning Officer responsible for EQ2, stated that the two different developers did not collaborate and refused to share information - hence the general strategies were not marrying up. This created a number of issues for the overall regeneration of the area. For example, there were access issues for NWSS, along with problems with the shared facilities which affect sustainability aspects (Bunn, pers. comm, 2007). Whilst the NWSS site is no longer a research consideration, its relationship with EQ2 highlights the importance of: partnership, collaboration, and communication, for reaching sustainable solutions.

9.2.3 A Précis of the Proposed Mega-development

The EQ2 masterplan comprises a series of three urban villages, which will include up to 6,250 residential units and 231,000 sq meters of built floorspace for mixed uses, and associated infrastructure (Dartford Borough Council, 2007a). The villages will be linked by one and a half miles of Fastrack bus lane, which will also connect the market centre in the heart of the development. They will also be bordered by parks, ponds and woodland (RUDI, 2003). DCLG (2008e), in discussing the GI at EQ2, stated that: "*Defining and characterising the development will be a range of formal and informal open spaces including lakes, parks, woodland, sports pitches and ecological areas linked by pathways and cycle tracks*". This statement reveals the priorities placed upon GI as a visioning and 'defining' component of the development. It also mentions both sports pitches and ecological areas (formal and informal landscape), which induced conflicting functional ratios and needs during the design and planning stages of GI (this is further discussed in general GI terms in *section 6.4.2.2* and in EQ2 speific terms in *section 9.6*).

The successful execution of these proposals is of importance to a number of development stakeholders for diverse reasons. In particular this is important to the LA, who has a duty to their local constituents and to follow legislation and policies; and to the developer - who needs to make a successful economic profit - it is necessary to create an attractive place where people will want to live and work.

Figure 19: The approved site masterplan (Dartford Borough Council, 2008).

As the largest UK mixed-use development in 2003 (Smith, 2005; DCLG, 2007a; RUDI, 2008), the scale of development had a projected construction phase alone in excess of twenty years. Such long-term 'active' development periods have particular intricacies and complexities which must be considered in relation to biodiversity. These include: temporal and spatial hierarchies of guidance documents; agreements and policies (internal and external to the site); the involvement of numerous actors and organisations; and, a wide palette of regulations and market influences. These issues will be investigated in the remainder of the chapter.

9.2.4 Current Situation with Respect to Biodiversity

By 2008, the following development activities were completed: a development platform over the remnants of quarrying activity; major earthworks and the species translocations; planting schemes along cliff boundaries within the Eastern Local Park; one of the first villages' streets; and the ground modelling and reed planting of one of the large habitat enhancement lakes (Fermor, pers. comm, 2009&2010; Bunn, pers. comm, 2010). Further detailed planning applications will be made in due course for each development parcel (each village and significant element of the development), and some initial progress was made regarding the detailed design of some areas (although this halted due to the recession).

The recent UK recession and cuts in government funding have had serious ramifications for EQ2, due to 'the market' and increased developer and investor 'risk' adversity. This, in addition to Land Securities' (the EQ2 developer) share prices plummeting from £22 to £3.50 owing to the recession (Farley, pers. comm, 2009), has left the site in a period of 'hibernation' since late 2008. During this current hibernation phase, biodiversity interests are maintained on the site with surveys and certain Site Biodiversity Action Plan (SBAP) items still being executed. This is attributable to the commitments in the planning submissions and protected species licenses, as well as to keep the planning application live (Fermor, pers. comm, 2009 & 2010; Smith, pers. comm, 2009).

9.3 LOCAL POLITICS AND SOCIO-ECOLOGICAL RESILIENCE

The researcher of this thesis has noted during past professional experience, that decisions within local politics can often significantly affect the biodiversity levels on individual development sites. This has certainly been the case with EQ2, and Bunn (pers. comm, 2007) the case officer for EQ2 at Dartford LA, explains how, following local elections, Dartford's local political leadership changed to a party who were more opposed to EQ2, due to an alliance with the Swanscombe and

Greenhive Town Councils (on the EQ2 boundary): "*Several members on the Council were also members of the Swanscombe and Greenhithe Residents Association"*. Bunn (pers. comm, 2007) elucidates that the new party partly gained power due to this Residents Association, who they subsequently needed to satisfy and maintain strong links with.

Whilst there were no particular concerns from council members regarding biodiversity on the EQ2 development, as: "*Members' biggest concerns were regarding transport issues and density"* (Bunn, pers. comm, 2007), politics 'did' indirectly have a considerable impact upon the potential biodiversity to be gained through the development. This related to the locations and widths of GI, which were influenced due to political pressure (Bunn, pers. comm, 2007) - this is discussed in greater depth in *section 9.6*.

This depiction of local politics illuminates that individuals with decision making powers over major developments, are not always in impartial positions. This kind of democratic process can be swayed by one powerful group, or several vociferous individuals, who may not be representational of the general electorate. Thus, the influence which local politics can have on mega-developments can be powerful, and vice versa. This case study illustrates the inextricable links between biodiversity proposals and priorities, local politics and socio-ecological resilience, or, in this case the lack thereof. This is at least partly owing to the previous lack of public access to the site (explained in *section 9.1.1*), coupled with the residential demographics and high prevalence of social issues.

From the designers' perspective, Rand (2003 p.18), the masterplanning partner at Barton Willmore, describes a battle concerning early greenspace proposals, which related to requests by a number of people [presumably the residential groups] for providing seventeen playing fields, which he felt was excessive. Rand suggested a more balanced community age structure should be appreciated, by providing more diverse sports facilities and multifunctional spaces. Nevertheless, in discussing and providing graphical representations of more detailed concepts, no link was made to ecological or biodiversity value or design (Rand, 2003 p.19).

Yli-Pelkonen's (2008 p.354) research findings in Finland look at the effects of ecological information upon local political decisions and reflect the researcher of this thesis's experience in England. His statement below lends further support to potential solutions to maximising biodiversity outlined in previous chapters, such as the designation of biodiversity champions

within political structures (top down approach) and actively encouraging and mobilising local socio-ecological resilience (bottom up approach):

"*Results from the interviews of politicians and city officials show that ecological information becomes more important if there are significant conservation values connected to a plan area, contacts and appeals from plan participants, strong media attention or if a decision maker focuses more on the issue due to personal interests and values*."

In addition to local politics, which has been the main concern of this section, mega-developments are also affected by organisational and professional politics (which will be discussed in the following sections). Moreover, there are other formal and informal political effects, regarding site biodiversity decisions, in addition to local political affiliations, such as: the aforementioned effects of low socio-ecological resilience, and specific ecological topic groups.

An example of this latter type of politics, was present on EQ2 and affected biodiversity decisions: *"There was a local ecological group 'Kent Reptiles' who affected the site by skewing the work towards reptiles, which became a little narrow minded and took the focus away from equally important issues"* (Fermor, pers. comm, 2009). The 'Kent Reptiles Group' was clearly not specific to the development site, or to the Ebbsfleet valley, so was geographically broad in scope, whilst being narrow in subject consideration. Biodiversity was not the aim of the group, but to specifically champion one element of ecology. However, after the local group's initial interest in EQ2, they began to focus on Ebbsfleet instead - possibly indicating that they were satisfied with progress at EQ2 (Smith, pers. comm, 2009). Such specific ecological pressure group attention has a positive influence in terms of elevating ecological and biodiversity prioritisation, and promoting a fear of bad publicity, which helps to ensure proposals are properly executed.

9.4 BIODIVERSITY STRATEGIES AND EXPERTISE AT EQ2

9.4.1 History of Biodiversity Planning

Prior to any real development consideration at EQ2, the site was broadly included in biodiversity documentation surrounding the development of the international rail link at Ebbsfleet, which was completed in 1994 – 1995. Additionally, various ecological surveys were completed by Lafarge Aggregate and Blue Circle Industries, on a rolling basis to ensure compliance with wildlife legislation during quarrying activity (Farley, pers. comm, 2009).

Since the development inception and feasibility phase at EQ2, an Environmental Impact Assessment (EIA) was conducted and Kent Wildlife Trust (KWT) initially assisted with site ecological information and advice for EQ2, but once the first of these two planning applications were submitted (explained in *Section 9.2*)**,** they were effectively one of the statutory consultees. Therefore, it was only private consultants involved (EDAW and Middlemarch Environmental Limited - MEL). EDAW were the first ecological consultants to be involved, as they had undertaken background surveys for Land Securities, who became the developer. EDAW also conducted the initial SBAP and baseline surveys which were carried out in 2002 - 2003 for the planning submission (Farley, pers. comm, 2009).

As EDAW did not have a sufficient number of skilled staff to deal with the project further, MEL was appointed after the planning consent was gained. As MEL is affiliated with the Warwickshire Wildlife Trust, this facilitated communication and understanding with KWT, as they 'spoke the same language' (Farley, pers. comm, 2009).

9.4.2 Specific Biodiversity Incentives

General development incentives for gaining biodiversity were discussed in *Section 4.7.3*.1 These included: FTSE indexes; CSR (Corporate Social Responsibility); legislation; gaining planning consent; hedonic effects and a setting for Investment; and other benefits.

Farley (pers. comm, 2009), the Project Director for EQ2 between 2003 and 2009, explains that whilst all of the benefits listed above were applicable to EQ2, the FTSE indices were of especial relevance to gaining biodiversity benefits. This was owing to the fact that all of the Ebbsfleet Valley was funded from the balance sheet (i.e. not project funding from a bank), and the developer, 'Land Securities', were on the FTSE index rating, so had an interest in the social and environmental aspects of development from the outset, due to the economic advantage of performing well (Farley, 2009).

Furthermore, specific ecological legislation is involved in EQ2 due to the presence of a number of protected species and habitats. This kind of legislation can involve financial losses (although more so in development programme delays, than penalties - as described in *Section 3.3.7* and *5.3.6*), and the potential to lose CSR benefits through negative publicity, if the designated species and habitats are not adequately protected.

9.4.3 The Implications of Site Hibernation to Development and Biodiversity Proposals

During development hibernations there may be both financial and temporal implications for biodiversity proposals. The 'financial' threats relate to the economic reasons which caused the hibernation, often necessitating amendments to implementation and delivery proposals. For instance, Bunn (pers. comm, 2010) details how the current economic environment has prevented the original plans for EQ2 to 'front load' schemes with forward funds; instead each development parcel is required to pay for itself, which would be extraordinarily difficult for this size of development for a host of reasons. Additionally, a £40 million government fund for strategic infrastructure is also no longer certain, and there are modal issues with the rate of development. For example, where residential developments are not reaching enough critical mass per year for bus services to be developed (Bunn, pers. comm, 2010). These issues equate to an increased likelihood that the developer will want to divide EQ2 into a number of smaller developments and sell on. Consequently, development quality of GI and biodiversity proposals would become at risk due to re-negotiation. To combat this, the planning department will endeavour to maintain the existing framework proposals (Bunn, pers. comm, 2010).

Fortunately, despite the economic recession and fall in developer share prices, the biodiversity proposals, design, construction, and management phases are all covered by Section 106 agreements (s106, which are explained in *section 5.4.3.2* of the Planning and Governance chapter). The s106 includes budgeted obligations which are incorporated within the cost plan. These budgeted allowances include the surveys, translocations, mitigations and other outcomes of the Biodiversity Management Plan (Farley, pers. comm, 2009).

Also, due to the impacts of the ecological sequencing of proposals being disrupted, there are 'temporal' threats to biodiversity proposals during development hibernations. At EQ2, ecological reception sites have all been created, and the lack of human site pressures resulting from the hibernation phase, is actually allowing opportunities for the receptor sites to positively establish (Fermor, pers. comm, 2009).

9.4.4 Prioritising Different Biodiversity Goals

Biodiversity goals on any site can generally be subdivided into two key goals: 1) protection; and 2) enhancement. The researcher of this thesis had noticed in previous professional roles that generally, a disproportionate amount of available biodiversity budgets seemed to be spent on surveying and translocating species, in comparison to enhancing habitats. This seemed

particularly disproportionate, in consideration of the relative biodiversity benefits provided by habitat enhancement, which in a number of cases could have been greater than continual surveys and translocations. This view was also reflected in the research questionnaire (see *section 3.2.5 and 3.3.5),* where four out of sixty four LA ecologist respondents to a general comments field regarding what they thought the key obstacles to maximising biodiversity were, listed this issue. Three of the four respondents specifically related this to Great Crested Newt legislation.

Fermor (pers. comm, 2009) elucidated that 95 %, or more, of Middlemarch Environmental Limited's (MEL) - the ecological consultancies' - work is surveys, with less than 10 % of the company's turnover being linked to ecological enhancement and creative ecology. Nevertheless, this is still greater than many other practices and the intention has always been to take the company in the direction of 'creative ecological solutions', which is the company's slogan (Fermor, pers. comm, 2009).

Farley (pers. comm, 2009) provided an example of translocation expenditures in a research interview. Whilst preparing EQ2 for earthworks, £250,000 was spent to translocate one individual newt (although slow worms and common lizards were also found). This was due to meticulously following the Natural England guidance, which seemed to Farley to be an inappropriate use of financial resources simply for one, single newt. This was especially so, when the probability of finding Great Crested Newts was known to be very low, and the money could have gone to creating a better newt habitat or something more beneficial (Farley, pers. comm, 2009). This echoes the comments made in the questionnaire findings (*section 3.5.5*), regarding the same species and misdirection of funds. The current priority, favouring protection and survey measures over habitat enhancement measures, is really dictated by the regulatory emphasis afforded by Natural England and their species licences, which are a separate process from the planning consent. Having been flagged up as a specific, but pertinent, issue in several different methods of research, a solution to this should be sought (see *section 9.10.3*; *Point 18 of Table 6;* and *section 11.1*).

9.4.5 Transdisciplinary Functioning at the Site Scale

The general transdisciplinary nature of maximising biodiversity on development sites, is covered in s*ection 5.3.3* of the Planning and Governance chapter. However, Kay (2008 p.11) concisely sums up the meaning of transdisciplinary: "*Complex systems approaches go beyond interdisciplinary to transdisciplinary, which evokes emergence between the disciplines over merely working between*

them". These concepts and requirements, in relation to biodiversity, follow through down to the site-level. However, in the researcher's experience, this can be frequently overlooked by project managers and indirectly related disciplines, who wrongly believe that biodiversity, should be the sole consideration of the ecology profession. Meadows (2008 p.98) believes that in general terms, this is a common issue: "*The right boundary for thinking about a problem rarely coincides with the boundary of an academic discipline, or with a political boundary*".

Understanding and acceptance (or not) of biodiversity as a transdisciplinary issue, affects the methods of working amongst a developer's team, and the directly and indirectly related site documentation. Johnson (pers. comm, 2009), the Environmental Director of ARUP, a global multi-disciplinary planning consultancy who have been involved in Thames Gateway projects, believed one of the key obstacles to maximising biodiversity was that: "*architects / urban designers who maximise spatial use of development plots without any apparent thought to biodiversity, greenspace and their value to human health and wellbeing*". In reviewing the site and planning literature for EQ2, it was apparent that there had been limited transdisciplinary consideration of biodiversity. Consideration was really confined to the ecological and landscape consultants and did not include transport, architecture and archaeology documentation (although there were some meetings held between archaeologists and ecologists), which in some instances provided conflicting proposals. Transdisciplinary issues are further considered in this study, inrelation to GI in *section 9.6.3*, and project management of Barking Riverside (BR) in s*ection 9.8.7.4*.

9.4.6 Sourcing Specialist Biodiversity Counsel and Assistance

9.4.6.1 Ecological and biodiversity planning consultations

The findings of the ALGE questionnaire, discussed in *Chapter three*, showed that a lack of in-house ecological specialists in LAs was a key obstacle to gaining biodiversity in major urban developments. *Table 4* of *Chapter seven*: 'Preface to Study One', also lists specialist knowledge, as a key theory theme.

Although Kent City Council (KCC) has an ecological planning officer, the individual authorities working under the KCC umbrella, do not have their own specialists - this includes Dartford LA who are responsible for EQ2. No evidence could be found relating to biodiversity recommendations or comments on EQ2 from the Environment Agency (EA). However, the 'external' statutory consultee for ecological and biodiversity related planning issues is Natural England (NE).

NE's London headquarters front the strategic GI for the Thames Gateway. Owing to the fact that EQ2 was the largest site within the Gateway, McDonald (pers. comm, 2009) of NE, described in a research interview, the importance which the organisation bestowed upon good communications with the developer of EQ2. Thus, ensuring they were on board with regards to the greengrid. Nonetheless, from the researcher's experience of working in three LA's in the North of England, the resources of NE appear to be over-stretched, resulting in cursory comments, limited to the most prominent sites, and focussing on protection measures and surveys, rather than enhancement opportunities. NE was very involved in the planning submissions for the high profile site of 'The Olympic Park', Thames Gateway, which was discussed in a research interview with Coathe (pers. comm, 2009). However, the LA planning files for EQ2 (planning references: 03/01134/OUT and DA/05/00280/0UT), which record all correspondences from external organisations, only contain one six line consultation response from NE's assistant conservation officer at the Kent office (Dartford Borough Council, 2009), regarding the clarity of ecological areas being illustrated on EQ2 plans. Whilst as statutory consultee NE may well have had more involvement with the EIA scoping stages, or directly with the developer, it is still surprising they did not have greater involvement with the planning submissions and permission for the largest development in the country. This is a further indication of the lack of ecological and biodiversity expertise and resources available to the Dartford LA, and to LAs generally (see *section 3.3.3)*.

The Wildlife Trusts (WTs) have an informal arrangement with the LAs in the Gateway, as they are non-statutory. Nevertheless, Young (pers. comm, 2008) explains that throughout the Gateway, the three WTs have, through their partnership, been very involved and effective with ecological and biodiversity planning from scheme inception. KWT is often 'informally' involved with developers and their agents in general biodiversity planning application advice, in addition to their 'formal' consultation role with SINCS (Local ecological designations). Nonetheless, KWT's consultation role with the LAs has become more formalised over the years on general biodiversity issues (Young, pers. comm, 2008). This arrangement has not occurred in the researcher's own experience, so the greater influence of the WTs in this area is likely to be reliant on relationships built between organisations and certain biodiversity planning champions within the local WTs.

Discussing the biodiversity and ecological consultation role in a research interview, Young (pers. comm, 2008) of KWT, stated that of especial importance, was: "*Being brought in at the earliest stages to avoid wrong assumptions being made and to influence developments prior to other items becoming 'fixed'*." This also reflects the ALGE questionnaire findings, which revealed that

'lack of early consultation' was chosen as the most significant obstruction to maximising biodiversity at the pre-application and planning application stages, and that one in three respondents listed this as one of the top three general obstacles to gaining biodiversity (refer to *section 3.2.5 question 5 and 6*). Johnson (pers. comm, 2009) also noted the importance of early biodiversity consideration: "*Most potential for biodiversity value is achieved earlier on in the development cycle*". Young (pers. comm, 2008) agreed with this, and suggested that being brought in at the earliest stages avoids misplaced assumptions from being made, and enables the influencing of the development proposals, prior to other items becoming 'fixed'.

9.4.6.2 In-house versus external LA biodiversity consultations

Previous professional experience and the questionnaire findings in *Chapter three,* have suggested that there is no true substitute for in-house LA specialists. There are many reasons for this, such as: their familiarity with the detailed nuances of the locale; they are best positioned to cross-reference documents and plans with planning colleagues; are able to promote transdisciplinary consideration, impartially; and, have greater authoritative effect in negotiations with developers and their agents. Nonetheless, statutory and non statutory consultees can fill a valuable role in the absence of 'in-house' specialists (as KWT has had with EQ2). Additionally, the WTs in the Thames Gateway have provided beneficial strategic guidance, such as a suite of documents which relate to different spatial hierarchies of GI (Young, pers. comm, 2009).

Young (pers. comm, 2008) relayed that misunderstandings sometimes occurred on the part of developers and their agents regarding KWT's limited staff and time resources, and the fact they are not a consultancy. Nonetheless, the developer's ecological consultants for EQ2 (MEL) remarked that KWT did not have a lot of time to consider the strategic issues, and their consultations to MEL and the LA were short due to limited resources (Smith, pers. comm, 2009). Therefore, the case at EQ2 adds weight to the contention that there can be no genuine substitute for in-house biodiversity planning specialists within the LA.

9.4.6.3 The influence of ecological and biodiversity planning consultations on proposals at EQ2

Moyse (2004) of KWT requested some very specific and thoughtful inclusions within his planning application consultation to the LA in Feb 2004. These included the following:

- A presumption in favour of green and brown roofs as part of the agreed action for black redstarts;

- Incorporation of wildlife habitats within housing areas and not just along the edges of the site.

No planning documents listed these proposals and during action research the researcher of this thesis separately noted the absence of these items within a consultation prepared for MEL regarding the draft greenspace strategy to the ecological consultancy (see *Appendix six).* The planning case officer was questioned regarding the absence of these requests in a research interview, who responded that: "*Future Management Plans should cover this. They should be able to gain this through next, more detailed stages"* (Bunn, pers. comm, 2007). However, from previous extensive professional experience, the researcher notes that not having gained these proposals prior to planning permission leaves a significant risk that these items will now not be gained (as they will not be legally binding agreements).

Moyse (2004) also requested the following conditions, which would significantly benefit future biodiversity:

- Monitoring regime to evaluate BAP [this was included in a s106];
- Employ ecological clerk of works [this was included in a s106];
- Developer to supply Kent and Medway Biological Records Centre with all data [this was included as an 'informative'];
- Min 50% roof area in each phase – green / brown roof techniques [this was not included in planning consent documentation]

Two out of the four proposed conditions were incorporated into binding planning permission documents (the s106), which illustrates the effective impact of ecological consultees to the planning process. The recorded biological information transfer was also useful, although not a 'binding' request. The lack of coverage of the green roof requirement in planning permission documents is highly likely to mean these will not be achieved, which is unfortunate, as the researcher has achieved such conditions through previous professional roles, and the Barking Riverside mega-development within the Thames Gateway also achieved such a condition (Grant, 2009 p.38).

9.4.6.4 Developer financed site-ecology and sustainable co-ordination roles

As the unusual development size would generate significant additional planning work, the developer agreed to finance three additional LA roles (yet to be commissioned). Two of the roles

have a biodiversity perspective: a Sustainable Development Co-ordinator – primarily to co-ordinate submissions; and an Ecological Clerk of Works – primarily to deliver biodiversity on the site and liaise with stakeholders and communities (See the interview with Sonia Bunn in *Appendix three* for information on these remits). The project director for infrastructure (Farley, pers. comm, 2009) confirms that Land Securities would have provided these roles even if not requested, as they were viewed as vital.

Additional to these roles, the two authorities will receive monies to cover officer costs during detailed design phases *"For the first 5 years Dartford will get £50,000 and Kent County Council (KCC) will get £25,000"* (Bunn, pers. comm, 2007). This is to cover the additional officer time required to evaluate numerous submissions, as the cross referencing and co-ordination of different information sets and responses will be disproportionately greater than for smaller applications (Bunn, pers. comm, 2007*).* Thus, it is in the developer's best interests to provide the extra resources and manpower, in terms of decision making timeliness.

Calow (pers. comm, 2010) explains that MEL had provided a form of part-time, contractual, Ecological Clerk of Works for numerous protected species and vegetation clearance works at EQ2. This 'Clerk of Works' acted as an interface between the ecological consultancy, the contractors performing the works, and the developer. The role was valuable in ensuring effective and timely compliance on the ground, with ecological legislation and Method Statement requirements (Calow, pers. comm, 2010).

In 2008, MEL also requested the consideration of a conservation ranger for the site, with responsibilities to include public and key stakeholder liaison, such as between the LA, KWT and NE. However, this was never commissioned (Calow, pers. comm, 2010).

9.4.7 Biodiversity Guidance Documentation for Mega-developments

9.4.7.1 The temporal hierarchy of site biodiversity documentation

The flow diagram in *Figure 20* has been created to depict the temporal hierarchy of key site biodiversity documents and strategies. However, reality does not operate in such a closed circuit, as documentation from other disciplines should also feed into the system, and be influenced by the biodiversity information.

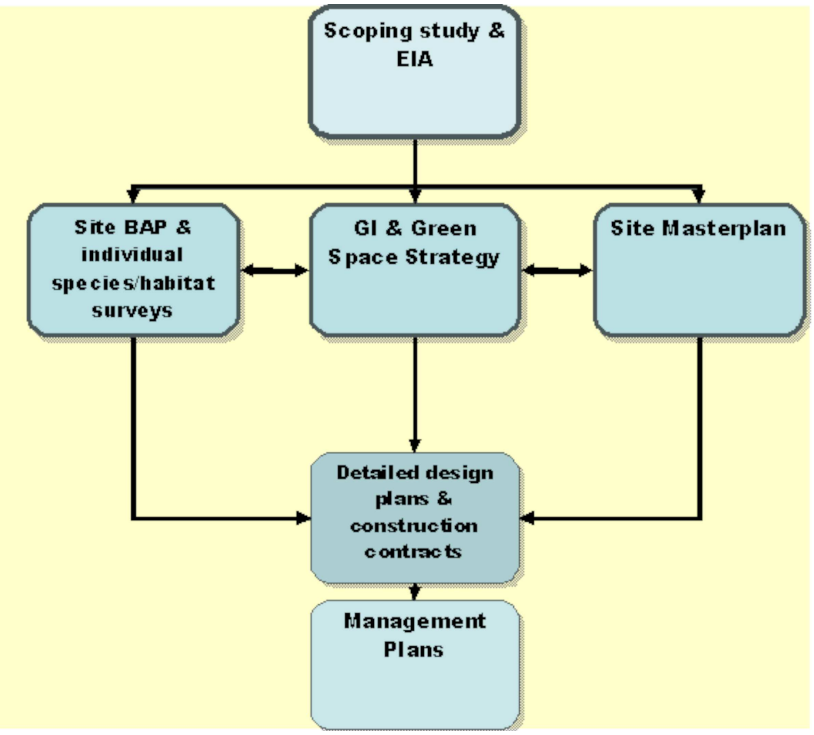

Figure 20: A flow diagram illustrating a simplified temporal flow of biodiversity documentation.

Ordinarily, the very first piece of documentation pertaining to site biodiversity on major development sites of a certain threshold scale, or sensitivity, are Environmental Impact Assessments (EIAs). The ODPM (2000) defines the projects to which the Town and Country Planning (Environmental Impact Assessment) Regulations 1999 apply (Schedule 1 and 2 project thresholds). The decision period of whether a site requires a full EIA, is called 'screening' and provides the trigger to start the EIA process. Once agreed that an EIA is required, initial ecological surveys and desk studies form part of the 'scoping' stage, where relevant impacts are identified resulting in 'Terms of Reference' for the actual impact study (CBD, 2005). During the EIA process further surveys and analysis are undertaken and the full EIA is written. EIAs are conducted and completed prior to submission of planning applications, and co-ordinate all of the potential direct and indirect environmental impacts of developments. Impacts are ranked by likelihood of occurrence, whether they are positive or negative, their severity and whether any detrimental impacts can be avoided, mitigated against, or compensated for. EIAs usually consider biodiversity impacts under the heading of 'ecology' and should also consider biodiversity enhancement opportunities. The CBD (2005) produced guidelines on biodiversity-inclusive EIA. Nonetheless, the National Biodiversity Strategy and Action Plans (NBSAPs) provide some direction, as do the related EIA references provided by the Institute of Ecology and Environmental Management (IEEM, 2006). Despite this, the 'Capacity Building for Biodiversity in Impact Assessment project'

(CBBIA) – which relates to developing nations - notes that universally, biodiversity inclusive assessments within EIA have been found to be weak (CBBIA, 2009) and the researcher of this thesis has viewed a number of EIAs in previous professional roles, which have not considered site biodiversity further than specific existing species and habitats. *Section 9.4.7.2* further discusses the relevance of EIA to EQ2 biodiversity.

If development proposals progress during and after the EIA research and submission, then for larger or ecologically sensitive sites an SBAP may be provided, although SBAPs may still be provided even if EIAs were not a precursor. The SBAP, Greenspace Strategy, and masterplan are then normally drawn up simultaneously, as they should inform one another. Due to the volume of research data generated from EQ2's SBAP and GI documents, coupled with the replicable relevance of the findings to other mega-developments, these two key biodiversity proposal frameworks are elaborated on in s*ection 9.5* and *9.6*. Biodiversity design parameters, standards, and visions should be devised during these strategic SBAP and GI documentation stages. The detailed design proposals and construction contracts are then produced at finer spatial grains (for each 'urban village'). It is this detailed stage, which determines concrete, tangible proposals from the influences of the preceding strategic documents, biodiversity visions, standards and parameters.

Management plans are normally a necessity, even for smaller major schemes, as ecological and biodiversity enhancements and landscape masterplans will require management – *Figure 20* illustrates where they normally fit into the documentation production process. An overarching management plan and individual area management plans have been written for EQ2. In addition to the management proposals, the future management company's skills set, and the financing of the management of the site in the long-term, are critical. Yet, it is unclear as to how EQ2's management of spaces and features will be financed in perpetuity (see a consultation provided by the researcher to MEL in 2007 regarding the initial draft strategy in *Appendix 6*). This lack of clarity, which remains to the present day, is likely to result in long-term financing by the future residents and businesses paying service fees - which could lead to the 'politicising' of management. For example, pressures to spend budgets in residents' immediate vicinities, for personal benefits, rather than on larger parks, or for the benefit of site-wide wildlife.

When asked about the overall net biodiversity levels anticipated at EQ2, Calow (pers. comm, 2010) believed that MEL's physical role of ecological ground clerk of works and various species translocations which had occurred to date, would assist in 'conserving', but not 'gaining' site

biodiversity. Implementing the management plans however, is likely to provide the net-gain (Calow, pers. comm, 2010). Furthermore, Young (pers. comm, 2008) believed that the production of guidance documents and clear biodiversity strategies, which provide appropriate hierarchies relating to local conditions, will assist in 'net' biodiversity levels after development. Nevertheless, Young raised concerns regarding the lack of detail and prescriptions within the current management plans (discussed further in *section 9.9.2.3*). This could partially be due to the fact that the management plans were being written prior to the detailed design being completed (unlike the ideal / normal situation illustrated in *Figure 20*) – so there were still uncertainties. For such a large and complex development it is difficult to stick to the 'ideal' documentation process, due to time constraints with planning permission requirements, funding and construction programmes. As mega-developments become more common globally, further research should be undertaken into successful processes of documentation production, to inform best practice guidance.

9.4.7.2 EIAs

As the starting point for biodiversity consideration in subsequent documents, information sources used within the EIA are important. Research specifically looking at improving the presentation of biodiversity information in Environmental Impacts (E.I) was conducted in Finland. This resulted in the following four findings: 1) when needed, the validity of E.Is could be increased by multiple expert statements; 2) consultants who undertake biodiversity surveys should be experienced and trusted; 3) more extensive EIA sections should be supplied for plan proposals; and 4) monitoring of the implemented plans should be improved (Yli-Pelkonen, 2008 p.353).

In the instance of EQ2, *point 3* above has been considered in greater depth through a Site BAP (SBAP). Moreover, Smith (pers. comm, 2009) from EQ2's ecological consultancy, describes in an interview (*Appendix 3*) the process whereby the underlying rationale of the EIA, as with most sites, was questioned as practical on site experience was gained, since some recommendations became inappropriate, or others which were not initially considered then became beneficial. Furthermore, Smith (pers. comm, 2009) highlighted the importance of allowing some level of flexibility to update proposals over time, but confirmed that this did not initially occur at EQ2, which caused various obstructions to gaining biodiversity improvements post EIA (Smith, pers. comm, 2009).

9.4.7.3 Cross-referencing

The cross-referencing of different types of planning and site documentation, particularly where agreements and proposals become superseded, is a significant issue on all major developments. The EQ2 EIA was reviewed for this research and a consultation report (see *Appendix Six*) was provided to MEL regarding how well the Draft Landscape and Open Space Strategy translated the ecological / biodiversity site requirements, Volume 2 of the Environmental Statement (ES), and the SBAP ecological and biodiversity requirements for the site (Barber, 2007). Moreover, Young (pers. comm, 2008) stated that KWT had found increasing difficulties with managing the cross-referencing involved in superseded development documentation for larger applications in the Thames Gateway. This was especially the case with EQ2, where they were consulted repeatedly from the pre-application phase onwards, with frequent amendments and versions of the same plans and documents. Without time to identify all of the amendments, mistakes could easily have been made when agreeing new plans (Young, pers. comm, 2008). Young (pers. comm, 2008) also believed it was becoming increasingly uncertain whether comments would be valuable, or whether the proposals being commented upon would also be superseded. Consequently, KWT began to believe that consultations may be becoming an inefficient use of their time.

The researcher of this thesis has also commonly experienced cross-referencing issues with superseded plans in previous professional roles, as often the amended versions did not outline all of the changes from the previously approved plans. There is commonly only a 'title' to the revision on the drawings and plans, leaving the consultee to play 'spot the difference', which is difficult given time constraints. However, amendments which are not identified may alter or negate previously approved biodiversity protection and enhancement measures. A short case study which illustrates this very point is provided in *Appendix 4.3.*

It would be desirable, to devise a protocol which could combat the problem associated with amendments detrimentally affecting agreed biodiversity measures; and to place the onus of identifying specific changes on the developer's team. Several procedures within the EQ2 development hint at elements of such a protocol, an example of which would be the recording of information, as discussed in the project management s*ection 9.8.3*.

9.4.7.4 Simplification of documentation

Yli-Pelkonen's (2008 p.354) research in Finland regarding the environmental information available to political decision makers, and reflecting the UK context, noted the following:

"*there can be thousands of pages of various survey reports related to a large planning project and it is a challenge to pick the relevant information from this amount of material…. Therefore, it is important that the presenters from the City Planning Department or the Environmental Centre present the relevant information in a condensed form that is understandable for the politicians*".

Certainly, in many large central government reports, 'executive summaries' are provided, which save wading through the entire document and potentially ubiquitous amounts of technical jargon, to find the central points. At EQ2, the SBAP and the management plans were ultimately simplified, as they were becoming too repetitive and unwieldy (Smith, pers. comm, 2009). The SBAP was finally condensed to only ten pages. The simplification and greater succinctness, allowed other documents and actors greater ease in referencing them, and thus, the realisation of maximised biodiversity is increasingly probable.

9.5 SITE BIODIVERSITY ACTION PLAN (SBAP)

BAPs – considered in this section, and GI – considered in the following section, are nested theory themes, which are considered at the regeneration, as well as the mega-development scale, as illustrated in *Table Four*.

9.5.1 Consistent Requests for SBAPs

The history and purpose of National and Local Biodiversity Action Plans (BAPs and LBAPs) has been discussed in *Chapter four*. These are national requirements, whereas the requirement for SBAPs is a discretionary request from LAs for large or sensitive developments. *Section 8.2.4* highlights a requirement inconsistency for SBAPs in the Ebsfleet Valley. Dartford Borough Council requested a SBAP for EQ2, while Gravesend Council did not request a SBAP for the neighbouring Ebbsfleet mega-development, despite the same development team being involved in both sites (Smith, pers. comm, 2009). This anomaly emphasises the lack of biodiversity prioritisation at the strategic level.

The lack of a transboundary approach to biodiversity requirements consequently prevented 'joined-up thinking' between EQ2 and Ebbsfleet. If they 'had' been considered together then Smith (pers. comm, 2009), believes it would have afforded greater flexibility for both the species translocations, from donor and receptor sites, as well as for the habitat creation processes as a whole.

9.5.2 The Initial SBAP and the Benefits of a Design Review

The SBAP will be implemented through the Environmental Protection Plan (EPP) and the Management Plans. This will lead to the creation and management of new habitats, as well as specific species measures, which will be provided through strategy, specifications and prescriptions (Smith, pers. comm, 2009).

Farley (pers. comm, 2009), the project director of infrastructure at EQ2 referred to the first ecological consultant's (EDAW's) initial SBAP reports as generally being good, but that there was only one individual within EDAW who was equipped with the necessary skills set and availability. This limited resource input was not conducive to such a very large development project, which was why EDAW was replaced by MEL in 2004 (Farley, pers. comm, 2009). The original SBAP was comprehensive in many ways (Bunn, pers. comm, 2007; Young, pers. comm, 2008), but it had not considered how the development site would change over time and what species and habitats would be appropriate with the 'new' biological systems and opportunities, which would be in place. In essence, it did not consider the development impacts and provide an appropriate vision for the future (Farley, pers. comm, 2009; Fermor, pers. comm, 2009; Smith pers. comm, 2009). Smith cited the example of a target to increase kingfisher numbers, despite the fact that the development phases would incur a loss of kingfisher habitat for a period. He considered the original SBAP to be too simplistic, due to its lack of consideration of the development phasing effects on site biodiversity, and consequently the appropriateness of many of its proposals.

At the time that Land Securities (the developer) were looking to find a replacement ecological consultancy to take over the writing of the SBAP, there were only two companies available who were capable of offering this integrated approach (Farley, pers. comm, 2009). MEL provided a larger staff resource for the project and their ability to provide a more integrated approach, in terms of providing an advisory capacity, report writing, and conducting the surveys, was preferable to the previous situation (Farley, pers. comm, 2009).

Farley (pers. comm, 2009), citing an example with a bird species (the black red start), also noted that there were other anomalies between the proposals and approaches of the two different ecological consultants i.e. whether to protect an area for only one species, or to develop the area to become valuable to a more diverse range of species instead. Farley (pers. comm, 2009), contrasting the processes between different urban design professionals, noted that despite major

developments normally having an 'urban design review' on matters relating to 'built' or 'landscape' design, there are never reviews of the urban 'biodiversity' design information.

In the case of EQ2, replacing the ecological consultants, allowed the second consultants (MEL) to act as a reviewing team and conduct an informal design review of the biodiversity information. This allowed a critical review of the SBAP - which was rewritten with greater consideration for the future changes proposed on the site. It also allowed updates due to new legislation, and benefits of the new team's different specialisations (Farley, pers. comm, 2009). The revised SBAP also tried to consider the interim nature of the 'phasing' of the works (Smith, pers. comm, 2009). Farley (pers. comm, 2009) confirmed that he would consider replicating this process on similar schemes in the future and that: "*For large and complex sites where the professional language of ecology is very technical, this kind of review of a consultants work by another organisation has proved very useful*."

9.5.3 Creating a Vision Relevant to Urban Biodiversity

Visions were another key theory theme identified for this study in *Table Four*. David Knight of NE is one of the country's leading urban biodiversity professionals and was interviewed for this research. Knight (pers. comm, 2009), made the following general statement regarding biodiversity visions:

"The key obstacle is a lack of vision and imagination. A credible and realistic vision of what urban biodiversity constitutes is missing. We need an inspiring and meaningful vision which resonates with people and adequately describes what we are trying to achieve. This lack of ability to translate a vision, affects the technical and professional ability to achieve and maintain urban biodiversity".

Knight (pers. comm, 2009) also noted that positive visions are required for biodiversity in many different contexts, but that there are very few examples of biodiversity used as visionary components to date. *Section 9.6.1* discusses biodiversity visions at the strategic masterplanning and GI stages. Nevertheless, Young (pers. comm, 2008) of KWT noted that referencing the biodiversity duty and whether the LA had selected the biodiversity indicator NI 197 (discussed in *Chapter four*) could increase the profile of biodiversity consideration at the local level. Although, on the other hand, Williams (2007 p.31) noted a lack of competitions and prizes relating to quality urban design generally, for private-sector-led housing developments. The lack of this type of incentive is unfortunate, as it would have the potential to stimulate innovative design case studies (as discussed in Study 2: *Chapter ten*).

The initial SBAP at EQ2 lacked a vision in terms of biodiversity enhancement. Putting the proposals into the context of the site location and what the development is going to become, whilst incorporating the interim phases, is a key design consideration (Smith, pers. comm, 2009; Knight, pers. comm, 2009; Farley, pers. comm, 2009; Fermor, pers. comm, 2009). Ultimately, this did occur at EQ2, although the final SBAP still did not express a 'vision' in terms of a formal vision statement.

