Where the rubber meets the road:
approaches to the redesign of urban mixed-use streets.

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Abstract:

The planning and design of streets has in recent years been characterised by a shift in focus. The transport-led paradigm of street planning and design that achieved dominance in the twentieth century has increasingly been replaced with one which demands a greater focus on the non-transport needs of all streets as 'places'.

The extent to which efforts at a policy level to re-position the design of streets under this new paradigm have been reflected in the approaches of professionals actively engaged in the planning and design of streets is the primary focus of inquiry here. Specifically, this report looks at approaches to redesigning mixed-use urban streets, which carry importance both for 'movement' and 'place' and are suggested to lay at the intersection between transport and urban design.

A broad review of relevant literature, including policy and guidance specifically related to the redesign of urban streets, is supported by a series of semi-structured interviews undertaken with those engaged in the planning and design of urban streets, from both transport and what are considered here 'urban design' specialisms.

It is suggested that whilst significant steps have been taken towards reforming street design away from a dominance of the concerns of transport, real divergences in interests and understandings remain between urban design and transport specialists. An emerging view across disciplines, however, appears to be one which embraces complexity, pragmatism and compromise, with an acceptance that it is in the nature of existing urban streets that any 'perfect' solution is likely to remain elusive.

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Introduction

Streets comprise the great majority of public space in cities. In London it has been estimated that 80% of all the city's public space (Mayor of London, 2016) are roads and streets. Whilst circulation and mobility are primary purposes of streets, an awareness of their wider role in the life of the city brings claims upon them from outside of the transport professions. This is particularly the case when it comes to urban mixed-use streets, which have an importance both as sites of commercial, cultural and social activities as well as routes for through movement and arteries of the transport network. Contemporary accounts of street design have generally foregrounded this complexity, with busy urban mixed-use streets seen as presenting 'wicked' problems (Carmona, 2015).

More generally, the last two decades have been characterised by a re-examining of the transport-led paradigm of street planning and design that achieved dominance in the twentieth century, demanding a greater focus on the non-transport needs of all streets as *places*. Given traffic engineering's rise to prominence as the key actor in urban street design was concomitant with the primacy of designing for increased motor traffic, the continued relevance of its principles and practices have been repeatedly challenged. Alongside this, fundamental questions have been asked about the sustainability or desirability of present levels of motor traffic in urban areas, as well as the continued appropriateness of the traffic-oriented organisation and design of streets. As a result, the importance of the non-transport elements of busy mixed-use streets has risen in prominence, as has the potential role of those with expertise in public space, and what we can broadly call those practising 'urban design'.

The impact of efforts to re-position the view of streets and their (re)design is a primary focus of inquiry here. A broad review of relevant literature, including policy and guidance

specifically related to the redesign of urban streets, is supported by a series of interviews with those engaged in the planning and design of urban streets. As increasingly the mixed-use street is seen as an inter-disciplinary concern, a focus of these interviews was an attempt to understand to what extent a coherent view has emerged between those from differing professional backgrounds engaged in their re-design, and particularly on the interplay between transport and urban design.

Defining Mixed-Use Streets

Commonly the term 'mixed-use streets' has been applied slightly more narrowly than it is used here, specifically to refer to 'traditional' local high streets where a fine-grained mix of land-uses, including retail, commercial and residential intermingle (Jones, Roberts, Morris, 2007; Carmona *et al.*, 2018). The term 'mixed-use streets' is used here to encompass a all streets that are effectively multi-functional – combining some importance for movement with space for other activities, be they shopping, socialising, or other urban activities. As such, mixed-use streets are here taken to include what have been called 'arterial streets' (Svensson, 2004), but not blank arterial roads free of active frontage, motorways, nor quiet residential streets.

Defining Urban Design

There is every reason to be cautious of speaking about urban design as a monolithic body of thought given a great range of views, scales and interests can be categorised in some way as constituting 'urban design'. In a broad overview of urban design Carmona et al (2010) attempt to define its boundaries whilst emphasising its position as both a 'mongrel' and an 'emergent' discipline. Since, in the broadest sense anybody materially affecting urban space can be seen as practising urban design, even if this is 'unconsciously', it is more instructive here to consider how urban design is constituted as a body of thought distinct from the issues of transport planning or engineering. Most accounts trace urban design's roots to relatively small group of writers emerging from the 1960s, including Jane Jacobs, Kevin Lynch, Gordon Cullen, Christopher Alexander, Jan Gehl and others. Though borrowing and synthesising insights from other disciplines, particularly architecture and town planning, these writers have contributed to the development of a new discipline.

Whilst Carmona et al (2010) helpfully bifurcate urban design into two distinct traditions, namely the 'visual-artistic' and the 'social usage', it seems that proponents of these two camps are now minority actors in the discussion and practice of urban street design, with a third category now more dominant - what is labelled the 'place-making tradition' which synthesizes insights from both. In the context of this study which looks at the intersection and interrelation between the transport and the non-transport elements of streets, we can hopefully afford to be broader still. Whilst landscape architects, architects and urban designers may bring distinct concepts, preoccupations or abilities to the designing of streets, some of which it may be useful to draw out in later discussion, these differences are not necessarily the primary concern here. These professions all have a primacy in whatever might constitute the 'place' aspects, rather than the movement and transport elements, and can in the context of redesigning existing urban streets be understood to be practising urban design.

Literature Review

Dealing with movement and place

The concept that those engaged in the design and planning of urban streets need to consider in some detail the demands upon it, both as a channel for movement and as a 'place' in its own right, is now embedded throughout contemporary guidance. TfL's Streetscape Guidance (Transport for London, 2016), for example, makes it clear that a 'collaborative, design-led approach' is crucial to achieving both the enhanced public realm and successful transport network the city aspires to. Primarily focused on the Transport for London Road Network (TLRN), which TfL directly controls and consists largely of London's busiest streets for traffic, it describes the task of the designer as understanding both the 'place' and 'movement' functions of the street and where possible enhancing both of these, the quality of the street and its efficiency for travel, in tandem.

This broad duality of functional categories i.e. 'movement' (here called 'link') and 'place' was developed specifically with the question of busy urban mixed-use streets in mind. Noting that conventional guidance on the design and management of streets had hitherto created a binary between arterial roads and local access streets, research from the ARTISTS (Arterial Streets Towards Sustainability) project suggested the way forward was in firstly reclassifying arterial multifunctional streets from a hierarchy built upon their importance within the wider traffic system, to one which also recognised their importance for various other activities (Svensson, 2004). In this account, recognising that any given street has a range of potential uses and users, the task for those designing and managing streets is to allocate space and time, given not all activities will necessarily be concurrent, between these competing uses. The two broad categories of users are those travelling through and using the street section as a *link* and those from whom the street is a locale for whom the street is functioning as a *place* in its own right.