Furthermore, a more comprehensive consideration of 'urban' biodiversity solutions could have been more evident within the final EQ2 SBAP. For example, this may have included: green roofs; eco-bridges and culverts across and under grey infrastructure; integral habitat features to buildings and hard landscape features; and, anticipating and solving certain types of detrimental human disturbance in sensitive areas, such as dog walking and off-roading. There was evidence that there had been some initial and limited consideration of these issues in the detailed design plan discussions, prior to hibernation. This involved an imaginative Sustainable Urban Drainage system (SUDs) concept, where grilled over water channels in urban areas could be planted with flag iris growing through (allowing public safety and biodiversity) (Smith, pers. comm, 2009). Certainly, it is possible that detailed design plans will deliver innovative urban biodiversity design in the future, but the lack of inclusion within the SBAP and other strategic planning documentation, renders this unlikely as there are now no links to regulatory requirements.

9.5.4 Budgeting for Biodiversity

In personal communications, Johnson (pers. comm, 2009) of ARUP, discussed the generally divided views of some developers involved in making financial biodiversity decisions, which were dependent on the context and their own individual perspectives:

"*Developers are generally interested in maximising the short term return on their investment, gaining planning consent and offloading long term responsibility to others. So it can be difficult to convince some clients. Others are very receptive to ideas and will go a long way to maximising biodiversity as they see it to be an integral part of the planning application and without it consent is less likely*."

Fermor (pers. comm, 2009), the managing director of the ecological consultants (MEL), believed he had managed to gain a much better financial agreement for the biodiversity and ecology budget for this site, per hectare, than any previous site he had dealt with: "*Millions of pounds have been costed to biodiversity and over a million has gone to 'great crested newt' habitat*

enhancement. The BAP's were costed and the client wanted to over budget for the cost modelling, which was very high" (Fermor, pers. comm, 2009). This was confirmed in the developer's documentation, which showed that the budget for ecological infrastructure (which was separated from 'hard and soft landscaping' budgets and also from 'streams and lakes' budgets) was £3 million, representing two percent of the total infrastructure budget of £151 million (Land Securities, 2003 p.29).

The high densities and urban nature of EQ2, will affect the final land value and the overall percentage profitability per hectare. This affects the biodiversity budgets per hectare, which should be higher in urban areas, as they require more sophisticated and complex biodiversity solutions, in addition to having greater economic resources than their rural counterparts. Moreover, the potentially multifunctional nature of some elements, such as the great crested newt habitats - which could also fulfil recreation, amenity, and surface water drainage policy requirements; are likely to have added financial benefits. These benefits may 'add value' to the scheme in other ways, as discussed in *Chapter six*.

9.6 GREEN INFRASTRUCTURE (GI)

9.6.1 GI Visions for Mega-developments and EQ2's Strategic GI Context

It is the intention that a significant proportion of the development will be given over to GI / open space: "*The development would include 6250 dwellings built in three linked villages, which would include schools, social and retail areas, and 33% of the site area would be open space*" (Dartford Borough Council, 2007a). A substantial proportion of this 33% is unbuildable due to cliffs. Nevertheless, the planning brief identified that an important function of the GI was also to prevent the appearance of a continuous built-up expanse and to spatially define both the existing and new communities (Dartford Borough Council, 2002 p.26). The major new GI elements at EQ2 were also to be completed prior to construction, providing an establishment period (Farley, pers. comm, 2009).

Together, the local greengrid proposals, KWT's hierarchy of GI guidance, the concept masterplan scheme, and the LA planning brief, effectively acted as preliminary GI vision, or framework, documents. The greengrid at EQ2 was originally envisioned as joining the main open areas with the frontage of the River Thames, and linking both of the existing communities with the development area (Dartford Borough Council, 2002 p.25-27). The LA design brief highlights the

strategic importance of the development site to the wider greengrid. It notes that EQ2: "*is one of the key building blocks",* and both lists the multiple ecological services to be provided, and highlights the importance of varied greenspace (Dartford Borough Council, 2002 p.25-27).

Knight (pers. comm, 2009) lists the initial masterplanning and visioning stage as generally the most obstructive phase to maximising biodiversity on development sites. He attributes this to the lack of understanding regarding ecological processes, and the attempts to impose current perceptions and designs into the landscape, which are often about to be significantly modified by developers. Similarly, Baker (1997 p.24) describes common issues with future greenspace designs on large settlements:

"*There has been the tendency in the past to design out natural landscapes from large settlements and then to put greenery back, in limited quantities, as an afterthought around buildings and in the form of highly simplified plant communities needing continual management to maintain them*".

Knight (pers. comm, 2009) also elucidates that there are frequently attempts to conserve a fraction of an ecological feature; accompanied by adding ancillary measures to compensate for loss. He gives the following example: "*if there is a pond on site, they try and retain part of that pond and put some bird boxes in the trees*". Instead, Knight (pers. comm, 2009) instead notes the importance which should be placed upon the interplay of socio-ecology and context, in understanding the future ecological functions possible, which should drive visions. At EQ2 the physical attributes of the site have driven the GI vision, rather than the potential ecological processes. For example, the peripheral green spaces and existing GI will largely be retained due to their established nature and steep topography. Whereas, the primary functional vision of the proposed network emerges as: the demarcation of residential villages, visual amenity / screening, and providing links between existing and proposed residential areas and new habitat creation (this is clearly visible from the EQ2 greenspace strategy document and *Figure* 19).

During the researcher's analysis of the draft greenspace strategy (see *Appendix six*), it was found that the physical parameters of GI, such as, the minimum widths, ecological attributes, planting mixes, and prioritisation of various functions, did not receive thorough, nor early early consideration (being largely absent from the draft version). These observations indicate that a GI visionary concept which adequately considered the ecological processes was absent in this instance. This was possibly indirectly due to having no experienced 'in-house' biodiversity or ecology planning officer, to promote this agenda in early negotiations. The following sections

investigate the spirit of creating the approved GI document, whilst considering the biodiversity impacts.

9.6.2 Biodiversity Value of GI at EQ2

The socio-ecology chapter (*Chapter six*) discusses the strategic importance and changing valuation of GI functions and understanding. During action research on the EQ2 development, it was evident within the draft Greenspace Strategy Document, that the focus of GI was of recreational value and visual aesthetics, rather than biodiversity or ecological value - which was given inconsequential importance. As these site specific documents must look to the wider strategies of the Thames Gateway, it is likely that they are reflecting the strategic prioritisation provided in the Thames Gateway visionary documents, rather than global requirements to halt biodiversity loss.

Additionally, the planning report - which lists the objectives of the greengrid - also implied that ecological and biodiversity functions were a secondary objective, after leisure and the setting for investment (Dartford Borough Council, 2005b). Bunn (pers. comm, 2007), the DC planning case officer for EQ2, was questioned about this in a research interview. Bunn stated that it had to read this way, given that the current politics correlated to the residents association's concerns regarding the new development's benefits to existing residents. Bunn (pers. comm, 2007) describes how influential the residents association has been in deciding the location of major elements of GI, although there is current debate, as they have now changed their minds about the location of the major 'Northern green corridor': "*This corridor is getting more and more eroded away due to other pressures of development e.g. access routes, formal spaces etc"* (Bunn, pers. comm, 2007) - (see politics *section 9.3)* regarding how the residents association became so 'powerful').

These findings highlight two key questions for consultations on future developments: 1) can we limit the effects of low socio-ecological resilience, or increase socio-ecological resilience? And 2) to what degree should communities and community consultation be able to influence the decision making processes affecting the biodiversity loss agenda, which has global ramifications? This is particularly relevant since the emergence of the new Decentralisation and Localism Bill (DCLG, 2010d). These two questions are answered in the concluding chapter, under discussions regarding prioritisation (*section 11.2*) and strengthening legislation (*section 11.2.2*).

9.6.3 Transboundary and Transdisciplinary Requirements

The developer and stakeholders have always been aware of the transboundary nature of the proposed GI within the Thames Gateway, and the necessity of linking the proposed GI of EQ2, to the surrounding and strategic greengrid: "*The whole remit was to link to the broader countryside and consider changes*" (Fermor, pers. comm, 2009). Nevertheless, the first of two landscape strategy submissions was criticised in the recommendation from the LA planning case officer to the planning board, by stating that it did not go far enough to provide a clear strategy and required the following: 1) Commitments to provision [prescriptions]; 2) tying into adjoining landscape [transboundary approach]; 3) how it relates to the SBAP [co-ordination]; and strategic landscape and character areas [vision] (Dartford Borough Council, 2005b sec.10.86). Following this initial submission, the planning officer and applicant discussed a new landscape strategy submission, which better addressed the issues raised (Dartford Borough Council, 2005b).

The initial concerns regarding the landscape and biodiversity strategies not marrying up, were investigated through questioning Bunn (the planning case officer), during a research interview. Bunn (pers. comm, 2007) responded:

"*The main problems were different aspirations for the core of the same space. The main area of conflict was the Urban Park. This was supposed to be a strong ecological park, but formal recreation conflicted in some ways and the width of the green spaces were debated a lot. The corridor at the top was getting eroded due to the different constraints. Urban designers had very different views to ecologists and couldn't include their views in the designs. Land securities changed the landscape consultants to Gillespies, who are better. There are also more cross cutting meetings now which is helping."*

From the developer's perspective their landscape architects, Gillespies, were leading upon the internal site GI; and their ecological consultants, MEL, were feeding into this process via Gillespies. The ES had already been written by the time MEL was involved, and to some extent this influenced the GI or 'greenspace' strategy. Despite this, Smith (pers. comm, 2009) explained that MEL still affected the lake design, the SUDs details, and species mixes. MEL helped set certain design parameters on different areas (e.g. each area was given different percentages of native plants to be used in the planting mixes), dependant upon how formal / urban the area was (Smith, pers. comm, 2009). Gillespies landscape architects took some of MEL's advice, but not all:

"*They would alter plans and reports with simple amendments such as changing an oak species, with another oak species, but were reluctant and often didn't make more fundamental amendments e.g. issues with some areas being too 'formal' and manicured and not having as much wildlife value, meadows etc. This seemed to be because Middlemarch were often given the plans as a fait au complete*" (Smith, pers. comm, 2009).

Furthermore, Smith (pers. comm, 2009) confirms, that consultations by Gillespies were very much 'last minute', lacking the important opportunity to 'sit around a table' and discuss plans and different interpretations. Consequently, "*It was difficult to try and retrofit ecological needs into what they had already [done]*" (Smith, pers. comm, 2009). These inter-professional tensions between specific disciplines, affecting GI and biodiversity, are reflective of a typically occurring 'power' inequality held between landscape architects and ecologists. This is likely, at least partially, to be due to contractual hierarchy (landscape architects are usually in a more powerful position over ecologists, and architects are usually in a more powerful position than the landscape architects). This arrangement seems to be based on whose contractual work is perceived to have the most economic value.

The relationship between landscape architects, ecologists, urban designers and architects is imperative to successfully integrate ecological requirements into major development sites through masterplans and related documentation (Calow, pers. comm, 2010; Ignatieva, 2010; Thompson, pers. comm, 2010). However, this is not simply a matter of multidisciplinary communication, or even 'interdisciplinary' communication and working. This is because effective communication and working also crosses organisational boundaries (e.g. LA, developer, and stakeholder teams) and involves 'language', as Thompson (pers. comm, 2010), the Ecology Manager for Norwich LA, elucidates: "*Generally, biodiversity issues often arise due to professionals not speaking the same language (landscape architects / urban designers and ecologists)".* This really necessitates 'transdiciplinary' working and communication, to realise biodiversity gains.

Incorporated within transdisciplinary working is also the communication and understanding between professionals of the same discipline. In the case of ecologists, Calow (pers. comm, 2010), the Principal Biodiversity Consultant for EQ2 at MEL, provides an example of an ongoing communication issue with stakeholders (KWT):

"*It can be difficult to manage expectations for wildlife NGO stakeholders sometimes as they have an idealistic approach to conservation at development sites and often struggle to understand the financial, timetable and practical issues of managing an engineering project of this size and complexity - with biodiversity only being a very small aspect of the overall picture*."

The disparity of views between ecology professionals from different organisations, lends weight to the notion of instigating urban biodiversity design reviews.

9.6.4 Overcoming Conflicts with 'Other' Infrastructure

Other infrastructure, such as service infrastructure (for example: sewers, communication cables and water and gas mains), or 'grey' infrastructure (for example: roads and railway tracks) can sever GI and create disturbance to ecological functions and species due to physical barriers to species mobility, noise, and light disturbance. At EQ2 'Fast Track' is a major transport route – a high frequency bus-guided system linking the sub region (Rand, 2003 p.16). Concern that grey infrastructure and GI proposals would be 'married-up', without any significant conflicts of interest, were voiced by KWT. KWT recommended: "*Avoidance of breaks in ecological connectivity corridors by any movement corridors / road crossings*" (Moyse, 2004).

Moreover, as part of action research, the researcher of this thesis explained this issue within a consultation provided to MEL (Barber, 2007). This consultation incorporated three sketch concepts illustrating: how ecological connectivity could be maintained where proposed grey infrastructure truncates GI; how compact hedging to roadside boundaries could reduce noise and light disturbance; and, how multifunctional biodiversity proposals could resolve more than one policy issue (see *Appendix six).* These concepts relied on a dual understanding of landscape and ecology disciplines, allowing the spatial expression of ecological proposals, which are more readily understood and incorporated by landscape architects (as discussed in *section 3.3.6*).

The potential severance of GI was also raised with the planning case officer during a research interview. Bunn (pers. comm, 2007) believed that it could still be possible to gain the swales under the 'fast track' infrastructure line. Nonetheless, in order to avoid grey infrastructure conflicts, the ecological requirements also need to be discussed with the engineers. This did not happen at EQ2 to the knowledge of either the researcher or Fermor (pers. comm, 2009). Hibernation of the project has meant this issue is yet to be resolved.

9.6.5 Summary of Findings on GI and Biodiversity Maximisation

The evaluation of strengths and weaknesses in the greenspace strategy production process, coupled with the critical analysis of the proposed outcomes, has produced some diverse findings in relation to the requirements for maximising biodiversity. These findings can be encapsulated as:

- necessity in linking and referring to the hierarchy of GI intentions;
- engaging in true transdisciplinary working and effective and timely communications;
- promoting socio-ecological resilience;
- appropriate visionary statements related to urban and mega-development contexts; and

- understanding and appreciation of the different types of phasing.

The following section elaborates on the latter of these prerequisites for biodiversity gains.

9.7 PHASING

The ALGE survey (See *Chapter three*) identified 'Knowledge and Experience' (s*ection 3.3.1*), 'Recording and Communication' (s*ection 3.3.6*), and 'Procedure' (*section 3.3.8*) as important obstacles to maximising biodiversity, which need to be tackled (amongst other themes). Development phasing relates strongly to these three particular themes.

Biodiversity protection measures and opportunities are frequently reduced, or omitted, due to a lack of appreciation of the impacts of phasing. This lack of phasing appreciation often results in limited or inadequate protection / mitigation / compensatory procedures, being put in to place on development sites. Examples of this, which this researcher has experienced in previous professional roles, include:

1) The moving / translocation of species being interrupted due to the surveys of other professionals e.g. archaeologists;

2) Preparatory earthworks (often carried out by subcontractors) may not take account of existing biodiversity protection zones / measures; such as tree protection exclusion zones and fencing;

3) Building construction may not adequately factor in green roofs or integral bird / bat habitat specification requirements, or build programming needs.

9.7.1 Types

The complex phasing arrangements involved in large major developments, or mega-developments, can be difficult for many consultants, stakeholders, or contractors to comprehend. For the EQ2 development, four different types of phasing have been identified. These phases may not all be specific to biodiversity, but their consideration affects biodiversity, and so they are listed and described below (and illustrated in *Figure 21*).

a) 'Temporal Phasing' relates to the lifecycle phase of a development. All 'major' developments will have this type of phasing (lifecycle phases have been described in *Table 3*).

b) 'Spatial and Actor Phasing' – (Development Plots) occurs when large major, or mega-developments are considered by one overarching developer (actor) for the Outline Planning Permission Stage, but after consent is gained, the site is split into smaller developable pieces, which are each then prepared by different developers (actors) for the detailed planning permission (Reserved Matters, or Full permission). Or, less usually, the scheme can be developed by the same developer, but different plots are still developed at different times, due to funding mechanisms or market requirements.

c) 'Spatial and Action Phasing' (different construction actions at different times and areas) where different construction themes, or 'actions' occur in different areas at different times. For instance, phases of site activity normally take the following order:

- Ecological and archaeological preparatory work (earthworks, translocation, protection measures, certain ecological enhancements related to translocation requirements);
- Site clearance and earthworks (ecological enhancements related to earthworks);
- Infrastructure implementation (transport routes, major services, green and blue infrastructure);
- Building construction phase;
- Landscape construction (planting and exterior constructions such as public realm, walls, integrated habitat features);

d) 'Ecological Sequencing', which can also occur on 'minor' developments (e.g. less than five residential units).This involves the living lifecycles of species and habitats, sometimes in co-ordination with the development phases, to avoid ecological damage and contravening planning conditions and species licences. For example: new planting should occur within the planting season (November to March): Newt surveys and translocations must occur within their active phases in spring; shrub clearance must avoid disturbing birds nests in the bird breeding season. "*Sometimes there can be no flexibility due to the species lifecycles – early consideration by the construction team through the project manager is essential*" (Smith, pers. comm, 2009).

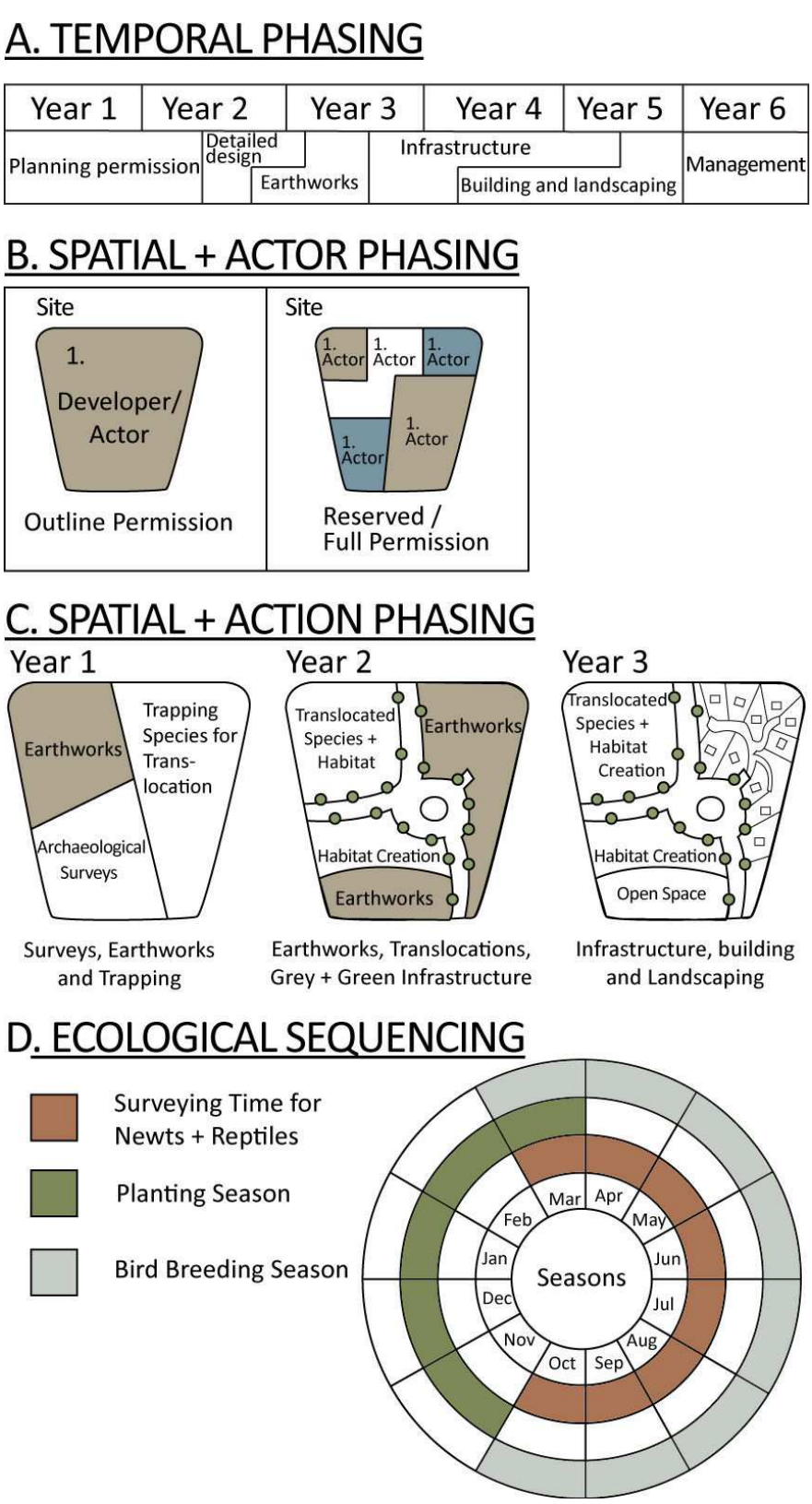

Figure 21: A visual representation of the four different types of phasing involved in major developments

These four different types of phasing are often combined together in diverse ways, on separate development schemes. A matrix of eleven distinct combination possibilities is illustrated in *Table Five*. Each of these eleven phasing scenarios will lead to different implications for site biodiversity. For instance, issues relating to 'ecological sequencing' (type D) and 'spatial actor phasing' (type B) will produce a different set of circumstances and considerations to issues relating to 'temporal' (type A) and 'spatial action' (type C) (see text box 1 - *Figure 22,* for an elaboration on this example and others).

Combination	Phasing Types			
1	A	B		
2	A	C		
3	A	D		
4	A	B	C	
5	A	B	D	
6	A	C	D	
7	A	B	C	D
8	B	C		
9	B	D		
10	B	C	D	
11	C	D		

Table 5: Illustrating eleven 'phasing type' combinations, possible on development sites (for major developments alone, there are 7 phasing types, as all major developments have development lifecycles)

It is important for successful biodiversity protection and enhancements that development actors appreciate the different phasing implications. Nonetheless, most will not have previously dealt with all of the potential phasing combinations (see *Table 5*). In some instances, they may not have even dealt with the four different types of phasing.

BOX 1

EXAMPLE PHASING COMBINATION 1 (B&D)

Spatial & Actor –developers (B) & Ecological (D)

Example of threats resulting from this phasing:

1) Records of biodiversity agreements may not be transferred from the initial to the secondary developers
2) Biodiversity proposals may be affected by changing developer skills sets, understanding, cultures, organisational relationships and capabilities
3) Site co-ordination is likely to be affected by numerous secondary developers
4) As the initial developer will not follow the development lifecycle through to construction completion, there will be less economic incentives to provide innovative biodiversity enhancements. Thus, the following are less likely:
    - Conducting translocations or habitat enhancements in advance to benefit biodiversity and establishment;
    - Implementing the 'early contractor scheme' (ECS) for costing and feasibility checks (see *section 9.8.5.2*).

Example opportunities:

1) Potential to increase biodiversity proposals if new developers have an environmental ethos – design review.

EXAMPLE PHASING COMBINATION 2 (A&C)

Temporal – development lifecycle (A) & Spatial & Action phase (C)

Example threats:

1) Planting area details may not be considered prior to construction, e.g. soil storage for residential garden areas. If topsoil is not stored, then heavily compacted soil structures after construction, may be irreparable and prevent adequate plant growth. This will limit future biodiversity value.
2) Specialist skills may not be considered prior to management phases in order to select appropriately skilled management companies (certain elements are not feasible to sub-contract). For example, if managing formal roof gardens (rather than green/ brown roofs).
3) If habitat enhancements associated with buildings are not designed / detailed prior to architectural design, then architects will not be aware of necessary special construction techniques, loadings, materials, or spaces required within/ on the buildings (similar for engineers and eco-bridges and tunnels).

Example opportunities:

1) Strategic GI and other major habitat enhancement works could be provided as a first stage, prior to construction, to ensure establishment.
2) Street tree and other urban trees could be planted at the same time as road constructions (dependant on planting seasons) rather than waiting for the general landscape phase after building construction works.
3) Implementing habitat features associated with buildings at the same time as the building construction phase, e.g. integral bat boxes within roof spaces is much better than retrofitting, which may not happen.

Figure 22: Phasing examples

9.7.2 The Impacts of Phasing Awareness on Biodiversity at EQ2

The developer's investment presentation clearly illustrates a preliminary phasing plan of smaller sub divisions of the scheme implemented sequentially for the two mega-developments within Kent Thameside (Land Securities, 2003 p.45-49). Keith Farley, the infrastructure project director, appreciated the matrix of phasing combinations at EQ2, and this was reflected in his project management style. KWT's request for a number of prescriptions to deal with consistency in the five different development plots / urban villages (Moyse, 2004), shows phasing awareness at type 'B' phasing. Young (pers. comm, 2008), also of KWT, proposes that GI be implemented as one of the first phases to allow establishment and maturity, illustrating type 'C' phasing awareness. There is evidence (TCPA, 2004; KWT, 2010a) to indicate specific economic and biodiversity benefits of this latter phasing proposal, which should be replicated on other major sites, e.g. that sites which are landscaped with woodlands and parks at least five years prior to completion of residential developments, resulting in mature sheltered landscapes by the time new residents are about to move in, can raise property values. Moreover, allowing some vegetated areas time to 'establish', could afford greater structural plant complexity and diversity over time, in comparison to planting everything at once, which also benefits certain species lifecycles and site biodiversity generally.

Furthermore, Smith (pers. comm, 2008) of MEL confirms there has always been early ecological sequencing awareness (phasing type 'D') at EQ2, so surveys and survey seasons have been factored in from the outset. This phasing awareness will assist biodiversity protection and enhancement. However, not all of the actors involved had the same appreciation of phasing, for example:

1) The original SBAP did not fully consider how phasing implementation would affect the ecological processes on site over time, due to type A, B and C phasing (see *section 9.5.2*)
2) The initial greenspace proposals did not appreciate the temporary phases due to type B, C and D phasing. The landscape architects considered EQ2 as one completed masterplan, and had not contemplated the role of interim areas for wildlife and people prior to final construction. This was a significant issue, as some interim areas could be left for 15-20 years. Nonetheless, prior to hibernation of EQ2, these issues had begun to be discussed in meetings (Smith, pers. comm, 2009).

3) Different contractor organisations had different levels of appreciation regarding ecological sequencing (type D phasing) (Smith, pers. comm, 2008). This is discussed further in s*ection 9.8.5.2*.

Moreover, as EQ2 was the largest mixed-use development at the time of initial consent, actors would not have previously dealt with a scheme of this scale, which could in itself impede phasing perception. It is also a common occurrence in the development industry, for different organisations and personnel to be involved at different phases (as has occurred at EQ2). This transition of actors often results in biodiversity information and knowledge being lost, or misinterpreted, which in turn affects the net biodiversity levels of the development. Potential solutions to this relate to recording mechanisms and transition protocols, which will be discussed in the project management section of this chapter, as well as the final conclusions.

Nonetheless, an awareness of actor transition issues is partially evident at EQ2 through the simplification of site documentation (Bunn, pers. comm, 2007). This simplification to highlight the key proposals and parameters will assist new personnel in understanding biodiversity proposals and phasing implications (discussed further in *sections 9.8.3* and *9.8.5*). Further evidence of phasing awareness and the potential to disrupt biodiversity proposals, is illustrated through the biodiversity proposal monitoring requests (discussed further in *sections 9.4.6.3* and *9.9.1.3*). Condition number fifteen of the planning approval notice (Dartford Borough Council, 2007b) requires an implementation programme of the SBAP for each of the smaller 'area master plans' / development plots, to assist monitoring. These can be revised where necessary over time, so long as implementation is carried out in line with the latest approved version (Dartford Borough Council, 2007b). Even so, it may have been even more useful, had this condition referred to certain parameters in the appendix, and also if 'part d' had not limited the monitoring of both the implementation and management plans to a period of 'five' years after construction completion.

9.7.3 Summary of Phasing Findings

The author has found, through extensive professional experience, that the impacts of a lack of phasing awareness should not be underestimated. To reduce or avoid issues arising from a lack of consultant / contractor phasing awareness, a number of measures can be put in to place:

- Skilled project management;
- Experienced employees (consultants / contractors), or adequate training on phasing;

- Recording processes / software to pull together phasing requirements, and to map the progress and communications / meetings;
- LA planning management procedures e.g. requiring phasing plans from developers and monitoring progress;
- New national guidance on phasing considerations and the submission of phasing proposals and mechanisms for managing complex situations.

9.8 PROJECT MANAGEMENT AT EQ2 AND BARKING RIVERSIDE (BR)

9.8.1 Importance to Biodiversity

The calibre of project management impacts heavily on the quality of realised proposals for all planning related disciplines. This is especially true for ecological and biodiversity proposals, which have a great emphasis on the importance of appropriate phasing and are vulnerable to eradication by conflicting proposals from other disciplines. As a consequence, effective communication, team selection, and transdisciplinary working, which are heavily influenced by project management, are comparatively significant for the biodiversity agenda.

Project management at EQ2 will now be investigated and compared against project management at BR (9.8.7).

9.8.2 Project Management at EQ2 Generally

The original project management team for EQ2 was very holistic, but was replaced by a smaller more commercially focussed management team in late 2008, due to the recession (Bunn, pers. comm, 2010). Some of the employees in the original team were seconded to Land Securities (the developer) from ARUP, due to their specialist project managing skills – Keith Farley being one (Smith, pers. comm, 2009). Keith Farley was employed as a Project Director of Infrastructure at Land Securities for the Ebbsfleet Valley (inclusive of EQ2), from October 2003 to February 2009 (Farley, pers. comm, 2009). Commenting on the effects of Farley's project management skills on the ecology of the site, Fermor (pers. comm, 2009) states: "*On EQ2 the ecology was easy and the project, despite its size, was relatively straightforward due to the skilled project manager*" (Fermor, pers. comm, 2009). This original project management team involved at least thirty to forty people, but since site hibernation, the replacement team is much smaller, less holistic, and commercially led (Bunn, pers. comm, 2010). Indicative of the loss of communication and quality design focus, was the fact that members of the wider development team were not aware of the name of the new project manager (Smith, pers. comm, 2009; Bunn, pers. comm, 2010).

This section will solely consider the initial project management style and the project manager who was employed up until February 2009. This is due to the fact that it was this 'active' phase of project management, which was responsible for the planning permission and site documentation. Consideration will be given to the impacts of the changing personnel and approach in S*ection 9.8.3* and *Section 9.9.1.1*. In addition to the developer's management team, their ecological consultant's 'MEL's' management team has also been considered (see *section 9.8.4*). MEL's key management staff were the Executive Director (Phil Fermor) taking a strategic view on the project and the Ground works Director (David Smith) managing site co-ordination.

9.8.3 Management Style, Communication and Recording at EQ2

Farley (pers. comm, 2009) used a 'Matrix' style of management, where individuals were either given responsibilities over certain locations within the main project area, or given responsibilities over different disciplines (although it was possible to have one person covering several roles). These responsibilities were then co-ordinated through meetings held every four weeks and Farley (pers. comm, 2009) admitted that: "*similarly with any large or complex development project, miscommunications had occurred, but the co-ordination meetings and matrix management style ensured that any issues were resolved effectively and were not 'lingering' issues*". Fermor (pers. comm, 2009) confirmed the excellent co-ordination and communication with other professional teams and noted that Farley was the best project manager he had dealt with, owing to his understanding of the ecological requirement. Bunn (pers. comm, 2007) also testified to the regular meetings with overlapping professions, and several meetings between landscape, ecology and archaeology professionals, around 2007. Nevertheless, Bunn (pers. comm, 2007) also noted that it was*: "Sometimes difficult to ensure that the right people from different teams attend. Sometimes things have been agreed in meetings and the actions seem to be forgotten".*

Co-ordination meetings have long been used in large projects. However, Farley (pers. comm, 2009) noted that over the course of his professional career, the style of these meetings had changed: "*from being very formal and rigid, with an agenda and a chairperson who worked through all of the actions, ten or more years ago, to having a much more informal communication style now*". Farley (pers. comm, 2009) put this down to the increasing use of emails to agree actions outside of meetings. In previous professional experience, the researcher of this thesis had noted that email agreements were commonly lost, and not formally recorded, and so Farley (pers. comm,

2009) was questioned about his own experiences, and he issued the following contractual warning:

"*Previously letters were stamped and dated upon receipt and filed. In contracts, formal instructions are given, or formal communications, with these it is understood that other correspondence which may come after will not supersede, unless another instruction is issued. With emails this is not the case and it can be wrongly assumed that someone has authority to amend plans when they may not"*.

This highlights that the contractual and superseding nature which email agreements can have, should be considered by all development actors and suitable protocols should be in place to ensure binding agreements are not made unintentionally, which will affect biodiversity.

Farley (pers. comm, 2009) then discusses contemporary project meetings, which could inform methods of presenting and agreeing biodiversity proposals and actions:

"Today's purpose of meetings tends to be less about actions and more about discussing common goals. It is still possible to have semi formal meetings, but they are more complex to chair and be involved in. But, if well orchestrated, they can be very flexible (e.g. people dipping in and out for relevant sections) and people can be more willing to discuss things creatively. Actions which need to happen can still be discussed and it is advisable to provide sets of information to a focus meeting to participants beforehand to reduce time wastage ".

Farley (pers. comm, 2009) confirms that Land Securities now use collaboration software 'Business Collaborator', to try and solve the problems associated with the new style of meetings and emails. The software records and dates everything (including emails) and allows drawings to be seen and commented upon, or amended, until they are 'signed off'. It is also possible to file under different subjects, such as 'biodiversity'. *"All records for Ebbsfleet have been left on this package, so that when the next team is taken on, they will have access to everything* "(Farley, pers. comm, 2009). However, Fermor (pers. comm, 2009) stated that MEL had not used this package, so were not directly filing into this system, which indicates it must have been an internal project management tool, which did not extend to all of the developer's agents. The research methods have also not identified any software packages being used to record information from the LA perspective, apart from electronically accessing archived and scanned planning files. Nonetheless, Young (pers. comm, 2008) from KWT believed that the transfer of information and recording is the responsibility of the LA and the developer.

During the life of the project many changes have occurred on the site, both physically (e.g. soil levels and topography); and through development phases (e.g. ownership changes, legal

obligations, and planning restrictions). Land Securities therefore spent time thinking about what information was important to keep, and to pass on. A GIS based system has been used to create a library of base data, covering all of the above, and a complete set of records will also be available to the subsequent development team (Farley, pers. comm, 2009). Bunn (pers. comm, 2007), also notes that the simplification of proposals into an overarching 'key principles' document, will assist new personnel in 'getting a handle' on the issues, before they delve deeper into the full documents, which are likely to be overwhelming without this form of introduction.

On a more detailed biodiversity implementation level, specific biodiversity contract clauses also existed for the major earthworks contract. These clauses referred to the simplified SBAP and management plans. However, the main biodiversity aims of this particular contract were related to clearing the site before the earthworks contractors began, rather than carrying out the enhancements, which would form a future contract (Farley, pers. comm, 2009; Smith, pers. comm, 2009). Tying the biodiversity documents into contract clauses creates legally enforceable responsibilities, which assists in implementation, awareness and recording issues (through cross-referencing).

9.8.4 Middlemarch Environmental Ltd's (MEL's) Project Management Style at EQ2

Fermor (pers. comm, 2009) clarified that MEL met the project team at Land Securities on a quarterly basis, in addition to the wider co-ordination meetings. MEL developed a bespoke management system in order to internally organise such an unusually large site. This management arrangement played to the strengths of particular personnel within MEL and facilitated the dual ecological work requirements at EQ2 (undertaking practical surveys and site works, alongside the production of strategic documentation). This duality of roles (site and strategic) was a coordination and management benefit which was not lost on Farley, who stated that this was one of the reasons for hiring MEL in the first place (Farley, pers. comm, 2009).

Acting as the strategic biodiversity leader, Fermor took an overview of the ecological licenses, BAP's, planning, and strategy - in relation to the wider Ebbsfleet Valley sites. Two other individuals were specifically managing EQ2 – these were: James Calow (involved in pre-planning and surveys as the principle biodiversity consultant) and David Smith (involved in the post planning issues on the ground). Under these two roles were a variety of surveyors, who were not specifically working on EQ2, and an ecological clerk of works (who was permanently based in Kent to work on EQ2 during the earthworks) (Fermor, pers. comm, 2009). Farley (pers. comm, 2009) observed that

having a practical and very 'hands on team' with MEL, helped both to avoid issues and deal with those that arose. Additionally, the flexible nature of the organisation meant there were no 'surprises' which could not be worked around.

Nonetheless, during action research on the site it was apparent that the management systems in place were not infallible with regard to biodiversity protection and management. During the limited action research phase, two instances of indeterminate detrimental site biodiversity impacts were witnessed. This involved an issue of vandalised species protection (Great Crested Newts) measures in 2007, which had not at the time been solved; as well as in 2008 a quantity of earth removal undertaken prematurely on a site which had yet to be surveyed for invertebrates. These incidents may have been circumvented if a site ranger had been employed at EQ2, as per MEL's original request (Calow, pers. comm, 2010).

9.8.5 Organisational Changes and Culture

9.8.5.1 Organisational and personnel changes

A number of different organisations have been involved in EQ2 and the wider Ebbsfleet valley over the years, and Farley (pers. comm, 2009) had noted a large 'turnover' during his involvement. In addition to employee turnover and post changes within organisations, major urban developments often have a high turnover of the organisations themselves. This is related to different organisations specialising in, or being responsible for, different aspects or temporal phases of the work programme. It can also be correlated to organisational resources and capabilities, as with the example of changing landscape and ecological consultants, described in *Sections 9.5* and *9.6* of this chapter. The researcher's previous professional experience has confirmed that these organisational changes can often lead to a loss of site information and knowledge - having detrimental effects to biodiversity proposals. On the other hand, as described in *Section 9.5.2,* these changes can sometimes offer positive benefits too, resulting from the review of site documentation and visions.

During action research at EQ2, within the implementation phase of the earthworks planning permission, the researcher witnessed confusion between contractors and ecological consultants due to organisational change. Relationships and understanding, which had developed between the different teams, was lost when the contractor organisations changed. The ensuing confusion demonstrates the benefits of retaining organisations, which have dealt with previous elements of the scheme, for future elements. This is directly linked to the advantages of maintaining the

business relationships and communication channels, which have developed across and between organisations, in addition to site development knowledge. Different organisations also have different cultural ethos's, which can further exacerbate the consequences of organisational changes. At EQ2, not all development phases have yet been experienced, but the earthworks phase offers an appropriate example, which is discussed in the following section.

9.8.5.2 Culture & CSR

During MEL's involvement in EQ2, there have been three different contractors involved at different times within the 'relatively' short-term major earthworks contract. The three contractors were: Blackwells, Fitzpatricks and Birse. Out of these three, only Birse had a real appreciation for the ecological works (Smith, 2009). Smith (2009) described how Birse asked numerous questions about the ecological requirements, and showed an interest in MEL's approach. They were far more sensitive than the other two contractor companies, although these latter may have adopted a different company emphasis and had sensitivities to different issues, such as archaeology (Smith, 2009).

Research by Dixon (2007b) indicates that at the local level, the development industry is struggling to come to terms with sustainability. Furthermore, he advises that addressing this is not only dependent on their culture, but also on their degree of engagement with corporate social responsibility (CSR). MEL consultants had worked with Birse contractors on a number of previous occasions, and Smith (pers. comm, 2009) confirms that they always look for a competitive edge and how to make their projects different in terms of CSR. This is particularly important with certain clients, such as the Highways Agency, or the Environment Agency, where cost is often not the only way to win tenders. Quality is increasingly important, and cost can now be as low as forty percent of the overall tender selection criteria. Health and safety and environmental considerations are specifically taking greater precedence (Smith, pers. comm, 2009).