Though its intention was to be used predominantly in the design of new residential streets, the publication of *Manual For Streets* (DfT, 2007) represented an important achievement in establishing clearly the principle that the non-traffic elements of streets needed greater consideration. In a sense it formalised some of the key demands of those engaged in the campaign towards greater recognition of the importance of designing streets with proper consideration for creating high-quality places. Michael Hebbert had, two years prior to Manual for Streets' publication, described this advocacy as 'a struggle' against the entrenched hierarchical model applied to the streets at a network level and its associated design standards (Hebbert, 2005). As in the account of the ARTISTs project, as well as subsequent iterations of "Link and Place" (Jones, Marshall and Boujenko, 2008), it was seen as fundamental to the achievement of truly mixed-use and multifaceted streets that the existing, very long established, ways of planning and thinking about our streets needed to be re-evaluated.

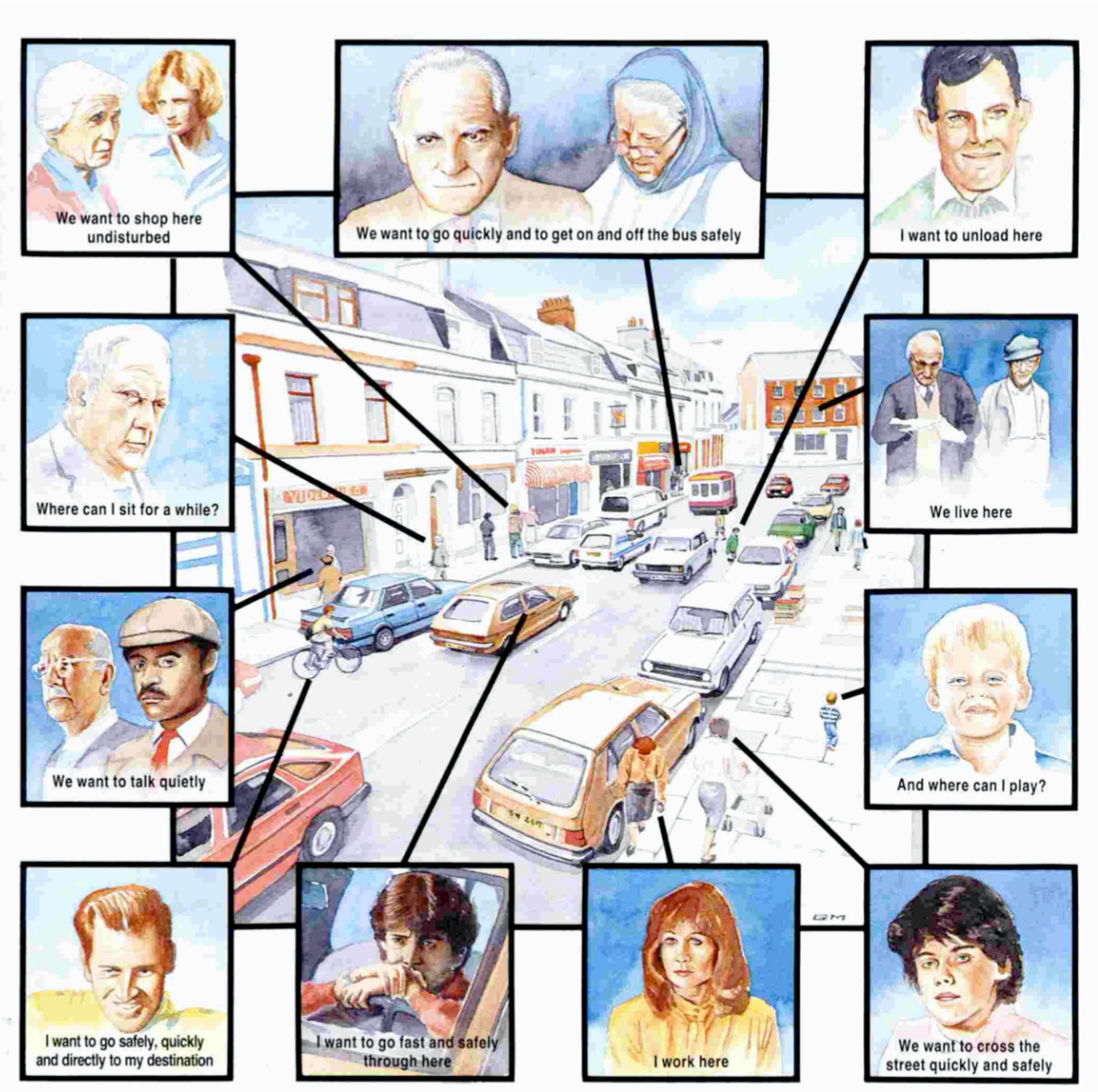

Figure 1: Competing Uses of the Street (Pharoah, 1991)

A landmark publication Hebbert does not mention in his history of street design (Hebbert, 2005) is Tim Pharoah's *Traffic Calming Guidelines* produced for Devon County Council (Pharoah, 1991). Many of the themes of later guidance are presaged here, though underpinning its specific recommendations lay the essential argument that continued growth in traffic was essentially incompatible with creating or maintaining attractive and viable town centres and high streets. The busy mixed-use street is portrayed clearly as a locus for competing interests, where the principal aim should be the reduction of both the speed and volume of traffic to create a healthy balance between what are called here "living" and "traffic" elements.

These fundamental principles of the hierarchical paradigm of road network planning have commonly been traced back to the Buchanan report of 1963, *Traffic in Towns* (Ministry of Transport, 1963). Even this ground-breaking work, however, was informed by many of the principles and concepts developed decades earlier by Alker Tripp in *Road Traffic and its control* (Tripp, 1950) where he had argued for thoroughgoing separation of motor traffic and pedestrians, largely on grounds of pedestrian safety. Faced with the prospect of huge and unprecedented rises in car ownership and usage, Buchanan's report suggested facilitation of

this growth would require a primary network for through traffic which bypassed the most important or valuable areas, particularly Britain's historic towns and cities. To this end, roads were ideally to be organised into two distinct but broad categories, primary routes for the circulation of traffic on the one hand and local access streets within what were called 'environmental areas' on the other. This fundamental principle, which Buchanan described with a famous 'rooms' (incorporating non-movement activities) and 'corridors' (purely, or at least primarily, for the movement of traffic) analogy, was of course not easily applied in existing built-up cities. However, *Traffic in Towns* did suggest a range of engineering-led solutions, some more plausible than others, which emphasised the desirability of separating as far as possible the traffic system from the movement and activity of people on foot (Bianconi and Tewdwr-Jones, 2013).

Whilst some of the radical new urban forms *Traffic in Towns* envisioned may have failed to materialise, the influence of its underlying principles has been recognised as enduring in the planning principles, legislation and guidance addressing street design. In particular, via two key pieces of guidance: *The Design Manual for Roads and Bridges (DMRB)* (Highways Agency, 1994) and *Design Bulletin 32, Residential Roads and Footpaths: layout considerations* (DB32) (DETR, 1977 and 1992), and the roads built upon their principles, have been seen as manifestations of Buchanan's traffic-led hierarchy of roads. The central principle of which is effectively to separate as far as possible important streets for traffic from the most important places for living, where there are active frontage and pedestrian activity.

Though DB32 is ostensibly a guide only for residential roads and footpaths, it has been emphasised that its influence has been much wider (Smith, 2018). Taylor and Sankey's account as to its enduring popularity emphasised its comprehensiveness and ease of application, arguing "every aspect of street layout has been covered, always from the perspective of the motor vehicle", whilst the detail of its guidance has allowed street design to be administered by the engineer without regard for local context, effectively applied as if a set of rules (Taylor and Filmer-Sankey, 2002). Though accounts of the shortcomings of this approach have tended to emphasise its ubiquitous impact in the design of new development and the associated blank distributor roads (e.g. Jones, 2008), a singularity of focus along existing urban arterial roads around keeping traffic moving has been seen to have led to the reconfiguring of these environments as car-dominated, if not empty, environments (Svensson, 2004). Twenty years after *Traffic in Towns* Buchanan himself recognised the challenge in existing urban areas in accommodating traffic was particularly acute, arguing one need to do no more than look at Oxford Street or the South Circular in London to realize much more needed to be done to deal adequately with the issues of traffic (Buchanan, 1983).

(Re)designing Urban Streets

As early as 2002, CABE's (the Commission for Architecture and the Built Environment) report on street design stated emphatically that what constitutes good streets was already agreed upon, and that this included designing for a balance of functions, whilst "high quality design guidance [was] already well developed and plentiful" (CABE, 2002). A key example of this was the 'companion guide' to DB32 *Places, Streets and Movement* (DETR 1997) which argued for greater recognition of the unique qualities of the 'traditional' street, which should carry a mix of uses and contribute to the 'fine urban grain' that characterises both vitality at

the street level and also a sense of community more widely. This message, that the multi-dimensionality of mixed-use urban streets needed to be re-emphasised, was reflected in Jones, Roberts and Morris' *Rediscovering mixed-use streets* (2007). Addressing this complex typology of streets specifically, it hoped to remedy what it described as neglect over a period of decades of these important traditional urban centres. The insufficient prominence given to their commercial and social uses is seen here as resulting in large part from the primacy given to their movement function, resulting in the dominance of traffic. In design terms this had meant these existing streets being re-engineered to cope with greatly increased volumes of traffic and the associated pressures of parking at the detriment to their other uses.

In the context of existing urban non-residential streets specifically, a later publication, *Manual for streets 2: a wider application of the principles* (notably this time a CIHT document rather than a DfT one) formalised this further, by attempting to apply the thinking that informed the original *Manual for Streets* to busier locations. This emphasised above all else that the designer should be sensitive to local context and the wider uses of streets even where the movement of motor traffic is a larger (and perhaps a more important) consideration.

Amidst this growing recognition of the limitations of the engineer-led, hierarchical paradigm which had informed urban street being redesigned in a unipolar, traffic-first direction, there has been recognition that a conscious effort was needed to elevate the status of the neglected characteristics of busy urban streets, perhaps most of all the pedestrian environment. This was the key aspiration of the "Link and Place" framework, which hoped to establish a new paradigm wherein the needs of traffic and of high quality places were given equal weighting in the planning and design of urban streets (Jones, Marshall and Boujenko, 2008). The adoption of the London 'Street Types Matrix', which classifies London's streets with consideration to both their movement and place functions, has theoretically embedded a consideration for the non-transport aspects of streets within the overall planning framework (TfL, 2013).

Alongside this work towards embedding a consideration of 'place' in the planning of urban streets, there have been a small number of studies which seek to review how infrastructure schemes are appraised and valued to match these changing policy aspirations. This responds to a line of clear criticisms laid out in accounts like Desyllas' The *Cost Of Bad Street Design* (2006), that that the negative impacts of motor-traffic-led designs on the interacting issues of conditions for pedestrians, a deterioration of the public realm, and the associated decline in walking, were all not being properly measured. One significant example of work done to remedy this perceived shortfall of evidence was CABE's report *Paved With Gold* (Commission for Architecture and the Built Environment, 2007) which suggested, by comparing high streets across London, that the value of investment in 'good' street design could be seen in increases in local property prices and retail rents. Similar work carried out more recently by UCL for Transport for London (Carmona *et al.*, 2018) deepened the evidence for the positive effects of improvements to mixed streets, especially local high streets and town centres, emphasising these were much more widespread than simple increases of property value.

A multi-disciplinary concern

It has been seen as a concomitant of the car-led hierarchy of streets and its associated manifestation in guidance that the traffic engineer has become the primary actor in street design (Dumbaugh and King, 2018). It is clear, however, that the professional interest in the design of streets has for considerable time extended beyond just those for whom transport is the primary concern. In particular, many classic texts on urban design have at their core an intimate concern with streets and their design. Jane Jacobs' *Death and Life of Great American Cities* (1961) serves as something of a paean to urban streets, which are seen to provide perhaps the most important spaces for social interaction in cities. Whilst the modernist concept of thoroughgoing separation between pedestrians and vehicles is strongly rejected here, as elsewhere in the urban design literature, a keen concern with the dominance of motor traffic and its creeping spatial demands is central to Jacob's narrative, a phenomenon she calls "city erosion". A similar concern is explored in Donald Appleyard *et al's* classic study *Liveable Streets* (Appleyard, 1980) which demonstrated an inverse relationship between levels of traffic on a street and its social cohesion and activity.

More recently, works with a greater emphasis on the design details of urban streets have emerged from urban design, amongst the most influential of which is Allan Jacobs' *Great Streets* (Jacobs, 1993) which documents and classifies streets primarily by their design characteristics, arguing strongly that typically the best streets are *consciously* designed. Here, above all else, great streets are determined by their contribution to community and the social life of the city. Perhaps naturally, accounts like Jacobs' which have emphasised that both the planning and design of urban spaces need to be rethought with a greater emphasis on the pedestrian environment and their other non-movement elements, have envisioned an increased role for non-traffic specialists. Southworth and Joseph are clear in their account of the history of street design that the way forward is for urban designers, planners and engineers to collaborate in developing new standards that are responsive to the full diversity of street users (Southworth and Ben-Joseph, 2003).