In relation to the changing quality ethos of development contracts, Smith (2009) describes a new process, which could have advantageous biodiversity ramifications, replicable to other developments:

"It has really been the last decade which has seen 'quality' rise up the agenda. Many large developments these days use ECI (Early Contractor Involvement). This is where contractors are brought in before the EIA/ ES process is submitted to look at the risks and opportunities – what are the ecological opportunities and what are the build times and costs likely to be – then you can commit to concrete principles and solutions and after planning submissions have been approved,

you are not / or are much less likely to be subjected to deliver things which are unbuildable, or too costly" Smith (pers. comm, 2009).

BOX 2

Smith (pers. comm, 2009) highlights the value of ECI through 2 other development examples:

1. For a development in Carlisle, the ES contained many commitments, such as putting in bat corridors, but the developer had not bought sufficient land, so it was not practical to put in the crossing points. Additionally, the ES was contradictory, as there had not been enough co-ordination between the companies writing the different chapters. Thus, the agreement process with the LA was extremely protracted, in which time site species composition had changed (Smith, pers. comm, 2009). ECI would have been very beneficial here, to reduce the time taken to gain planning consent.
2. MEL was involved with the pre-planning of the 'Norwich Northern Development Route', to ensure that the biodiversity aspects of the scheme would be buildable prior to planning submissions. This enabled MEL to ensure that all of the opportunities to maximise biodiversity were being taken, and the detrimental impacts were minimised. Elaborating on the benefits of this, Smith (pers. comm, 2009) gave the following hypothetical example. This approach allows for situations where you can advise the client to buy half a hectare of extra land for £200,000, which could then be used to create embankments with lower gradients and less of a requirement for the removal of excess topsoil. The extra land allows more wildlife habitat creation; and potentially saves £500,000. The financial and wildlife benefits of this early involvement are clear.

Figure 23: ECI Examples

9.8.6 Partnerships and Collaboration

Due to the site complexity and numerous involved actors, partnerships and collaboration were critical features of the project management. For example: knowledge sharing, promoting innovation ideas, and aiding effective communication. The internal relationships of the developer's wider team have been discussed in *Section 9.5* and *9.6,* and Fermor (pers. comm, 2009) confirms that from the ecological and biodiversity perspective: *"The archaeology team were first on site and the landscape architects were critical, which most clients accept (and we need to get the relationship right), as they're designing the green spaces*".

Discussing wider collaborations, Farley (pers. comm, 2009), the project director, actively encouraged partnerships with outside organisations. A particularly successful partnership, evolved from the Ebbsfleet project, with Cambridge University and Herriot-Watt University academics from the Implementation Strategies for Sustainable Urban Environment Systems (ISSUES) research group (ISSUES, 2009). Academics were originally commissioned to research lessons which could be learnt from the 'New Towns' in the 1950's. Through effective communication, a partnership approach evolved between the academics and the practitioners. This was particularly valuable during a critique of the masterplan by different academics and short presentations of how the academics' work could be usefully applied to project elements (Farley, pers. comm, 2009).

9.8.7 The Comparison Mega-development: Barking Riverside (BR)

9.8.7.1 The selection and utilisation of the BR case study

Comparison case studies can allow 'relative' judgements to be made, in order to classify or gauge case studies as 'good' or 'bad' examples of particular processes or mechanisms. As with EQ2, the mega-development of Barking Riverside (BR) is set within the Thames Gateway, is correspondingly complex in development size and nature, and has involved the same ecological consultants (MEL). The similar contextual background enables comparisons of the execution of project management and the biodiversity impacts. As BR is at a more advanced lifecycle stage than EQ2, it also acts as a forewarning to future project management practices at EQ2.

Project management issues, which caused detrimental biodiversity impacts at BR, became apparent through criticisms during two research interviews regarding the Thames Gateway. Nonetheless, it must be clarified that these criticisms only related to the period from spring 2008 to spring 2009, and were focussed on site biodiversity protection and enhancement. Other periods of time and other development agendas have not been studied or analysed. Nonetheless, during that period of a year, project management failures led to significant biodiversity losses, which could easily have been avoided.

9.8.7.2 BR's development context

At 179 hectares, BR is another of Europe's largest brownfield sites (Barking Riverside Ltd, 2004). The development is set within the London administrative zone of the Thames Gateway, and proposes a sustainable community for 26,000 people, and was well under construction during

2007 (Oakes, 2007 p.25). It will be built in four phases and will integrate mixed development, creating jobs for 1500 people, with an expected completion in 2025 (Local innovation, 2010). The decision to form a unique joint venture to develop the site was announced by the ODPM in 2003 and was formed in 2004 (Barking Riverside Ltd, 2004). "*Bellway Homes and English Partnerships (EP) established Barking Riverside Ltd as a joint-venture company (EP owns 49 per cent of the company and Bellway Homes own 51 per cent)"* (Dixon, 2007c). Due to this partnership arrangement, two project managers had joint overall responsibility: one from English Partnerships (EP – prior to becoming the Homes and Communities Agency – HCA) / London Development Agency; and, one from Bellway Homes. However, the project manager from Bellway Homes did not seem to have the same control over decisions, that the EP project manager had (Smith, pers. comm, 2009).

The section 106 agreement at BR requires a landscape and ecology management plan, as well as a landscape and ecology design guide (the latter being a more unusual planning requirement, which offered a great opportunity for biodiversity and ecology) prior to the implementation of each stage of development (Barking & Dagenham Borough Council, 2007). Additionally, interim management plans were requested for each development stage, and it was proposed that provision be made for green and brown roofs, an ecology park, an ecology centre, and protecting and preserving the natural habitats (Barking & Dagenham Borough Council, 2007; Barking Riverside Ltd, 2010). Nonetheless, the architectural focus of the development was evident in various site literatures and is encapsulated in the following statement:

"*Barking Riverside will deliver this eco-friendly and energy-efficient vision alongside a full range of housing... Architectural design will play a key role in securing this development and we have selected two internationally renowned design teams – KCAP-ML and Sheppard Robson"* (Oakes, 2007 p.26).

9.8.7.3 The biodiversity implications of project management at BR

There were two key research interviewees regarding the biodiversity implications of project management at BR: 1) Smith (pers. comm, 2009), from MEL, commented on the 'stark contrast' between project management approaches between EQ2 and BR; and 2) Duckworth (pers. comm, 2009) who worked in a short-term role as the BR 'biodiversity by design' officer between spring 2008 and spring 2009. The latter role was partly funded by Barking Riverside Ltd (the developer), the London Wildlife Trust, and NE.

Both Smith (pers. comm, 2009) and Duckworth (pers. comm, 2009) heavily criticised the project management at BR and expressed frustration that not only were ecology and biodiversity enhancement opportunities not realised, but protected species (water voles) had needlessly and negligently been killed as a direct result of the poor project management. Smith (pers. comm, 2009) explains that:

"*Middlemarch's involvement was to produce 'Ecological Protection Plan' documents during the construction phase. The protection plan was ignored, which is why the water voles were destroyed. The Environment Agency got involved with some kind of enforcement, but I don't believe anything significant came of it*".

Duckworth (pers. comm, 2009) held the project management style responsible for these biodiversity losses. He provided the researcher of this thesis with various forms of site documentation and emails, which evidenced that the project manager had been warned of the consequences of ignoring the ecological protection plans to protected species, the lack of action to remove the invasive weed 'Japanese Knotweed', and the missed enhancement opportunities.

9.8.7.4 Management style, communication and recording at BR

Smith (pers. comm, 2009) explained that there was a great deal of ambiguity regarding roles and responsibilities, action requirements, and the programme of works within the development team. He also emphasised that the causes for this were, poor project management with undefined responsibilities and no evident co-ordinating role. Site biodiversity was further hampered by language barriers in design meetings, owing to the involvement of a foreign company 'Gustafason Porter', which created difficulties in perceiving specific issues and nuances (Smith, pers. comm, 2009). Moreover, Duckworth (pers. comm, 2009) confirmed that a senior member of BR's team also identified generic issues with the project management style, which was evidenced in writing.

Duckworth (pers. comm, 2009) elucidated that the inadequate project management had the following impacts:

- Undeveloped relationships and relationship breakdowns;
- Prevention of transdisciplinary, or even multidisciplinary working. This specifically included the biodiversity design officer being warned by the project director not to discuss biodiversity issues with other professionals, and "*not to divert architect's attention*";

- Physical separation of design teams, thereby disregarding the original intentions for the biodiversity design officer to integrate with teams and spend two days a week at BR;
- Lack of recruitment of promised roles in the outline planning application (Ecological manager and Ecological clerk of works);
- Excluding the biodiversity design officer from relevant meetings, such as 'Design Panel Meetings';
- Misunderstandings of development team skills and no delegation of responsibilities by the project manager, "*who was loathe to relinquish any control, yet was preoccupied with higher profile matters*";
- Risks to protected species were understood, but not taken seriously (Similar to issues in the 'Kelham Island, Sheffield' case, described in *Appendix 4.4*);
- A general lack of prioritisation and appreciation led to lost opportunities to enhance biodiversity.

9.8.8 Summation of Different Project Management Approaches

The comparison case studies of EQ2 and BR provide a valuable illustration of the power which project management styles can have on site biodiversity. Moreover, they illustrate that despite readily available ecological expertise, and having the other necessary conditions and mechanisms in place to protect and enhance site biodiversity, this is all to no avail if there is a lack of understanding and appreciation at the top (Duckworth, pers. comm, 2009). Therefore, the employment of project directors who: "*at least sympathise and appreciate biodiversity requirements and manage relationships, communications and actions effectively*" (Duckworth, pers. comm, 2009), are a prerequisite for maximising biodiversity on major developments. Furthermore, adequate biodiversity prioritisation and appreciation at the project management level, not only benefits biodiversity; but can also avoid major development contentions, for example: enforcement action, long delays, costly remedies to unnecessary problems, poor public relations, and impoverished end results with fewer social and ecological benefits.

At present, the only method of acquiring a project manager with such skills would be to compare different contenders': portfolios, training experience, and how they answered a range of related qualitative questions in a tendering / application process.

9.9 INTENTIONS AND RISKS AT EQ2

9.9.1 General Intentions and Risks

9.9.1.1 Current proposals and how they could be jeopardised

At the current time, the detailed design, construction and management of EQ2 are still simply proposals and intentions. Whether or not these proposals will be followed, or changed, is a risk to the future biodiversity of EQ2 (Bunn, pers. comm, 2010; Young, pers. comm, 2008). Young (pers. comm, 2008) believes that the single biggest opportunity, or threat, for EQ2's future biodiversity, is whether the BAP will be followed properly, or not: *"If implemented correctly, the development has the potential to become an exemplar scheme. However, without the necessary capital or 'will' to implement, this could be a big threat to biodiversity on the site."*

These concerns are also reflected and elaborated by Farley (pers. comm, 2009), who believes that a risk to the site's future biodiversity value is: *"That the new team will have a different attitude to what has been done in the past".* Again, this signifies the importance of organisational cultures and ethos's. Discussing the economic impacts and the hibernation phase, Bunn (pers. comm, 2010) anticipates that should the site be divvied up into smaller developments, there will be no central, overarching project manager dealing with the communications and site wide issues. This would relate to a huge loss in management control and achieving appropriate levels of quality, consistency, and existing biodiversity proposals (although there would still be a central ecological clerk of works and other conditioned posts). Consideration and discussions need to take place regarding whether a 'central' management role could still be achieved in some manner (Bunn, pers. comm, 2010).

9.9.1.2 Prescriptions and flexibility as solutions

There are seventy planning conditions attached to the EQ2 planning consent, along with the Section 106 agreement, and species licenses, which creates a degree of legal binding to many of the biodiversity proposals and intentions. Nonetheless, there is the risk of a revised development proposal, or planning application being necessary for economic reasons.

The researcher of this thesis has noted in previous professional roles, the existence of a common development team tactic, which is used in negotiations and proposal submissions. This tactic is to provide only indicative proposals, which use general phrases and weak 'action' words (such as: 'could be managed in an ecologically sensitive manner', 'should include native species', 'may consider the creation of new water features') rather than definite proposals. These latter use

strong 'action' words (such as: 'every 50 residential units will make provision for 15 integral and 10 external bat boxes', 'all office and commercial buildings must comprise of a minimum of 40% green or brown roofs', or 'future management plans have to provide detailed cross references to the requirements and recommendations in the SBAP summary'). The level of resistance which developer's teams display to amending the general, weak phrases of indicative proposals, to specific, robust phrases, indicates that this is intentional. The reasons behind this are likely to relate to: benefits in retaining perceived 'build' flexibility; a lack of skilled and knowledgeable consultancy staff capable of providing detailed proposals; and, time constraints when filling out 'template' submission documents. Foucault's 'power' functions of discourse (see *Section 2.7*) are very obviously evident here, and there is a strong need for more powerful words relating to biodiversity prioritisation, regulation and specified actions.

The planning report (Dartford Borough Council, 2005b) and consultations for EQ2 initially highlighted concerns regarding a lack of commitment, and that there was *"insufficient evidence to judge compliance with national and local policies*" (Young's WT consultation in Sep 2006). In research interviews, Bunn (pers. comm, 2007) and Young (pers. comm, 2008) were questioned about this, and whether they believed it was possible for developers to 'commit' to proposals, whilst still retaining their necessary degree of flexibility. Bunn firstly confirmed that she did not believe this was an effective developer tactic, as it slowed down the planning process by not giving the required information. Bunn and Young also believed it would be possible for developers to provide enough commitment whilst retaining flexibility. Bunn believed that the requirement at EQ2 to submit the 'overarching' strategy documents, which would be later filled out with more detailed strategy documents, now achieved this, although the process could have been much quicker if provided earlier. These strategies set the parameters to assess the more detailed permissions and the commitments, principles and objectives, and to set out the 'non-negotiables'. Nonetheless, Young still felt there was an issue with some of the more detailed site documents not being prescriptive enough.

Furthermore, a number of risks are still related to the proposals and intentions throughout specific lifecycle stages. *Section 9.9.1.3* considers monitoring and enforcement as solutions, whereas a selection of key risks at specific development phases, which have yet to occur, are outlined in *section 9.9.2*.

9.9.1.3 Monitoring and enforcement as solutions

During personal communications and a research interview, Johnson (pers. comm, 2009), the environmental director of ARUP, listed monitoring and enforcement as one of the key obstacles to maximising biodiversity on major urban development sites, due to a *"lack of legally enforceable agreements on provision and management of greenspace and lack of enforcement action on failure to implement planning conditions*". Johnson (pers. comm, 2009) elaborated that following the planning consent stage "*it is all about enforcement of agreed action, setting up and achievement of long term management and the funding / support mechanisms applied*". These reasons, lend support to requiring the prescriptions and parameters discussed in *Section 9.9.1.2*, as they would assist in site monitoring and legal enforcement processes. These views are also supported in the questionnaire findings, discussed in *Chapter three* and another key interviewee's views (Loyd, 2010), discussed in *Appendix 4.1* .

The planning consent at EQ2 had a 'monitoring' planning condition (number fifteen). This specifically related to the mitigation and enhancement proposals contained within the SBAP and the management plans, with monitoring reports requested at three yearly intervals. Securing this specific monitoring requirement will be advantageous in ensuring that monitoring will actually occur, and such a requirement was advised for developments generally by Coathe (pers. comm, 2009) from NE, during a research interview. Coathe (pers. comm, 2009) describes the difficulties in discerning the stages at which general developments are at from LAs, or even in some instances whether a development has commenced or completed. This, along with the occurrence of detrimental effects to delivery with personnel changes, renders the monitoring of biodiversity proposals "*extremely difficult*" by NE, particularly as resources for monitoring are scarce due to other key priorities.

A similar situation with monitoring by LAs is provided in the findings of the questionnaire, shown in *Table 1* (14 out of 64 questionnaire respondents listed monitoring and enforcement issues as a key obstacle to maximising biodiversity on major urban sites in an 'open comments' field), which implies that an improved system and incentives for monitoring would benefit biodiversity through aiding appropriate enforcements. Various organisations could thus save time - acting as a greater developer incentive for ensuring biodiversity proposals are implemented. Furthermore, Coathe (pers. comm, 2009) believes that the requirement for reporting within BREEAM assessments, which relate to ecology and can be required through planning, could pose an effective method of

ensuring monitoring. At EQ2 planning permission has already been granted, but this could be considered on other mega-developments within the Thames Gateway.

9.9.2 Risks at Specific Lifecycle Phases

9.9.2.1 Detailed design

The detailed design of the GI and incorporation of biodiversity features will also be a major threat, or opportunity, for biodiversity (for sites generally and at EQ2) - as explained in *Chapters one* and *six.* Young (pers. comm, 2008) of KWT believed that a shift in development ethos, from conservation to amenity, would significantly threaten the achievement of biodiversity improvements. At EQ2, a change in ethos is now increasingly likely with the organisational and personnel changes.

The future detailed designs at EQ2 would also require serious consideration of adaptation to climate change (Farley, pers. comm, 2009). Farley (pers. comm, 2009) confirmed that the original development team had already considered adaptation to climate change to a limited extent, in terms of selecting the planned habitat creation, tree species suitable for the projected future climate, and contemplating natural shading from trees as an adaptation technique. If this consideration is not followed through in the detailed design stages, then there could be significant habitat and species impoverishment in the long-term.

9.9.2.2 Construction and implementation

Key obstacles to achieving maximised biodiversity on development sites commonly involve the loss of incentives and motivation post planning permission, and during the delivery stage (Coathe, pers. comm, 2009; Johnson, pers. comm, 2009). This was also found in the ALGE questionnaire (*Section 3.3.9*), and would imply that solutions to this specific set of obstacles should involve the identification, or creation, of new incentives.

Young (pers. comm, 2008) believes that the single biggest opportunity or threat for EQ2's future biodiversity is whether the BAP will be followed. If correctly implemented, the development has the potential to become an exemplar scheme. However, without the necessary capital or 'will' to implement, this would be an enormous threat to site biodiversity (Young, pers. comm, 2008). A number of items discussed in the project management section also affect whether proposals will be implemented, such as: project management style, recording of information, and adequate 'handovers' during personnel and organisational changes.

9.9.2.3 Management / aftercare

In consideration of the importance of the post completion management phase to site biodiversity levels, Johnson (pers. comm, 2009) stated:

"*Most potential for biodiversity value is achieved earlier on in the development cycle - construction is too late to start thinking about these things. However - achievement of the aims occurs during construction and afterwards in the implementation / operational phases - getting management right in this latter phase is key to long term success*".

At EQ2 there is an Estate Management Company (Ebbsfleet Valley Management Company) who will be centrally responsible for managing the Ebbsfleet Valley developments. This will involve nine sub-management areas within EQ2, and then an even smaller hierarchy of management companies, who will deal with individual apartment blocks (Farley, pers. comm, 2009). It can be deduced from this proposed hierarchy of management companies, that effective co-ordination between the management companies to share biodiversity information and practical management skills will be a necessity. A major risk to future site biodiversity levels would be a lack of coordination during this management phase. Interview discussions and personal communications with Bunn (pers. comm, 2007; 2010) also highlighted potential issues related to the financing arrangements for the management phase. For instance, if the financing of perpetual management of the larger open spaces and GI relies on commercial and residential service charges, then socio-ecological political pressures may become apparent. Such politicisation could divert attention away from the biodiversity proposals within the SBAP, the greenspace strategy, and the ecological area management plans.

A generic threat, which is present at the outset of this development stage, is lost or forgotten information; such as: ecological management plans and EIAs, which are sometimes discarded once planning permission is granted (Coathe, pers. comm, 2008). This is a knowledge management issue, which has implications for biodiversity failing to gain sufficient purchase on the development process, as previous biodiversity agreements and proposals are not implemented. Such lost information can come about due to organisational and personnel changes (as explained in *section 9.8.5.1*). Adequate recording, file organisation, handover processes to management companies and project management, are all beneficial practices; which could help to alleviate such issues, and have been effective to-date in the case of EQ2 (see *section 9.8.3*). Incentives in the form of awards, or contractual obligations, are other methods of alleviating the potential of ignored information. Moreover, Young (pers. comm, 2008) expressed specific concerns regarding the implementation of biodiversity proposals at EQ2; as she believed that

some of the management plans were too vague and not prescriptive enough. Similar to the detailed design stage, there is also the concern that the future site management ethos may favour 'amenity', rather than 'biodiversity value' (Young, pers. comm, 2008). Therefore, the selection of sub-management companies, with the right organisational ethos' and skills sets will be just as important as ensuring adequate handovers and information systems.

9.10 CONCLUSION

9.10.1 Influences from the Thames Gateway

Throughout EQ2's development lifecycle phases thus far, it is clear that the biodiversity proposals have been influenced by the wider regeneration level of the Thames Gateway, and also initially by the development decisions made by Kent Thameside Partnership (KTP). Despite the common tendency of favouring amenity value and architectural urban design priorities over the functions for ecological conduits and biodiversity, a sense of continuity between the GI strategies also emanated from different spatial hierarchies. This can be attributed to the branding of the 'greengrid' concept and to the promotion, leadership, vision formation, and partnership working of certain organisations. A correlation is also evident between spatial and strategic scales of BAPs, which is due to both the strong national and local legislation, and the provision of hierarchical local guidance by the WTs.

Unfortunately, the strategic regional influences of low biodiversity prioritisation within the Thames Gateway were also evident in the local politics affecting EQ2. These influences affect the governance frameworks, and hence the insufficient level of statutory biodiversity expertise to judge planning applications for mega-developments, instead relying on the limited resources of charities (primarily the Wildlife Trusts). The governance frameworks also fail to supply political champions of biodiversity - who could promote enhancements and ensure monitoring and enforcement. Instead, specific political site decisions at EQ2 reduced biodiversity and GI potential in preference for supporting social community perceptions, which have since been reneged on (see *section 9.5*).

The regional GI visions and development design ethoses, favoured architecture-led urban design and amenity goals, at the expense of adequate biodiversity consideration. This was reflected on the site level at BR. They were also reflected to a lesser degree at EQ2, if not by the project manager - certainly by the landscape architects, who will have been influenced by the higher

strategy GI visions. These prioritisation issues led to inter-disciplinary tensions for ecology and biodiversity professionals. Their own potential to embed biodiversity proposals within the strategic documents and detailed proposals of other disciplines, in line with a suite of regulations and policies, was frustrated. Thus, this nested case study illustrates that the biodiversity design opportunities (and protection, in the case of BR), which would have incurred no extra design or implementation costs, have been lost or impeded at the site level, as a direct result of low agenda prioritisation at the national and regional levels.

In England, the government's apparent circumvention of biodiversity protection and enhancement, through a lack of prioritisation and vigour, is in fact pervasive. English government departments persistently use weak 'action' words in policies and guidance - for instance, the wording in the NERC Act's biodiversity duty (NERC, 2006) – which concerns England and Wales - is weaker than the Scottish counterpart (The Nature Conservation (Scotland) Act 2004). Furthermore, England seems to have less biodiversity armoury than some other parts of the UK. There is, for example, a disparity between England and Wales, where in England there are no requirements for biodiversity champions, yet Wales has both political and enforcing biodiversity champions – see *Sections 3.3* and *Appendix 4.1*. The reasons behind this could form the basis of future research, where an initial starting point could look at the influence of the 'market' pressures and multi-national development organisations on such priorities and decisions in Whitehall.

Nonetheless, this lack of environmental prioritisation, in the case of the biodiversity agenda - discussed throughout this thesis - (despite the rhetoric and the UK government being a signatory to the international agreement for halting biodiversity loss), is very short sighted. Not least for the environment, but also for economic and social agendas and the need to create competitive European and global cities (see *Section 4.3.2.2*). Evidently, biodiversity must be given greater prioritisation at the central political decision making centres, as well as the regional levels, to ensure individual development schemes reach their potential.

9.10.2 Solutions to Strategic Biodiversity Obstacles and Replicable Successes

Without making some fundamental changes to the central English decision making processes, there is not one singular solution to the implications of the issues listed in *Section 9.10.1*. Nevertheless, the deployment of numerous smaller adaptations could cumulatively make a

significant contribution towards change. For instance, these may include the following roles for central government:

1. Ensuring political biodiversity champions are assigned in England and have training, which will assist biodiversity appreciation, knowledge, and prioritisation (champions can: formalise a responsibility to raise awareness; question accountability; and provide a point of contact - to potentially 'iron out' issues for, or between, different actors).
2. Insisting that LAs have dedicated roles for experienced 'in-house' biodiversity planning expertise - to adequately fulfil statutory duties.
3. Promotion of urban biodiversity design, as a form of urban design. This topic has currently been overlooked as a component of 'urban design', despite the far greater global significance (environmentally, socially, and economically) than many of the existing considerations.
4. Instigate competitions / awards / prizes to realise innovative urban biodiversity design – thereby promoting biodiversity enhancement.
5. Provide a new transdisciplinary body with a key responsibility for biodiversity enhancement innovation – which could feed into other sustainability agendas and organisations.
6. Create new legislation to provide a net enhancement of biodiversity, incorporating some form of tax incentive.
7. Require SBAPs to become a planning requirement for developments reaching a certain threshold (based on size / sensitivities similar to EIA thresholds).
8. Case studies, illustrating positive biodiversity impacts through governance strategies and networks, should be researched and publicised.

9.10.3 Site Level Obstacles and Replicable Successes

The EQ2 case study has on the one hand, provided a meta-consideration of development issues impacting on the potential for biodiversity protection and enhancement on mega-developments. Whilst on the other, it has directed focus towards project management implications and specific planning documentation at the site level, such as concept masterplans, visions, GI strategies and SBAPs.

Many of the identified site level obstacles and potential solutions support previous findings from the questionnaire and other elements of the research. For example, benefits relating to: transdisciplinarity; strong biodiversity planning policy (which is about to be amended); recording

systems for biodiversity proposals – of particular relevance once key personnel or organisations leave or change; in-house biodiversity expertise; enforcement and monitoring systems; preventing misdirection of biodiversity funds; and, early ecological consultation.

Nonetheless, there were also abundant site level findings which raised new issues and solutions. These predominantly related to project management, such as: ECI; specific project management styles, abilities and processes; and, an awareness of phasing complexities and specific lifecycle stages. Yet, these findings also related to issues of: urban biodiversity design and innovation; politics and socio-ecological resilience; and, the selection of specific organisational cultures and ethos'.

9.10.4 Key Recommendations from Study One (1A & 1B)

Due to the size of the mega-development and the accompanying wide palette of available data, diverse findings and potential recommendations have been identified. As a result of these findings, the general textual body of this chapter is discursive and necessarily expansive. Therefore, in order to summarise the key findings, recommended replications, and potential solutions which emanate from this case study, a tabulated summary has been provided below (*Table 6*). Some of the solutions and recommendations which are evident within *Table 6* are beginning to fit into particular themes. The design and partnership elements will be further investigated in the following chapter, and subsequently, the key themes will be discussed in the concluding chapter.

BIODIVERSITY ISSUES IN STUDY 1(A&B)	ISSUE STRENGTHS	ISSUE WEAKNESSES	RECOMMENDATIONS FOR MAXIMISING BIODIVERSITY
1. VISION	- Strong, clear briefs set the development agenda and greatly assist in continuity throughout development lifecycles - Visions for biodiversity and ecology which are site specific and innovative are more likely to engage the rest of the development team	- Absent visions, or visions which do not include biodiversity represent lost opportunities - The visions and early consideration of biodiversity at BR were very good, but poorly executed project management prevented the realisation of this vision during the time period studied	- Visions need to consider all phases of development, including the fully constructed management phase - Visions must not go against the ecological processes of the new development, but consider new processes and landuse - Include a vision statement at the start of SBAPs, which can capitalise upon any potential opportunities through proposals to create innovative new habitats and features for a wide range of species. This requires creative thinking, particularly in urban environments, where there may need to be several different functions for every space
2. URBAN BIODIVERSITY DESIGN EXPERTISE AND EXPERIENCE	- The involvement of individuals who are experienced in biodiversity planning and design could greatly improve biodiversity within mega-developments through their understanding of built form and biodiversity possibilities - Such an individual was present at BR and the potential for maximising biodiversity was great. However, poor project management and low priorities prevented achievement. - An example of innovation at EQ2 included the planting of flag irises within SUDs grilles – but more examples were needed	- At EQ2 there were requests for green and brown roofs by KWT, but a lack of early urban biodiversity design skills within the LA or consultancy failed to support and progress this request - EQ2 missed biodiversity design opportunities at the planning permission stage i.e. no design policies or design codes were agreed within the built form or streetscapes. This is because there was no 'urban' focus by any of the ecologists within the consultancy at the time	- Select consultancies who have urban biodiversity design experience (not just ecologists with field surveying skills) - Specialist resources within charitable trusts, QUANGO's & NGO's should also be accessed for specific specifications and issues - Collaboration with relevant academic individuals and research groups should also be saught, to aid innovation and /or success at practical implementation - Provide urban biodiversity design codes (as with other elements of urban design)

3. INITIAL CONCEPT MASTERPLANNING	- Can create highly original and inspirational masterplans	- Usually conducted by professionals from architectural backgrounds with no consideration for ecological processes and biodiversity requirements - Often removes the opportunities for biodiversity at an early stage (due to the above)	- Ensure transdisciplinary working of the lead 'concept' professional (or better still, have a transdiciplinary team) - For mega-developments such as EQ2 and BR, an 'anticipatory' design approach (as with EQ2) is an inappropriate design method for this development scale. Instead, a design method more closely aligned to Steinitz's (2010&2011) 'combinatorial' method should be considered
4. PRESCRIPTIONS	- Shortens planning process and negotiation time (Bunn, 2007) - More likely to achieve biodiversity gains and site quality	- Absence of prescriptions leads to uncertainty for everyone (including the developer and investors). Can also lead to lengthy negotiations and problems at the detailed design and construction phases	- Robust specific proposals to be agreed prior to any planning consent. - Where some degree of flexibility is still required by the developer regarding implementation details. This can be still be provided (see *section 10.3.1*)
5. URBAN BIODIVERSITY DESIGN REVIEW & INNOVATION	- Consultants within the same profession can have different approaches, ideas, knowledge and experience. Design reviews are a way of capitalising upon these different attributes and skills to increase design quality and consensus - Increased opportunities for innovation and workable solutions - especially useful in solving complex and diverse issues, which are unlikely to be fully resolved by one individual, or team - 'Tagging' on to an existing design review system, or process, is a possibility	- Within the same discipline there may be different approaches and these eventualities must be successfully mediated	- Design reviews should be actively encouraged and implemented – to promote and assist urban biodiversity design and innovation - By using the existing system of urban design reviews (currently overpopulated with professionals from architectural backgrounds) this will also assist transdiciplinary working and understanding that urban biodiversity design is a cross-cutting and transdiciplinary responsibility. This research has found no evidence of a formal urban biodiversity design review to-date

6. TRANSDICIPLINARITY	- Positive project management styles and meetings can build relationships and understanding between professionals from different disciplines and organisations, to overcome obstacles, and reach fitting biodiversity solutions	- There have been transdisciplinary tensions between certain professionals due to 'power' inequalities - Ecologists are consulted too late by other professions - The Thames Gateway Design Pact needed less architectural focus and greater focus on transdiciplinary visions (*section 8.2.6.2*).	- Find a method of reducing the power inequalities in professions due to contractual worth (see GI transdisciplinary *section 9.6.3*) - Investigate the possibility of a 'trigger' for earlier ecological consultations and involvement in detailed design and management proposals (potentially linked to the EIA process / ES recommendations) - Retain successful contractors and consultants who have delivered quality in the past and have built site knowledge and relationship networks - A greater voice needs to be given to biodiversity related professionals in leadership and strategic visioning (*section 8.3.4 & 8.3.5*)
7. DEVELOPMENT HIBERNATION	- Depending up on the lifecycle phase in which this occurs, it may provide new habitats time to establish without human disturbance (in the case of EQ2)	- Biodiversity proposals, costings and skills may be lost during this period - Depending up on the lifecycle phase in which this occurs, this may disrupt species translocations or habitat enhancements	- Megadevelopments with long construction periods i.e. over 5 years, should provide a contingency plan for biodiversity within the SBAPs or other biodiversity related documentation for this eventuality. Points of consideration would depend on the site specifics, but should include 'plan B's' during habitat enhancements or species translocations. Preferably ensuring that these elements of a scheme are financially 'frontloaded'
8. PROJECT MANAGEMENT	- EQ2 – management style (matrix), meeting style and recording style. Used business collaborator software to record effectively - Ecological consultants (MEL) – played to people's strengths	- At BR project management was directly responsible for destruction of existing wildlife and lost biodiversity opportunities, due to a general poor project management skills (communication etc) and also a personal low prioriisation of biodiversity and prevention of transdisciplinarity	- Replicate the successes in EQ2 project management and avoid the 'pit falls' of poor project management at BR (see *section 9.8*) - Reference biodiversity documents in contract clauses
9. ECI – EARLY CONTRACTOR INVOLVEMENT	- Potentially, this could be built into competition briefs or planning briefs and will increase	- This would require the selection of a contractor / consultant at a very early stage, when not all of the	- Contractors must be involved in the projects inception through the ECI process (rather than waiting for the construction phase itself)

	the likelihood of biodiversity proposal implementation, in addition to economic advantages. See *section 9.8.5.2*	parameters are yet defined. It is therefore important to select organisations with the right skills sets and this could be difficult if the project proposals are still largely undefined.	- To minimise misunderstandings it would be beneficial to provide contractors with a summarised ecological brief of the different development phases, which is cross-referenced to detailed documents and referred to within contract clauses. This can then be re-issued to different contractor teams as and when they change over the course of the long construction phases. - During inductions of contractor teams, a member of the construction team should be designated as a biodiversity champion. This member of staff should also be commissioned with 'handing over' to the next construction team's biodiversity champion, to assist with information and knowledge transfer.
10. COLLABORATION	- Regular co-ordination meetings and partnership with other sectors such as the academic research groups, may positively influence schemes to enhance biodiversity - In some instances organisational competition can be healthy e.g. if it 'raises the game'	- Sonia Bunn noted that some actions seemed to be forgotten following co-ordination meetings at EQ2 (Bunn, 2007) - Shand (2009) referenced in *section 8.3.2* notes that the complex stakeholders involved in the Thames Gateway leads to competition between organisations, rather than collaboration	- Encourage strong partnerships and foster good working relationships with different teams and organisations through regular meetings, which culminate with defined actions and responsibilities - Accountability and a clear division of roles, responsibilities and actions for biodiversity maximisation between different organisations and stakeholders is critical for regeneration areas. However, competition can be healthy when accountability is defined, shared, and sits alongside collaboration in achieving shared goals.
11. RECORDING AND ORGANISATIONAL CHANGE	- Business collaborator, or similar system of information storage can greatly assist future teams and individuals in comprehending ecological responsibilities and biodiversity proposals	- The current system is inadequate for cross-referencing and superceded proposals (see *Appendix 4.2*). As a result many amendments are approved accidentally – often at the loss of biodiversity - Agreed biodiversity proposals can	- Simplify key concepts (whilst cross-referencing to more detailed documents), so it is easy for new staff to pick up - New law or responsibility placed upon the developer's team, regarding the responsibility of highlighting changes to plans (superseded) which are likely to affect other life froms - Spatially record all proposals by all disciplines wherever possible, and use a GIS database to record all site changes –

		be lost at any stage due to knowledge leving with key individuals departures, or 'lost' agreements	physical, legal, ownership and planning within each section of the mega-development
12. PHASING	- A strong understanding of phasing can positively affect biodiversity maximisation during the design, construction and management phases of a major development	- A general lack of phasing understanding of many professionals regarding mega-developments. This can result in accidental damage or loss to existing or proposed biodiversity	- It may be appropriate for the RTPI or other such organisation to set up 'phasing' training / guidance in a megadevelopment context - The researchers phasing oulines in Section 9.7 could be used for training purposes
13. ECOLOGICAL CONSULTANTS WITH DUAL ROLES	- Consultants with a duality of roles can produce the strategies and plans, as well as provide the surveys and work on the ground. This leads to greater co-ordination and overall understanding of the development complexities and how to maximise biodiversity theoretically and practically	None	- When selecting ecological consultancies for large major developments and mega-developments, consideration should be placed on whether they have a duality of skills - The ecological consultants at MEL (on EQ2) offer an effective model of working in this instance; with integrated ecological consultation skills (see *section 9.8*). Where there is this duality of roles, there is more impetus to tie the theoretical strategic reports to the practical site workings.
14. CULTURAL ETHOSES OF ORGANISATIONS	- Selecting contractors or consultants on strong biodiversity ethos', CSR demonstrations, and track records will optimise future site biodiversity - Ensuring 'Eco' is defined as 'ecological' and not 'economical' will assist in increasing biodiversity prioritisation	- Organisational ethoses and cultures are not always apparent - Different organisations often have a different understanding of the definition of 'Eco' (s*ection 8.3.5.1*)	- Use relevant selection criteria in the tendering process. This could be achieved through quality aspects and specifically providing a percentage consideration of the winning tenderer on their credibility, ability, and track record in providing quality biodiversity protection and enhancement schemes. For instance, this may have been identified through obtaining a specific 'good contractor' award scheme. - Ensure that at the start of 'visioning' excercises, all consultants and stakeholders are aware of 'key term' definitions.
15. BIODIVERSITY INCENTIVES FOLLOWING PLANNING CONSENT	- Biodiversity incentives post planning permission are required to ensure agreed proposals are carried out and not forgotten	None	- Incentives must include 'carrot' and 'stick' methods due to different types of developers. Beneficial incentives such as 'tax relief' / awards etc require further investigation

			- Address currently weak enforcement procedures and fines (as discussed throughout the thesis)
16. TRANSBOUNDARY	- Large developments are often part of a development partnership, which give transboundary consideration to GI (e.g. Greengrids). Thus, maximising mobility of species across areas	- As the Ebbsfleet Valley has shown, there are inconsistent site BAP (SBAP) requests	- Require SBAPS on all major developments, which reach a certain threshold or sensitivity (new legislation or included within a planning policy statement)
17. ECOLOGICAL / BIODIVERSITY CONSULTEES FOR LAs	- In the case of EQ2 KWT (wildlife trust) was able to provide quality guidance to the LA regarding the planning submission	- Having no 'in-house' biodiversity officer will have reduced the ability for communication with internal LA employees from associated disciplines - There were also time and resource constraints on KWT as a charity - The lack of an 'in-house' officer reduces the potential to make positive contributions towards biodiversity maximisation during development negotiation meetings, unless invited and attending all meetings	- All LAs (with significant urban areas) should have an experienced urban biodiversity planning officer to comply with statutory duties - The publicity of the greengrids and the KWT biodiversity and GI guidance should be replicated on other large sites - It is important for this scale of project, that consultants have staff and skill resources which will have longevity – and are not reliant on one individual
18. SURVEY & PROTECTION VERSUS ENHANCEMENT	- A small shift in emphasis from species protection license requirements, to ecological and biodiversity enhancements could enable significant overall benefits	- Currently many protected species translocation requirements e.g. Great Crested Newts specifically are costing an inordinate sum of money, in comparison to budgets for enhancement	- Natural England to review ratio of biodiversity funds given to each and the relative merits. Should protection and translocation requirements be relaxed in exceptional circumstances? - This should be coupled with stronger legislation for enhancements
19. LOCAL POLITICS	- Possess the 'power' to make the ultimate planning application decisions, which can maximise biodiversity levels to their full potential	- Decisions are negatively affected by low socio-ecological resilience and lack of biodiversity prioritisation. This is common on mega-developments due to lack of	- Provide informative presentations & events to surrounding communities and encourage consultation and participation prior to consent - Ensure political biodiversity champions become

		previous public access or established local level ecosystem services - Decisions are negatively affected by presentation of information (e.g. skewed views by particular species groups such as Kent Reptiles group) and by low prioritisation by central government	mandatory in England (these could be trained in conflict resolution, mediation and local politics) - Provide executive summaries of biodiversity and ecological information, which have unambiguous parameters and prescriptions, which do not override site BAP and link to national BAP - Wider consultation process on key sites (and encourage better involvement by statutory organisations e.g. Natural England and the Environment Agency)
20. GOVERNANCE APPROACHES	Flexibility – opportunities for a change to the existing network priorities, processes and outcomes	- A lack of biodiversity prioritisation and accountability (*section 8.3 & 8.5*)	- Clear biodiversity leadership must be defined and evident; with clear responsibilities, roles and actions defined and programmed - Biodiversity prescriptions are necessary, yet they also need to be flexible at this strategic level to encourage innovation, investment and locally appropriate solutions
21. SOCIETAL & POLITICAL PRIORITISATION	A changed prioritisation could deliver major biodiversity improvements on the ground	- A lack of social and political appreciation of the global biodiversity ramifications to humans, and indeed the 'local' links (*section 8.5*)	- Media intervention is necessary by central government to illustrate the links to everyday life - Publicise successful case studies - New legislation and incentives

Table 6: Summary of the key findings and recommendations from study one

10 STUDY 2 – COMPETITION & PARTNERSHIP: OPPORTUNITIES FOR BIODIVERSITY INNOVATION

10.1 STUDY INTRODUCTION

10.1.1 Biodiversity Design Context

Biodiversity design has been raised as an important consideration for tackling the issue of maximising urban biodiversity on major development sites within other chapters of this thesis. Some elements of four of the key theory themes, which were listed in Chapter Seven of Study One – relating to design and procedures (Table 4, points: 6, 7, 9 & 10); are given a closer inspection through this chapter. Specifically, this chapter relates to several of the findings of Study One, which were listed as key issues at the end of Chapter Nine: vision, urban biodiversity design expertise, urban biodiversity design reviews and innovation, and biodiversity incentives (Table 6, points: 1, 2, 5 &15).