Similar Studies

A number of studies have emerged in recent years which deal specifically with the topic of how urban mixed-use streets are planned and designed. Matthew Carmona's research on London's local high streets (Carmona, 2015) and Jones, Roberts and Morris' *Rediscovering mixed-use streets* (2007) both examine the complex roles of mixed-use streets in detail with a particular focus upon remedying their relative neglect, which in both accounts is rooted in the interlinked issues of their conflicting roles and a fragmentation of responsibility for their upkeep. However, the question of how such theoretical work has pervaded the thinking and practice of those active in its manifestation, and specifically those actively engaged with (re)designing urban streets, appears to remain an unexplored area.

Methodology

Sixteen in-depth semi-structured interviews were conducted with fifteen participants (with one follow-up interview) who were all approached for their expertise in the field of urban streets. These consisted primarily of prominent figures in the field of urban street design, including key figures emerging from the literature review, as well as practitioners identifiably involved in recent street redesign schemes of interest to the researcher. A small number of people highlighted in early interviews were also included as part of this study, in effect utilising a snowball method.

A conscious effort was made to balance interviewees between those with a grounding in the three design professions identified earlier as practising 'urban design', and those with a grounding in transport planning or engineering. Following a semi-structured interview guide, conversations were had either over the telephone or using video-conferencing software, a method noted for its suitability for semi-structured interviews of this nature (Cachia and Millward, 2011), but also necessitated by active government social-distancing guidelines during the COVID-19 pandemic.

The purpose of the interviews can be seen as typical of those using qualitative research interview methods – to understand the research topic from the perspective of the interviewees themselves (Cassell and Symon, 2014). In this case that meant attempting to gain a developed understanding of the personal experiences and perspectives of those actively engaged in planning and designing mixed-use streets. Specific lines of questioning were sometimes 'bespoke' to the interviewee, referring to their experiences on specific schemes or theoretical contributions the researcher knew them to have worked on. This follows Kvale's advice that qualitative interviews should focus upon 'specific situations and action sequences in the world of the interviewee' (Kvale, 1983). In complement of these specific lines of questioning a number of dominant themes emerging from the literature review were explored with all participants.

The interviews undertaken were all recorded and transcribed, to allow close critical analysis after completion, with the aim of organising the responses gathered and identifying emergent themes. The resultant chapters which structure this report set out below reflect both what emerged as the most salient topics from the transcribed interviews, but also the dominant concerns within the literature, as well as the lines of questioning of the researcher.

The three key themes were:

i) Ways of seeing – which relates to how the redesign of urban streets is conceptualised by those I interviewed, and the differences in perspectives between professionals of differing backgrounds.
ii) Collaboration – how working together, especially across disciplines has been experienced.
iii) Separation vs Integration – the extent to which separation of modes and functions is desired or deemed necessary.

A fourth topic was explored, in a sense as a case study, where the views of practitioners were sought on an area less thoroughly examined in the literature.

iv) Dealing with cycling – how the needs of cycling can be integrated into mixed-use streets.

Given the close interplay between the wider literature and the interviews in this report, each theme will have a background section which covers the literature specific to this sub-theme, laying out some of the historical precedents and key concepts which were seen to be particularly influential on contemporary thinking in these areas.

Ways of Seeing

Introduction

It has been argued that a shift from a hierarchical traffic-led paradigm of streets towards a movement and place-based model, which considers the non-traffic roles of streets in their planning and design, has been global (Carmona *et al.*, 2018). As such it is increasingly typical that those involved in their (re)design are asked to take a comprehensive and holistic and multifaceted view of their functions. In this section it is investigated how well-equipped practitioners are to do so, and what remaining differences in perception, attitude and understanding still exist between the differing specialisms with a stake in the design of mixed-use streets.

Background

Traffic Engineering

"Road space is a scarce resource, and traffic engineers need to ensure that roads are able to accommodate as much traffic as possible, subject to safety and environmental constraints." (O'Flaherty, 1997)

Traffic engineering is, in essence, a quantitative scientific discipline. Its focus in relation to roads and streets has been seen to have subtly shifted over time, in particular with an increased focus on traffic management rather than the continued development of new road capacity for traffic, but its central task has remained the provision of mobility for goods and people via the expeditious movement of vehicles (Teodorovič, 2015). Though some updated handbooks recognise that urban streets are likely to require what it calls "alternative traffic designs", including lower-speed environments and an acknowledgment of a broader range of users (Wolshon *et al,* 2016), this emphasises that its fundamental concepts are not necessarily sympathetic to urban mixed-use streets. Traffic engineering has been described as a fundamentally 'conservative' profession (Jones, 2008) and it has been suggested its practitioners have a tendency to "design by legislation" (Taylor and Filmer-Sankey, 2002), preferring to take a design 'off the shelf', casting traffic engineers as either reluctant or unconscious designers.

"Strict adherence to the manuals is actually promising; rather than convincing the engineers to fundamentally rethink their approach, we need only amend the manuals in order to reform the profession." (Duany, Plater-Zyberg and Speck, 2000)

Despite the optimism expressed by Duany *et al* that a strict adherence to mandated practice means traffic engineering requires only enlightened guidance, the idea complex urban streets can or should be designed by a set of inflexible set of standards that even an 'unthinking' designer could apply, has not generally been accepted. It has not been just the standards of highway design but also their 'rigid' application which are cast as the barriers to good design (Hebbert, 2005). Though the replacement of DB32 with *Manual for Streets* (DfT, 2017) was in part an attempt to deal with specific issues in the design of streets, like the prevalence of cul-de-sacs and blank distributor roads, it also sought to contribute towards a fundamental reform of the mindset of the engineer themselves.

This underlying concern that traffic engineering was being applied with narrowness of focus and rigidity is addressed in some detail in *Manual for Streets*, which targeted a decisive break from what it called "standardised, prescriptive, risk-averse" methods. This has been accompanied by a perhaps more fundamental questioning of the underlying assumptions of traffic engineering which inform established ways of working. In particular, the usefulness and appropriateness of safety standards rooted in theory, which apply geometric criteria derived from mathematical models to situations of human interaction, rather than evidence from practice, have been severely questioned, (Jones, 2003). In essence the argument has been that the standards of traffic engineering have, in urban streets particularly, served to provide the *illusion* of safety and speed (Whitby, 2002)

Urban Designers

If the guide for the traffic engineer has been typically theoretical or numerical, accounts of urban design have tended to emphasise the importance of direct observation of public life. Indeed some have argued strongly that urban design is not a science but rather self-consciously an art (Marshall, 2016), which resists the distillation of the physical world into abstract quantifiable metrics. The importance of the careful watching and recording of the nuances of public life has been identified as the common thread which runs through many of urban design's classic studies, as they are drawn together as one coherent way of looking at the world in Jan Gehl and Birgitte Svarre's *How to Study Public Life* (2013). Recognising urban design's construction as in large part a reaction to the abstractions of modernist city planning, it has been argued its focus is practical and centred around the questions of "what should be done" and "what will work" (Moudon, 2013). As such the interplay between the physical design of the street and its social activity is a typical point of emphasis. A successful street will in theory be identifiable by the character of activity upon it.

In Allan Jacobs' *Great Streets* (1996) such a philosophy informs a close studying of precedent. The physical properties of established streets are closely documented alongside an account of the subjective experience of experiencing it, *always* on foot. *Great Streets* in this account are characterised by more than just offering a pleasant walking experience, but by also playing host to social and non-movement activities, like stopping to talk or sitting to relax. Jan Gehl, the architect and urban designer, formulated this same idea by subdividing the everyday activities observed on the street into three categories: *necessary, optional and social* (Gehl, 1987). Whilst the *necessary* activities like travel will be seen on any street, *optional* activities like walking for leisure will only be seen in good conditions and a pleasant environment. The last category of *social* activities are only likely to take place in a high-quality street environment, but this will enable all three.

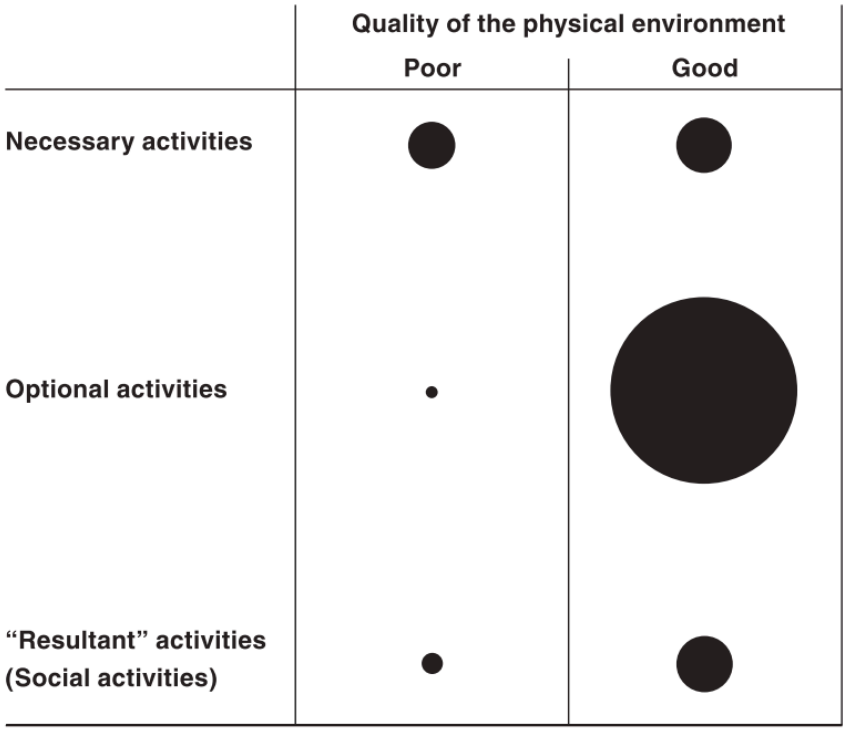

Figure 2: Quality of the physical environment and the nature of activities (Gehl, 1987)

The situation of the urban designer as primarily interested in the pedestrian realm of the street, both for its movement and non-movement uses, emerges from the urban design literature more widely. Reid and Bartholomew's practical and comprehensive review of the techniques and considerations to create walkable urban environments (Ewing and Bartholomew, 2013) argues that later exercises in 'objective' studies of pedestrian and street behaviour have largely endorsed the concepts developed by urban design's founding theoreticians, among them: William Whyte, Jane Jacobs, Kevin Lynch and Jan Gehl.

Urban design and walking

"There is more to walking than walking" (Gehl, 2010)

It is noteworthy that attempts have been made, by transportation specialists, to distinguish between 'striders' for whom an expeditious journey is paramount and 'strollers' from whom an improvement in the public realm might be more important to encouraging walking (Heuman *et al.*, 2005). Indeed this distinction is made elsewhere by dividing pedestrians into 'link' users or 'place' users depending on their immediate purpose (Jones, Marshall and Boujenko, 2008). Typically, approaches from within urban design have resisted any such bifurcation of walking purposes, preferring to emphasise that good urban form and attractive cities will elicit more walking of all kinds.

Despite this however, a clear prioritisation of the *essential* elements of facilitating movement of foot, over and above the more subjective or aesthetic elements, can be seen in practical approaches to existing urban streets. A report developed by a multi-disciplinary team from UCL, led by urban design professor Matthew Carmona, suggested that improving the safety and comfort of the pedestrian experience should be the most pressing priority in improving the public realm (UCL and TfL, 2018).

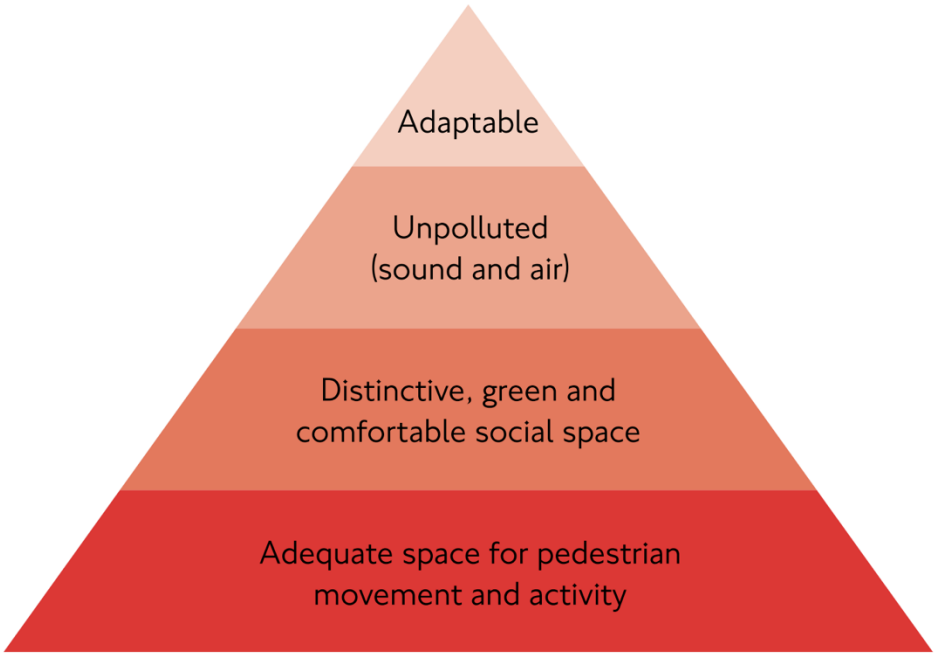

Figure 3: A hierarchy of interventions for London's mixed streets from (UCL and TfL, 2018)