Innovative biodiversity design, which considers a site's future 'uses', and the impacts of those changed uses upon ecological processes, is necessary in order to maximise urban biodiversity (Knight, pers. comm, 2009). This was revealed during previous professional experience, and further clarified within findings from the survey questionnaire – which listed a lack of early enough consultation for design input as a key obstacle in *Table one*, interviews, and the Eastern Quarry case study (s*ection 9.5.3*).

Surprisingly, innovative biodiversity design is not only absent from the majority of developments, but over the course of sixteen years of studying, researching and practicing environmental planning, very few examples of 'innovative' design have come to light in this field - even during the attendance of two international Ecocity conferences (although *section 6.5* illustrates several innovative strategic solutions to GI). The limited repertoire of examples is indicative of the absence of innovation. This absence is linked to a severe lack of: early involvement of ecological expertise; appropriate skills sets within development teams; LA negotiating skills due to a lack of both resourcing, and in-house ecological expertise; true transdisciplinarity; robust and meaningful incentives; biodiversity design reviews - as described in the case of Eastern Quarry; and appropriate case studies, specifications and products. Nevertheless, the latter is improving, and a recent new biodiversity technical guide for new build '*Biodiversity for Low and Zero Carbon Buildings: A Technical Guide for New Build'* (Williams, 2010), contains several specifications and product information for bird and bat habitat.

Fundamental to the absence of innovation is that the terms 'biodiversity' and 'design' are rarely used concurrently (and so professionals are not used to thinking of biodiversity as a part of the design process). Notable exceptions exist nonetheless, such as the 'biodiversity by design' guidance produced by the TCPA (2004), and green roof design for predominantly high biodiversity value (Dunnet & Kingsbury, 2004). Where a certain familiarity exists regarding the disciplines of landscape design, urban design and architectural design, biodiversity tends not to be conceptualised as something which can be creatively expressed, or designed. Indeed, analyses of topical discourse within the professional development culture, reveals that biodiversity is not even incorporated within these other design constructs. For instance, street trees or planting beds implemented within landscape and urban design schemes generally have biodiversity value as a by-product, rather than as considered design intent.

In addition to the process obstacles and the 'framing' of the concept of biodiversity design, there are additional social causes for the lack of innovation, which revolve around 'fear'. This social 'fear' relates to consequences and conflicts of designing habitats, or attracting particular species to development sites e.g. fears from the public, such as being stung / mess, as an interview participant elaborated upon (James, pers. comm, 2010); or fears from professionals and politicians e.g. practical issues of maintenance and liability related to protected species legislation - creating development, or business constrictions – as previous professional action research has uncovered. Whilst these fears and conflicts are largely unfounded, or can be 'designed out' or eliminated through education, fear is nevertheless a powerful de-motivator for biodiversity design innovation (see also *section 4.5* regarding human conflicts).

10.1.2 Case Study Research Framework

The illumination of emergent theories within this research, relating to the ability of competition and partnership processes to overcome some, if not all, of the aforementioned obstacles to biodiversity innovation, is the subject of this chapter. The two studies within this chapter were selected to further investigate these emergent theories, whilst adding detail to some of the findings from the previous key case study. One site-based case and a smaller process-based study, highlight successful process solutions for aiding innovative biodiversity design. Leonard-Barton (1995) describes a dual methodology for case studies, which relies on both synergistic use of a longitudinal single site with replicated multiple sites. In this chapter, a retrospective study (the smaller process-based study in Malmö, Sweden) along with a retrospective 'case memory' i.e.

numerous remembered studies from previous professional experience, offers an opportunity to identify patterns indicative of dynamic processes; whereas the longitudinal study, provides a close-up view of patterns over time (the main / site-based study in Sheffield, UK). The author has conducted field visits to both studies depicted here, in addition to interviews and reviewing literature.

The site-based case: 'Central Riverside, Sheffield' (*section 10.2*), demonstrates how several common issues can be overcome, such as: acquiring an appropriately skilled development team; achieving creative, multifunctional design; and avoiding communication problems associated with dynamic personnel and organisational involvement. It is a 'mixed use' urban development, providing the real-time longitudinal case study.

This longitudinal study is supported by the retrospective study (*section 10.3*): BO01 exposition centre in Malmö, Sweden. The retrospective study offers a different perspective, whilst supporting the longitudinal study. Together, they investigate aspects of the competitive design process, as a means of maximising biodiversity potential. They also illustrate another key finding of the research: that maximising biodiversity on development sites is more likely to be achieved when solutions are multifunctional - answering more than one development, or planning criterion (Barber, 2006).

10.2 CENTRAL RIVERSIDE, SHEFFIELD, UK: A COMPETITIVE DESIGN PROCESS

10.2.1 Description

The 'Central Riverside' development is located in Sheffield city centre, just outside the 'heart of the city' and between the River Don (green corridor) and 'The Wicker' (retail and restaurant area), see *Figure 26*. It is split into two development parcels, the first being a prestigious £13 million office scheme (*Figure 24*), which had reached completion by the start of this case study research, and the second is a £20 million mixed use residential and commercial scheme which was under construction next-door during the case study research, but has now been completed. By combining a competitive design process with partnering, the regeneration scheme was successful at achieving a high environmental and architectural quality.

Figure 24: Photograph of office scheme ©David Barbour, BDP architects

Figure 25: Artist impression of residential & commercial unit, BDP architects (Incorrectly shows no vegetation to the river bank)

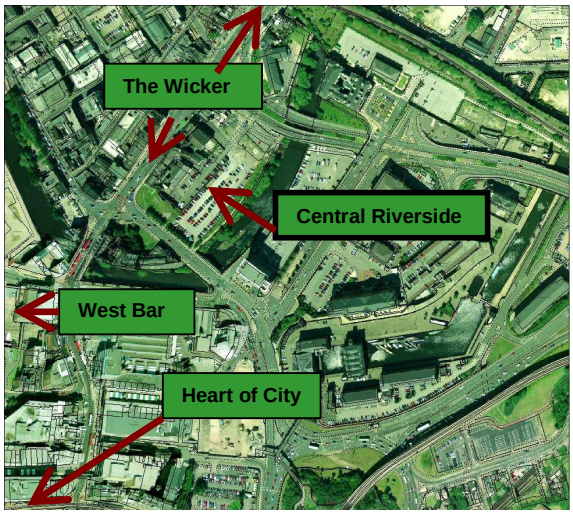

Figure 26: Location

ON SITE

- Bird & bat boxes on office roofs
- Urban tree & shrub planting in courtyard
- Green roofs on upper levels of residential
- Wetland & roof garden on podium level (above the retail units; used by residential & overlooked by office)

OFF SITE - RIVERBANK

- Kingfisher nesting boxes & perches
- Artificial otter holt
- Removal of invasive non-native species (Japanese Knotweed)
- Re-planting native species suitable for protected water voles
- Existing trees protected - new tree planting

Figure 27: Biodiversity benefits gained

10.2.2 Gaining Proposed Biodiversity Benefits

The pre-development baseline biodiversity was relatively low, as the previous land use was car parking (a row of semi-mature trees and a strip of rough grassland existed). The initial ecological survey conducted by the developer's consultants found no notable species present on site, but suggested bird and bat boxes along the riverbank. Additionally, due to the adjacent River Don – an important local green corridor, Sheffield City Council (SCC) identified opportunities for species (including protected species) to colonise the site, if appropriate features were provided. SCC were also keen to realise green roofs in compensation for the loss of trees and grassland and to increase the local biodiversity.

Space was limited for biodiversity enhancements. However, the development provided a number of features and habitats, both on and off site, to aid colonisation of an array of species present within the locality (see *Figure 27*). The biodiversity gains on this site were far greater than most

similar sized, urban developments in England, making this an interesting development process to investigate.

The success in gaining the biodiversity benefits listed in *Figure 27,* was assisted through a combination of: supporting policies; competitive process; and multifunctional benefits - fulfilling other planning criteria and strengthening justifications e.g. green roofs (illustrated in *Figure 29)* and a roof garden (illustrated in *Figure 28*), which not only provided fantastic biodiversity opportunities, but also alleviated flood zone issues through water retention; air quality issues through planting and amenity issues by providing recreational and visual amenity for the rest of the development. Additionally, the partnering process (between SCC, the developer's agents and relevant stakeholders) helped in retaining proposals throughout detailed design and construction phases.

Figure 28: Roof garden plan for residential scheme (Podium level accessed from residential units) SCC public planning documents.

Figure 29: Green roof on upper levels of roofs on residential scheme. (indicating different substrate depths to benefit a wider array of species). SCC public planning documents.

10.2.3 Development Process

SCC owned the development land and wanted to realise a high quality urban regeneration on the site. They already had two development partners on board and wished to use the competition process to allocate a third, for the residential and retail element.

Of the two existing development partners 'Sheffield One' was an urban regeneration company set up in 2000 to spearhead the regeneration of the city centre, and 'Priority Sites' was a

development company with previous experience of working with SCC, and were selected to deliver the strategic masterplan and speculative office elements.

Priority Sites worked with stakeholders to produce the masterplan and development brief used in the competition stage. Two of the key objectives in the brief related to enhancing the river frontage and introducing high quality public spaces of a human scale, thereby highlighting the city's green heritage. A key planning and urban design principle also considered a green roof. Whilst objectives did not explicitly relate to increasing biodiversity, they were enough to request enhancements in negotiations at the competition stage. However, negotiation might have been easier had biodiversity enhancements been more explicit in the brief. On this theme Ogden (pers. comm, 2007), the city development manager at SCC, stated:

"The competitive approach can be used to raise the bar on design or other qualities but only if: a) the site has enough development value to fund it and, b) you have a clear development brief which you can hold them [developers] to. It's also important to ensure your developer team has the right expertise, e.g. ecologists if that is a key aspect. You can influence the team through the brief and competition process".

The competitive element to select the final development partner/design was a two-stage process. Five developers were invited to competitive tender, and three with appropriate credentials and teams were shortlisted to develop design proposals further, which involved a series of negotiations and meetings.

More than 20 % of the developer selection criteria was design focused (chosen by the LA), and the natural environment was considered to a great extent in the design and selection process, due to its appearance in the brief and the importance apportioned to the adjacent river, its biological capabilities and pedestrian route (Deshpande, 2007). Additionally, emphasis was placed on sustainable design and biodiversity features during selection stage meetings, and the third development partner 'Artisan' was selected largely due to their compliance with these goals. SCC's team included city planners, development control planners, urban designers and an environmental planning officer, who were able to operate in a co-ordinated manner with the developers agents, to ensure biodiversity aspirations could work in a practical sense. This co-ordination (which was witnessed by the author of this thesis during previous professional experience; as well as during site visits, interviews and documentation reviews), ensured the building design, strategic vision, social and public proposals, construction programming and planning control, all considered and allowed for high quality biodiversity enhancements.

Historically, development contracts often bypassed quality, being predominantly price-based. Although more unusual, the competitive design process, with greater quality focus, is becoming increasingly popular. Smyth (2006) points out that price-based competition leads to what economists term 'value added', whereas 'added value' achievable through design competitions, is value that exceeds 'value added'. There is increasing evidence that quality schemes, enhancing development settings and increasing sustainability credentials, can also achieve increased profits and reduced voids (periods where properties are not let), please refer to s*ection 4.7.3.4* and the VALUE (Valuing Attractive Landscapes in the Urban Economy) Research project (2010) for further information. Furthermore, in the case of Central Riverside, all apartments were sold prior to construction, which is indicative of success.

Competitive design processes tend to be required where a site is particularly sensitive or prestigious, although the process can also be useful to larger / more complex developments in general. The approach is usually initiated through a formalised competition – usually through a professional institute, through the hosting of an exposition, or through competitive tendering. Single-stage competitive tendering is normally only associated with competitive costs, whereas two-stage (in this case), has a negotiation / competition element. This element usually concerns design quality, with discussions focussing on design briefs and innovative proposals. Exemplary schemes, or unique solutions, are often produced through obtaining a greater partnering approach (Saad *et al*, 2002); which is especially useful where creative and multifunctional biodiversity features are desired. However, Zhang and Li (2011) note that this kind of two-stage competitive tendering is still characterised by price competition, firm contractual arrangements and resolving disputes through litigation (adversarial). Therefore, they believe that for innovative partnering (which overcomes barriers such as the 'lack of trust'); a widespread change of culture is needed (Zhang & Li, 2011). For this particular example, the LA had previously worked with the chosen developer 'Artisan' – which assisted in partnership related trust.

Ogden (pers. comm, 2007) believed that whilst the percentage of all development initiated by competition may be quite low, with publically sponsored projects the percentage is high and probably a majority. Increasingly, large regeneration areas rely upon Compulsory Purchase Orders (CPOs) to acquire appropriate land assemblies enabling co-ordinated development. Ogden (pers. comm, 2007) further suggests: *"It's not necessary for a L.A to own the site to promote a competition, provided they have gone through a process of consulting on and approving the right planning policy. Then the Council can use CPO powers in support of their selected partner"*.

Partnering, between contractors and commissioning bodies (and potentially key stakeholders), is now widely seen as a way of avoiding any negative consequences of competitive tendering. The essence of partnering is based on the basic social process of co-operation and that the aims are to raise transaction frequency, so clients and suppliers learn more about each others requirements and generate trust (Winch, 2002).

Instances of miscommunications on the Central Riverside site regarding biodiversity proposals could easily have resulted in their loss, but this was avoided due to successful partnering (evidenced from the author's direct previous professional experience, and later research interviews and site visits). Success was achieved through: regular communications; cross-professional contacts; an increased understanding of different stakeholder aspirations; records of aspirations; and the presence of champions within teams. Some examples of the successfully resolved miscommunications follow.

1) The artist's impression of the mixed use scheme (see *Figure 25*) illustrates a hard urban edge to the river, rather than the existing vegetated bank with proposed wildlife enhancements. This led to misunderstandings regarding the approach to the riverbank.
2) Bird and bat box proposals for the office roof were almost discarded, due to confusion over specification requirements and building design.
3) Riverside proposals were nearly lost due to confusion over which development plot would provide which features.
4) Specification quality of the podium level wetland and upper level green roofs were almost reduced, due to value engineering and construction programming.
5) Riverside trees were nearly removed due to stakeholder concerns (police) regarding safety issues.

Smyth and Pryke (2006), whilst quoting Calvert (1995), highlight that failing to recognise the existence and potential power of stakeholders, may lead to serious problems at advanced stages of project planning and implementation. SCC built relationships with stakeholders in the area surrounding Central Riverside, over the course of many years and projects. This assisted resolution of issues with stakeholders, such as the Police concerns mentioned in point 5 of the list above. Most private developers, however, do not have this background knowledge, but by tapping into LA contacts and conducting consultation exercises, they can still engage potential stakeholders.

Partnering, which ensured implementation of proposals, was just as essential to Central Riverside's achievements as negotiating the proposals in the first instance. Male (2001), states that issues such as relationships and attitudes to partnering are likely to be as important, if not more so, than price. The importance of partnering and relationships was also identified in an NAO review (2005), which (amongst other items) saw opportunities for improving value-for-money in: collaborative working through integrated teams and savings in whole life costs through better design. Additionally, the Egan Review (2004) advised that, establishing integrated cross-cutting teams together with a mechanism to successfully transfer individual's knowledge; and encouraging collaboration, would all assist sustainable development. These points can also apply to maximising biodiversity.

Successful partnering requires appropriate organisational frameworks. Complex development projects, particularly those in urban areas, have numerous transient professionals and organisations involved during the development process. They are transient either because their involvement is often related to only one stage of the scheme, or due to staff movement during the lengthy time between project inception and completion. Staff may move due to promotions or new positions and organisations can experience restructuring or replacement. It is therefore essential to have detailed, unambiguous records of biodiversity aspirations, which provide easily interpreted and transferable knowledge for the future.

The developer for the residential scheme (Artisan) changed some of the construction personnel during the construction stage, including the site foreman who had been involved in meetings concerning biodiversity proposals. The replacement staff initially questioned some of the biodiversity proposals, indicating an adequate handover had not occurred. Additionally, a key member of SCC's staff had also left during the construction phase. However, the planning department had detailed records of principles, specifications, locations (Artisan's landscape consultants had worked with SCC to record features spatially) and quantities of features and materials, which were all tied to planning conditions. The records resolved the issues and biodiversity aspirations were not compromised (Mansell, pers. comm, 2007 & 2008). Later personal communications with the planning case officer (Mansell) and a site visit in 2009, however, did reveal some slightly negative amendments had been made due to further construction personnel changes - explained below.

Due to resource and skills requirements, planning consent files and related conditions do not generally contain the level of detail described above. Additionally, planning files do not normally contain non-planning related information and the method and volume of stored information presents difficulties in extracting relevant biodiversity information from the many other issues, as they are usually all merged together in correspondence and other documentation. Therefore, planning files in their current state do not offer the best method of recording all relevant biodiversity information to individual developments.

Furthermore, when the developer's architects (BDP) were asked to comment on their view of the effectiveness of the process in implementing biodiversity proposals, a representative was critical of SCC's timing of requests and lack of research assistance: "*The introduction of further requirements after planning consent had been granted created difficulties [mainly financial, due to less competitive pricing after tender documents signed] for the client"* (Trickett, pers. comm, 2007). Contrary to this statement, SCC's experience, coupled with email documentation, confirmed requests and explanations had been made prior to planning consent, with the exception of one item, where the developer was supplied with supporting information. Despite the architect's advanced project recording system, their statement indicates that relevant information was inadequately recorded and transferred to them by the developer. The Architects were amenable to incorporating biodiversity features and it was really only process issues which set up barriers for them to implement these items: *"We would like to emphasise that we recognise the benefits of promoting biodiversity and incorporating elements to encourage plant and animal life in urban sites such as this. The costs of many of these items are generally small in the context of the overall project"* (Trickett, pers. comm, 2007).

Access to the green roof and roof garden was gained by the researcher following construction completion in February, 2009. Unfortunately, weather conditions at the time of visiting (several inches of snow) affected the value of visual information gained from photographs, see *Figures 30 - 32*. However, plants were visible under the snow on the extensive green roof, although the undulating depths of growing medium to increase biodiversity value were not present - this was due to much confusion during the construction phase, caused by the site foreman changing on three occasions (Mansell, pers. comm, 2009), and the detailed records, which were available, not being accessed due to a key staff member leaving.

Figure 30:
Photograph of roof garden: Feb 09 (Photograph by Helen Barber)

Figure 31:
Bat boxes on office (Photograph by Knight Frank)

Figure 32:
House martin boxes on office (Photograph by Knight Frank)

The roof garden had been constructed in line with the agreed proposals, except for two factors: 1) shrubs had been planted in place of several silver birch trees, which from both a visual and biodiversity perspective (in terms of canopy structure and varied habitat provided by the addition of trees into the space) would have been a better approach; and 2) the proposed wetland area with marginal planting, which would have created a biodiverse and functional habitat feature, had instead been replaced with a formal water fountain, which due to design, had no real functioning habitat features. These losses were due to the personnel changes described above and inadequate data retrieval processes. Additionally, the management company's representative, who accompanied the researcher on the site visit, had not been briefed on how to maintain the green roofs and had calculated that the maintenance of the water fountain (due to the pump etc) would be in the region of £5,000 per annum (Dyson, 2009). The change of design was particularly unfortunate, as the original biodiverse proposal would have incurred much lower management costs and labour requirements.

10.2.4 Case Study Summation

Although enhancements were still gained, the lack of adequate recording and distribution of information resulted in costs to the client and design team, as well as increased running costs and lower biodiversity value with the completed development. This clearly needs to be avoided, as not only were costs unnecessary, but they could have affected implementation or willingness to enhance biodiversity on future projects. Previous professional experience has highlighted that this is a common problem, pointing to a general need for better biodiversity recording for individual developments.

Records should ensure proposals are still followed if key personnel are lost. They could take the form of one document or folder, transferred to and held by the current developer/occupier/agent and could include the following:

- List of enhancements/management requirements
- Spatial record of enhancement/protection measures
- Quantities/application details
- Specification principles
- Reference to relevant documents/details
- Relevant contact details (including type of involvement)
- List associated policies/legislation/regulations
- Multifunctional proposals should reference related professions documents/contact details, as changes to engineer/architect plans, may also change biodiversity functions.

Nonetheless, in this instance the planning documentation system still exceeded many recording systems used for biodiversity proposals, as proposals were at least spatially recorded on a detailed landscape plan. This was due to Artisan's landscape consultants (Planit EDC Ltd) and the local authority working together to produce this. Additionally, a number of features were tied into planning conditions, which provided quick reference and robust requirements, enabling the planning officer to ensure the retention of key features during personnel changes and the ensuing confusion from the contractors.

This case study was seen, by the developer and LA, as a successful example overall (in addition to the author, who has extensive professional experience on such sites). The success is also evident in the physical biodiversity features and habitats achieved (no greater measure of success). It illustrates how competition and partnering overcame common obstacles to implementation, but it also raises the issue of adequate recording. The loss of the SCC and consultant's biodiversity champions, following employment changes and completion of the design process, in addition to the contractor's high personnel turnover, led to: communication issues; the loss of some biodiversity value; and the likelihood of future management issues.

10.3 PROCESS CASE STUDY: BoO1 European Housing Exposition Site, Malmö, Sweden

The Bo01 European housing exposition site in Malmö, Sweden, was an internationally renowned example of the competitive design process, which came about due to environmental design criteria. The competition process for the Bo01 exposition site was two-stage. Firstly, the city of Malmö competed with other Swedish towns and cities to become the housing exposition site (RyderHKS, 2007) which was won in 1996 (URBED, 2010 p.24). The selected theme for the exposition, which opened in 2001, was sustainability – biodiversity enhancement being an important aspect of this. Secondly, design and development opportunities were offered via a competition.

Once Malmö had won the bid to host the Exposition, a total of 17 developers undertook 22 different developments, providing an initial total of 358 dwellings, in the first phase (eventually becoming 2,000 dwelling units). Quality standards were established by a 'Developers Group' - a tri-partite body made up of City Officials, Community Representatives and Developers. Thus, high design and sustainability standards were achieved (RyderHKS, 2007).

A 'Quality Programme', development agreements and Expo agreements were drawn up. Biodiversity was ensured within all new developments through the quality programme – this acted in a similar manner to the Central Riverside, Sheffield design brief (*Section 10.2.2*). With 'sustainability' as the theme of the competition, a strong focus was given to biodiversity and a creative multifunctional approach to its incorporation encouraged. This included a unique 'point system' method, which provided the framework: "*Every developer had to choose 10 out of 35 green points… Developers were also required to establish mechanisms for long-term management and maintenance. Overall this has resulted in a mosaic of habitats including green roofs and walls, wetland retention ponds and courtyard gardens*" (TCPA, 2004). The points list was an inventive policy, allowing for flexibility and creativity in approach (essential for larger developments), whilst ensuring a minimum threshold of biodiversity benefits were attained (see f*igures 33 – 35* for examples).

Figure 33: Substrate & planting mounds creating interest for people as well as providing hibernacular, food & habitat for a variety of species.

Figure 34: Aquatic planting & water rill, providing habitat, visual amenity & surface water run off solutions

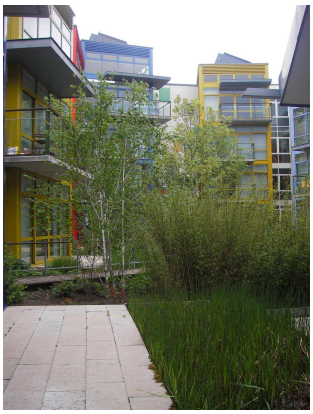

Figure 35: Ponds within communal areas providing potential for wildlife, recreation & education

Photographs by Helen Barber

Developers worked in partnership with the LA and community groups, towards the aspirations of the agreements and quality programme. Testament to BO01's success is the number of international and national visitors attending Malmö to study the diverse sustainable design approaches.

The study demonstrates that the partnering and competition approach can achieve successful biodiversity enhancements on larger scale developments. A key component to success, were the agreements (similar to design briefs / contracts) which provided the framework and the recording of biodiversity aspirations. Without commitment to these flexible - yet prescriptive documents, more homogenous and less multifunctional biodiversity solutions are likely to have resulted.

10.4 CONCLUSION

The increasing complexity of development schemes and the requirements upon them, has led to a corresponding increase in overlapping professional issues. As the biodiversity issues tend to be more intricate and complex than those of related disciplines (due to the complexity of living organisms, their lifecycles and requirements), they are likely to gain greater benefits from the competition and partnering process.

The combination of competition and partnering were certainly the main contributors to maximising biodiversity at the Central Riverside development, although they were not the only

ingredients to success. Several stages were crucial to maximising biodiversity in this urban development:

- Vision – multifunctional biodiversity benefits (providing 'added value', assisting other requirements and increasing justification)
- Brief – setting clear objectives and design principles
- Team/skill selection
- Negotiation and design creativity. Negotiation was most effective at gaining creative solutions during the selection stage.
- Partnering. Improved communication and cross-professional meetings retained proposals during detailed design and construction.
- Planning conditions. Prescriptive conditions recorded and ensured delivery of quality and detailed proposals.
- Champions overcame difficulties and co-ordinated proposal implementation.
- Marketing opportunities. The appeal of positive marketing can assist implementation of biodiversity enhancements. The architects and developers used environmental credentials of this scheme in their marketing strategies. However, this was a product of the enhancements, rather than a driver to gaining them.

The two studies illustrate that competition and partnering are capable of improving biodiversity at different development scales, and that different types of competition process can be used. The Malmö BO01 site demonstrated the successful combination of partnering and competition on larger, more complex sites; as well as adequately recording biodiversity aspirations.

The competition process was advantageous in selecting developers, consultants and designs over a purely financial tendering process. The advantages included: greater opportunities to select relevant teams/skills; quality emphasis; negotiating to maximise potential prior to final selection; and, increased motivation to provide innovative design solutions. Whilst competition is gaining popularity in local government bodies, as an auditable, fair selection process in gaining 'best value', rather than purely 'financial value', it is not used as widely elsewhere. This may be due to the financial and time implications associated with running a competition. However, where there is enough profit in a scheme, the increased quality should counterbalance costs in many circumstances.

Relationships created through the partnering process assisted in fostering common goals and understanding different issues, building trust and providing opportunities to rectify situations where features may have been lost (for instance, overcoming issues of social biodiversity 'fear' mentioned in the introduction). These benefits helped to overcome common obstacles which tend to occur due to: the lack of familiarity of most built environment professionals with biodiversity enhancements; and in overcoming obstacles which restrict biodiversity innovation.

11 CONCLUSION

11.1 THESIS SYNOPSIS

This thesis began with *Chapter one* 'Introduction' discussing the importance of the global issue and environmental mega-risk of biodiversity loss, which rivals that of climate change, and which will increase in prominence over time due to our dependence upon ecosystem services. The link was made in *Chapter one* between global biodiversity loss and the cumulative effects of individual development schemes, which can enhance local biodiversity, thereby slowing the global rate of decline. The need for this research was justified due to the current obstacles in achieving biodiversity protection and enhancements on major development schemes.

The breadth of the 'system' under study required the adoption of a meta-consideration and a 'systems approach' for the research to enable the resulting knowledge and findings to possess the greatest practical relevance and applicability (see *Figure 1* for the global components of the wider system, and *section 1.2.4* for an introduction to the systems approach and meta-consideration). The multi-strategy research methodology which was employed (explained in *Chapter two*) explored the complexity of enabling successful ecological works throughout all development lifecycle stages, whilst *Chapter three* identified the common obstacles.

In addition to case study literature reviews, specific literature reviews were undertaken in the biodiversity and planning fields. During the iterative research approach to these literature reviews, in combination with other research methods, several factors became apparent for maximising the potential impact of the research:

1) that 'governance' should be an important component of the planning literature review;
2) that the biodiversity literature review should be refined to concentrate on 'urban' biodiversity - resulting in a thesis title amendment; and
3) that human ecology and socio-ecological resilience had a significant influence within the specific research topic, as well as the wider prioritisation of the biodiversity agenda.

The resulting 'background' chapters: *Chapter four* 'Urban Biodiversity', *Chapter five* 'Planning and Governance' and *Chapter six* 'Socio-ecology' illustrate the complexity of the topic whilst weaving other research findings into the literature reviews (smaller case study findings, interview insights and previous professional action research insights) to advance some of the emergent theories forming, whilst coalescing the more distant elements of the wider system. These background

chapters now provide a relevant philosophical and practical framework of knowledge for any further theory generation or case study research projects related to this topic (see Aim (B) in *section 1.2.5*).

During the course of the research, a number of paradigm shifts (in terms of the way we conceptualise the biodiversity agenda and how we must tackle it) became evident. Firstly, *Chapter one* 'introduction' discussed a central paradigm shift relating to a changing focus from protection and conservation, towards increase, enhance and repair. Several examples of, or requirements for, accelerating this shift, were given throughout the thesis. For example, the ALGE questionnaire (*Chapter three*) identified a specific need for changing the financial spending focus from specific ecological survey requirements and licenses, to spending on biodiversity enhancements instead (focusing resources where they provide the most biodiversity benefits - which in some circumstances is provided through enhancements and repairs). This example was further investigated through other research methods, and formed a specific recommendation in *Chapter nine* (*see table six, point eighteen*). The thesis also discussed a shift away from a rural, to a more urban focus of biodiversity enhancement – as society must become re-connected with biodiversity and nature in order for us to move forward effectively in tackling and prioritising the agenda. This argument was also supported by discussions in *Chapter four* and *Chapter six*.

The urban biodiversity and socio-ecology *Chapters* (*four* & *six*) additionally highlight the importance of biodiversity as a 'quality of life indicator', and that despite the multifunctional benefits of urban biodiversity, the agenda must not lose sight of its primary goal during attempts to attract greater socio-ecological resilience. This was a concern of several research participants. The GI conceptual framework (discussed in *Chapter six*) would be an appropriate strategy to deliver a refocus, as historically GI has been re-branded several times and is still evolving as a concept. It could therefore provide an appropriate vehicle for re-emphasising the importance of increasing local biodiversity levels for biodiversity's sake. These chapters also support the encouragement of innovative urban biodiversity design and for urban biodiversity to become a key aspect of 'urban design' consideration. Through the identification of these shifts in theoretical understanding of the agenda, we can better comprehend the issues and map ways forward which can more positively influence the implementation of specific recommendations.

The key obstacles to maximising biodiversity within development schemes and the lifecycle stages in which they occurred (or were prevalent within) were identified in *Chapter three* (see *section*

3.2.5 and *3.3*), and were supported and furthered in following chapters and complementary research methods. Research interviews explored a range of different professional and academic viewpoints as to obstacles and potential solutions. The case studies, on the other hand, provided a primary evidence base which could be 'measured' against previous professional experience. This enabled the lifecycles of specific obstacles and solutions to be pin pointed, whilst furthering emergent theories and providing unique findings through triangulation. Cumulatively, various findings, theories and recommendations developed from the overall research methodology were listed and discussed in *Tables four* and *six,* and s*ections 3.3, 5.5, 6.5, 8.3.5, 8.5, 9.10* and *10.4* and answered 'research aim A and C' and a significant proportion of 'research aim E' (see *section 1.2.5*). The latter aim being further answered in the background chapters.

It is evident from these findings that the obstacles and solutions to maximising biodiversity within major urban development schemes can be categorised into the following themes:

1. PRIORITISATION (politically, socially, professionally and legally)
2. DESIGN INNOVATION (design, skills and specialist staff, and case study resources)
3. PROCEDURAL PROCESSES (project management, planning / enforcement procedures, accountability and incentives)

Elements of these three themes are discussed throughout the thesis e.g. s*ection 3.3* and *Table 4* & *6*, and in many instances there are overlaps between the themes, e.g. prioritisation affects specialist staff resources and incentives and enforcement procedures can affect the realisation of design innovation.

11.2 PRIORITISATION

11.2.1 Extent of the Prioritisation Issue

Prioritisation of the biodiversity agenda has been the most prevalent and recurring theme throughout the research, suggesting that if this is tackled, many of the other obstacles will also become at least partially resolved. Prioritisation is specifically discussed in s*ection 3.3.2*, *section 4.6*, *sections 5.3.2.4, 5.3.2.5* and *5.4*, *section 8.3.5, and sections 9.10.1* and *9.6.3*. This lack of prioritisation is pervasive and despite the rhetoric of government departments and organisations as to intentions to protect and maximise biodiversity within developments, the actions and the documents produced, tell a different story. *Section 4.2.3* discussed a general confusion emerging with the term 'eco' and *section 8.3.5.3.1* discussed the loss of meaning of the term 'ecology' in

relation to the eco-region and eco-development within the Thames Gateway strategic documents. Furthermore, Lewis and Kelman (2009 p.15) recently noted that the term 'ecology' was "*no longer fashionable*", whilst unconsciously providing another example of the loss of the true meaning of the term. An example of the lack of understanding of the term 'biodiversity' in common parlance was also provided in s*ection 4.5.* Therefore re-prioritising biodiversity and ecology would require a national marketing and PR campaign.

Due to the pervasive nature of the low prioritisation for maximising biodiversity within development schemes, the solutions must include both legislative strengthening from central government, and finding methods to maximise socio-ecological resilience both nationally and with respect to individual developments.

11.2.2 Strengthening of Legislation

To combat the low prioritisation of the biodiversity agenda, a number of suggestions regarding the strengthening of legislation (by amending existing and creating new legislation) have been suggested through this research project, as well as by others. These legislative and accountability changes would require the sanctioning power of large-scale politics (Beck, 1995 p.11). Further research in the form of consultation and existing detailed legislative framework models and case law would be necessary, but suggestions relevant to this research project include the following.

1) Changes to how we view wildlife, e.g. "*Recognising the intrinsic value of other species in law so humans are put on a level playing field with other species would be a very good beginning*" (BBC News, 2010b p.1).
2) Systematically incentivising biodiversity increases in urban development sites, for example a presumption in favour of urban developments which increase net biodiversity by a certain level, in combination with appropriate biodiversity taxes, subsidies or charges which should be ratcheted up over time. Taxing as a coercive device was first mentioned in s*ections 5.4.2.1* and *5.4.2.2*, and again in s*ections 6.4.5.3, 8.2.8* and *Point fifteen* of *Table six*. Such systems could stimulate innovation and allow technologies to become increasingly economically viable and supported through public purchasing (RCEP, 2007 p.142; Farley, pers. comm, 2009). These taxation concepts were compared, in a research interview, to the Landfill Tax model of increased incentives; the gradual increases expected for the Code for Sustainable Homes; and the initial proposals for a carbon tax (Farley, pers. comm, 2009), all of which followed a similar principle of gradual introduction – giving time for procedures, technologies, products and culture to 'catch up'.

This kind of 'polluter pays principle' is supported by PPS1 (Planning Policy Statement 1) in relation to sustainable development and environmental costs generally, and also by Beck (1995 p.130). Several examples of this kind of biodiversity taxation incentive principle have been established at the city level. The Biotope Area Factor Strategy (BAF) in Berlin in 1994, provided financial incentives through taxation to increase ecologically effective areas, in relation to residential building plots (Hagen & Stiles, 2010). Furthermore, a Greenification Certificate System was developed in Nagoya, Japan. With this scheme, regional and local banks co-operated to give lower rates of interest to developers providing greenspace within their development schemes (Kohsaka, 2010). Following further research, it should be feasible to 'roll out' a biodiversity taxation and incentive scheme on the national level.

3) Strengthening of enforcement through new enforcement powers, resources, biodiversity champions, training of magistrates and increasing fines (in line with observations in *Section 3.3.7* and *Appendix 4.1*, as well as suggestions by Johnson (pers. comm, 2009).
4) Simplification of certain protective legislation to improve clarity and accountability. For example, Tree Preservation Orders (TPO's) could include all trees over a certain girth at 1.5 metre height above ground in urban areas or city centres. This would contrast with the existing situation of some urban trees being protected by TPO's, some trees being protected by Conservation Area protection status, and others not protected at all. The extra work generated for LA arboricultural staff - through requests to work on or fell protected trees, would be balanced by the lower administration work to check if trees are protected and an end to constantly updating protected tree files. The researcher of this thesis knows from previous LA arboricultural responsibilities (within three different LAs), that this would ease confusion (on behalf of developers and the public) as to a trees protected status in an urban area and would also ease enforcement and prosecution processes - acting as a deterrent to illegally felling and damaging urban trees. This suggested legal modification (requiring consultation) is one example of simplifying environmental legislation. Changing the 'burden of proof', so that actors / organisations are obliged to publicly justify themselves for biodiversity misdemeanors, rather than the onerous examples of LAs burdens of proof, provided in *Appendix 4.2,* should also be pursued. This is in line with Beck's (1995 p.130) general environmental suggestion.
5) Recording requirements regarding biodiversity and ecology for major development sites should be regulated through new legislation (see *section 11.4* for recording details), with

the potential inclusion of a regulation relating to the notification of superseded plans which affect biodiversity protection and enhancement proposals (to answer problems highlighted by *Appendix 4.2* and *Point eleven* of *Table six)*. Both of these recording aspects should be related to a duty to other species – as per the legislation suggestion at the start of this list.

11.2.3 Strengthening of Socio-ecological Resilience

Case Study One illustrated the need to investigate ways in which socio-ecological resilience can be mobilised on large major, or mega-developments. Such developments do not tend to fit within existing urban built environment typologies, located instead in large brownfield, or even 'greenfield' sites. As a consequence, they do not have the same socio-ecological resilience as developments containing established parks and other GI, which are surrounded by residents, workers and commuters who have benefitted from the ecosystem services for some time, and formed cultural practices. Moreover, limited access to the pre-developed sites tends to equate to a lack of local knowledge, or appreciation of any existing biodiversity or GI features or value. Socio-ecological resilience benefits, in terms of human community benefits, biodiversity protection, policing, management, and even attracting funding (if organised and proactive community groups emerge) were discussed in *Chapters four* and *six*. These benefits justify the need for further research into what mechanisms should be instigated at the inception of such mega-developments, in order to mobilise existing and future communities to engage with their natural environmental assets (going much further than existing community consultation).

At a national level, socio-ecological resilience also needs to be mobilised with respect to the biodiversity agenda in order to drive real change and political influence (as occurred for the climate change agenda through various government media campaigns). There is still limited social concern and action for the biodiversity agenda, and Beck (1995) intimates that resistance to ecological issues may involve a fear of self limitation. However, as s*ection 5.3.2* describes – the opposite is true and 'Quality Of Life' (QOL) depends on biodiversity levels being maintained globally and enhanced locally. The Nagoya Declaration, 2010, lists environmental education and local community participation as strong tools for raising biodiversity awareness (URBIO, 2010), and these can be incorporated into development programmes.

It is recommended that central government should incentivise others to provide media interventions, to increase social consciousness of the direct impacts and potential for local levels

to be positively amended for biodiversity and also human QOL. This would also include the translation of local methods to tackle the current social disassociation with nature (discussed in *Chapter four*) through education programmes and curricula and local initiatives. The activities of the Portland Audubon Society (see *section 4.5*) might be replicated in terms of urban biodiversity centres which attempt to reconcile real and perceived human conflicts with nature in cities.

11.2.4 Supplementary Reprioritisation Measures

Tackling the legislative and socio-ecological resilience issues of prioritisation in the ways described in *sections 11.2.2* and *11.2.3* (both top down and bottom up approaches) can then be supplemented by ensuring biodiversity champions of both a political and an administrative nature are in place locally. This was suggested by Douglas (pers. comm, 2010) in a research interview and biodiversity champions would also assist many of the issues identified in the ALGE questionnaire (*section 3.3*); such as increasing / improving: 'knowledge and experience', 'prioritisation', 'specialists', 'policy', 'recording and communication' and 'procedure'. Florgard (2010) highlighted that the presence of a person who is enthusiastic about the goal of preservation and who also has the possibility to influence the process, is a crucial factor in urban biodiversity preservation, so long as participants are informed about what to do and how to do it. Where these individuals are not naturally present it is possible to set up a protocol (as in Wales) where this is mandatory (see *section 3.3.2*).

11.3 DESIGN INNOVATION

Design innovation began to be considered in *Chapter four* 'urban biodiversity', which contemplated competitive cities and incentives (s*ection 4.3.2* and *4.7*). Urban biodiversity understanding and adequate resources for specialist staff were also identified as key obstacles in *section 3.2.3* and became a recurrent theme throughout different research methods. This needs to be tackled along with the provision of innovative examples and case studies (*section 6.5*) and mechanisms and incentives, such as design reviews and competitive processes, to drive innovation, which have been discussed in s*ections 9.4.6* and *9.5.2,* and *Chapter ten*. Recommendations and how to 'action' these recommendations were also outlined in order to facilitate urban biodiversity's inclusion as an equal or more important facet of 'urban design' conceptualisations. Further ecological design awards for urban biodiversity innovation, similar to the UK MAB Urban Forum's Urban Wildlife Award for excellence *(UK MAB Urban Forum, 2010*), along with urban ecological design codes, should be made available and promoted nationally and locally.

The research highlighted that urban biodiversity specialists require a different set of skills than that of traditional ecologists (*section 3.3.1, 4.2.1* and *9.5.3*). Current urban biodiversity roles and responsibilities are unclear and fragmented across many organisations (key organisations being listed and discussed in *Appendix 5*), with no central or cohesive approach to enable effective direction or action. Centralising all urban biodiversity remits and providing greater urban biodiversity specialist support for all, through a new or existing organisation, is strongly recommended for consideration / implementation by central government.

The suggested solutions to 'Design Innovation' included: a new organisation; incorporating urban biodiversity design reviews; ensuring adequate specialists with the correct skills; providing design competitions and adequate competitive processes; and case studies. However, to further benefit biodiversity through 'Design Innovation', these suggested solutions should be complemented by applying methods which encourage transdisciplinarity, partnerships, socio-ecological resilience, and improved governance structures – especially at visioning stages (see *sections 5.3.4, 9.4.5, 9.8.6, point six* and *ten* of *table six* and *section 10.4*). These additional benefits would be realised through engaging a wide variety of professionals, politicians and the public with the urban biodiversity design process, thus minimising the potential obstacles associated with miscommunications and a lack of understanding.

11.4 PROCEDURAL PROCESSES

There was a general feeling from research participants that more biodiversity guidance was not necessary, due to a significant amount of existing guidance available for specific species, habitats and particular development phases, as discussed in the *Section 1.2.4*. However, throughout the thesis, numerous procedural processes have been outlined as obstacles and recommendations have been made for improvement. The most notable discussions (in addition to the recommendation tables previously mentioned at the start of this chapter) involved planning and enforcement procedures (see *sections 3.3.7 and 5.3.6*, and *Appendix four*) which require specialist biodiversity input in order to be effective, locally appropriate and specific.

Greater clarity and certainty for investors is needed, which does not put up 'hurdles', but which offers greater flexibility in how the risks and rewards of private-sector regeneration may be shared (Pragnell, 2009 p.16-17). C*hapter five* explained that this call for certainty and flexibility for developers and investors is not new, but an age old conundrum. Prescriptive and robust wording

in combination with simplified documentation and procedures (cross-referenced to greater detail) could form part of the answer to this. The procedural example given in the Malmö case study in *section 10.3.1*, offers a way of retaining such flexibility whilst providing prescriptive and robust biodiversity related development parameters.

Various research methods used throughout this project e.g. questionnaire, interview, previous professional experiences and case studies all contained findings which indirectly or directly illustrated common obstacles relating to unspecific and weak requests for biodiversity benefits (this was especially discussed within *Chapters three, eight, nine* and *ten*). These methods also directly and indirectly suggested solutions, or support for greater: flow between policy hierarchies; prescriptions and detail; standardisation and simplification of biodiversity related information where possible – to enable comprehension by other professions, developers, and to aid clarity generally (Johnson, pers. comm, 2009); and robust, locally specific and quantifiable parameters for biodiversity protection and enhancements associated with development schemes.

A specific example of simplifying and standardising legislation was given in *section 11.2.2* relating to TPOs and an example of simplifying and standardising biodiversity information has been provided in relation to local BAPs. This was suggested in a research interview with the SCC planning officer Mansell (pers. comm, 2008), who explained that local BAPs are sometimes written with ecology experts in mind, rather than the larger audience involved. They can be long and contain ill-defined or unclear recommendations, without definite desired actions, specification examples, approximate costs, or spatially mapping specific areas. Simplification of site BAPs was also discussed in *section 9.4.7.4*. These documents could provide recommendations in a similar way to some LA landscape character assessment guidance documents, which can provide clear and simple, yet specific and robust, design parameters for certain situations.

Project management procedures to replicate or avoid have been discussed in the EQ2 and BR case studies (*section 9.8*) and meet research 'Aim D' in *section 1.2.5*. Better accountability would come about through greater prioritisation, stricter legislation and enforcement, whereas greater incentives would assist in maximising biodiversity through development schemes – particularly if targeted after planning permission has been granted (i.e. incentives to perform during the construction and management / operational stages).

The frequent lack of appropriate recording of biodiversity information and proposals, or the adequate transference of those records over the developments lifecycle phases, as well as to appropriate actors and organisations, was stressed as a significant biodiversity obstacle (see *sections 3.2.4, 3.2.5, 3.3.6, 9.8.3, point eleven* of *Table six,* and *10.2.4*). Appropriate and adequate records and recording processes are required to cross reference to other documents, inform new actors, and for implementation, monitoring and enforcement purposes. Findings from the research suggest that LAs could also benefit from using software similar to 'business collaborator' for the larger major developments. This would enable the swift location of all biodiversity relevant information, as well as a method of recording agreements made in emails (as explained in the project management section of EQ2 – *section 9.8.3)*.

Moreover, the researcher's idea to replicate a system similar to health and safety files (under Construction Design and Management [CDM] regulations) was put to several research interview participants who responded positively in support of such an idea (Farley, pers. comm, 2009; Johnson, pers. comm, 2009; Westfold, pers. comm, 2008). This process would additionally benefit from the legislative amendments discussed in *section 11.2.2 (point one* and *five)*, and would involve biodiversity and ecology records for the development being centrally held and transferred throughout the development lifecycles to relevant responsible actors. As with the Health and Safety Executive's responsibilities for the CDM health and safety file process, a central national urban biodiversity organisation should be involved in monitoring and enforcement of this recording process (if progressed). This central organisation would also receive and investigate complaints. Further research into this suggestion for a new recording process would require consultation and collaboration with appropriate central government departments.

11.5 LIMITATIONS AND SUGGESTED FURTHER RESEARCH

General limitations of the research approach, which relate to the large system under consideration, are discussed in s*ection 1.2.7*. Due to these limitations, further research is needed in a number of areas.

Further research potential has been identified in the three concluding themes discussed above i.e. research into: detailed legislative framework models and case law for biodiversity prioritisation; the feasibility of 'rolling out' a national biodiversity taxation and incentive scheme; investigating potential mechanisms for mobilising existing and future communities to engage with their natural

environmental assets (also discussed in *section 8.2.9* in relation to cultural symbols and media information); and investigating the potential for a new site biodiversity recording process. In addition to the above list, other sections of the thesis have indicated the following further research questions:

- How to address the power interplays between different construction professionals (e.g. architects & ecologists), which relates to the financial worth of their contracts (s*ection 9.6.3*)?
- The management / aftercare accountabilities and mechanisms, which relate to biodiversity features and habitats in mega-developments (s*ection 8.2.8*) ?
- Investigating the effects of, and reasons behind, the disparity between England and Wales' different responses in using biodiversity champions (s*ections 3.3* & *Appendix 4.1*). Moreover, do different 'market' pressures and multi-national development organisations influence such priorities and decisions in Whitehall, and could this lead to weaker biodiversity protection and enhancement (s*ection 9.10.1*)?

11.6 PRÉCIS

Negative system traps (explained in *section 2.8.2.4*) have been causing the continuation of local biodiversity loss and provided numerous effective obstacles to adequately protecting and enhancing biodiversity within major urban development schemes, despite existing policy and guidance to the contrary. Professionals and academics have been grappling to find solutions to maximising biodiversity within development schemes. This has largely involved the production of discrete elements of guidance pertaining to specific species / habitats / development lifecycle phases, which have tended to have insignificant impacts upon maximising biodiversity, as they do not positively change the negative system traps.

The obstacles and solutions to maximising biodiversity sit within a milieu of disparate processes, which are inextricably and irrevocably linked to one another. Through the meta-consideration provided by the 'systems approach' and multi-research strategy taken within the thesis, the key and common obstacles to maximising biodiversity within such development schemes have been thoroughly investigated and identified at all spatial and temporal scales of consideration. Published theories and new directly related theories from this research have been combined in a way which provides an appropriate framework in which to investigate nested case studies, to consider nested theories, and to provide nested recommendations. Theories and a host of

recommended solutions have emerged from this research project. Nevertheless, the problem of maximising biodiversity in major urban developments can be defined as a 'wicked problem' using characteristics outlined by Rittel and Webber in 1973. For example, there are no definitive formulations, and each problem is the symptom of another problem (RCEP, 2007 p.6). It is therefore the framing of the problem/s which defines the resolution and in addition, the recommended solutions.

Key research findings have demonstrated that it is the social and hence political prioritisation which is the root cause of numerous legislative, policy, enforcement, education, communication and organisational process failures; which create the obstacles to achieving biodiversity potential within urban development schemes. This thesis has argued for a change in prioritisation levels, making a case on the basis of social and economic need (in addition to the obvious environmental requirements). The recommendations to tackle the pervasively low prioritisation of biodiversity in relation to other polices will generate positive change to the negative 'system traps', thus allowing further practical and process recommendations to become more effective. These prioritisation recommendations will generally only be actionable by central government, and local governance structures. Whereas the other two key recommendation themes: design innovation and procedural processes will tend to be tackled by LAs, biodiversity related organisations, private sector developers, and a host of professionals (especially project managers).

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APPENDICES

APPENDIX 1 GLOSSARY OF ANACRONYMS AND DEFINITIONS

GLOSSARY OF COMMON ANACRONYMS

ALGE	- Association of Local Government Ecologists
ATLAS	- Advisory Team for Large Applications
BAP	- Biodiversity Action Plan
BR	- Barking Riverside (Mega-development)
CABE	- The Commission for Architecture and the Built Environment (now decommisiioned)
CBA	– Cost benefit analysis
CBD	- Convention on Biological Diversity
CPRE	- Campaign to Protect Rural England
DC	- Development Control
EA	- Environment Agency
EIA	- Environmental Impact Assessments
ES	- Environmental Statement
EQ2	- Eastern Quarry (2) Mega-development
GI	- Green Infrastructure
HCA	- Homes and Communities Agency
KCC	- Kent City Council
LA	- Local Authority
LBAP	- Local Biodiversity Action Plan
LDF	- Local Development Framework
MEL	- Middlemarch Environmental Limited
NAO	- National Audit Office
NE	- Natural England
NGO	- Non Governmental Organisation
OS	- Open Space
SBAP	- Site Biodiversity Action Plan
SCC	- Sheffield City Council
SEA	- Strategic Environmental Assessment
PC	– Planning committee
POS	- Public Open Space
QUANGO	- Quasi-autonomous Non Governmental Organisation
SUBR:IM	- Sustainable Urban Brownfield Regeneration : Integrated Management
TG	- Thames Gateway
WT	- Wildlife Trust/s
WW2	- World War Two

DEFINITIONS

Biodiversity Term

There are numerous definitions for biodiversity. De Long, 1996, reviewed 85 such definitions. Nevertheless, some are more widely accepted by scientists and policy makers than others. By far

the most widely accepted, is that put forward by the Convention on Biological Diversity (CBD). 150 government leaders signed the CBD at the Rio Earth Summit in 1992. The definition for biological diversity (the longer version of the term was used at this point) within the CBD was described in Article 2: "'Biological diversity" means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." (CBD, 2008). The Millenium Ecosystem Assessment (2005) also used the same CBD definition of biodiversity in their Ecosystems and Human Well-Being: Biodiversity Synthesis report. Whilst defining biodiversity they also highlighted that: "Biodiversity includes all ecosystems - managed or unmanaged." and that "Biodiversity is the foundation of ecosystem services to which human well-being is intimately linked" (MEA, 2005).
"… Originally, biological diversity referred to species and genetic diversity (Harper & Hawksworth, 1995) but Norse et al., (1986) expanded its use to three levels: genetic (the genetic variation within species), species (the number of different species) and ecological (the variety of communities with their non-living environments) diversity" Elander et al (2005 p.285)

Gaston and Spicer (1998) coin a simple definition: "*Most straightforwardly, biological diversity or biodiversity is 'the variety of life', and refers collectively to variation at all levels of biological organisation*".

Biodiversity Action Plans (BAP's)
The European Union has long been committed to halting the loss of biodiversity. EU nature legislation dates back to 1979 and it's Biodiversity Strategy has been in place since 1998. The European Commission published the 'The European Union's Biodiversity Action Plan: Halting the loss of biodiversity by 2010 – and beyond" in 2008.

The JNCC (Joint Nature Conservation Committee) describes the UK BAP, on their website (http://jncc.defra.gov.uk/page-5155), as:
"*The UK Biodiversity Action Plan (UK BAP) was published in 1994, and is the UK Government's response to the Convention on Biological Diversity (CBD), which the UK signed up to in 1992 in Rio de Janeiro. The CBD called for the development and enforcement of national strategies and associated action plans to identify, conserve and protect existing biological diversity, and to enhance it wherever possible*".

The National BAP provides targets for certain important habitats, or individual species. From this national BAP, LAs and conservation organisations have produced 'local' BAPs. In some instances, these have been further worked up into the next layer of detail into Site BAPs (for very large development sites, such as the EQ2 case study).

Biogeochemistry
"Biogeochemistry: the study of transport and transformation of matter and energy in ecosystems." (Kaye et al, 2006. p. 192).

Discourse Analysis (DA)
Usually split between Critical Discourse Analysis (CDA) and Foucauldian DA. CDA tends to be very focussed on linguistics; whereas foucauldian relates more to power and knowledge (see Foucauldian section here and also detailed explanations in the Methodology (Chapter 2).

Ecocentric
A mindset where ecological issues are the dominant concern (opposed to anthropocentric i.e. human issues are the dominant concern).

Ecological Footprint

Rees and Wackernagel (1996), defined ecological footprints of a city as: "*the total land area required to meet the demands of its population in terms of consumption and waste assimilation*"(Rees and Wackernagel, 1996).

Foucauldian Discourse Analysis

Foucauldian DA (after Michel Foucault) concentrates more on the knowledge and function of discourses and the relation of power within social analysis (focussing less on linguistic features). In the context of this research, it is generally used in analysing data i.e. understanding and considering the agendas which some interviewees may have to promote a certain viewpoint i.e. developers agents will be keen to promote the 'positives' of their engagement and the development project (wary of 'bad press' and seeking opportunities for self promotion); or positive promotion or misleading information in strategic documentation (see *Section 2.7*).

Sharp and Richardson (2001 p. 193) explain that generally discourse analysis is increasingly being used as a research aproach in planning and environmental policy. They also explain that Foucault broadens discourse to embrace social action, but that there is considerable variation in taking a foucauldian approach. Furthermore, they profer a suitable definition, or framework, to consider a foucauldian approach:

"*The characteristics of a Foucauldian approach can therefore be summarized as follows:*

- *a view of social change as shaped by and shaping changes in communication (in common with a Habermasian analysis);*
- *a view of social change as shaped by and shaping changes in practices (in contrast with a Habermasian analysis);*
- *a view that 'good' social change cannot be pre-specified by theory (in contrast with a Habermasian approach);*
- *a view of social change as shaped by power, conceptualized as competition between differing systems of meaning or 'discourses';*
- *a view of a discourse as a specific ensemble of ideas, concepts and categorizations that are produced, reproduced and transformed in a particular set of practices, through which meaning is given to physical and social realities;*
- *a view of discourse competition as shaped by power relations;*
- *a view that a Foucauldian analysis can challenge the status quo through narrating changes in the field of discourse competition over time*" (Sharp & Richardson, 2001 p.198).

Mega-development

Developments with several hundred residential units do not require the same infrastructure, or complexity throughout the development lifecycles, as those which essentially involve the creation of new towns. There are no known definitions for mega-developments which are sufficiently endorsed at present. Therefore, a definition of 2,000 residential units, or more, shall be used for the purposes of this research. Such a development size would require significant infrastructure and phasing complexities and would necessitate a mixed composition of other use classes, such as retail and commercial floorspace.

Meta-governance

"*Meta-governance is concerned with how political authorities are engaged in promoting and guiding the 'self-organisation of governance' systems through rules, organizational knowledge, institutional tactics and other political strategies (Jessop 1997, 575)".* (Whitehead, 2003 p.6). For one of the more detailed accounts of meta-governance see: Jessop, 2001, 15-18.

Negative system trap

Meadows (2008 p.111) explains that 'system traps', or 'problematic behaviour archetypes', are systems: "*structured in ways that produce truly problematic behavior*".

Panacea trap

Ostrom *et al* (2007) state that:

"*In the context of governance of human–environment interactions, a panacea refers to a blueprint for a single type of governance system (e.g., government ownership, privatization, community property) that is applied to all environmental problems*".

Furthermore:

"*Practitioners and scholars who fall into panacea traps falsely assume that all problems of resource governance can be represented by a small set of simple models, because they falsely perceive that the preferences and perceptions of most resource users are the same*".

Systems approach / sysytems science

The process of removing bounded rationality to consider all aspects of a system. This is discussed in more detail in *section 1.2.4* & *2.8.2.4.*

Socio-ecology

Probably the best definition for this is given in the socio-ecology chapter (Chapter 6), section 6.1.2: "*Socio-ecology is one term amongst many used to describe a remit of social and ecological considerations, with 'Human Ecology' and 'Socio-ecological resilience' being two of the most commonly used terms. The term socio-ecology has been selected for use in this research as it is a short hybridisation, which is clear in meaning. Socio-ecology is the study of the human and societal impacts upon ecology and biodiversity, and also the human dependency upon ecosystems and biodiversity for survival and quality of life".*

Transdiciplinary (or transdisciplinarity)

A term used to describe an approach to working together. If multidisciplinary can be taken to mean a number of different disciplines working within the same team or organisation (usually on different projects); then interdisciplinary tends to mean a number of different disciplines working together on the same project (where professional languages must additionally be shared); multi-partnership tends to mean a number of different organisations working on the delivery of one project, or area of work (potentially from one discipline); then transdisciplinary means true cross-working between different disciplines and different types of organisations (e.g. business, government, academia, community groups etc) on joint delivery (see also *section 5.3.4.1*).

APPENDIX 2 POLICY

2.1 National Planning Policy Explanations

PPS 1: Delivering Sustainable Development

PPS1 introduces and supports the importance of protecting and enhancing the quality of urban areas, including their natural environments, by providing appropriate local policies and DC decisions. The PPS also requires: up-to-date environmental information on the area; protection of wildlife species and habitats; the general promotion of biodiversity; assessment of potentially negative and positive impacts (direct / indirect / cumulative / long-term or short-term). This is in addition to complying with Directive 85/337/EC regarding environmental impact assessments (EIAs) for certain developments; and seeking environmental enhancements and avoiding adverse impacts. Nonetheless, there is a caveat that if adverse impacts are unavoidable, planning authorities and developers must consider possible mitigation, or compensatory measures (DCLG, 2009b).

PPS9: Biodiversity and Geological Conservation

At the National level, the directly 'biodiversity' related PPS9 is the most influential policy, which follows the new paradigm of enhance, increase and repair, rather than merely protecting the original baseline. Paragraph 14 of this policy is particularly useful:

"*Development proposals provide many opportunities for building in beneficial biodiversity or geological features as part of good design. When considering proposals local planning authorities should maximise such opportunities in and around developments, using planning obligations where appropriate*"(ODPM, 2005).

This paragraph can be translated into relevant guidance, planning conditions, design and project management and aftercare agreements for individual sites. However, Goode (2006) does not believe that PPS9 adequately addresses the needs of biodiversity conservation in urban areas, and having used PPS9 and the former PPG9 as a key tool in a decade of earlier professional life, the researcher of this thesis would concur. Goode suggests that strategies for protection of important urban sites, and valuing habitats for ecosystem services should be addressed as a major component of additional planning advice on urban GI (Goode, 2006). The UK-GBC (2009) also believes that PPS9 should additionally incorporate guidance on measuring, reporting on, and setting targets for biodiversity. Conversely, Donatantonio, (2008a p.10) reports "*Biodiversity has seen minimal improvement through planning policy guidance and is a bureaucratic burden for councils, a select committee has been told*". Nonetheless, this latter statement is in sharp contrast to the findings of this thesis, which reflect views from LAs, private consultancies and developer's representatives.

PPG 17 : Planning for Open Space, Sport and Recreation

The value of open space for nature conservation is recognised in PPG17. However, the researcher of this thesis has experienced biodiversity conflicts with this policy in planning practice. Nevertheless, the policy has influenced CABE Space's manifesto for open space and its good practice guide for producing open space strategies, which include biodiversity enhancements. Goode (2006) warns that despite the guidance, most urban greenspace remains of negligible biodiversity value, falling far short of its potential.

The need for 'dense' cities, due to population levels and greenbelt, encourages 'infill development'. This then leads to a great urban challenge: where to build, and which green areas to conserve? (Yli-Pelkonen, 2008 p.346). The researcher has found through previous policy work,

that this PPS is often not robust enough to protect open spaces which are either biodiverse, or possess the potential to improve local biodiversity.

Proposed Policy Amalgamation

The amalgamation of several policies (PPS7, PPS9, PPG17 & PPG25) into one new draft policy: 'Planning for a natural and healthy environment', which will include GI, has been proposed and has recently been consulted upon (DCLG, 2010). On one hand, practitioners believe it will be "*beneficial to biodiversity to link to the health agenda, in order to raise the valuation and prioritisation of biodiversity*" (Thompson, pers. comm, 2010), whereas, on the other hand, Hitchcock (pers. comm, 2010) warns that: "*amalgamated policies could water down the impact of biodiversity policies*". The researcher has similar concerns regarding the initial proposal, which have been expressed in a consultation to the Urban Nature research network, particularly highlighting the need to retain 'enhancement' of biodiversity on 'all' developments (see *Appendix 2.2*). Additionally, the RTPI (2010) suggested in their consultation response, that the draft PPS was leaving "*PPS7, PPS9 and PPG20 weakened in both purpose and value*" and that "*there is a reduction and dilution in the emphasis given to the natural environment as a result*" (RTPI, 2010).

The RTPI (2010) were particularly concerned regarding their perceived weakening and diluting of PPS9: "*PPS9 is also weakened, which is worrying since less than 40% of Local Planning Authorities (LPAs) have access to a dedicated professional council ecologist for technical guidance. Additional guidance will be essential in providing a structured approach to considering significant adverse effects on biodiversity*". They also responded separately to the Draft Government Circular: biodiversity & geological conservation – statutory obligations and their impact within the planning system (DEFRA/DCLG 9/03/10) and highlighted the need for both documents to be co-ordinated (RTPI, 2010).

Whilst the draft policy will no doubt be amended following consultation, the policy position of biodiversity, in terms of the dilution and weakening is unfortunately very revealing with regard to the English governments current prioritisation of biodiversity.

2.2 POLICY CONSULTATION TO URBAN NATURE NETWORK

Response to 'Urban Nature' (International Network, Salford University) Regarding Proposals for PPS – Planning for a Natural and Healthy Environment Consultation

Amalgamation of PPS9, PPS7, PPG17 and PPG20

- PPS7 – Sustainable Development in Rural Areas
- PPS9 - Biodiversity and Geological Conservation
- PPG17 – Planning for Open Space, Sport and Recreation
- PPG20 – Coastal Planning

Relevant background of respondent (Helen Barber)

- Chartered Landscape Architect
- Chartered Town Planner
- ISA Certified Arborist
- Over a decade of experience working in planning departments and planning related professional roles covering biodiversity and landscape planning e.g. development control

consultation, guidance and negotiation with major developers; policy formulation in three local authorities; private practice experience working with developers as clients.
- Final Year of PhD: 'Maximising biodiversity throughout the lifecycle of major development projects'

Response regarding biodiversity implications

Firstly, I must clarify that my response relates to the proposed PPS9 (Biodiversity) element of this policy amalgamation. Whilst I have a good working knowledge of PPS7 and PPG17, I am not responding upon these issues. Further, I have no working knowledge of PPG20.

I voiced concerns to Peter Greenfield (Biodiversity Policy Officer) of DCLG during a telephone conversation on 5th August 2009, regarding potential loss of the highly regarded PPS9 generally, and especially paragraph 14. This had been the most effective implement in the biodiversity planning tool box to date, since publication in 2005. Prior to this, PPG9 (published in 1994) had been an effective tool, but not to the same extent. PPS9 had been especially effective due to emphasising enhancement and improvement of biodiversity (rather than just statutory or designated sites or species) on 'all' individual development sites. I explained to Peter Greenfield that PPS9 was seen as a major benefit in a recent questionnaire to members of ALGE (Association of Local Government Ecologists) which I conducted. I offered to share my knowledge and experience upon the topic through any relevant forums, but unfortunately this did not come to fruition.

The research findings from the ALGE questionnaire noted that one of the obstacles to maximising biodiversity on major schemes was 'a general lack of awareness in the planning community regarding PPS 9 requesting biodiversity enhancements'. This was seen as something which needed to be improved to assist biodiversity levels, as PPS9 could be highly effective at gaining biodiversity enhancements. (http://www.ukmaburbanforum.co.uk/docunents/other/obstacles_and_solutions_May09.pdf or http://www.helencbarber.com/?page_id=12)

Drawing upon professional experience of using PPS9 (e.g. in planning inquiries; as justification for appropriate LDF policies and SPD documents; and especially during development control negotiations to secure substantial biodiversity benefits on major urban sites) I have to object to the proposed 'streamlining' of these policy documents on two key points:

1) **I object to the loss of an independent national biodiversity planning policy.** Biodiversity loss is a global environmental mega-risk, no less important than climate change. Whilst the two are linked, they also have unique independent issues. Biodiversity is being lost through landuse change. PPS9 tackled global biodiversity loss through local landuse change. Whilst the PPS, which superseded the PPG added 'geological conservation' to the remit of the policy (which preferably it would have been contained elsewhere), it did not detract from the central biodiversity enhancement message. The proposal to merge biodiversity with these very different issues is a mistake, which will only further confuse planners and 'water down' the requirement of all developments to provide a net gain in biodiversity on development sites. In short, it will take away the one golden tool which environmental planners had to ensure biodiversity was protected, repaired and increased (when not designated). I believe the loss of PPS9 does not show a due regard to the NERC Act, and will minimise biodiversity issues in the eyes of planning professionals.
2) **I object to proposed individual policies relating to biodiversity on plan-making and development management.** I have concerns regarding several of the plan-making policies which put too great an onus on Local Authorities to provide evidence upon elements,

which most are not equipped to deliver in terms of skills base and labour shortages (e.g. **NE1.1; NE1.2.2**). Inadequate, or a lack of plan-making could seriously damage attempts to protect, repair and increase biodiversity. If inadequate evidence bases are not accepted by planning inspectors and appeals are lost, this could damage biodiversity. The GI policy (**NE4**) misses opportunities for innovative planning. It goes no further than Green network policies in PPG9 (1994), nor the achievements of Frederick Law Olmsted 150 years ago.

The biodiversity related development management policies are not robust enough:
NE8.1) This policy uses weak wording: LPA's 'should aim to avoid harm to the natural environment through development'. If LPA's follow the advice of refusing development which can not compensate for or mitigate against harm, then surely the wording should be: LPA's 'must avoid harm to the natural environment through development'. [this kind of subtle wording is legally very significant]
NE8.2) This is 'a given' through other legislation, what about having due regard for habitats and species which are not designated or statutorily protected? This is where 'biodiversity' comes important, rather than just an individually protected species.
NE8.4) Definition of what constitutes 'a need for, and benefits of, the development in that location outweigh their loss', with regard to ancient woodland and veteran trees. Most ancient woodland and veteran trees are at risk of development. I have personally been involved in numerous cases where developers have tried to argue a host of reasons why hospital extensions, residential areas etc provided a need for and benefits of development which outweighed the loss (rather than finding new sites). I can understand this phrase being used in relation to TPO'd trees, but not in relation to ancient woodland or veteran trees, which are extremely rare in England. Planning officers will take a balanced view upon any conflicting policies in relation to need for development in any case, so I do not feel this is necessary and just weakens the case to an unacceptable level.

NE8.7) This policy reflects the effective paragraph 14 of PPS9. Although it should be explicit that this: includes urban developments with no current biodiversity interest; and relates to 'all' developments.

NE11.1. 3&4) This is a new policy which is welcomed and will have a very positive effect, particularly on urban wildlife. Indirect effects of lighting is a frequent issue on many applications.

I believe that an independent biodiversity policy (such as PPS9) is both necessary and justifiable in tackling the mega-environmental risk of global biodiversity loss through national and local development impacts. I also believe that the current PPS9 should be strengthened and added to, both in the wording and phraseology, as well as content. This is in line with advances in our understanding of ecological planning, human ecology and global issues.

GI has always been a significant component of Local Plans, yet with the burgeoning population forecasted and the birth of the mega-developments in England (associated with large mixed use developments in the growth areas and proposed eco-towns), this now deserves greater national policy input. My Case Study in the Thames Gateway is certainly illustrating this need. GI has always been covered within the biodiversity policies and should remain this way for various logical reasons, not least that this fits with EU directives.

The fact that GI policy needs expanding adds to the notion that PPS9 should remain a stand alone policy document. There is no obvious reason why it is lumped with the other policies as there is

no clear overlap. It will only serve in muddying the waters further with respect to peoples understanding of biodiversity and what we need to achieve (many people still do not understand that a monoculture of perennial rye grass on a sports pitch is not a biodiversity benefit - unless of course it was previously hard-surfaced). Lumping biodiversity with sports policies will not assist.

I am a strong proponent of multifunctional biodiversity features and habitats, when the intrinsic value of biodiversity is retained and the other benefits are generally secondary, or equal to the biodiversity. However, I do not support multifunctional biodiversity benefits when the biodiversity element becomes the least important feature and the intrinsic value of the habitat or feature is lost. The proposed policy amalgamation would inadvertently lead us further along this latter route.

Increasingly in England we are becoming divorced from the EU Directives which support GI for ecological necessity and secondary benefits to humans gained from the intrinsic value of nature (education, psychological well being etc). Instead I increasingly find myself battling on planning applications to make other professionals realise that GI is not about shoe horning in 8 formal sports pitches with floodlighting with no space left for nature. We need to avoid this approach, or we will have lost urban nature, save for a few ornamental trees (which people can see 'under' for safety) and narrow strips of short grass (which people can see 'over' for safety).

I would welcome further involvement in this debate if possible.

Helen Barber
Aston University
barberhc@aston.ac.uk

2.3 POLICY CASE STUDY: WEST THURROCK MARSHES

The Process Case of West Thurrock Marshes

In 2006, a planning application was submitted for a large distribution centre on the marsh, which is one of most biodiverse nature reserves in the country, with over 1,200 species, many of them extremely rare. The site also represents the second best invertebrate site in the UK, containing 36 invertebrate species in the red data book alone (Wildlife Extra News, 2008; Buglife, 2008). Despite opposition by Buglife (National Invertebrate Conservation Trust), the LA and the Essex Wildlife Trust - the Thurrock Development Corporation approved the planning application.

Buglife involved the biodiversity minister and the Prime Minister, and challenged the development of the site at the High Court in 2008 (Buglife, 2009). Nevertheless, developers gained permission to develop the site due to weak wording of the section 40 duty, which only stipulated 'regard' to biodiversity. The judge, believed that the duty was 'a weak one', and not as strong as a competing and conflicting policy. Therefore, he dismissed the application to revoke planning permission. Buglife then took the case to the Court of Appeal, but unfortunately this was also unsuccessful (Buglife, 2009).

The decision will destroy over half of the site and will further weaken the biodiversity duty, as it has now set a precedent, highlighting major failings within our current system to protect even one of the best biodiversity sites (Wildlife Extra News, 2009; Buglife, 2008 & 2009). This clearly indicates the need for greater prioritisation of biodiversity policy and regulations in England.

Roberts (pers. comm, 2008), the Buglife Biodiversity Project Manager, was questioned through this research, and makes the following key recommendations for change, to maximise biodiversity in development:

- Proper allocation at the forward planning / local plan stage;
- Adequate level of site environmental information prior to and during application stages (including invertebrate surveys where appropriate);
- Provision of expertise (e.g. through ecology/biodiversity officers) within LAs;
- Credible guidance for planners, developers and consultants (e.g. techniques to integrate biodiversity);
- Changing the LA policy priority;
- Government legislation and policy that was genuine about protecting biodiversity would help. PPS9 is the main weapon that we have, but too often it is 'trumped' by policies driving economic development;
- Strengthen the NERC Biodiversity Duty wording;
- A more impartial and balanced way of undertaking EIAs, preventing vested interests, i.e. when developers conduct EIAs, this seemingly leads to inadequate surveys and 'burying' of information which does not help development (Roberts, pers. comm, 2008).

APPENDIX 3 KEY INTERVIEW NOTES

Numerous academics and professionals have been interviewed for this research, and many have also answered questions via emails or telephone discussions. It has not been deemed appropriate to incorporate all of the notes for all research participants (although they will be available on request for a 12 month period from the initial thesis submission date). The list directly below lists all personal communications (including formal interviews, and key email and telephone correspondence – also covered). The Second list then contains a selection of interview participants who were formally interviewed in person and who were most extensively referred to within the thesis and therefore their interview notes has been included within this appendix (in order of occurrence in the list, rather than date order).

PERSONAL COMMUNICATIONS

Key: E = email; **P** = phone, **I** = interview

1. BAXTER Howard (2008) - Senior Planning Officer, SCC (**E**: numerous & **I**: 5th September 2008)
2. BUNN Sonia (2007 & 2008) – Principle Planning Officer – EQ2 Case Officer (**I**: 4th Oct 2007; **P**: 8th Dec 2010; **E**: various)
3. CALOW James (2010) – Principle Biodiversity Consultant, MEL (**E:** 26th March, 2010)
4. CHAMPION H Mike (2010) - MIEEM, WT: Lancashire, Manchester and North Merseyside (**E /P**)
5. COATHE Dominic (2009) – Environmental Planning Advisor for the Thames Gateway, NE (**I**: 3rd April, 2010)
6. DESHPANDE Harshada (2007) - Principle Urban Design Officer, SCC (**E:** 30th Sep 2007 & **P**: 1st Oct 2007)
7. DICKENSON Howard (2007) - Head of Building and Conservation, CCC (**E** & **P**: August – September – various)
8. DOUGLAS Ian (2010) - Professor Emeritus in urban geography / urban ecology at Manchester University (**I**: 5th Feb 2010 & **E:** Various from 2009-2011)
9. DUCKWORTH Graeme (2009) - Biodiversity By Design Officer for BR (**I**: 3rd April, 2009; **E**: various through April, 2009)
10. ELMQVIST Thomas (2009) - Professor in socio-ecological resilience, Stockholm University, Sweden (**I**: 30th August 2009)
11. EVANS Paul (2010) - Environmental Sustainability Specialist, HCA (ATLAS) (**P**: 16th April, 2010; **E**: 1st April, 2010)
12. FARLEY Keith (2009) – Project Director of Infrastructure, Land securities (**I**: 16th July, 2009; **E**: July, 2009)
13. FERMOR Phil (2009) – Managing Director, MEL (**I**: 23rd September, 2009)
14. FROST Pete (2008) – Senior Urban Partnerships Officer, CCW (**E**: various from Sep – Dec, 2008, following discussion at BAP Conference in Aberystwyth, Wales)
15. HARROW Peter (2009) – Senior Solicitor, SCC (I: **5th** February, 2009)
16. HEALEY Chris (2008 & 2009) - Team Leader in the Planning Department, SCC (**E**: numerous & **I**: 5th September 2008 & 4th February 2009)
17. HEDFORS Per (2009) - Assistant Professor in Landscape Architecture, SLU, Uppsala, Sweden (**I**: 1st Oct 2009)
18. HENNEBERRY John (2009) - Professor of Property Development Studies, Sheffield University (**I**: 3rd February 2009; **E:** 4th Jan 2009 - Feb 2009)
19. HITCHCOCK Greg (2010) – Thames Gateway Officer, KWT (**P**: 30th March, 2010)
20. HORLOCK Martin (2010) – Biodiversity Information Officer, Norwich County Council (**I:** 8th March, 2010 (informal discussion); **P**: 23rd March, 2010)
21. JAMES Philip (2010) - Professor in Urban Ecology, Salford University (**I**: 5th Feb, 2010)

22. JOHNSON Paul (2009) - Environmental Director of ARUP, London (**I:** 18th August, 2009; **E**: August, 2009)
23. KITSON Laura (2008) - GI Officer at Bedfordshire and Luton GI consortium (**E**: Aug – July, 2008)
24. KNIGHT David (2009) – Senior Urban Biodiversity Specialist, NE, Wakefield (**I**: 11th Sep, 2009)
25. KNIGHT Louise (2008) – Senior Social Researcher, Aston University (**I**: 3 separate meetings during 2008)
26. LACONTE PIERRE (2010) – Chair of the International Society of City an Regional Planners (**E**: numerous from 2009 – 2010, following meeting at the Human Ecology Conference, Manchester)
27. LLOYD Eryl (2010) – Detective Constable, Environmental Crime Officer, EA (**P**: 13th April, 2010; **E**: Jan, 2010)
28. MANSELL Kate (2007 & 2008) – Senior Planning Officer, SCC (**I**: 18th Nov, 2008; **E**: Numerous throughout 2007)
29. MCDONALD Brian (2009) – Senior Growth Advisor, NE, London (**I**: 3rd April, 2009)
30. OGDEN Simon (2007) – Head of City Development Unit, SCC (**E**: various in 2007 from May onwards)
31. PHILLIPS Greg (2008) – Technical Co-ordinator for River Nene Regional Park (**E:** 31st July, following discussion at RTPI Planning Convention, London, 2008)
32. PREECE Alan (2009) Nature Conservation Officer at Dudley MBC (**E / P**: 31st July 2009 & **I**: 18th Sep 2009)
33. REED Katy (2008) – Technical Director, MEL (**I**: 4th September, 2008)
34. ROBERTS Jamie (2008) – Biodiversity Project Officer for the BUGLIFE charity (**E**: 6th Nov 2008, following discussion at the BAP conference in Aberystwyth, Wales)
35. ROBERTSON Joanna (2008) – Senior Biodiversity Advisor, CCW (**E**: 18th September, 2008)
36. SANDSTROM Ulf (2009) – Researcher in Urban Biodiversity and GI, SLU, Uppsala, Sweden (**I**: 1st September, 2009)
37. SELMAN PAUL (2008) – Professor in Landscape Architecture, Sheffield University (**E**: 18th February, 2008)
38. SMITH David (2009) – Landscape Director, MEL (**I**: 10th November, 2009)
39. STEINITZ Carl (2011) – Professor in Landscape Architecture and Environmental Planning, Harvard University (**E**: 17th – 21st February 2011, following introduction at seminar at Sheffield University regarding eight ways of designing)
40. THOMPSON Heidi (2010) – Ecology Manager, Norwich County Council (**P**: 20th March 2010; **E:** March 2010)
41. TRICKETT Simon (2007) – Architect for BDP Architects, Sheffield (**E**: various from June onwards in 2007)
42. WESTFOLD Julie (2008) – City Ecologist, SCC (**I**: 5th Sep 2008)
43. YATES David (2010) – Senior Landscape Architect, Norwich County Council (**P**: 25th March, 2010)
44. YEANG Ken (2008) – Partner / Chair of Llewelyn Davies Yeang Architects & Author (**E**: 4th September, 2008)
45. YOUNG Sue (2008) – EQ2 Ecological consultant and GI expert, KWT (**I**: 9th August, 2008)

KEY PARTICIPANTS

- Professor Emeritus Ian Douglas (Manchester University, UK) - 2010
- Professor Philip James (Salford University, UK) - 2010
- Professor John Henneberry (Sheffield University, UK) - 2009
- Keith Farley (Land Securities, UK) - 2009
- David Smith (MEL) - 2010
- Graeme Duckworth (Biodiversity by Design Officer – Barking Riverside)
- Sonia Bunn (Dartford Borough Council) - 2007
- Sue Young (Kent Wildlife Trust) - 2008
- David Knight (Natural England) - 2009

Research Interview with Professor Emeritus Ian Douglas
Manchester University

Geography Department
School of Environment and Development (SED)
5th February 2010

1) How have you seen perceptions of urban biodiversity change over the last 40 years of your academic career?