Ewing and Bartholomew's (2013) guide to designing and planning for walkable streets draws a similar conclusion, though over a wider neighbourhood planning scale, prioritising 'essential' features like safe crossings before what it calls 'highly desirable' features like adequate tree coverage, or even 'worthwhile additions' like public art. Though this emphasis on dealing with the basics of the pedestrian environment on busy streets first is common, it has been stressed that this is in effect a first step in rolling back the prioritisation of the car. In Gehl Architects' 2004 report on London entitled *"Towards a fine City for People"* (Gehl Architects, 2004) it was argued the lack of data on pedestrian movement had made walking "largely invisible" in the planning process and that the overarching priority given to vehicular traffic was the chief culprit.

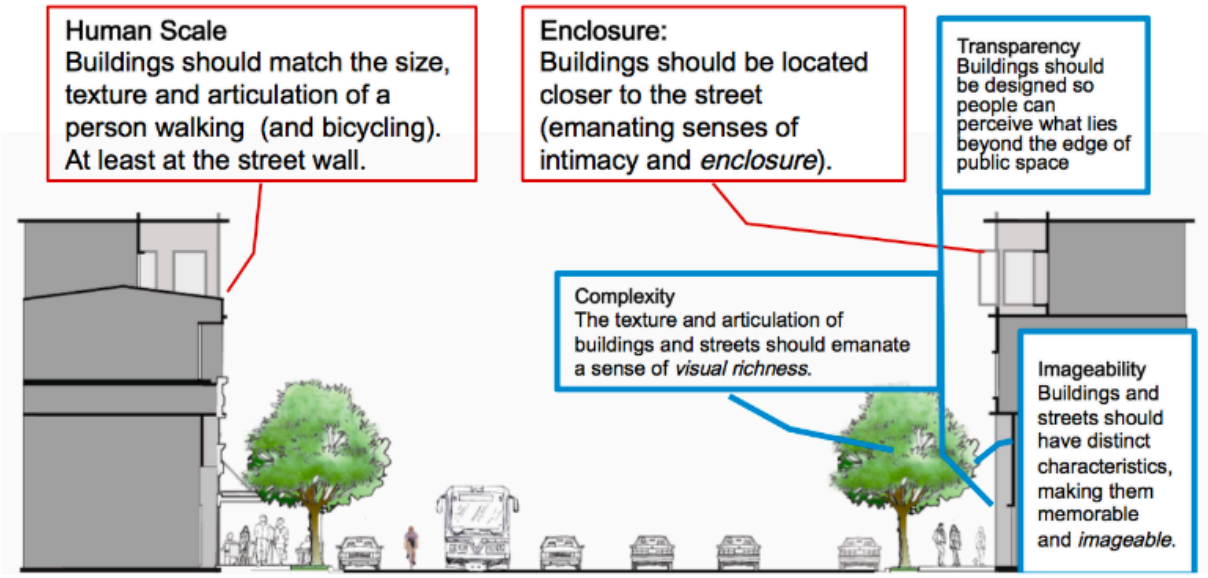

Figure 4: Urban Design characteristics of a walkable environment (Appleyard, 2016).

Explanations of what makes attractive street environments in the urban design literature quite often emphasise strongly the influence of the full range of architectural elements upon the subjective experience of being on the street. The characteristics of a good urban street environments are typically conceptualised using a set of perceptual categories: *Imageability, Enclosure, Human Scale, Transparency* and *Complexity.* Whilst these may all be important components, any adaptation of many of these are likely to remain outside the control of those tasked with the redesign of existing urban streets and serve effectively as constraints.

Creating a common view?

Attempts to unify a vision of the street for practitioners of differing professional backgrounds can be seen in current policy and guidance, like London's adoption of the *Healthy Streets* approach (Plowden, 2019), which acts simultaneously as a conceptual guide to what to look for in a street redesign, as well as functioning as a tool to inform intervention and to quantify and make tangible some of the historically less easily valued aspects. Building on this, London's Planning for Walking toolkit emphasises that any designer look at the street as more than just a conduit for movement, arguing that effective planning and design for the pedestrian should enable "incidental social interactions and amenity value of a multi-functional, attractive place to shine through" (Transport for London, 2020).

It has been argued that the projects which will be most effective will necessarily be led by 'urbanists' who transcend the limitations of any particular discipline (Stemmet, 2002). The sense in this account, which is reflected elsewhere in the literature, is that each discipline has a unique and valuable contribution to make, but all are partial and none alone is sufficiently comprehensive. Though at least some of the people interviewed towards this study might be described in some measure as *urbanists,* it may still be the case that differences in perspective between practitioners with different professional backgrounds remain. As such, the continued sense of the limitations provided by disciplinary boundaries

are considered here to get a sense of the degree to which a unified way of looking at mixed-use streets as multi-functional *places* has emerged in reality.

Interviews

Two-tribes

All of the interviewees I spoke to came with a professional grounding in at least one of five professions: transport planning, traffic engineering, urban design, architecture and landscape architecture. Though each of these five has its own unique qualities and realms of interest, and many practitioners I interviewed overlapped these boundaries or had professional competencies in more than one specialism, it was agreed that the most substantial essential divide lay between transport and non-transport specialists.

Many of my interviewees stressed how closely related transport planning and traffic engineering were in principle and in practice, with almost everybody with either of these specialisms emphasising that the work that they do has, at one time or another, cut relatively seamlessly across these boundaries. When it comes to dealing with urban streets, in the simplest sense they can be described as two scales of the same broad activity.

Similarly, the architects, urban designers and landscape architects I spoke to tended to relate that they felt there was a great deal of common language, shared concepts, and areas of interest between these disciplines. Indeed, some of the practitioners I spoke with had trained as architects but now specialised in urban design, whilst some were trained landscape architects who specialised as urban designers working primarily on urban streets. In this sense it appears fair to say all three of what I will call in this context the 'design professions' are, in dealing with urban streets, effectively practising urban design.