There have been influential works regarding the ecology of urban areas long before ID's career e.g. The Natural History of Hampstead Heath (1905).

ID witnessed the second WW, and at the time of the re-building plans for the roads and the skyscrapers, there were parallel plans for the first British National Parks and research and documentation of London's Natural history: by Fitter, R.S.R 1945 – 'London's Natural History', and a book on Birds in London: by The London Natural History Society (Homes R.C, Chairman), 1957, 'The Birds of the London Area since 1900' (both books published by Collins, London).

ID witnessed golf courses ploughed up as wheat fields and tadpoles and other urban wildlife could be easily found in small waterbodies in Watford. ID clearly remembers a teacher taking his class out to look at the bomb rubble and noting the vegetation and wildlife which had already started to re-colonise within the urban areas. Greenspaces were valued in planning, but it had yet to be identified as part of global biodiversity solutions.

In 1966 ID was in KL, Malaysia and although the city has changed a lot since these times, there is still a fragment of rainforest left in the city centre, situated where the telephone tower is. There is also the Bukit Timah nature reserve in Singapore, this reserve was retained due to water reservoirs underneath (although largely depleted now), and has greater biodiversity than lowland rainforest patches – it is an island in the city.

In 1976 an influential piece of work was published documenting an urban garden (Owen). This work helped bring attention to the biodiversity available in urban areas.

George Barker was the first urban officer within English Nature and lobbied for the urban environment within that organisation, through the setting up of an 'Urban Forum'. George Barker had many contacts and links to other urban ecologists, such as: Gerald Dawe (who set up the

centre for urban ecology in Birmingham in 1992?) and to Peter Shirley, who was heavily involved in the Urban Wildlife Trusts.

Carolyn Harrison (biogeographer) and Jackie Burgess (social geographer) were also heavily involved in urban biodiversity and were ex students of ID (did I get that right?) and they did a lot of work on the urban use of green spaces within London. Another person who did a lot of work in terms of urban green spaces is Jonathon Box. Jonathan Box did a lot of work on access standards for green spaces in urban areas, which have now been incorporated within planning policies (people should be within 300m of accessible green space).

John Celecia set up the MaB Urban Forum in Paris as part of UNESCO, to deal with urban ecology and he involved ID (who set up the UK version) and also a German Professor in Berlin (professor S?) in urban biogeography. Urban ecosystems were also being looked at in Brussels.

George Barker was linked to most people in Europe. In the USA urban biodiversity was being looked at through the LTER project (Long Term Ecological Research) and there were 2 research centres: 1) Phoenix, Arizona; and 2) Baltimore, Washington DC. These centres were looking at biodiversity in cities.

ID noted that it would be a very interesting exercise to work out a network diagram of how all of the influential urban biodiversity individuals know one another and are connected.

ID believes that champions are key to urban biodiversity and that there needs to be both a political and administrative champion. In the City of Manchester there were both of these from 1996 – 1998 [Ian I cant make out my handwriting – were these the right years?] a political champion (a Councillor) and a planning officer (Ted Kitchen).

Under John Majors government in 1993, two meetings were held in Manchester Town Hall: A local Government Forum on Local Agenda 21 and an NGO local meeting in 1994, which included the Wildlife Trusts. These meetings would not have occurred without the sustainability champions (of which biodiversity had a significant part). Unfortunately, a compromised statement was agreed due to the committee conflicting on different policies. It did not really achieve anything significant for urban biodiversity in the end due to these conflicts relating to other policies. E.g. An incinerator is good for renewable energy, but not good for public health (that kind of conflict).

ID believes that climate change hijacked the environmental agenda straight away and has changed prioritisation and progress. [Ian – is this last bit a true reflection of what you meant?]

2) What has been your involvement with SCOPE and how effectively may it influence decision makers?

SCOPE was established in 1959. One of the founder members was Gilbert White – an American Geographer interested in flooding. He did some of the first work with global environmental problems such as climate change and heavy metals.

White viewed humans as geological agents. SCOPE was interested in peri-urban environments and ecocities and 40 countries subscribed.

SCOPE was the first body looking at the global environment. Many other organisations later grew out of this, such as: IGBP, INI, MEA. SCOPE still provides direct advice to UNESCO and UNEP. Each year SCOPE publishes work for decision makers through brainstorming on particular issues and

collective working with members of SCOPE. Island Press publish SCOPE's work and the older material can be found upon the website. There are a number of biodiversity publications which maybe of interest.

SCOPE was reviewed by the ICSU who have decided they can not support SCOPE any longer – this is due to SCOPE having to rely on voluntary international scientists giving their time, which is difficult with the current system. Yet, SCOPE is still active with UNESCO as mentioned above.

3) Socio-ecological resilience in terms of valuation and prioritisation of urban biodiversity

ID used the example of a long strip of woodland behind the residential area where he lives as an example of peoples different attitudes towards nature. A LA Tree Officer had allowed the felling of several trees behind one of the houses (setting a worrying precedent). A different neighbour came out after the trees had been felled expressing concern due to effects upon bird habitat. Along the whole strip ID has witnessed a range of uses and management of the same strip of habitat, but ID believes the strip of woodland becomes degraded overtime due to no collective action.

ID also cited the fact that many surveys of urban habitats showed the greatest valuation often appeared to be from dog walkers, which had their own impacts.

Ian discussed New South Wales (NSW) University and how they became engaged with planning. This affected a presidential address regarding rainforest wilderness (an area of 20,000 square miles), some of these areas became mapped as a National Park and reviewed an EIA. As the Councils were very small and lacked their own expertise, it was very easy (relatively) for academics to influence. In the early 1970's a strong Lobby occurred through a trade unionist: Jack Mundey who introduced a green ban. There were tremendous lobbies regarding mangrove swamps, where people were fighting to save biodiversity in the face of flood mitigation works (see no 5 below).

4) Accountability for protection and enhancement of urban biodiversity

Didn't have time to cover this adequately, although the other answers are linked.

5) Governance and political decision making

ID's own earlier work was very applied and dealt with human impacts upon the environment E.g. 1) through changing catchment areas and increasing flooding issues in the swamps of NSW, Australia, which destroyed much of the ecology; and 2) surface water run off in logging areas causing major erosion in Sabah, Borneo. In both of these instances ID was able to influence political decision makers and improve future situations. ID postulates that it was easier to influence politicians in these particular locations at that time due to the limited number of organisations and actors involved.

Part of ID's success in Borneo, was due to local knowledge being onboard. Local university students could communicate their concerns and highlight simple solutions directly to their minister. Another part of the success, was through media attention – as a local newspaper had reported: 'Geological disaster looms says Professor' – this negative news story had engaged the Minister, who flew out to talk to ID and the Sabah students.

The concession owners incorporated the suggested policy/ best practice, partly due to this political influence. The area was gazetted and protected and an International Science project was set up in Borneo.

Research Interview with Professor Philip James
Salford University, School of Environment & Life Science
5th February 2010

1) Developments

- Effective overall enhancements of urban biodiversity require a trans-disciplinary and systems approach to planning, design, implementation and management. But which disciplines do you believe are 'key', and which would benefit from greater engagement?

The 'Urban Buzz Study' was undertaken by UCL and UEL. A sustainability planning panel was established from different academic disciplines to look at live proposals in London e.g. noise, energy, urban ecology, planning and space syntax, cultural issues. The co-ordinator for the group gathered development control examples of development site planning submission material from 5 Boroughs e.g. masterplans and other documentation. All academic members of the panel noted that the professional planners involved in the developments were extremely focussed upon energy issues (particularly carbon related issues) to the probable detriment of many others.

- Your teaching includes land use planning. Have you also been involved in research relating to any physical urban development schemes and biodiversity?

Not so much through the teaching element, nor individual schemes. However, the Cheshire ECOnet project adopted an ecological framework, which Regional Planning Guidance then required for all boroughs in the North West. Yet, these Ecological Frameworks became subsumed by the more recent GI agenda, which sidelined ecological considerations.

2) Socio-Ecological Resilience

- Considering the social, economical, and environmental considerations upon any urban piece of land, do you believe that large urban developments have reached a new level of biodiversity complexity?

In discussing major developments in general, PJ was of the view that there have always been political conflicts, or tensions between economy, social and environmental issues (although the terminology has changed) which have had a great deal of complexity and now have the added difficulty of such a very strong emphasis on economics – if an argument doesn't stack up economically, that seems to be the defining factor. Companies and the multi-nationals now have a lot of power with the market-led approach [Philip – is this what you meant here, or have I misinterpreted?]. The point I was trying to make is that in a market-led economy then economis is going to be the major driver.

In discussing mega-developments, such as some of the Thames Gateway sites - with the wide variety of organisations and actors, PJ believed this may have reached a new threshold of complexity.

It was PJ's personal (rather than academic/professional) view, that politicians are more accountable today, and with decision making being more open, it is also more complexity in making decisions.

- Do you believe biodiversity issues decreased in prioritisation, in terms of both academic research funding, and in general consideration, since the rise of the climate change agenda?

Climate change has generally hijacked all other mainstream environmental and ecological issues.

Not being able to put a value on biodiversity, which people can compare with other things, is part of the problem. With peak oil and the energy/carbon issues, people can understand scenarios and they can link relevance to their every day life, being more immediate and obvious, whereas, with biodiversity loss this is not the case. How do we do that about biodiversity?

- Society becomes engaged with urban ecology when it is distinct urban green parks offering obvious human benefits, but it is hard to engage society in equally important yet less well defined features and areas. Have you ever experienced any examples of this, or where this is not the case?

As far as most people are concerned biodiversity is 'dirty leaves dropping on the floor, or annoying birds which wake them up in the morning' [something to be irritated with].

Whilst PJ was doing some research on eco-cities for a lecture in Helsinki, he noted that there was a great deal of documentation regarding transport, waste and energy, indicating that the two words: 'environmental and ecological had become quite mixed up in general parlance.Also, the notions of ecology 'in' a city and ecology 'of' a city (e.g. flows of energy and systems ecosystems [and ecological footprints]).

Paul Peacock, an honorary visiting research fellow [Philip, was this man a researcher regarding city bees, or a postgraduate student at Salford?]

An undergraduate student at Salford, wanted to do a project to see if the introduction of a number of hanging baskets had a positive impact on local bee populations, however, he expressed fears regarding being sued if it was successful and anybody got stung as a result. Urban environments are now so sanitised and controlled and society has become so risk adverse.

Some attempts to partially tackle this through education, media and certain programmes e.g. 'artery for life' (which promotes health – Halton Borough Council) and TEEB (European Project).

3 Green Infrastructure (GI)

- GI was originally promoted due to biodiversity and nature conservation. However, several organisations began to promote additional multi-functional benefits e.g. human health and recreation etc. In my professional career (as a chartered landscape architect and chartered town planner), it became obvious to me that these secondary benefits, then became the almost sole consideration, with biodiversity becoming overlooked. Do you have any views on this?

This is also the experience which PJ has had. Biodiversity aspects are lost due to valuation (or lack of). 10 districts of Greater Manchester were in the process of adopting the Ecological Framework (mentioned earlier) when they got sidetracked by GI, which did not contain the ecological aspects (or certainly not to that degree).

With the Cheshire Network (ECOnet) the networks and links already existed at different locations. But the project tried to change the thinking towards biodiversity and also the private spaces and gardens. It looked at 4 different areas in Greater Manchester. Some were more important as they had designations, other areas in South Manchester had very large gardens, where it would be more important for LA's needed different actions e.g. preventing infill developments on the gardens, recognising local distinctiveness, garden management. Multiple benefits could be achieved through the overall project, which included urban city centres.

It was envisaged that the creation of corridors and networks would be strengthened by the framework, which explained what sort of ecology was there and how it could be improved. Ideas were given on what could occur and it was not prescriptive. Planners liked this approach, as the Framework was covering a number of authoritative boundaries, so they could still adapt the framework for their own individual needs and work up the detail themselves, with their own specialisms.

- In your 2005 presentation to the Spiglet Group, Manchester – you considered policies pushing for a landscape approach to conservation and highlighted the funding mechanisms in greater Manchester. Are you still involved in any of this research? Who do you feel should be funding GI?

No not still involved in this.

4 Education

- From what disciplines are your PhD and MA students undertaking urban biodiversity studies and research from?

Biologists, Ecologists, Educational wildlife programmes, environmental artists etc (very eclectic)

- A Managing Director at an Environmental Consultancy told me that the young ecological consultants he took on from different Universities were not interested in urban ecology (preferring work in pristine ecologically designated sites) and most of them did not have suitable skills sets, or motivation to be involved in habitat enhancements/design, preferring surveys. How do you believe ecology students on degree and masters courses could be motivated and taught about urban ecology and enhancements? Is this something your own university has programmes on?

If you were to survey wildlife television – all would probably be within pristine areas e.g. Simon King (8pm BBC2), Spring watch and autumn watch (although they did a small coverage of urban foxes). It is very rare to have urban locations – most are in the wilderness and natural places.

Students want to study lions, tigers, elephants and exotic areas. When PJ has done British wildlife modules there have on occasion been complaints by some students who want to study exotic wildlife.

Salford does provide students with some basic survey techniques and experience, which not all universities do. However, enhancements are not covered.

A discussion occurred between HB and PJ about the possibility of needing to find a new type of practice with the right skills sets, as many existing professions have distinct boundaries. PJ believes success of biodiversity in urban areas relies upon individuals and suggested that a design competition, which would be properly publicised and financed would be a possible way forward. HB agreed as this links to findings from a previous conference paper.

- How difficult / easy is it to find examples of good practice/ case studies in urban biodiversity design and techniques to show students?

Difficult

- Do you believe there has been a decline in peoples/students association with nature than several decades ago?

Missed this question, as partially covered by other answers.

5 Collaborations

- Your collaboration for the ODPM Re: 'enhancing decision-making in Spatial Urban Planning using advanced ICT', involved collaboration with academia, practice and government – how rare/ usual is this type of working and did you find any obstacles/ difficulties?

New Horizons project. PJ did not believe this was a particularly special project, as it was not cross-sectional working. Front loaded e-governance is needed.

- Your collaborators formed a research group: 'Future Workspaces for Environmental Decision Making' Did any technology techniques come out of this group which would be relevant to trans-disciplinary working to further urban biodiversity in development schemes?

Electronic workspace could include citizens. But a bigger broadband width would be required.

- With your international collaborations, have you noticed a different valuation of urban biodiversity in different cultures/ countries? If so, do you believe this is due to social, political, both social and political, or some other difference in valuing systems?

Yes, a recent trip to Finland is the perfect example. They have a very different view of what a city is. They are much more connected to ecology, which, to some extent is possibly linked to the fact that many Fins have summer cottages in rural areas, where they can gain a deeper connection.

Meeting with Prof. John Henneberry (03.02.09)
Department of Town & Regional Planning
Sheffield University

A discussion proceeded regarding JH's research into 'Creating a Setting For Investment' – Interreg IIIB project. HB also asked JH for advice regarding some obstacles to biodiversity enhancement on major developments.

HB supplied JH with her 'Ecocity Conference' paper, which included the 'central riverside' case in Sheffield. JH will see if it has any use to others on the URSULA research project, which is specifically looking at riverside developments.

HB is happy to assist in the URSULA project if her prior experience negotiating with developers to achieve environmental enhancements on the River Don, or knowledge of appropriate contacts within Sheffield City Council can be of assistance.

HB supplied JH with the Arboriculture (tree) report at Kelham Island (the prosecution was dropped due to a technical planning issue). JH will see if this valuation (which was seen as 'sound' by the legal advisors), is of any use to his price/preference research.

During the discussion, JH made the following comments, which HB may quote him in her research/ follow up with further research:

- Compared to other countries in Europe, the UK has less owner occupied commercial properties. This was particularly apparent to JH during a research partnership with Germany and Belgium. JH explained that this meant that "the situation where the end

user/ occupier is different from the main developer and from the property owner is more frequently found in the UK. We are therefore more reliant on the market and have a more marketised and fragmented system."
(JH quoted figures from the IPF report: The Size and Structure of the UK Property Market, 2005 – p.34, which stated that, in 2003, 61% of retail property was owned by investors [that is, was occupied by tenants]; the equivalent figure for other sectors was 63% for offices and 23% for industrial accommodation)

- JH suggested I may look into literature on hedonic analysis, to see if there is any preferential pricing for property, which has environmental enhancements e.g. number of trees in a neighbourhood relating to increase in price of property.

- HB stated that she had heard of a housing developer several years ago, who had introduced a choice of certain environmental enhancements and who had received a 15% take up. JH was not aware of specific examples of this, but mentioned that it is called 'expressed preference' (because people have actually paid money for those enhancements and, hence, have expressed their preference for them). JH also mentioned that in order to show a 'stated preference'/ contingent valuation, then you would need to ask lots of people how much extra they would pay for a biodiverse house etc to find out a value (however, JH also pointed out that spoken agreement to commit more money to biodiversity, could be quite different to 'actually' committing more money).

- "The current financial crash may result in a marked change in the private market model – which is partial [prioritising economic benefits over social and environmental ones] and short term. People may now be more amenable to an alternative approach, which is not just driven by money and profit, but takes a more holistic and long term approach" JH.

- "There is an opportunity for the state to say that markets only work so far and a developed framework for a more holistic approach could be taken. However, this would require significant action, such as a change in legislation" – JH is not convinced that current political parties and leaders would opt for this though.

- The system in the Netherlands is that the government may acquire a development site at existing use value [normally low; eg. agricultural value], prepare/service it and sell it on to house builders [or other developers, if not for residential use] at the market value for the new use. The difference in land values [known as development value because it arises from the development for a higher, more valuable use] is kept by the government and used to pay for the infrastructure and services. The land act is called the "Land Development Act" / "Grondexploitatiewet" and came into effect in July, 2008, which acts as a tool for value capturing (DeWolff, 2007). [*Helen, note that this is the approach described in the first bullet point on page 3 of DeWolff's paper. The paper implies that direct value capture by government has reduced in recent years.]*

  Part of the land development act is to end uncertainty on costs which the municipality will retrieve from the development. This is set out clearly in a fact sheet (VROM, 2007), which states the following:

Allocation of costs
To bring the uncertainty about the costs to be retrieved by the municipality to an end a list of the types of costs that may be included in the development plan will be drawn up. Costs that are

not on this list may not (by enforcement) be retrieved by public law. This list will be laid down in a so-called Order in Council (Amvb). In this way 40 years of legal uncertainty about type of costs with respect to contracts and taxes on profit comes to an end.

Costs of land development are, amongst others:

• the cost of preparation of land for building
• the cost of green areas and water amenities
• the cost of environmental and archaeological research
• the cost of land decontamination
• the estimated cost of damage as a result of plans
• land development costs at the urban district level that are useful for the operational area
• the cost of compensation for the loss of nature values, green areas and water amenities in the area

- When asking JH about my ideas for recording systems, JH suggested looking into the land charge system / land register, as a legal search is conducted which brings up specific planning conditions and holds solicitors negligent for not passing on that information.

INTERVIEW WITH KEITH FARLEY (RESEARCH NOTES)

Regarding: Eastern Quarry, Ebbsfleet Valley, Thames Gateway, Kent.
16th July 2009.

Keith Farley (KF) was employed as a Project Director of Infrastructure at Land Securities for the Ebbsfleet Valley, from October 2003 to February 2009. KF is currently employed at Heathrow airport on the terminal 2 redevelopment and extension. KF's background was in civil engineering and he previously worked for ARUP.

Questions were first associated with phases within the development lifecycle and then specifically related to particular issues, as follows:

1. **DEVELOPMENT PHASE ISSUES:**

INCEPTION:

- **Were any organisations / individuals involved in biodiversity at the earliest inception stage i.e. prior to the scoping study for the EIA?**
- **If so, which organisations / Individuals (internal / external) were involved and what did their involvement / interest consist of?**
- **Did any documents / decisions come about through this?**

KF answers:

- 15 years ago, the site of Eastern Quarry fell into part of the regional context. First the Bluewater retail development was constructed and then the Ebbsfleet International Railway. These were the 'anchors' for developing Eastern Quarry.

- Outline planning permission had been granted for Ebbsfleet when KF joined (this was the largest consent awarded in the UK at the time). In 2003 there was an application made for Eastern Quarry outline consent which had been modified to a slightly smaller application, as the National Grid took up a large proportion of the site and an agreement could not be reached upon the financial compensation for them to relinquish their part of the site. An application was submitted to amend the application boundary to exclude this area.

- Blue Circle Industries Plc owns a lot of land in Kent and also owned this site (Lafarge and Blue Circles are one and the same since Blue Circle was bought by Lafarge in 2001).

- The Channel Tunnel rail link looked at the biodiversity of the surrounding area and documented their findings. This was completed approximately 13 – 14 years ago and was possibly produced by either ARUP for RLE. EDAW undertook background surveys for LS.

- Wildlife surveys were also completed by Lafarge Aggregate/ Blue Circle Industries on a rolling basis to ensure compliance with wildlife legislation (rather than due to minerals planning conditions).

- The development at Eastern Quarry was initially LA led through the Dartford Development Plan and agreement with Lafarge.

- EDAW conducted the initial BAP. Baseline surveys were carried out in 2002 / 2003.

DESIGN / PLANNING STAGE:

- **Did you experience any difficulties with fulfilling the biodiversity planning requirements for planning permission, or Natural England licenses?**
- **What professional help did you enrol to assist you and how was this managed?**
- **Have any lessons been learnt through this process, which would influence the way you would go about this again with hindsight?**

KF answers:

- Kent Wildlife Trust (KWT) were initially helpful regarding site information and advice, but once the planning application was submitted they were effectively the statutory consultee. Therefore, it was only private consultants involved (EDAW and Middlemarch). As Middlemarch were affiliated with the Warwickshire Wildlife Trust this was useful in communications and understanding with KWT, as they spoke the same language.

- EDAW's initial BAP reports were good, but there was only one individual within EDAW who was equipped with the necessary skills set and available. Land Securities had decided to take a holistic approach to 3 different planning boundaries, which they work in i.e. Swanscombe, Ebbsfleet and Eastern Quarry. The availability of only one individual was not conducive to such a very large development project, which was why EDAW was replaced by Middlemarch in 2004, due to their larger staff resources for the project and their ability to provide a more integrated approach, in terms of ability to advise, write the reports and do the surveys. At the time Land Securities was looking, there were only 2 companies available for interviews able to offer this service.

- Middlemarch were able to act as a reviewing team / test team to update the BAP due to new legislation and their different specialisms – in a similar way to an Urban Design Review. This kind of review is conducted for a number of disciplines, but not normally for ecology. For large and complex sites where the professional language of ecology is very

technical, this kind of review of a consultants work by, another organisation, has proved very useful. KF would consider replicating this process on similar sites in the future.

DETAILED PLANNING PERMISSION

- **An ecological clerk of works was required in the planning conditions. When will this post be filled and how do you see the role developing?**
- **How were the broader principles of biodiversity in the BAP and Ecological Management Plans going to be worked into the detailed design of the urban areas?**

KF answers:

- Land Securities had already decided this was something they were interested in. The Ecological Clerk of Works was initially employed to be present during the earthworks and was to continue throughout the process. Now that the development has gone into hibernation due to the economic downturn, it was decided not to keep the Ecological Clerk of works on as they were not necessary until construction begins again.
- The next level of detail was starting to be worked up (prior to the downturn) for the first neighbourhood area and how the 'fast track', cycleways and roads would work. However, detailed design, or detailed principles for design, such as: '40% of roof spaces to be vegetated roofs' had not occurred. KF said that this was due to not wanting to be too prescriptive on design, when technologies, culture, ideals and climate change would be changing during the life span of the project and a desire to maintain flexibility at this stage.

MANAGEMENT / AFTERCARE

- **Who will be responsible for the management of the sites biodiversity and how will management information be integrated to other management plans e.g. landscape and archaeology?**
- **Do you believe there needs to be any systems or processes set up to ensure the site is managed as per the ecological management plans?**

KF answers:

- There is an Estate Management Company (Ebbsfleet Valley Management Company) who will centrally be responsible for management of the Ebbsfleet Valley. There will be 9 sub management areas within EQ2 and then a smaller hierarchy of management companies again, who will deal with individual flats.
- Control measures were extracted from the BAP and management plans into contracts for contractors for the earthworks.

2. PROCESS ISSUES:

PROJECT MANAGEMENT

- **Could you describe the project management system/ hierarchy, which was employed for the site generally, and how well the biodiversity issues fit within this?**
- **Conflicts and miscommunications frequently occur between different issues on large sites. Please could you outline what kind of obstacles, or conflicts occurred with reference to biodiversity?**
- **Have you specifically identified any beneficial processes for biodiversity e.g. contract clauses and types, recording systems, partnerships?**

KF answers:

- A Matrix style of management was used. Individuals were given responsibilities over certain locations within the main project area and individuals were also given responsibilities of different disciplines (although it was possible to have one person covering several roles).
- Co-ordination meetings were held every 4 weeks

- As with any large project, there were many instances of miscommunications, but nothing that was not identified and resolved before it became a significant problem.
- Yes, we had specific contract clauses for biodiversity extracted from the BAP and management plans, but the main aim was to clear the sites before contractors completing earthworks began [other points discussed elsewhere below].

RESOURCES

- **Had any 'processes' been put in place to ensure that enough resources will be available to realise the biodiversity vision? E.g. financial agreements, management and resources?**
- **Are there any resource risks to realising the biodiversity proposals e.g. Will it be affected by the current economic failure?**

KF answers:

- design, construction, management phases are all covered by section 106 agreements. The s106 includes obligations all of which are budgeted for within the cost plan. Budget allowances have also been made for the surveys, translocations, mitigations and other outcomes of the Biodiversity Management Plan.
- Yes, the current project is in hibernation and the 'office' element of the scheme will not now be needed for another 10 years or more. This is due to the downturn and amount of new office space available due to businesses going out of business.
- Share prices of land securities had plummeted from £22 to £3.50.

TIME / PHASING

- **Obstacles and conflicts can be experienced in the phasing of complex ecological works and other items in the work programme, due to specific timing of protected species and the need for flexibility over time due to changes in markets and government requirements which may change proposals.**
- **How did you try and reconcile the need for flexibility in the exact development proposals for such a large scheme and the need for certainty for biodiversity requirements?**
- **At what phase will the Green Infrastructure be implemented?**
- **Some of my recent research findings have highlighted a number of LA Ecologists would prefer some of the money being spent on surveys to be spent upon enhancements instead. How do you feel about this?**

KF answers:

- The adaptation to climate change has been thought about to an extent and KF was aware that this would be a serious consideration for the site with respect to detailed design.
- Having a practical and very 'hands on team' with Middlemarch has helped avoid or deal with any issues as they have arisen. There have not been any 'surprises' which could not be worked around. Selection of the planned habitat creation and tree types that will be suitable in the projected future climate was considered. Other adaptation techniques such as natural shading from trees was also being considered.
- The Major Green Infrastructure was to be completed prior to construction.
- Whilst preparing the site for earthworks £250,000 was spent to translocate 1 newt due to meticulously following the Natural England guidance. Whilst slow worms, common lizards etc were also found this did seem an inappropriate use of financial resources for one newt, when the probability was known to be very low and the money could have gone to creating better newt habitat, or something more beneficial.

PARTNERSHIPS / COMMUNICATION

- **How have partnerships and communication processes operated at Eastern Quarry?**
- **How have you overcome the technical language of different professionals?**

- **My own research has highlighted issues in recording biodiversity agreements and proposals, particularly the loss overtime, or to relevant parties, of email agreements – what are your thoughts on this?**

KF answers:

- A particularly successful partnership which evolved through the Ebbsfleet project was with Cambridge University academics from the centre for sustainable development. Cambridge University were commissioned to provide research papers looking at lessons which could be learnt from the 'New Towns' in the 1950's. The contacts made were mutually invaluable to the project and academics research alike and this was particularly valuable during a critique of the masterplan by different academics and short presentations of how the academics work could be usefully applied to elements of the project.
- KF admitted that similarly with any large, or complex development project, miscommunications had occurred, but the co-ordination meetings and matrix management style ensured that any issues were resolved effectively and were not 'lingering' issues.
- Over KF's professional career the style of co-ordination meetings has changed from being very formal and rigid with an agenda and a chairperson who worked through all of the actions. This has changed over the last 10 or more years due to changes in communications, with much more use of emails to agree actions etc outside of meetings. Today's purpose of meetings tends to be less about actions and more about discussing common goals. It is still possible to have semi formal meetings, but they are more complex to chair and be involved in, but if well orchestrated, they can be very flexible (e.g. people dipping in and out for relevant sections) and people can be more willing to discuss things creatively. Actions which need to happen can still be discussed and it is advisable to provide sets of information to a focus meeting to participants beforehand to reduce time wastage.
- Yes, the loss of email agreements is also a common issue within private practice. Previously letters were stamped and dated upon receipt and filed. In contracts, formal instructions are given, or formal communications, with these it is understood that other correspondence which may come after will not supersede, unless another instruction is issued. With emails this is not the case and it can be wrongly assumed that someone has authority to amend plans when they may not.
- 'Collaboration' software is used now. For the Ebbsfleet Valley 'Business Collaborator' software was used, where everything is recorded, dated and drawings can be seen and commented upon, or amended until they are 'signed off'. It is also possible to file under different subjects, such as 'biodiversity'.
- All records for Ebbsfleet have been left on his package, so that when the next team is taken on, they will have access to everything.

HIERARCHIES

- **Through reviews within available literature and my own research, I have found there is a common theme of policies and agreements at different scales not flowing. Is this something you have experienced yourself?**

KF answers:

- KF believes it will be possible for the strategic proposals of 'a general enhancement of biodiversity on the whole of the site' to be filtered down through the different layers of detail.

DEVELOPERS INCENTIVES

- **Apart from gaining planning permission do you believe there are any other benefits to developers – directly, or indirectly in protecting, enhancing and increasing biodiversity?**
- **Did land securities use any of the biodiversity protection/ enhancement proposals within any promotional / auditing processes?**
- **What is necessary for developers to take biodiversity more seriously?**

KF answers:

- The main incentive for large developers is the return for shareholders. On the FTSE indexes, the 'FTSE 100' is the economic monitor and the 'FTSE for good' is the social and environmental measure for ethical businesses. To get on the FTSE for good there is a reduction in 0.25% of borrowing, but it costs half of that to get that saving, which makes it a financially sensible option. If negotiated correctly, any company can do this. This is related to the company in general rather than specific projects. Ebbsfleet Valley is all funded from balance sheet (ie not project funding from a bank)
- Other key incentives are the CSR benefits for publicity and marketing, and legislation.
- KF admitted that stronger legislation on biodiversity enhancement would have a positive impact. However, he made the comparison to the gradual change in 'waste legislation' i.e. the Landfill Tax increases. With landfill tax, a plan was announced in advance of the changes and then the changes were gradual. This encouraged innovation due to the cost increases and gave time for technologies to be developed. KF advised that a planned progression approach similar to that of Landfill tax should be emanated to any tightening up of biodiversity enhancement legislation. Also similar to the landfill tax, is the gradual increases expected for the Code for Sustainable Homes from level 1 to level 6 by 2016. Note also the proposed carbon tax is following a similar principle

ORGANISATIONAL / KEY PERSONNEL CHANGES

- **Did you experience much organisational change with this project, prior to your own departure? If so, did you have any systems in place to deal with the change?**
- **Did you have a handover period / have you been contracted for a handover period when new teams are employed?**

KF answers:

- There has been a lot of turnover and a number of different organisations involved in Eastern Quarry and the wider Ebbsfleet valley.
- A lot of changes have occurred on site over the years – either physically, or through ownership changes, soil levels, legal obligations and planning restrictions. Land securities spent time thinking about what information was important to keep and to pass on. A GIS based system has been used to create a library of base data covering all of the above. Land securities were piloting a system where any new construction would have got added, but this was not completed.
- There has been and will not be a handover period as such. However a complete set or records will be available.
- HB briefly asked KF about her own ideas regarding recording of biodiversity being kept centrally and separately with the development site. Dependant upon detail KF thought this was an interesting topic to pursue and suggested that the LA could own something like this, whilst being paid by the developer.

WHAT DO YOU BELIEVE ARE THE BIGGEST RISKS TO THE BIODIVERSITY BEING ENHANCED OVERALL ON SITE?

KF answers:

- "That the new team will have a different attitude to what has been done in the past".

The key thing to replicate (for biodiversity enhancement) is putting proposals into the context of the location and what it is going to become. Also, that protecting an area for only one species may

not always be right e.g. black red start, when it could be developed to be more valuable to a more diverse range of species instead, especially when there maybe other areas which are more suitable for the black red start (or whatever species) elsewhere within the locality. (KF advises speaking to David at Middlemarch regarding this further).

INTERVIEW QUESTIONS FOR DAVE SMITH REGARDING EQ2 NOVEMBER 2009

INCEPTION

- At what stage did you become involved?

DS got involved post initial planning stages and was initially involved in protected species issues. The site was still active at this stage and quarrying was still occurring in part of the site up until about a year ago.

- What was your brief? Your main responsibilities?

DS was the main contact and took a holistic view of the site. As there were so many different surveys occurring by different people in different parts of the site, Dave had a co-ordinating role to find out what was being done/ why it was being done and what the findings were and the process for change in what was required.

- What other organisations were involved at the time?

Natural England and Kent Wildlife Trust were the main organisations involved. The EA was only involved to a very small degree. NE looked at the BAP's and ES and protected species. They didn't get involved with Dave over the green grid However, although they may have communicated with the landscape architects.

- What were the issues with the previous BAP for the site, which had been done by a different consultant?

The original BAP was a bit too simplistic e.g. it had items in requesting an increase in Kingfishers. However, due to the site activity and phasing many smaller ponds had to be filled in prior to the creation of new ponds, so there would initially be a dip in kingfisher populations, so some of the targets had to be 'tweaked' as some of the species were not appropriate for future conditions. The revised BAP tried to consider the nature of the 'phasing' of the works

DESIGN/ LAYOUT / PLANNING (OUT planning permission)

- What was your involvement at this stage

Middlemarch were feeding through information through Gillespies – Landscape Architects. Commenting on things like the lake design and species mixes.

- Did you liaise with others? In what way?

Gillespies

- Did you have any input into the green network design?

This was mainly the realm of the landscape architects and the ES had already been done when Middlemarch got involved. However, Dave had some involvement with the SUDS details e.g. grilled over water channels in urban areas with flag iris coming through (allowing public safety and biodiversity)

- Were you involved with habitat feature/habitat creation design?

Yes, Middlemarch helped set certain design parameters on different areas e.g. each area, depending upon how formal/urban the area was, were given different percentages of native plants to be used in the planting mixes. Landsecurities were planning to go out to competition for the detailed design of certain areas though. Middlemarch had also produced a simplified

BAP and Management Plan, which was 10 pages long (as the original one was getting too unwieldy)

- Did you have any involvement with any technical details for anything?

Not really.

PROJECT MANAGEMENT

- How has this worked? *Dave co-ordinated everything within Middlemarch and has simplified everything, as the reports for all the different areas and different species were all getting too repetitive and unwieldy. Dave would meet with the on-site Middlemarch Clerk of works regularly to sort out any issues which may arise.*

  The previous site project manager/director 'Keith Farley' was very good. He had the right balance of control. He didn't control everything 'too' tightly, but co-ordinated everything that needed to be done and had an appreciation of the different issues.

  This was in stark contrast to the Project Manager at Barking Riverside 'Clive' who seemed to have no co-ordinating role. Everyone working on the project was very unclear on what was happening and what everybody's roles were. The actions which needed to be done and by whom were not clear and consequently a population of protected watervoles were destroyed through construction works. The project management was very poor and responsibilities were not clear..

  There was an EIA done on the site and then smaller ES's for each area.

  With Barking Riverside there was also a foreign company involved in the scheme 'Gustafason Porter'. Due to this there were communication issues with Barking Riverside as it was very difficult to reach understanding of the nuances of the issues and design in meetings.

  There was another Director/ project manager ' Ian Millard' from Bellways who was part of the Barking Riverside consortia/ company along with the London Development Agency. However, Ian didn't seem to have the same control over decisions that Clive had.

  Middlemarches involvement was to produce Ecological Protection Plan documents during construction. The protection plan was ignored, which is why the watervoles were destroyed. The Environment Agency got involved with somekind of enforcement, but Dave does not believe anything came of it.

- Have there been any inter-professional conflicts in any of the different teams, regarding anything which could affect biodiversity? If so, which professions; what was the conflict about; and how was it resolved?
  Gillespies Landscape architects took some of the advice, but not all of Middlemarches advice. They would alter plans and reports with simple amendments such as changing an oak species, with another oak species, but were reluctant and often didn't make more fundamental amendments e.g. issues with some areas being too 'formal' manicured and not having as much wildlife value, meadows etc. This seemed to be because Middlemarch were often given the plans as a fait au complete.

  Things seemed to be done very much at the last minute and there was not enough time left to consult with Middlemarch. There lacked enough sitting around a table and discussing plans and saying to Middlemarch "is this what you meant?"

It was difficult to try and retrofit ecological needs into what they had already.

Nobody had seemed to grasp how the site had and would change. For instance some of the areas would be left for 15-20 years before the final construction and what would happen to these areas in the interim? Inroads had started to be made on this before the project was put on hold. People were starting to look at what was to be retained; what would be impacted temporarily, which areas would definitely be 'lost', or 'left' for a long time.

- Have there been any changes made to project management during the course of the project so far, which could positively / negatively affect biodiversity issues?
  With the current hibernation phase, biodiversity is kept going on the site at present and surveys and certain BAP items are still being done due to the commitments in the planning submissions and protected species licenses. There is a new project manager, but Dave is not aware of his name. None of the original team is left, there is just a 'holding' team left of 3-4 people (compared to at least 30-40 originally).

  Originally some people had been seconded over to Landsecurities from ARUP.
- Are there any changes you would like to make, which could affect biodiversity, which are outside your control? *Not really, apart from less development.*
- Have you identified any beneficial contract methods / processes / clauses for biodiversity? *Contract clauses referred to the 10 page simplified BAP, which had been reduced from 80-90 pages for the whole site. (Dave was it actually in the contract clauses for the earthmoving contract???)*
- Have there been any misunderstandings / miscommunications regarding biodiversity?

DETAILED PLANNING PERMISION / CONDITIONS ***– Dave suggests speaking to James Calow regarding this section.***

- *Due to the size and complexity of the EQ2 application, Land Securities must assist the LA with the necessary manpower to deal with it (a post in the LA) and an ecological clerk of works. What is your understanding of the roles and responsibilities of these two roles?*
- *Do you believe this is the best way of achieving the LA's goals, or do you think it could have been achieved in a different way?*
- *Have there been any issues with other planning conditions/ legal requirements?*
- *To maximise biodiversity what needs to happen at the detailed design stages?*

RESOURCES

- Will there be adequate resources to implement / manage the expected standard of biodiversity enhancements? E.g. financial, time and staff. *This was answered by Keith and Phil previously, so ignore.*

TIME/ PHASING

- What consideration has been given to phasing ecological works*? Dave has co-ordinated this – see previous answers.*
- Have there been any ecological surveys which have significantly slowed down any part of the design or construction phase to date? *No, there has always been early awareness, so surveys and survey seasons have been factored in from the outset.*
- How flexible does timing and phasing of the works need to be? *For ecological works, sometimes there can be no flexibility due to the species lifecycles – early consideration by the construction team through the project manager is essential.*

- Have you experienced any conflicts / solutions to conflicts with maximising biodiversity content and phasing? *Yes, through the initial lack of understanding by the landscape architects regarding the phasing, although this had started to be ironed out.*

  Also, it is very dependant upon the Contractors. Whilst Middlemarch has been involved there had been three different contractors involved at different times with the major earthworks. Each time the construction companies/ staff needs to get up to speed with what is required, but it really boils down to their company ethos.

  These three different contractors were: Blackwells; Fitzpatricks and Birse. Out of the three, only Birse had a real appreciation for the ecological works and were sympathetic to this. Birse asked a lot of questions about the ecological requirements, were interested in how Middlemarch were doing things and were far more sensitive than the other two contractor companies. The other companies may have had particular sensitivities to other issues/ taken a different emphasis e.g. social/ archeological etc.

  Middlemarch has worked with BIRSE a number of times previously and they always look for a competitive edge and how to make their projects different. This is important, as with certain client companies such as: the Highways Agency, or the Environment agency cost is often not the only way to win tenders and quality is becoming increasingly important e.g. cost can now be as low as 40% of the overall selection of winning tenders, with Health and Safety and environmental considerations taking a larger role.

  It has really been the last decade which has seen 'quality' rise up the agenda. Many large developments these days start to see ECI (Early Contractor Involvement). This is where contractors are brought in before the EIA/ ES process is submitted to look at the risks and opportunities – what are the ecological opportunities and what are the build times and costs likely to be – then you can commit to concrete principles and solutions and after planning submissions have been approved, you are not / or are much less likely to be subjected to deliver things which are unbuildable, or too costly.

  Two other case studies which Dave mentioned to highlight the value of ECI were:

  1) ***Carlisle*** *(?? Dave what was the actual project name and location/ development type?).For this development the E.S had many commitments such as putting in bat corridors, but the developer had not boght enough land, so it was not practical to put in the crossing points. Additionally nobody had checked that the ES was contradictory as there had not been enough co-ordination between the different groups/companies writing the different chapters. As a result it has taken a very long time to agree with the LA that they do not need to do certain things, as species composition of the site has changed e.g. no longer require netting for sand martins, as no longer present and bat roosts changed - Dave have I got the correct species here – anything to add? Also, you mentioned a Public Inquiry?? Why did this occur?? Was it due to not being able to agree the ES for the reasons stated above?*
  2) ***Norwich Northern Development Route*** *(again anymore detail on type of development/ location etc?) Middlemarch got involved here with the pre-planning, as did others, to ensure that the scheme would be buildable prior to submitting the planning. This enabled Middlemarch to ensure that all the opportunities to maximise biodiversity are being taken and minimising detrimental impacts e.g. it allows for situations where you can advise the client to buy, for instance (hypothetically) half a hectare of extra land for £20,000 which could be used for creating embankments with lower gradients and requiring less excess topsoil to be taken from site and the extra*

land additionally allows more wildlife habitat creation, whilst saving possibly £500,000.

ADVANTAGES / DISADVANTAGES

- What do you believe have been beneficial approaches to achieving biodiversity gains on site?
  - *Got to be proactive, rather than reactive*
  - *Got to engage with stakeholders so that they can realise that the development of the site would not be a straight line progression. By engaging with them, could get people to understand that and how the site would develop every 5 years for instance.*

- What do you believe have been obstructions to achieving biodiversity gains?
  Nobody was questioning the underlying rationale with the EIA initially. Through becoming more involved in the scheme and having more detail uncovered, it is possible to realise, that some items are not appropriate and others, which were not initially considered would be beneficial.

  The neighbouring / wider development of Ebsfleet, which is also being developed by LandSecurities with Middlemarch as the ecological consultants was under the jurisdiction of a different LA (Gravesend Council). Consequently, no BAP, or ecological strategy were required and the neighbouring sites were not considered together. If they had been considered together then it would have afforded greater flexibility for translocation of species e.g. watervoles could have been translocated into the EQ2 site, from the Ebsfleet site, as this site is quite 'contained' due to topography and features, so would have had no mink predation. Habitat creation could also have been looked at in a more flexible way between the two developments. This had started to be looked at prior to the crash.
- Have there been any local political issues affecting wildlife?
  Because the site was viewed as a quarry, they had no great expectations.of the biodiversity.

  KWT didn't have a lot of time to consider the strategic issues. Their consultations were short because they had limited resources.

  The local amphibian reptile group had initial input and looked like they may have a lot of future involvement, but as the site progressed they seemed to have minimal input and seemed to have more to do with Ebbsfleet (possibly an indication they were happy with what was occurring at EQ2?).

MANAGEMENT / AFTERCARE

- How will the BAP and individual management plans fit into other management documents? *The BAP and the management plans were simplified, as getting too repetitive. This would make it easier for other people's documents to refer to this.*

  The BAP will be implemented through the EPP (Environmental Protection Plan) and the Management Plans, which will lead to Habitat management, habitat creation, specific species measures which will result in: strategy, specifications and prescriptions.

Meeting Agenda / Brief: 3rd April 09
Graeme Duckworth

Aims and objectives of the meeting are to discuss mutual experience and research concerning the obstacles and potential solutions to maximising biodiversity on major urban developments.

I am particularly interested in 'process' obstacles and solutions i.e. Project management/ recording of ecological agreements / organisational processes / flow of policies from strategic to site specific / contract types and clauses / Design briefs and GI plans / Partnership/ incentives / enforcement / overcoming difficulties in some way where the biodiversity proposals could have become lost. However, I am also interested in other wider issues, such as political will, local planning framework etc.

I will give you a copy of my latest paper from last year concerning competition and partnership with regard to maximising biodiversity – this was published in CD form from conference proceedings at the Ecocity World summit in San Francisco last April (my current paper, is only in very draft form at present, but covers local government ecologist views to obstacles and solutions to maximising biodiversity in urban developments – I can share some of the findings in our discussion if helpful).

Barking Riverside Development (BR), East London.

Questions:

1. What was the handover process like when you first took on work at Barking Riverside (BR) and as you were leaving (assuming someone will be taking over from your role)?
2. I understand that BR is currently within phase 1 – how is this progressing? What ecological work has been conducted/ implemented so far? And what are the next stages?
3. Is the focus on protecting existing biodiversity, or enhancing and increasing biodiversity?
4. In what specific ways did you attempt to embed biodiversity into BR?
5. What were the successes? And could any of these be replicated on other sites?
6. What were the failings? And could these have been avoided with hindsight / more resources / different skills?
7. Does the following proposal still stand, and if so, what do you believe maybe the potential obstacles to achieving this over the course of the developments lifecycle? "*The open space takes up 40% of the entire site and will be divided between the natural landscape and public parks shaped and integrated into neighbourhood areas, whilst areas of ecological interest remain protected*."
8. You have worked with a variety of professionals/ organisations and groups on BR (Barking Riverside Ltd (the developer), their suppliers, including landscape designers, housing and street architects, ground engineers and ecologists etc). How have you found their knowledge and understanding of biodiversity? How have they worked together with regard to biodiversity?
9. Have there been any conflicts with providing recreational spaces as well as ecological ones?
10. Have there been any conflicts with providing the green infrastructure, versus transport / telecommunication / services infrastructure?
11. On a scale of 1 to 10 (with 1 being specific and rigid proposals and 10 being flexible/ open to interpretation proposals) where would you place biodiversity proposals at BR on that scale (we will probably need to discuss this a bit more)
12. Besides the residential units being of a sustainable build. Are there any requirements for developers to provide biodiversity features on and within the residential units e.g. green

roofs, green walls, hibernacular, food sources, shelter/ roosting boxes? If so, who requested this and what are the agreements? E.g. planning permission?

13. It is very common for biodiversity proposals and agreements to be lost / misinterpreted due to either miscommunications between different organisations and professionals, or due to the recording systems of the organisations who have an interest/ responsibility for these biodiversity proposals. Have you experienced any of these issues, if not, or if too early in the process, how have you overcome these issues/ what measures are in place (if any) to deal with this?
14. What are the regulatory requirements to maximise biodiversity at BR?
15. Were there any specific incentives/ benefits to the developers and their agents?

The written notes for this interview have been lost through an electronic external hardware failure. Nevertheless, below are Graeme Duckworth's own notes on his experience as Biodiversity Design Officer at Barking Riverside (one of the documents sent to the researcher to support the interview discussion):

D4B/Barking Riverside Biodiversity Status at 1st March 2009

On 23rd December 2008 Barking Riverside Ltd (BRL) submitted its detailed planning application in respect of the following aspects of the development: (1) Strategic Infrastructure Architecture, (2) Sub-Framework Plan 1, and (3) Sub-Framework Plan 2.

GJD had reviewed the biodiversity aspects of this application and submitted comments to BRL and its structural landscape designers, Gustafson Porter, in particular in respect of the following documents: (1) Strategic Infrastructure & Servicing Details Appendix D - Biodiversity & Landscape, (2) Strategic Infrastructure & Servicing Details Appendix F - Riverside & Wetland Buffer Zones, and (3) Middlemarch's Ecological Protection Plan.

GJD's main concerns related to (1) plans for the protection of the foreshore grassland and inter-tidal mudflat (ITMF), and (2) the absence of detailed plans for the protection of the water vole habitats. BRL did not respond to GJD about his concerns, but GJD has belatedly come to learn that BRL is addressing these matters, at least in part.

Towards the end of 2008, following the water vole 'incident' on Buzzard's Mouth Creek (BMC), BRL met the Environment Agency (EA) to discuss biodiversity matters. GJD was ignorant of this meeting until a subsequent telephone conversation with Liz Walker of the EA, when she told him that, at the meeting, Clive Wilding (the project director) admitted that BRL had 'lost focus' on biodiversity at Barking Riverside.

It seems that, since this meeting, BRL has very much taken its lead in biodiversity matters from the Environment Agency. Clive Wilding has not sought advice from Design for Biodiversity in any way, although Ian Millard, the development manager, has sought GJD's input with respect to the mitigating the potential disturbance of the water-birds in the vicinity of Colonite Wharf (the T-jetty).

Possibly as a result of the meeting with the EA, during 2009 BRL has taken a number of actions to strengthen the biodiversity aspect of the planning application. Firstly BRL engaged Middlemarch Environmental to propose a Biodiversity Enhancement Plan for the foreshore (and ITMF). GJD reviewed this report, which is comprehensive and largely allays GJD's concerns.

BRL also engaged DF Clark of Chelmsford ("Arboricultural/Ecological/Landscape & Woodland Management/Planning"**)** to design a mitigation plan to restore the damaged habitat along the Buzzard's Mouth Creek for the existing water vole population. The designs and management recommendations are to be agreed with the EA, after which point further plans to manage and enhance the remainder of the creek will be produced.

GJD understands that the above reports will be submitted to the planning authority to support the application.

Notwithstanding GJD voicing his concerns to BRL throughout the second half of 2008 about its plans for water vole habitats, it is presently unclear (to GJD) what BRL intends to do regarding the protection of water voles across the entire site (i.e. other than along the BMC). For example, it is D4B/LWT's view that compensation for lost habitat should be provided (i.e. where ditches have been infilled), but to date none has been proposed (to GJD's knowledge).

It seems that BRL may also engage Cresswell, a subsidiary of Hyder Consulting (the project's ground engineer), to provide services in this respect, since a copy of Cresswell's organisation chart at BRL shows landscape designers and ecologists, including Mike Deans, a 'water vole specialist'.

Other outstanding biodiversity issues include (1) the number and size of proposed surface water outfalls through the flood bund (and hence across the ITMF), which is being addressed by Hyder Consulting, DF Clark and the EA, (2) the design of the lighting of the cycle/footpath running along the edge of the development bordering the foreshore grassland, and (3) despite the promises of the planning applications (and GJD raising this matter with Clive Wilding during 2008), no action has been taken to eradicate Japanese Knotweed on the site.

Furthermore, to GJD's knowledge, the roles of Ecological Manager and Ecological Clerk of Works, promised in both the original outline planning application of 2004 and the recent application (see Middlemarch's Ecological Protection Plan) are still waiting to be filled. With an Ecological Clerk of Works in place, BRL might have avoided the water vole incident on the BMC.

It is apparent that, with respect to biodiversity matters, Clive Wilding is now focussing on addressing the concerns and meeting the requirements of the Environment Agency in its role as a statutory enforcement agency, without complementing this by taking advantage of the discretionary role of Design for Biodiversity, notwithstanding BRL's part-funding of the Design for Biodiversity Officer between August 2008 and January 2009.

GJD is bemused by BRL's neglect of D4B's services during the past six months and by Clive Wilding's implicit refusal to manage/oversee GJD's work (or even latterly to communicate with him). During this time Clive has not commented to GJD on his satisfaction (or otherwise) with GJD's work. This aspect of GJD's role has been somewhat dispiriting.

Interview with Sonia Bunn (Dartford Planning Case Officer for EQ2)
04 / 10 / 07

Introductory discussion:

- *Section 106 agreement is now on the web site.*
- *30,000 residential units in total within Kent Thames area*
- *6,000 units at EQ2*
- *1,500 additional units to EQ2 at the sub station site*
- *3,000 additional to EQ2 at Northern area of Ebsfleet station – predominantly commercial mix though, as this area is seen as the 'City' area – radiating out from Station. More information at: www.ebsfleetvalley.co.uk*

Process Queries

- What involvement (if any) have central government played in this scheme? i.e. Did central Government push for allocation of this site for housing due to desperate need for housing in S. E? / did earlier applications get sent into secretary of state?

Central Government influenced the site, by land allocation in the Regional Spatial Strategy. Central government provided the general vision for the area, but did not guide on numbers of units etc.

- How has political pressure affected the planning process? (local and national)

At first the local political leadership was labour who were very supportive due to the development bringing in money and jobs. Then the leadership changed to Tori, which was anti – development due to the amount of development planned in the area, cumulative impact and concerns over high density. The Tori party got in due to an alliance with Swanscombe and Greenhive Town Councils. Several members on the Council were also members of the Swanscombe and Greenhive Residents Association. As the Tori's gained power partly due to the residents association, they needed to keep the association happy and there was strong involvement.

- Indicative proposals, which do not commit – how helpful do you think this common developer tactic is? – insufficient evidence to judge compliance with national and local policies (Sue Young from WT commented upon this in sep 2006). Do you think it would be possible to commit in a flexible way – so that all happy? (possibly through careful wording)

Sonia did not believe this was an effective developer tactic, as it slowed down the process and didn't give the required information. She did believe it would be possible for developers to provide enough commitment whilst retaining flexibility and the requirement to submit the 'overarching' strategy documents, which would be later filled out with more detailed strategy documents achieved this now (but the process could have been much quicker if provided earlier). The strategies set the parameters to assess the more detailed permissions (reserved matters) later. There were commitments, principles, objectives and set out the 'non-negotiables'

This should make it easier to remember the strategic thoughts and minimum requirements, when the inevitable amendments come forward. Sonia believed this was essential for a development of this size due to the volume of information generated by this size of application and would give the bigger picture, which would be invaluable if any key members of the team left and a new person had to pick this up from the beginning.

- Section 106 agreement – mentions inter-relationship with other strategies. How difficult has it been keeping a handle on all the different strategies, do you feel there has been enough effective communication between the different professionals? What has been / could have been put in place to ease this? Have there been any conflicting proposals between different strategies?

There have been regular meetings with overlapping professions – more so now though. Recent meetings now between landscape, ecology and archaeology. Sometimes difficult to ensure that right people from different teams attend. Sometimes things have been agreed in meetings and the actions seem to be forgotten about.

- Section 106 mentions 'officer time costs'. Please could you briefly explain what this is to cover and how it would work?

For the first 5 years Dartford will get £50,000 and KCC will get £25,000 to cover officer costs in evaluating all action plans to cover all submissions. This is to ensure there is adequate man power to assess submissions. This has been requested as this is not a normal sized application – being so large and the amount of work in terms of cross referencing different sets of information and co-ordinating responses will be disproportionately greater than smaller applications.

- Will the sustainable development co-ordinator also be considering biodiversity issues? – how long will the post run for / is this full time – will they be impartial?

Sustainable development co-ordinator will be considering all issues and will be responsible for co-ordinating all of the different submissions related to sustainability, this was a later requirement and it is intended they will provide an overview.

The ecological clerk of works will primarily be responsible for delivering biodiversity on the ground and seeking community engagement and there is a separate transport co-ordinator role through a section 106 agreement as well.

The sustainability co-ordinator and the ecological clerk of works will both be paid by and work for the developer directly. They will both report to the LA on a 6 monthly basis and will be engaged for the life of the development.

The transport co-ordinator is slightly different as they will be answerable to a board made up of the LA, Developers and community group representatives (in HB's opinion the transport co-ordinator will be in a more impartial position than the others, who may become biased towards the developer due to lack of contact with others and also payment and direction from the developer).

- Who will pay for maintenance of open spaces and green grid in the long term – are any areas to be adopted?

No areas are to be adopted by the LA. There will be a legal agreement / management agreement to look after the open spaces in perpetuity and a service charge will be placed on houses and commercial units to create revenue to pay the management company.

- Conditions – were there difficulties agreeing any biodiversity related conditions – what were the reasons?

No

- How is the separate application / ownership of the substation and surrounding fields marrying together? Have there been any issues? Have these been overcome? How?

There have been a lot of issues with the substation due to lack of communication between the two different developers. This has created access issues for the substation site (physically it is very cut off from the rest of the development due to the steep topography)and also strategies within the two developments have not really married up due to both the lack of communication and also the different stages that the developers have been at. This has caused a lot of problems for the smaller substation site, as how will it be sustainable with the lack of interaction with the rest of the site and use of their facilities. As the different developers do not want to speak to one another and will not share information, the Council is looking at possibilities to link this development across the road via a pedestrian and cycle way (maybe bridged??) to the Ebsfleet station development instead. The road network and roundabouts is likely to be required to change anyway.

- Planning Report in 2005 mentioned Green Grid (p27 / 57). Section 10.8 listed the objectives of the green grid – biodiversity appeared to be a secondary objective after leisure and setting for investment? Was it meant to read this way?

It had to read this way due to the politics at the time, which were related to the residents association. There were political / community concerns about the existing residents benefits of the new development. This is why Northern Park was located at the North near the existing communities and not around the new lake to the South. However, there is now debate between residents association and local politicians, as now don't seem so keen on the Northern green corridor, which runs east to west, as see it as cutting off the new and the old communities. This corridor is getting more and more eroded away due to other pressures of development e.g. access routes, formal spaces etc.

- Section 10.86 of the 2005 Planning Report lists problems with Landscape as aspirations, but no commitments to provision – fresh lsc strat was submitted prior to issue of planning permission. Highlighted a problem with landscape and Biodiversity not marrying up.
    - Why do you think lsc and biodiversity proposals were not marrying up? (e.g. different consultants, lack of communication, different professional views, not enough cross cutting meetings, lack of guidance?)

The main problems were different aspirations for the core of the same space. The main area of conflict was the Urban Park. This was supposed to be a strong ecological park, but formal recreation conflicts in some ways and the width of the green spaces were debated a lot. The corridor at the top was getting eroded due to the different constraints. Urban designers had v.different views to ecologists and couldn't include their views in the designs. Land securities changed the landscape consultants to Gillespies, who are better.

There are more cross cutting meetings now which is helping.

- How realistic do you think it may be to use labour at construction stage and ongoing maintenance contracts for landscape – is there an available skilled labour force? (10.104)

There is a requirement to support training. 'Employ Kents Thameside' Group involved in setting up a 'learning stop'

- Why is there a duplicate planning application in, what is purpose? (DA/05/00/280 OUT)

The old 'twin tracking' process, which they were able to do at the time of the application submission as it was several years ago. This enables them to go to appeal on one application for non-determination, whilst still progressing the other duplicate application at the same time.

- What have been 'members' biggest bug bears? Have any concerns been raised regarding sustainability and biodiversity specifically?

Not really. Their biggest concerns are over transport (and were over density, but there is a more sensible Tori Leader in position now)

- Was an Urban Development Corporation involved? Was there a development competition? Did the Council own any of the land themselves? Is there a developement brief?

No, but there is a development brief on the web site, on different location to where main application documents are.

Detailed Biodiversity Queries

- Richard Moyse (WT) requested the following very valid inclusions in Feb 04:
    - A presumption in favour of green and brown roofs as part of the agreed action for black redstarts.

Future Management Plans should cover this. Should be able to gain this through next, more detailed stages.

    - Avoidance of breaks in ecological connectivity corridors by any movement corridors / road crossings
    - Incorporation of wildlife habitats within housing areas and not just along the edges of the site

He also requested the following conditions:

- Monitoring regime to evaluate BAP (included in sec 106 Heads of terms)
- Employ ecological clerk of works (incl in sec 106)
- Developer to supply Kent and Medway Biological Records Centre with all data (informative)
- Min 50% roof area in each phase – green / brown roof techniques

- Community woodland?
- 33% - open space (not including non accessible wildlife sensitive zones?)

Does include all areas including non accessible areas – included in the SPG

- Allotments were taken out, but now back in?
- Off site provision of some playing fields in Swanscombe?
- Is the pipe for drainage through Craylands Gorge existing or proposed? (10.110)

To replace an existing one. Again management plan will cover this and should look at some restricted access as this is an ecological area.

- How can access be managed to limit pedestrian, motorbike and dog use of sensitive wildlife areas – is this being properly looked into?
- How will severance of green grid by transport links be overcome – is this being looked into / factored in by transport consultants?

Not too late to look at this still. Possible to gain swales under the fast track due to flat topography on this part of the site.

Simple strategy documents should give the answers.

Kent Wildlife Trust – EQ2 Biodiversity Involvement

Interview with Sue Young

09 /07 /08

- **Apart from acting as a consultee on ecological matters to the Local Planning Authority (LPA) for Eastern Quarry (EQ2), what is Kent Wildlife Trust's (KWT) role (and your role in particular) in the Thames Gateway?**
    - How does KWT fit in strategically with the developments in the Thames Gateway? I.E. what is the strategic hierarchy which KWT fits into (is there a Thames Gateway Board?).
    - Does KWT consult on other developments in the Thames Gateway?
    - Is there an overall biodiversity strategy / aspiration for the Thames Gateway, which EQ2 is fitting into?
        - If so, what format does this take e.g. overarching document or policy which is/ is not planning related?
        - Are there any copies you could provide me with?
    - Does KWT consult due to lack of appropriate personnel at the LPA, or for other reasons?

The Department of Communities and Local Government (DCLG) are the driving force behind regeneration in the Thames Gateway.

Kent Wildlife Trust (KWT), along with London and Sussex Wildlife Trusts comment on many of the relevant developments and upon the biodiversity content of strategies and frameworks in the area of the Thames Gateway.

KWT acts as a non statutory consultee to LPAs on biodiversity issues, whereas Natural England are the statutory consultee on biodiversity matters. KWT is often informally involved with developers and their agents in advising upon individual planning applications relating to general biodiversity matters, particularly upon regeneration sites, due to the often wider biodiversity affects upon developing brownfield land. KWT's consultation role with the Local Planning Authorities has become more formalised over the years on general issues of biodiversity, but they have always formally consulted upon SINCS (Local designations for ecological value) called Local Wildlife Sites or Sites of Nature Conservation Interest in Kent, as KWT are administrators of the LWS system.. Kent County Council have their own ecologist to comment upon planning applications, but most other Local Authorities in the area don't.

KWT also conducts other beneficial work regarding the Thames Gateway regeneration e.g. work with communities in implementing wildlife schemes; Green Infrastructure issues (S.Y's new role) and providing guidance documents on development issues.

S.Y's Role has just ended but she was responsible for commenting upon all relevant developments in the Kent part of the Thames Gateway. KWT's relationships and level of guidance and influence

vary with the different L.A's depending upon: the L.A's employees (i.e. whether they have in-house planning ecologists) and also depending upon the individual case officers involved and their relationship and level of consideration to environmental concerns.

The Thames Gateway Biodiversity document, which was produced by the Trusts (second bullet point below) was written, published and distributed widely since the production of the first BAP for EQ2. This has not been formally 'adopted' by the LA's as a Supplementary Planning Document (SPD), although there were initial discussions to this affect. S.Y is unsure how well used the document is by LA's, but confirmed it had been distributed widely to L.A's and other relevant organisations and individuals. This document fits into a suite of documents. In order of most strategic hierarchy to more local space these are:

- ***NATURAL Regeneration: Biodiversity in the Thames Gateway; principal strategic policies and objectives for a greener Gateway***. *Partners sponsoring Natural Regeneration: English Nature (now Natural England), Environment Agency, Essex Wildlife Trust, KWT, London Wildlife Trust and RSPB. This was produced in 2005*
- ***Thames Gateway – for wildlife and people: Essex, Kent and London Wildlife Trusts working in partnership within the Thames Gateway since 1959 to conserve and enhance important green areas for wildlife and people.***
- ***A CHARTER FOR KENT THAMESIDES WILDLIFE: Strategic Biodiversity Objectives for Kent Thameside*** *(produced in 2005 by KWT).*
- ***A Greener Gateway: Working with business, local government and communities for a sustainable future.*** *Produced by KWT.*

- **What were the problems with the original BAP that was drawn up for EQ2?** (the one that consultants prior to Middlemarch conducted)
  - What do you think led to these problems? E.g. communication / guidance?

S.Y will email me the original consultation responses.
S.Y came into post after the initial BAP was written, but believes that the first version of the document to be consulted upon needed to undergo changes and improvements as with any first draft. The original version would also have been produced prior to any of the biodiversity guidance being produced.

- **Have you experienced any difficulties with the management / strategic context of conducting your role, which may have affected the maximisation of biodiversity to some degree?** E.g. employees leaving; communication issues; recording/ transfer of information; conflicting roles; conflicting policies; restructuring of organisations; political change; organisational capabilities; budgets etc. **If so, please specify.**

- *SY deals with consultations over a 40 mile radius with support at management level for more strategic decisions. This means KWT resources to make consultation responses are stretched thinly over the area*
- *The transfer of information and recording is really a matter for the LPA and developer.*

- *Lack of understanding sometimes occurs on the part of both developers and consultants regarding KWT's / limited staff and time resources i.e. that they are not a consultancy.*
- *When consulting on planning applications which appear to be more about 'process' rather than reality e.g. EQ2 earthworks management plans (which will change as the area will be developed and subject to other planning management plans) S.Y feels that it is more difficult to comment because of the uncertainty of future plans and an inefficient use of time resources if it is known that they will not be implemented as will be superseded.*
- *When consulted at pre-application, then consulted frequently with amended plans and different versions of the same documents, it becomes increasing difficult to manage these different layers on larger applications i.e. cross referencing and 'picking up' on all changes.*

- **Have you experienced any beneficial management / strategic measurements, which have affected the maximisation of biodiversity to some degree?** E.g. Partnering exercises; competitions; political change; policy implementation; communication improvements; recording / transfer of information; organisation restructuring; or organisational capabilities etc. **If so, please specify.**

  - *Being brought in at the earliest stages to avoid wrong assumptions being made and to influence developments prior to other items becoming 'fixed'.*
  - *Producing guidance documents and clear biodiversity strategies, which provide appropriate hierarchies related to local conditions.*
  - *Partnership of WTs very effective*
  - *Biodiversity Duty (NERC) very effective when explaining to different organisations about biodiversity requirements. WT produced a leaflet on this.*
  - *S.Y felt that CABE space currently focuses mainly on 'urban design' and less on biodiversity within that 'urban' design.*
  - *Kent County Council (KCC) has chosen 'biodiversity' as one of the 60 particular targets for the Local Area Agreements, which are chosen out of 180 / 200 by LA's and reported to the Government for funds. This has been effective in bringing Local Wildlife Sites into conservation management.*

- **What do you think could be / are the future opportunities and threats of maximising biodiversity on EQ2?**

  - *The single biggest opportunity, or threat, for EQ2's future biodiversity, is whether the BAP will be followed properly, or not. If implemented correctly, the development has the potential to become an exemplar scheme. However, without the necessary capital or 'will' to implement, this could be a big threat to biodiversity on the site.*
  - *The site becoming managed more for amenity, rather than conservation in the future is a concern.*
  - *'Vagueness' of management plans is also a current concern. S.Y feels a more prescriptive management plan would help give confidence that the biodiversity*

opportunities on this development will be realised. S.Y understands there is a balance between the developers needs for flexibility with the need for certainty for biodiversity protection and improvement.

- *S.Y believes Green Infrastructure (G.I) should go in first, in terms of the phasing, but this is unclear at present.*

- **Who is taking over your role? Will it be the same remit and will you still have any involvement in EQ2?**

S.Y 's new position at KWT will be that of: Living Landscapes Team Leader (for the Kent area). This is looking at larger scale / strategic G.I and will address de-fragmentation, larger green corridors and reserves.

The new Planning Policy Officer is dealing with the bigger developments at present. In future, it may be Debbie Salmon (in post for two months), or the new Thames Gateway Officer (in post for 2 weeks) who takes over from S.Y's previous post.

Meeting with David Knight (Natural England)
Wakefield September 11th 09
URBAN BIODIVERSITY

DK's key responsibilities at NE:

- DK leads 'urban biodiversity' in England at NE, due to his legacy of work for EN. As DK's remit has been changing overtime, this element of his work is not currently receiving as much attention as it deserves, and a new post to take on the work has not yet been created. Originally, NE were anticipating 3 main directorates: !) Urban; 2) Rural; and 3) Marine. For a variety of reasons however, this did not occur and NE decided against having separate urban and rural policies. Despite urban and rural policy areas being merged, there is not the same capital or focus available for 'urban' biodiversity, as is the rural counterpart (with countryside stewardship schemes etc). This is currently being assessed and NE intend to achieve a vision as well as firm aims and objectives for NE's role with regard to urban biodiversity.
- Promoting/ progressing the LA biodiversity performance indicator (NI 197)
- Urban brownfield / mosaic BAP

Questions / Discussion topics:

- From your own professional perspective, what have you personally found to be the biggest obstacles to maximising biodiversity in urban developments?

The key obstacle is a lack of vision and imagination. A credible and realistic vision of what urban biodiversity constitutes is missing. We need an inspiring and meaningful vision which resonates with people and adequately describes what we are trying to achieve. This lack of ability to translate a vision, affects the technical and professional ability to achieve and maintain urban biodiversity.

- Have you found any particular phase of development (prior to inception/ feasibility / planning/ detailed design / construction/ management) to have the most prevalent/ difficult to overcome barriers to maximising biodiversity?

The broad scheme masterplan stage is the most obstructive, due to the link to the lack of vision. People try and conserve features in situ and throw in a few accessory measures e.g. if there is a pond on site they try and retain part of that pond and put some bird boxes in the trees. Instead, people should look toward the ecological function e.g. the ecological function should be the focus of G.I, but this is not the case.

Developments often create a drastic and significant modification of the landscape. Professionals need to work with the pressures of development and make the biodiversity work for the ecological functions, as well as the new uses and new development constraints and opportunities. We need to move away from attempting to save scraps and diminished versions, of what once was (although in some cases species/habitats need to be saved), but the focus should be on what is the best that this ecological provision can be for the future, rather than saving a lesser version of the past???? Is that what you meant?

Some people's visions for biodiversity tries to impose into the landscape, despite going against the ecological processes, which are trying to take it somewhere else.

The interplay of culture and scientific processes of ecology are very important, as is the context. For instance there are now more non-native naturalised plants in the UK than native.

- Is NE the key/only advisor to Central Government on biodiversity?

No, the JNCC co-ordinate work on the UK BAP, as well as the UK interagency habitat group (putting together the urban brownfield BAP). Also translating he biodiversity strategy 'working with the grain of nature' into the UK BAP.

DEFRA have the lead responsibility for biodiversity targets and chairs the English Biodiversity Strategy (EBS) group. There is also a small biodiversity policy unit who work in Bristol.

NE also advise DEFRA on planning policy, when DEFRA are consulted and NE do a lot of work with implementing the policies and principles within 'working with the grain of nature' and the Public Service Agreement Targets (PSA), which deal with the Natural Environment and therefore biodiversity. These PSA agreements deal with all governmental bodies and include large land owners, such as: the MOD and English Partnerships (as was) – now Housing and Communities…..

- Were you aware that DCLG are proposing to amalgamate PPS9, PPS17 and PPG7?
    - Are/ will NE be involved in this?

Yes, NE have the draft and are being consulted upon this. The three policy guidance /statements have very different viewpoints and so something probably needed to be refined to prevent conflicts. For instance: PPS9 concentrates very much on intrinsic worth, whereas PPS17 is very focussed on social perspectives and takes a utilitarian view on resources – including biodiversity.

However, DK pointed out he was not necessarily agreeing that these 3 documents should be streamlined into one. DK also pointed out that it would be difficult to have the debate about the coverage of these issues in these 3 documents, without also considering the revision of 'green belt policy'.

- Are you involved in 'Urban' Biodiversity Policies at NE?

DK is involved in the policies and consultation on policies as mentioned elsewhere.

- You were involved in the URBIO conference – how well do you feel the contributions made here fed into COP9?

Translated well, as an International group of Mayors has now been setup to work on biodiversity issues. Also, the LAB project (Local Authority Biodiversity Project) through ICLEI (UNESCO group?? Mathew Thomas – Brighton – urban biosphere?) who met at COP9. The 'City Biodiversity Index' URBIO 10 will probably translate things more to COP10 than the previous one.

- Outcomes from COP9 included the need for biodiversity to be thought of / included in cities. How do you think the UK can translate this here?

Difficult, as will always be different perspectives on what this means e.g. ecological footprint of cities / biodiversity within cities. Different scales of governance etc (David – not clear what you meant here??)

- My research to date has shown that accountability and prioritisation are two of the key current obstacles to maximising biodiversity in urban developments. What are your thoughts on prioritisation of biodiversity loss within the development / planning / business / governance arenas?

Prioritisation depends upon: the context; the client; and the 'use' class of development, as well as how strong/pressing other, potentially conflicting policies maybe e.g. delivery of housing targets.

CO2 emissions and climate change adaptation were developed as indicators for L.A's by DEFRA, in parallel to NI 197. Climate change department and natural environment ???? (David, did you mean climate change department within DEFRA? Are linked to biodiversity priority?). Weighting is given to those issues by central government and then affects L.A's. Of the approx 200 indicators, which LA's can focus upon at an organisational strategic level, biodiversity is one of them through: NI 197. Every L.A. is to report on all 196/200 indicators in 150 authorities in England.

Government expects performance of all indicators to improve year on year. However, approximately 30 are selected for particular improvement targets. These are locally agreed targets, where the indicators are worked out in relation to the local context and are given their own wording in indicators such as: NI197.

DK is keen to state to LA's that NE / DEFRA are more concerned with improvements upon the ground rather than the audit trail (although some form of audit trail must exist). This is currently being reviewed.

Part of the indicator (NI 197) can be monitoring effectiveness of local designations. This is a grass roots designation as the LA has ownership over local sites. Local sites are at risk from development, but rather than achieve lots of new requirements, many LA's have put a lot of resource (financial and labour) into local sites and are proud of their achievements, so it made sense to build upon this, rather than reinvent the wheel..

There is indicative guidance on size thresholds to ensure high levels of biodiversity and this is effective at conserving the biodiversity interest.

The sites of small areas of nature, tend to be more valuable for reasons above and beyond the ecological value, in what they provide in terms of their functionality e.g. screening, aesthetics etc.

- The results of my questionnaire to LA Ecologists revealed that half of ecologists / biodiversity officers dealing with planning applications, never commented upon 'urban' biodiversity issues and many felt they did not have adequate knowledge of 'urban' biodiversity. Additionally, several planning officers have said they want to provide for urban biodiversity, but don't know how to. How do you think we can address this 'technical knowledge' gap?
- How can BAPs move away from specific species/ habitats/ areas in urban areas, to achieve greater net increases of biodiversity generally, wherever it can? Perhaps we can discuss this around your work on: Priority Habitat of Open Mosaic Habitats on Previously Developed Land.

If a site is to be developed, the focus needs to be on what the site can be in the future, rather than what it was in the past.

- Do you believe the biodiversity PI, should/could be made mandatory, rather than a choice?

To some extent it is through other legislation and guidance and through the fact that all L.A's are advised to report on all of the performance indicators.

Inspiring people, is usually a better way of achieving biodiversity protection and gaining better sites, rather than through regulation. E.g. Canvey Wick SSSI in the Thames Gateway achieved a lot more than pure regulation would have provided.

A positive vision is required for biodiversity in many different contexts. There are few examples at present of biodiversity as part of many visions. However, Bradford regeneration scheme (the demolition of the magistrates court and development of a beach) is a large regeneration scheme by Will Alsopp, incorporated biodiversity within the masterplan and the vision. Biodiversity should be integral to these and in many cases will need to challenge various concepts e.g. native v's non-native and having vibrant rich wildlife to go with vibrant rich communities.

- Several of the potential indicators for the Biodiversity PI (*e.g. Proportion of Local Authority owned/controlled land managed for biodiversity; Impact of development control decisions on biodiversity; Provision of accessible greenspaces; Delivering biodiversity through Local Sites.)* could be quite difficult to measure and/or subjective in terms of their actual net gains and losses. How can this PI promote/ ensure 'real' gains?

This is an inherently complex issue to measure. It is up to the individual LA's to decide on what is suitable to measure within their own contexts.

- My research has also uncovered a fear that money from/ or requested to be spent by developers during the planning process for biodiversity, is often misspent on onerous/ expensive surveys or protected species requirements, often to no great benefit to those species, but to the detriment of having any money left available for actual 'enhancements'. What are your thoughts? (most of the comments I received about this related to GCN's).

DK saw the value in Surveys, but agreed that more could be done in terms of enhancements (DK – the notes were sketchy on this – do you have anything to add?)

APPENDIX 4 OTHER PROCESS CASE STUDIES

4.1 Enforcement: The Welsh Example

The Welsh Example

Lloyd (pers. comm, 2010), a detective constable environmental crime officer - seconded to the Environment Agency (EA) in Wales, was an interview participant for this research. The biodiversity side of Lloyd's work involves the Wildlife and Countryside Act through illegal development issues. On urban sites, this commonly includes: numerous bat issues, great crested newts associated with industrial estates, and urban tree issues and felling (Lloyd, pers. comm, 2010).

The police undertake enforcement, as the Countryside Commission for Wales (CCW) do not have prosecution powers. Potential crime scenes are attended and assessed, evidence is gathered, suspects are interviewed, and evidence files are then submitted to the Crown Prosecution Service (CPS) (Lloyd, pers. comm, 2010). The legislation is adequate, although more powers to 'stop and search' and an easier process of gaining warrants would greatly assist. However, Lloyd (pers. comm, 2010) also reports that few enforcement cases go through the court system: "*This maybe due to it being a first offence – resulting in a caution, or it may not be in the public interest to take something to court, or there may not be enough evidence (3 tests for CPS)"*. Wildlife constables also conduct training presentations to Magistrates Associations, explaining the impacts of wildlife crime - for when cases do progress to court (Lloyd, pers. comm, 2010).