Self-image

"If I say I'm an engineer a lot of people will assume that I come with a fixed set of views"
(Traffic Engineer and Transport Planner)

I was struck by the reluctance of many of those I spoke with who had a training and professional background in traffic engineering to apply the label of 'traffic engineer' to themselves or the work they do. In fact, most of those I spoke to who had a grounding in engineering did not use this label to describe themselves, more than anything else noting it was unhelpfully limiting in describing their work. Even in the one case where the label was used without hesitation there was some level of admission that doing so was in a sense deliberately cutting against the grain and represented something close to an act of protest against the continued diminishing of traffic engineering as a profession.

Interestingly, amongst all of these people, including those who no longer used this label to describe themselves, there was a common acknowledgment that the criticism engineering had endured from other built environment professions was in some significant part unfair. Whilst there was acceptance and acknowledgement that traffic engineering had been constructed and practised in a narrow and often inflexible way, its way of thinking and professional expertise were seen as both useful and necessary, even within a 'reformed'

paradigm for urban streets. A corollary of this was a frustration that its practitioners are often unfairly caricatured, despite acknowledging that 'traditional' or 'unreconstructed' traffic engineering was a barrier to developing good streets. It was stressed in these cases that the other built environment professions also have significant limitations in their understanding, it is just less common for these to be subject to the kinds of criticism engineers seem commonly to receive.

"If I say I'm a traffic engineer I get blamed for everything"

(Traffic Engineer and Transport Planner)

Most often, perhaps looking to connote a wider appreciation of the complexities needed for good street design, many of those with a background in engineering had added 'urban designer' to their professional description. In general, there is a discernible and seemingly widely held feeling that urban design is in a simple sense more fashionable, with its practitioners seen as more urbane and perhaps sophisticated than a mere transport engineer or planner. Those who I spoke with from a transport background who had gone on to study urban design, often mid-career, in one way or another tended to emphasise both the relative broadness of urban design's considerations and subsequently the sense that it dealt with the issues of urban streets, and the wider city itself, in a more holistic way - a transport and mobility specialism allowed you to deal with just one, albeit important, aspect of the street itself and the wider city's functioning.

I was struck by how many more people I came across who had a background or training in engineering or transport planning who had subsequently, formally or informally, studied urban design than those who had done the opposite. Those few who had undergone training or learning in the opposite direction tended to speak of engineering and transport considerations as something it was *necessary* to know, particularly if you wanted to challenge the engineering or transport planning orthodoxies underpinning the design of streets. This contrasted starkly with the accounts of transport professionals who had undergone learning in the opposite direction who were much more positive in their descriptions of the adoption of urban design into their own professional body of knowledge, described generally as a widening of focus and the acknowledgement of greater complexity in what was being considered at the street level.

First things first

"It depends what you mean by design, I mean engineers should be capable of dealing with numbers but they're not necessarily capable with the subtleties of appearance"

(Traffic Engineer)

In speaking with many practitioners with a background and grounding in highway engineering, it was noted often that a lack of creativity on the part of the engineer, or even a lack of sensitivity to the non-highway aspects of streets, should not necessarily come as a surprise. It was raised as an important point that engineers, in essence, are simply not taught to 'design', at least not in the sense it may commonly be understood. Whilst everyone had heard the criticism that engineers are more likely to look something up in a design handbook and apply it, and it was widely accepted that this was no untrue, it is important to understand

that unlike the design professionals I spoke with, they are neither trained nor are they necessarily naturally inclined towards designing the street as a polyvalent space from a metaphorical blank sheet of paper.

This highlighted a criticism, or at least a limitation, of current guidance. Almost all of those with a close understanding of how engineers think, by which I mean practising engineers or those trained as engineers, were in agreement that recent attempts to develop a new professional culture within traffic engineering did not run with the grain of how engineers are taught to think. It is worth noting that I did speak with more than one person involved in the writing of *Manual for Streets* (DfT, 2007) and these all pointed out that a conscious decision was made not to provide ready-made solutions, but to ask engineers tasked with street design to apply context-led, creative and flexible thinking. Amongst these, however, as well as amongst a wider group of those I spoke with, there was a feeling that future guidance might, and indeed should, adapt its approach to be more tangible or even prescriptive.

"I always start with where are the trees going to go"

(Landscape Architect)

Perhaps superficially an unsurprising response for a landscape architect, but one given with a completely rational explanation – this is simply the element of streets which is the most sensitive to constraints. Yet, that this was not an answer elicited from anybody else emphasises there are still quite different priorities and ways of working particularly between, but also within, the built environment professions. More than one of those designers I spoke to with a professional grounding in architecture spoke of working in a broad sense from the buildings inwards. Similarly, urban designers often spoke of thinking first of the land-uses and the kinds of activities these might generate before moving inwards towards what might be possible or necessary in the street or the carriageway itself. Interestingly, when those with an engineering background spoke of not going straight to traffic flow and the demands of vehicle movement through the street, it was as something of a deliberate point of correction, something learned along the way and not from the traffic engineers 'handbook'.

It was quite common that though no-one spoke specifically of adopting a specific technique from urban design's classic works, many of those urban designers I spoke to were informed by observation of pedestrian behaviours on the street. One urban designer and landscape architect recalled noting local workers eating their lunch at a bus stop as it constituted the only existing seating on the street, which informed the prioritisation of this as an issue to be remedied, whilst another urban designer spoke of more formally mapping and producing sketched diagrams of pedestrian movements and stopping points. In terms of defining aims, in many cases urban designers spoke of making streets and the associated public spaces along them more inviting, more people-oriented or even more pleasurable. It was striking that levels of use were cautioned against as a measurement by many designers I spoke to, who emphasised the importance of the quality of experience for those using the street. This is to say that in some cases when asked if the expectation was a generation of more pedestrian users, or more 'staying' activity on the street, this was resisted.

Measuring success

"There is a conflict to designing streets full stop."

(Traffic Engineer)

Those with backgrounds in transport planning or traffic engineering were much less reluctant to deal in quantifiable tests of one kind or another, and in many respects it was noticeable how much quicker those from these backgrounds were happy to target more or less of one type of behaviour of another as a component outcome of a redesign. What was more noticeable than this however was the greater emphasis amongst those I spoke to with a professional specialism in transport to conceptualise street design as a trade-off or a compromise made between competing user groups.