Lloyd suggests that police specialisms are important in compiling evidence files for prosecutions, e.g. of a sufficient quality and providing an appropriate chain of evidence, otherwise cases tend to fall apart in court (Lloyd, pers. comm, 2010). Lloyd is one of two dedicated, full-time wildlife officers, in addition to a further eighteen volunteer police officers, acting as wildlife champions (in total: 20 officers with wildlife roles in North Wales). This can be contrasted to England, where Cheshire and Merseyside have only one non-dedicated champion each (fitting around other remits) (Lloyd, pers. comm, 2010). Increased training, 'champions', and dedicated specialists, are necessary for effective wildlife enforcement. This is due to the regular use of wildlife information creating greater confidence, skills and results. Therefore, designated solicitors with experience in wildlife cases are also beneficial (Lloyd, pers. comm, 2010).

Lloyd (pers. comm, 2010) imagines the reasons for the prominence of biodiversity enforcement in Wales, compared to that of England, is three-fold: 1) The Welsh Government seem to take biodiversity seriously; 2) The previous Chief Constable 'Brunstrom', who was head of the National Wildlife Crimes Unit, was a real champion of wildlife; and 3) partner organisations (i.e. CCW and EA) have funded the positions (something the English counterpart 'NE' has not) (Lloyd, pers. comm, 2010).

4.2 Superseded Plans: Kelham Island, Sheffield

The case of 'Kelham Riverside' development in Sheffield, illustrates the potential implications of unclear amendments with superseding plans. This particular development consisted of two blocks of residential apartments, with associated landscaped spaces and ecological protection and enhancement measures along the River Don. The riverside willow trees along the development boundary, were the largest trees in the city centre, and were protected by 'Conservation Area' status and a specific planning condition. Acting as the senior environmental planning specialist for the city centre at the LA, the researcher of this thesis liaised with the developer's agents in planning negotiations and during site discussions with the site contractors, ensuring that

everyone understood that the trees were legally protected, why their retention was so important, and to agree appropriate protection measures. Despite the development team's full knowledge of the trees protected status, numerous documents relating to tree retention, and recent protection discussions, all of the trees were illegally felled. The LA's officers provided comprehensive written 'proof of evidence' files for a prosecution case and the developer and their agents were interviewed under caution, where it became evident that the trees had been felled to prevent a perceived lengthening of the construction programme.

Regardless of this, the LA's solicitors became reluctant to pursue the prosecution, believing there would only be an approximate 50: 50 chance of success. The reasons for this were partially due to the passage of time (of several months, which the courts take a dim view of), which had occurred whilst arranging the interview under caution and its transcription, collating evidence and specialist reports from other LA departments and for the legal department to check the information (Healey, 2009); and a minor issue of the trees being protected via Conservation Area status and a planning condition, rather than a Tree Preservation Order. However, the main reason for the solicitor's decision not to proceed with the court case, was due to a recently superseded drawing of a wall detail, which had additionally and inconspicuously referenced tree removal in minor text, and was thus not detected by the planning case officer.

The case above clearly illuminates the gravity of the ambiguous intentions of superseded documentation, which can create major biodiversity related predicaments.

APPENDIX 5 BIODIVERSITY PLANNING ORGANISATIONS

5.1 List of related organisations

Independent organisations

FWAG – Farming and Wildlife Advisory Group formed in 1969 – environmental consultancy and advice

ADAS – Established for over 36 years. Environmental consultancy, rural development services and policy advice

Government Organisations (list key organisations)

NE – Natural England (formerly known as English Nature)

CC – Countryside Commission

EA – Environment Agency

JNCC – Joint Nature Conservancy Council

DEFRA – Department of Environment, Food and Rural Affairs

Trusts / Charities

International

Greenpeace

Friends of the Earth (FOE)

World Wildlife Fund (WWF)

National

RSPB

Wildlife Trusts

Groundwork Foundation

Bat Conservation Trust

Pond trust

BUG life

ALGE

Urban Wildlife Networks (2005??)

The Woodland Trust

National Council for the Conservation of plants and gardens

5.2 Organisation Roles

Key Influential Organisations

The Joint Nature Conservancy Council (JNCC), Department of the Environment, Food and Rural Affairs (DEFRA) and Natural England (NE) are the key biodiversity advisors to central government in England. The JNCC co-ordinate the UK BAP and translate the biodiversity strategy: 'working with the grain of nature' into this BAP, and also co-ordinate the UK interagency habitat group. DEFRA lead on biodiversity targets and chair the English Biodiversity Strategy (EBS) group. NE advise DEFRA on planning policy, and implement policies and principles within 'working with the grain of nature', and the Public Service Agreement Targets (PSA) (Knight, 2009).

Nonetheless, it is the Environment Agency (EA), Natural England (NE) and the local Wildlife Trusts, who are the main external consul tees during major planning applications. Whereas, internal consul tees (within LAs) possess the most leverage in obtaining biodiversity benefits, through negotiations with developers and stakeholders.

5.3 Process Case study: ATLAS Organisation

ATLAS as a Specific Example of Organisational Constraints

ATLAS was set up by the government in 2004 as an independent advisory service for the special complexities of very large developments. It is hosted by the national regeneration agency: the Homes and Communities Agency (HCA: formerly English Partnerships), and aims to tackle generic obstacles to good design and project management. Their sponsoring government department is Communities and Local Government (DCLG) (English Partnerships, 2008).

The Advisory Team for Large Applications (ATLAS) is sponsored by Communities and Local Government (DCLG) and hosted by English Partnerships, as part of the Planning Advisory Service (PAS). They work with LPA's and the private sector to help deliver quality, large-scale development, through advice and Planning Performance Agreements (PPA's) (DCLG, 2007c&d). ATLAS claim to access all levels of government agencies to assist project outcomes and that their: mediation; documentation assistance; and project management facilitation, translate into significant time and cost savings. (ATLAS, 2007)

All developments over a certain threshold can use the PPA process. The threshold is: developments of 500 units and above of housing, or 200 units or more of housing if containing a mix of other uses (ATLAS, 2008a). Those below the threshold maybe considered by a panel of advisors and use of a screening Pro-forma (ATLAS, 2008b&c). PPA's are not legal agreements, but according to ATLAS: they can reduce the likelihood of going to appeal, unblock issues, and improve quality outcomes (ATLAS, 2008a).

The ATLAS website (Atlas, 2008c) contains a useful web-guide which incorporates sustainable development, design and project objectives. Alarmingly for the last two years, it has not referred to biodiversity, nor does it include PPS9 when listing PPSs which have particular emphasis on the delivery of environmentally sustainable communities.

In order to understand why biodiversity was absent from ATLAS's web guide, Evans, the Environmental Sustainability Specialist for ATLAS, was interviewed. Evans (2010), whilst expressing a keen interest to do more, admitted that apart from GI, the HCA seemingly only promotes ecological value/biodiversity through the Code for Sustainable Homes (Evans, 2010). Regarding GI, Evans also reported that there was a lack of 'in-house' expertise on biodiversity, and that biodiversity guidance was not sought from external sources. Therefore, the environmental theme and GI focussed heavily upon the 'energy' agenda, as well as waste, power, and IT, reflecting the knowledge and expertise within ATLAS. Evans (2010) also noted that biodiversity tends to be raised during development workshops by the community: "*Locally, people are strongly promoting biodiversity and knowledge can be gained from within the LA's (if present) at an early stage*". This statement illustrates the importance of socio-ecological resilience, which was discussed *Chapter six*.

Evans (2010) described how energy strategies, and probably biodiversity too, are often an 'afterthought', and that attempting to integrate these issues at later stages is often unsuccessful, and should instead be discussed during visioning work with LAs and developers. Evans (2010) stated that the lack of prioritisation was likely to be due to the professionals involved in development, who understand and gravitate towards transport and urban design issues at the start – due to the traditional considerations, which have created a culture of understanding. These findings are commonplace within planning related organisations, as the same views are

reflected in interview comments with a planning professional at SCC (Heeley, pers. comm, 2008), as well as questionnaire responses (*Chapter three*).

Evans (2010) illustrated his knowledge and support of urban biodiversity features during the interview. However, it appears that the hands of such individuals are tied through organisational structure. Evans explained that the HCA 'panels system' would have to be changed in order to influence consideration of, or commission work, related to biodiversity. The HCA Panels tend to be run at 3-5 year intervals and are where external consultancies are given the opportunity to bid for joining an 'approved list' for external work such as: research reports, or specific advisory capacities. These panels, or themes, are categorised by expert disciplines and there are approximately 20 - 30 of these (Evans, 2010).

APPENDIX 6 GI & MANAGEMENT PLAN CONSULTATION FOR EQ2

Landscape & Ecological Consultation - Middlemarch Environmental Ltd

Re: Draft Open Space Strategy for Eastern Quarry 2, Kent. Gillespies.
Job No:
Date: 5th June 2007

EASTERN QUARRY 2
Draft Landscape & Open Space Strategy (May 2007)

INTRODUCTION

This consultation focuses on how well the Draft Landscape and Open Space Strategy (O.S strategy) is translating the ecological requirements for the site. The BAP and Volume 2 of the Environmental Statement have been considered alongside this document.

To enable a more comprehensive consultation, we will also need to look at the O.S strategy in relation to the following documents:

- Planning Decision Notice (with list of conditions)
- Public Realm Strategy
- Community Strategy
- Archaeology Report
- Highways / Transport Documents
- Environmental Statement (Volume 1)
- Management Plan (assuming a separate Sec 106 agreement exists for a management plan, or will this be embedded within other existing/ proposed documents?)
- Building massing and architectural concept sketches (to ensure bird and bat habitat / brown and green roofs and green facading are being considered at earliest stages)

SITE CONTEXT / ISSUES

New Planting

Surrounding the site are many areas of new landscape planting works. A cursory visual inspection has highlighted that a relatively large proportion of the new tree stock (standards or greater) have failed and their crowns are dying back. There are 3 possible reasons for this (possibly a combination), which are:

- Poor tree / tree pit specification
- Poor growing medium and sundries e.g. 75mm bark mulch
- Lack of irrigation and aftercare

The O.S Strategy needs to give adequate guidance on the above to ensure that tree planting within the scheme has a far higher success rate.

Vandalism

Areas immediately surrounding the site e.g. new landscape design near Craylands Gorge (A) and recent engineering and newt fencing to the East of the site (B) have suffered from vandalism.

(A)  (B) 

Although the Community Strategy may tackle / address vandalism issues, the O.S Strategy should also provide guidance / specification to ensure robust design for landscape and habitat features (Particularly within Craylands Gorge, Northern Park and The Green Network, which are likely to be at more risk due to less natural surveillance). This guidance would ideally cover construction and post construction phase advice.

GENERAL

The O.S Strategy will inform all future 'Reserved Matters' applications on land use, for each different phase of works. As such, it will need to give clear and detailed guidance for the minimum requirements of each scheme.

Some design flexibility will be needed to allow individual neighbourhood spaces to create distinct identities and legibility throughout the scheme. However, a design code and checklist with common specification details will need to set certain parameters to ensure a common high quality runs throughout the scheme and that opportunities for biodiversity and habitat creation are not lost when reserved matters applications are submitted.

At present the detailed design guidance and example specifications need to be worked up a little to ensure successful landscape design and maximisation of value to biodiversity.

The O.S Strategy is broadly split into 3 parts:

1. The 'green network' and masterplan
2. Individual open spaces
3. Implementation and management

This consultation will assess the strengths and weaknesses to biodiversity of each of these sections and make suggestions. Additionally, the following items could be considered within this document, if not already incorporated in a more over arching document:

- Responsibilities - e.g. for protection of existing habitats during construction (e.g. protective tree fencing), for management of different areas (including 5 year maintenance and on-going management e.g. dredging, thinning out, new planting works). Who responsible for park bins and dog bins (although none mentioned – will be needed)? Will L.A adopt any of the areas? Who is responsible for management of access?
- Financial Budget - Where will budget for long term management come from and how much will it be? Will there be revenue generators designed into the scheme? E.g. office /retail / residents pay maintenance fee or business such as park café and hire of canoes set up to drive funds back into park maintenance.
- Ecology / Landscape / Archaeology / Engineering / Architecture overlaps. E.g. Drainage swales and SUDs are mentioned frequently for biodiversity and visual amenity, but are

engineers going to implement these without knowing of these other desirable functions? Archaeology will have a large impact on growing medium and species to be planted on the northern boundary and eastern entrance (Paleolithic tools, mammoth tusks and roman temple foundations have been found) – what are the restrictions / what can be achieved?

THE GREEN NETWORK / MASTERPLAN

Green networks are primarily maintained / designed for wildlife connection, but can come with a host of 'add on' benefits such as public recreation routes, passive recreation and visual amenity (Habitats Directive, PPG9 / PPS9).

Although in need of some refinement, the main objectives for the Green Network are set out on Page 34. Further guidance should be set out on:

E.g. 1 Allowing the continual movement of wildlife. Set minimum distance which usable habitat needs to be, which does not include combined cycleway / footpath and verges (currently there is reference to 15m (p.34) and 20m– needs to be clear).

E.g. 2 Avoid ecological severance e.g. sports pitches or hard landscaped open space cutting across and not providing the minimum width of habitat (as this will prevent many species from using the link).

E.g. 3 Design guidance to avoid conflict of use. (Local play spaces will conflict with thicker vegetation cover as natural surveillance should be maximised due to safety issues for formal play for younger children. Pressure for tree and vegetation removal in future years. Miss-use of spaces and anti social behaviour if formal open spaces hidden from view). Maybe only imaginative play features incorporated along green network rather than formal physical play items unless smaller linear areas on periphery?

E.g. 4 Access (public and wildlife).

- Need to maximise wildlife access E.g. culverts under main roads, main entrance on West side and Fast Track. To prevent 'severing' of network, which will seriously limit wildlife potential.
- Controlling dog access onto ecologically sensitive areas needs to be explored and examples of control given. Also need to consider indirect effect of large number of new pet dogs and dog walking will have on area (provide dog bins).
- Where will human access be controlled and how – what are the examples?
- How will inappropriate leisure activities be controlled? i.e. quad bikes / motor crossing / motor boats?

The Green Zones Detail Plan and Cross section on Page 35 could be very useful, but need to be 'worked up' in more detail and annotated with notes and dimensions or to scale. (how wide is combined footway and cycleway – says 3m on page 35, but 2m on page 31).

Phasing of Green Network construction and planting.

This arterial route running throughout the scheme is outside built development areas and should be implemented at the earliest possible stage (ideally implemented at the time that the primary transport infrastructure goes in). This will benefit the scheme in the following ways:

- long term visual amenity / site cohesion, if planted at same time
- Provide a more mature/attractive setting for new residents
- Better screening from construction for new/ existing residents

- Allow mobile wildlife species to adapt better to construction disturbance / translocation
- Allow stronger populations of key species to develop during 20 year construction phase.

Long-term success and consistent quality

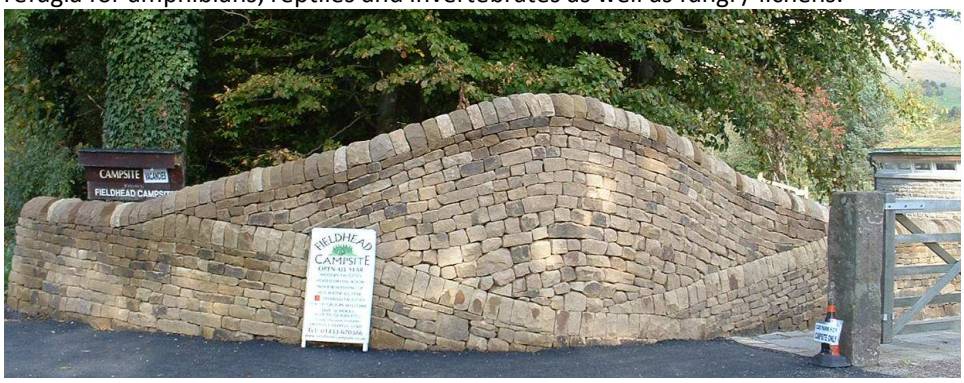
- A benchmark of design quality and specification needs to be set.
- Provide an example plant schedule with species sizes, densities etc.
- Provide a palette of materials to be chosen
- Produce checklist of habitat features
- Define dimensions of features and specification

Detailed example

A detailed example (annotated plan with basic specifications) of the green corridor (could even be several alternative applications) illustrating how best to maximise wildlife potential. At present sketches are too indicative to be meaningful.

E.g:

- Regular inclusion of small ponds / scrapes within or at the edge of structure planting to benefit amphibians, reptiles and invertebrates (as per BAP)
- Piles of logs and dry stone walls (built in robust manner so not easily removed / possibly incorporated into other functional items e.g. public art, terraces, drainage swales) for refugia for amphibians, reptiles and invertebrates as well as fungi / lichens.



E.g. Contemporary dry stone wall / art feature suitable for invertebrates. Different designs to suit a range of species should be employed.

- Mixed native hedge planting (double or triple staggered rows) under planted with appropriate bulbs / wildflower seed mix along selected road boundaries (benefits: where need formal edge, limit public access, wildlife cover)
- Incorporate species / features recommendations from BAP. E.g. Plant *Euphorbia amygdaloides* at edge of structure planting for rare invertebrate: *Dicranocephalus medius*. (not currently included).
- Bird and bat boxes – implemented as part of maintenance / management plan i.e. immediately on mature trees to be retained and within 10 years of larger new planting.
- Compost heaps – for grass cuttings and autumn leaves from open space. Could be provided within structure planting area and hidden by hedging / dry stone wall / topography. Particularly good for reptiles also, British compost heaps are home to at least 300species of beetle alone

Treatment near buildings

The Northern boundary detail plan on P. 31 shows structure planting located hard up against buildings – this will not be possible for number of practical reasons. Need to ensure there will be adequate room left for habitat.

Visual Screening
Mounding and tree planting is not a good combination due to drying out. Need to avoid moisture loving trees such as alders on mounds. Gradients of mounds, aftercare and species selection need to be thought through.

Conflicts of Use

- Where is most desirable for human access and most desirable for undisturbed wildlife? Show on plan.
- Lighting – how will this be sensitively designed into green networks?

Northern Park
Only formal sports tend to be discussed, what about passive recreation such as: bird hides / wildlife spotting / picknicking? To create better connection with people to wildlife.

Technical mountain bike use and horse riding – will this be difficult to manage around sensitive ecological area?

Where are mitigation habitats and how will control access – deep pools (H&S)
Do existing hedgerows need 'gapping up'?
Growing medium for new planting?

INDIVIDUAL OPEN SPACES

This section gives a good idea of space hierarchy and what spaces could be used as.

Provide more detailed species list – range of plant sizes and what circumstances different species used. Give Indication of percentage areas hard / soft landscaped. Include biodiversity features such as:

- Large blocks of high nectar source plants
- Seasonal variety and long flowering season (e.g. fuchsias, lavender, rosemary, *Potentilla fruticosa*, *Abelia* and *Hypericum 'hidcote'*
- Good mixture of flower types i.e.open and flat for beetles and hoverflies (e.g. fennel, geraniums, saxifrages and spiraea), tubular and harder to access for large bees and long tongued insects (e.g. foxgloves, campanulas, antirrhinums, broom and salvias) and night-scented for moths (e.g. nicotonia, honeysuckle)
- Fruit trees or shrubs with berries (not over hard surfacing)

Street trees?- will this be in public realm strategy? BAP says native street trees – probably wont be appropriate in many areas and will need a 'variety' of tree or exotic due to urban circumstance i.e. form of trees close to buildings, fruit dropping on hard surfacing, longevity, root environment.

IMPLEMENTATION AND MANGEMENT

Phasing
Previously mentioned - try phase green network structure planting sooner.

Are there clear boundaries of implementation, which do not bisect habitats (particularly habitat creation areas)?

Drainage and water levels – how will connecting features such as swales, ditches, outflows affect phasing / wetland habitat?

Objectives
Management objectives? Examples of how maybe managed (rather than just ' will be managed')

Management is mentioned throughout the document, but management objectives and examples are not. E.g. need to keep succession to scrub under control for many areas and the need to disturb ground in others. Management objectives, examples, actions, frequencies and time of year should be included e.g. mowing regimes, dredging water bodies, thinning out, gapping up, replacement planting.

Plant specification
Needs to be worked up in more detail to ensure quality, consistency and longevity.

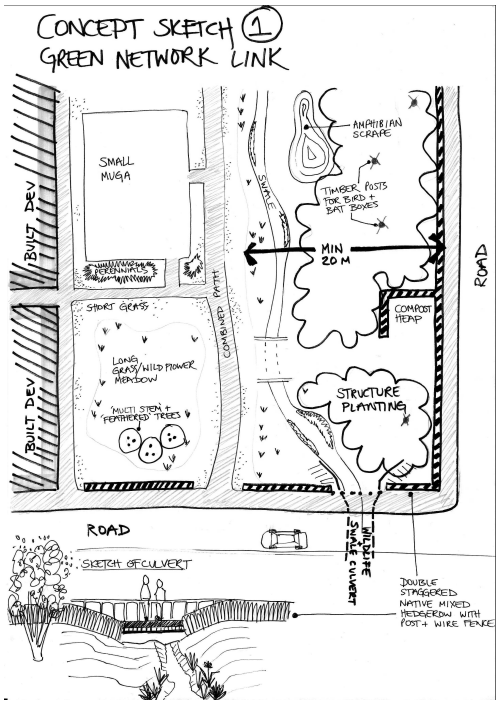
Should guide on:

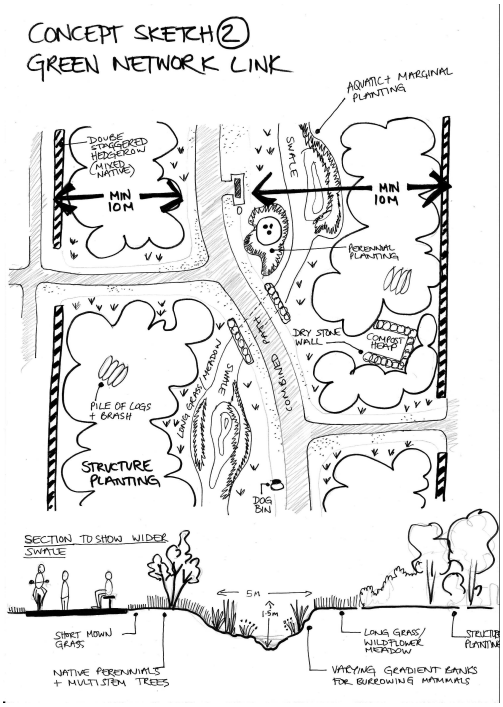
- tree pit specification;
- sudries such as mulch, slow release fertilizer, other soil ameliorants, underground guying, staking and tie methods for trees
- plant schedules
- Proportion of semi mature tree stock for maturity
- Feathered / Multi stemmed / standards / whips

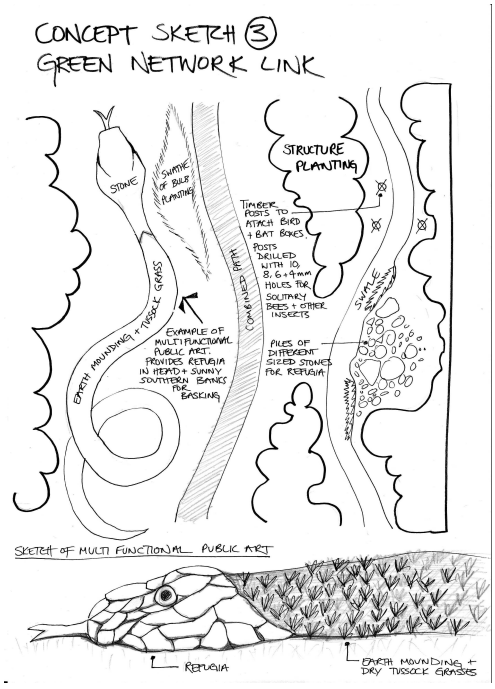
Main Plant Species Selection

- Bulbs and grasses should also be incorporated.
- bulrush-use carefully as invasive
- Which oak is common in area – robur or petraea?
- Ash and Aspen –need to be careful where due to brittle wood
- % per species in mix should be given as an aid

Helen Barber
BSc Hons, Land Dip, former MLI, ISA cert arb


CONCEPT SKETCH (1)
GREEN NETWORK LINK
BUILT DEV
SMALL MUGA
PERENNIALS
SWALE
AMPHIBIAN SCRAPE
TIMBER POSTS FOR BIRD + BAT BOXES
MIN 20 M
ROAD
COMBINED PATH
SHORT GRASS
COMPOST HEAP
LONG GRASS/WILD FLOWER MEADOW
MULTI STEM + FEATHERED TREES
STRUCTURE PLANTING
BUILT DEV
ROAD
SKETCH OF CULVERT
WILDLIFE SWALE CULVERT
DOUBLE STAGGERED NATIVE MIXED HEDGEROW WITH POST + WIRE FENCE


CONCEPT SKETCH (2)
GREEN NETWORK LINK
AQUATIC + MARGINAL PLANTING
DOUBLE STAGGERED HEDGEROW (MIXED NATIVE)
MIN 10M
SWALE
MIN 10M
PERENNIAL PLANTING
DRY STONE WALL
COMPOST HEAP
COMBINED PATH
PILE OF LOGS + BRASH
LONG GRASS/MEADOW
SWALE
STRUCTURE PLANTING
DOG BIN
SECTION TO SHOW WIDER SWALE
5m
1.5m
SHORT MOWN GRASS
LONG GRASS/ WILDFLOWER MEADOW
NATIVE PERENNIALS + MULTI STEM TREES
VARYING GRADIENT BANKS FOR BURROWING MAMMALS


CONCEPT SKETCH (3)
GREEN NETWORK LINK
STONE
SWATHE OF BULB PLANTING
STRUCTURE PLANTING
TIMBER POSTS TO ATTACH BIRD + BAT BOXES
POSTS DRILLED WITH 10, 8, 6 + 4mm HOLES FOR SOLITARY BEES + OTHER INSECTS
COMBINED PATH
SWALE
PILES OF DIFFERENT SIZED STONES FOR REPTILIA
EARTH MOUNDING + TUSSOCK GRASS
EXAMPLE OF MULTI FUNCTIONAL PUBLIC ART. PROVIDES REFUGIA IN HEAD + SUNNY SOUTHERN BANKS FOR BASKING
SKETCH OF MULTI FUNCTIONAL PUBLIC ART
REPTILIA
EARTH MOUNDING + DRY TUSSOCK GRASSES

Review of Management Plan Content – Notes by HB 04.12.07

INTRO

Whilst realising the current plans are only for part of the overall development (related to the landform), the suggestions for consideration below are for the entire development – based on information in the plans.

The notes are a set of queries and suggestions. Although focussing on ecological issues, they also consider landscape architecture and arboriculture related points. As the plans are still in their inception phase, please let me know if you would like to discuss any of the comments below in any greater depth. I am accustomed to critiquing documents from a regulatory perspective, so apologies if I have over used words such as: 'should', 'must', 'as a minimum' – it is ingrained within me. I am also aware I have missed relevant meetings, where many of these points may have been discussed.

GENERIC

Length

The length of time the management plans are intended to last for should be clear e.g. 25 years after completion / In perpetuity of housing development?

Vandalism

A generic issue, to be considered in all management plans, is the presence of vandalism both on and surrounding the site. This was picked up in KWT – Groundwork Kent Plan – 28.05.04 – which lists the vandalised boundary treatments, as well as noticeable vandalism witnessed during site visits by myself in early summer 07 (including much of the GCN protection fencing).

The relatively high occurrence of vandalism has implications to temporary protective fencing and markers, permanent protective fencing, habitat features which could be moved / burnt / damaged in any way etc. As a minimum, all plans should consider both materials used for habitat features and fencing / markers in the context of robustness, as well as a regime (particularly stating how often) any vulnerable features (existing or proposed) should be monitored on site. Consideration in the management plan should also be given to location of habitat features i.e. out of public view from main access points and paths where possible.

Boundary treatments and access arrangements / points

How will people, dog and motorbike access be controlled to prevent damage / disturbance to sensitive areas? The management plan should guide landscape architects on 'where' needs to be fenced off and 'what' needs to be kept out. If possible specifying type of fencing or access arrangements e.g. 'A' or 'K' frames to keep motorbikes out.

Habitat features

All 'Area' management plans should list the supply and erection of a range of bird and bat boxes as standard. In the prescriptions section, the number of bird and bat boxes should be stated along with: which type of bird and bat boxes i.e. species to attract; design / catalogue number; where they are to be located i.e. how high off ground, onto trees / posts to be driven into the ground and how to be fixed etc. Could also include suitable owl boxes in woodland / woodland edge if owls known to be in the surrounding woods outside of the site (unless don't want these predators due to other species?).

Individual areas should also list numbers of, specification and locations for additional habitat features in prescription sections, such as: hibernacular, timber piles (and how to try and avoid vandalism), ladybird boxes, Kingfisher nesting pipes (if want to attract in areas where no suitable banks/ friable soil) and perches etc

Management options (table in all area and species management plans)
The word 'options' in the tables of management actions seems ambiguous – are they options to pick and choose? Shouldn't the management plan be more decisive and commit to all of the actions / options, or possibly none will be realised?

Tree stake and tree ties
Suggest all new tree planting with stakes and ties, in any areas, to be inspected and adjusted on a seasonal basis (should be in prescription section for all areas). Total removal of stakes and ties (stake hole to be backfilled with suitable growing medium) after 8 seasons (2 years), but should be at earliest opportunity (once root ball has established to extent that tree can fully support itself).

Management plan should stipulate that all individual new tree planting (of standard or greater) should use adjustable tree tie only (to prevent damage of living cambium layer and defect tree in long term)

Templates
Are templates used for management plans for different projects? If so, are the formats ever significantly changed for different projects / how flexible is their usage? (query for my own research interest).

AREA PLANS

Craylands Gorge

Questions regarding Gorge / plan – KWT – Groundwork Kent plan – 28.05.04

- Is the previously constructed rail link in Craylands Gorge still present? (3.2.1.4) If so, does it have particular biological function to any of the notable species e.g. limestone chippings associated with rail link supporting certain species? Or, how will it be affected by the proposed pedestrian link?
- Are the 29 confirmed bird breeding territories in Craylands Gorge (3.2.2.3.2) located on a map / known locations? Is this important if trees being felled for paths and scrapes?

Questions regarding Gorge / plan – rtmme 2890 – APCG01 Oct 07

- Does a comprehensive arboricultural survey exist for craylands gorge? i.e. to BS 5837 / 3998 standard? If not, we should have one due to works and sensitivities in this area.
- Are the trees protected by TPO /CA/ or planning condition?
- What is the current age structure of trees? Are we trying to retain this structure or improve? This is not clear from the plan.
- 4.2 – (marking / fencing imp features) – could be clearer about type of fencing (important to be robust if preventing construction workers and heavy plant from entering) BS 5837 states particular design of herras fencing for tree protection – quote this?
- How will ecological clerk of works be trained regarding the habitats, species and their management objectives? Will there be in house training / hand over period and liaison to ensure the new employee understands the history / overall vision / specific requirements? Is there an umbrella document that deals with this? What happens if the ecological clerk of works changes? Maybe important to state how management related activities are recorded – so easy for someone else to pick up?

- Rotational clearance techniques – definition of 'unavoidable disturbance' may be useful – as will mean different things to different people. Contractors definition of unavoidable could be very different from an ecologists.
    - States up to 20% area to be disturbed or cleared per year to minimise impact. This means in 5 years there could be nothing older than 5 years – is this desired?
    - Is anything sacrosanct from the disturbance and clearance? E.g. old oak trees?
    - How will disturbance / clearance take place? E.g. machinery/ heavy plant (broad brush clearance), or chainsaw of individual trees / shrubs?
- Compartment 6 a) – page 7. States sessile oak seedlings removed?

Also, states that wood will be removed, but page 13 states wood needed for stag beetle? Is this talking about different areas?

- <u>4.31 – sycamore removal</u>
    - What is percentage of sycamore present in wood – what is desired percentage?
    - What is phasing, if any, of removal?
    - Any re-planting of other species to replace? – if not, sycamore will probably re-colonise / regenerate.
- <u>Path and glade creation</u>
    - the path and glade creation will require tree felling and severance of roots of those to be retained – this will lead to further decline and tree removal, there will also be tree removals for path lighting (if proposed) and tree removals due to H&S issues of pedestrianisation – what are the limits on the path width, where is the best location in terms of minimum impact to trees, can special construction techniques be applied? **There is a risk of loss of character and habitat value through too many tree removals.**
    - How much removal is acceptable?
    - Which trees are to be removed where?
    - Management plan should identify how the trees should be removed and the specifics (which should be related to a comprehensive tree survey of the area) i.e. how protect others, special construction, etc
- Fig 4.1 – appropriate for large forest areas, probably not appropriate for a narrow gorge – may have nothing left if 20 – 30 metres are to be left clear of high canopies as the fig shows.
- 4.52 – where is a suitable area of low ecological value? How are seeds to be collected? When is ploughing and sowing to take place (time of year – any constraints to time period?)
- Table 5.1 - Could I speak to someone about some of the management practices identified over a plan, to make sure I am not misunderstanding how and where this is all to take place?
    - Concerns over arboricultural language, which is not standard and could lead to confusion and loss of many of the trees
    - Confusing management practice for this area – would like to suggest alternative wording after discussion?
    - Is the woodland ride separate from the pedestrian route through the gorge?
- Maybe an annual chart showing 'when' to monitor 'what', 'where' would be useful in the management plan and also make the ecological clerk of works life easier?
- Monitoring – when does the 5 year monitoring period begin? On start of construction period / on completion?
- Can the pedestrian path be constructed as a raised walkway? This would a) protect more of the tree roots, resulting in fewer losses; b) help to keep pedestrians and dogs on the path, rather than potentially damaging some of the more sensitive areas; c) potentially provide habitat itself by providing shelter to smaller mammals and dark /dry area for

certain invertebrates and d) be a practical design solution as the Gorge is described as having a floor which can have standing water.

North West Corner

This management plan is still in its early inception stage, so there are only a few comments:

- Incorporate pond/ scrapes as an action and give a year to be done in. Is later management required to renew scrapes after 10-15 years say once they have naturally succeeded? Give some basic information on dimensions, locations and numbers. E.g. 3-5 metres wide by 5-10 metres long and 1 m depth (dimensions and shapes to range). Create with gentle gradient to edge to allow access of mammals, amphibians and birds in and out of water. Minimum of 10 in area. Notes on liner for permanent ponds e.g. clay content and how many to be permanent e.g 3-4?
- Were there to be new hedgerow plantings? Would you like me to provide you with a specification?
- New 'individual' semi mature trees needed as wind breaks / shelter / Perching / roosting places? Could just plant along path, so rest of area left open? Let me know if you would like a tree and tree pit specification notes from me?

Southern and SE Border

- Under the grassland section, it is stated that 'cuts' will be reduced down to 1 annual. The other areas also state 1 annual cut. As different wildflower species benefit from being cut at different times of year (to spread seed), the more cuts the more floristically diverse the grassland should become. Is it possible to increase cuts in some of the areas? (I am not aware what species are present and when they are ready to be cut, so afraid cant elaborate any further)

Cliff Top Area 4

Nothing firm to comment on at present

Retained Cliffs

Control of invasive plant species (manually / chemically?)

Rest of document is copied from other areas (mistake?), so no further comment at present.

SPECIFIC SPECIES PLANS

Bats

Under the 'protection options' section –

- How will protect – what kind of fencing / is it at high risk of vandalism?
- Same comments as with Craylands Gorge with respect to 20% disturbance per year is acceptable if unavoidable – need to define unavoidable. Also sounds a lot, as everything could have been disturbed in 5 years.
- Roost protection – should define the width of a buffer and how the buffer needs to be protected.

Under the 'management options' section –

- Although retaining dead trees is good ecologically, this can not be done where the hazard potential of people getting injured by trees is high (i.e. near paths etc) as the risk is very high (fatality). A risk assessment should be done to identify in which areas dead trees can be left standing. There maybe areas where this is possible, or there may need to be trees which are fenced off e.g. with a post and wire fence to lower the risk.
- Fig 4.1 – woodland ride – same comments as those for Craylands Gorge

- 4.3.4 (called grassland habitat, but actually Hedgerow habitat). Hedgerow areas in need of 'gapping up' should be identified on a plan and the lengths of new planting stated. New planting should be specified i.e. whips of 600mm plus, planted in double staggered rows (rows 450mm apart) native mix, (table with species list and % mix), notch planted with handful of compost incorporating slow release fertiliser at 400mm centres and supplied with rabbit guard.
- Management plans to include seasonal inspection of rabbit guards and eventual removal from all necessary areas after maximum of 6 season (18 months) if not before.
- 4.3.5 – open water – Conflict with amenity use (fishing and fishing stock) of ponds and bat/ GCN requirements. Should state in management plan which ponds o.k to have fish in and which not. Pollution – maybe state no surface drainage to open water from amenity grassland areas (fertiliser maybe used on amenity grassland).
- 4.4.2 – bat design and fig 4.2 – needs to state what type of bat the design is suitable for. Need to state what kind of bats we are trying to attract where, and what boxes are suitable for them. What % of different type of boxes are needed? How many boxes should be supplied (if don't state could end up with 2). On buildings timber / rural look may not be appropriate. Can get concrete durable ones out of catalogues suitable for offices etc. Management plan should list these. The example shown in Fig 4.2 is not very suitable for attaching to trees – it has 4 nails which are likely to leave the tree open to infection and disease (4 nails so close likely to crack wood also, which could progress to far worse defect over time) – find less invasive method of attachment.

Management plan prescriptions

- 3.1 – Storage tunnel. Could probably do with a little more explanation for any new employees picking this up for first time e.g. where is the storage tunnel? What are the panels / battens to put inside?
- 3.2 – Woodland management. suggest different wording / approach, or in danger of having no trees left (happy to discuss in more detail/ advise on wording)
- 3.3 – states 'allow standard trees to grow every 20 metres'. Should state that a hedgerow tree (extra heavy standard tree) to be planted during planting season into a backfilled planting pit (backfill of cultivated growing medium, with mix of compost and slow release fertilisers included)
- Table 5.1 – give some examples of appropriate planting to use.

GCN - RT-MME-2890-GCN1

Looks comprehensive – no comment

REPTILES

No new comments, except to include refugia construction, such as dry stone walling methods etc where possible in the prescriptions section.

Birds

Black red start – Provision of 'brown' biodiversity roofs on new commercial developments – when looking at the whole development, this needs to be a management plan requirement. Roofs will need to be flat and liaison with architects at very conceptual stages i.e. now, would be advisable. For larger roofs, brown as well as green roofs could be incorporated – green roofs on lower roof levels for higher amenity value to higher levels (increase lettability of higher levels).

Kingfisher habitat – Which ponds are they likely to be 'fishing in' / which ponds to contain fish stock? Will the fish stock be appropriate food to kingfishers? Around these particular ponds are there are adequate existing banks to nest in? Where are these (maybe useful to identify on a plan).

In not adequate nesting sites, can banks be created? If so, need to specify how and where in prescriptions section. If not, kingfisher nesting pipes / boxes can be bought from catalogues and fixed to man made structures such as walls, if high enough out of way of rats.

Little ringed plover
Don't know anything about this bird - no comment.

Other birds
When considering whole development management plans: install robust version of a range of bird boxes to houses and other structures. Also, bird baths and bird feeding platforms and hanging posts for communal gardens (so residents in apartments can still feed birds).

Invertebrates
Looks very comprehensive and I have little knowledge on subject, so only suggest following:

- Provide comp post bins to all residents with gardens (for whole development).
- Provide large on site compost areas for mown meadows (where material to be taken off site to provide low fertility for wildflowers)
- Provide wooden posts driven into ground with a number of different sized drilled holes (placed within structure planting areas).
- Provide high nectar source flowering plants in communal gardens and more formal parks
- Plant species such as hedge mustard in pocket parks – known to attract butterflies (see my old consultation on the green space strategy plan – list more species)
- Use low stone walls, where possible for level changes

Plants, Lichens & Funghi
Similar comments regarding woodland management prescriptions

Helen Barber
BSc Hons, Land Dip, Former MLI, ISA cert arb.