Figure 5: The Healthy Streets Indicators (Saunders, 2017)

The Healthy Streets indicators were broadly welcomed by the designers I spoke to, with it generally being felt they captured the most important qualities of good streets. One person interviewed referred to these characteristics as "just good urban design" whilst another suggested they simply formalised or re-packaged design concerns they had been pursuing long before their adoption by TfL. It seems significant that these indicators have been praised for their "extremely valuable plain-language" (Parkin, 2018) with an associated checklist which makes its qualitative categories in some way quantifiable. Lingering doubts from some transport professionals that this approach to street design may fail to adequately address the strategic transport functions were, however, noted.

"Transport should not lead any kind of vision for anything"

(Traffic Engineer)

It was noticeable how often architects and urban designers spoke of one outcome that drove design being in some sense to highlight, or make a more prominent feature of, a specific building or other architectural elements of the street. In one specific case it was seen as a key success that a chapel on a stretch of high street had its prominence raised in a re-design, attempting consciously to develop the *imageability* of the street (see figure 4). In more than one instance interviewees referred to the "latent" qualities of the street, which along with the existing users and patterns of use, may amount to its overall potential. One interviewee was very explicit in this, arguing that investment should be targeted at the streets with the most latent qualities, in particular high levels of human activity and active frontage, which are only a redesign away from being successful public spaces.

Discussion

It seems clear that the attempts to change the culture of street design have had a significant impact, both amongst those I spoke with, but also as recognised by these practitioners, within their wider professions. The replacement of the traffic-led hierarchy of streets with a wider recognition of their importance as places now appears well-embedded. A widespread approval for the *Healthy Streets* approach, for example, indicates a general acceptance that non-transport considerations deserve serious consideration and some level of parity with the transport role of streets. A close concern for the architectural qualities of the street, as well as the local activity generated by its social and commercial functions was foregrounded across the professions and situates the non-traffic elements of the street in a sense as the most important element guiding its potential.

It was recognised more than once that the underlying aims of urban design are increasingly important for local politicians, because they can be seen as complementary to ambitions of generating economically successful and desirable places to live. This can be particularly true of the redesign of mixed-use streets, noted for their past neglect, which often form the hubs of local communities and are in effect 'high profile' locations. An interesting off-shoot of this suggested by one respondent was that the elevation of importance of 'place' and public realm improvements has been closely associated with the establishment of strong political leadership over an area, particularly in the form of metropolitan mayors.

That the underlying principle of attempting to quantify the qualitative aspects of urban design and 'place' was not objected to may offer hope of further coalescence around a common view of the street. Whether any current approach sufficiently captures the transport role of the street remains a point of contention, yet I was struck by how little disagreement there was on the continued importance of traffic-reduction to urban life, with a common view emerging that this is, more often than not, coterminous with the creation of better urban streets. This in some sense situates 'progressive' transport planning and urban design broadly as allies with shared aims in the redesign of urban streets.

Work being done to broaden the evidence base for space reallocation from motor traffic in busy streets is welcome in this regard. UCL and TfL's recent study which suggested improvements to mixed-use streets made for walking and cycling led to a 216% increase in observations of Gehl's 'optional' and 'social' activities is one such example which situates the

twin-aims of developing sustainable travel and thriving places as harmonious (Carmona *et al.*, 2018).

It seems everybody who engages deeply with the redesign of mixed-use urban streets must reckon with concerns that transcend any one specialism and are perhaps likely, in the course of doing so, to develop an understanding of the limitations of their own professional discipline(s). However, given many of those I spoke with would be recognised as leading experts in this cross-disciplinary area, this may be especially true. It seems significant the extent to which traffic engineering as a profession appears in retreat, with its reputation seemingly damaged and its professional label perceived as carrying unflattering connotations. Though many with a transport specialism did note the limitations of urban design, or the gaps in knowledge of its practitioners, it was sensed that urban design has broadly increased in confidence having undergone a period of greater recognition and acceptance, particularly with regard to urban streets. Despite the continued significance of the concerns of traffic, which is to say, there was clearly recognised to be a continued need for the professional knowledge of transport planning and traffic engineering, there has been a widespread recognition that the effects of traffic engineering's previous dominance over street design in urban areas, and particularly upon mixed-use streets, has been rightly diminished.

Collaboration

Introduction

"*the street is, a priori, a creature of compromise*"

(Greenberg, 1997)

It has been argued that "all successful streets are the product of interdisciplinary effort and specialist expertise"(Davis, 2018). This is a view common to current street design guidance, which tends to emphasise the importance of specialists in public space working alongside professionals in transportation, in support of the shift away from the classification and design of streets as primarily or solely corridors for movement (NACTO, 2016). Given urban mixed-use streets have an array of complex and competing demands upon them, this is perhaps likely to be of central importance in these locations more than anywhere else. That said, the exact form and nature of such a collaboration has not always been clearly laid out. Given the clear and tangible range of divergent views on street design from across the professions seen previously, it is worth consideration how effectively such collaboration is operating in practice.

Background

The process laid out in by Jones *et al*'s guide to planning and designing streets upon the principles of 'Link' and 'Place' clearly positions two broad professions as separately experts within these two distinct areas. The working outcome is suggested to be that urban planners and urban designers lead on the 'Place' aspects of a street, whilst transport planners and engineers lead on the 'Link' aspects, collaborating within a multi-disciplinary team but with clearly defined roles (Jones, Marshall and Boujenko, 2008). Subsequent technical guidance has tended to be less specific in setting out particular roles and responsibilities for particular specialisms, instead emphasising more simply that a range of skills will be needed to redesign urban streets effectively. Both London's Streetscape Guidance (Transport for London, 2016) and Manual for Streets 2 (CIHT, 2010), for example, emphasise that a range of skills will need to be brought to any redesign of busy urban streets, but avoid laying out any division of roles or prescriptions in terms of which professions or specialisms will need to be included.

The increased emphasis on the need for cross-disciplinary working has in some sense been a response to the perception that the trend over some decades had been towards increasing fragmentation and separation between the built environment professions (Southworth and Ben-Joseph, 2003). There remains a concern, for example, that even a broad 'mongrel' discipline like urban design is being taught without sufficient integration with the larger field of built-environment disciplines with which it necessarily overlaps (Carmona, 2016). It has been suggested that where once there was a "close fit" between engineering and urban design, with a unity of purpose between these two disciplines, a growing dissatisfaction with the traffic-dominated and engineer-led design of urban streets has been increasingly central to urban design's accounts of the need for reform in their design (Hebbert, 2005). This widened divide is reflected in accounts which underline that a greater appreciation of the objectives of those from fellow professions is a necessary precondition to

effective collaboration between disciplines (Giles-Corti, 2006). This may imply that whilst a clear need for the full range of disciplinary knowledge to be brought to bear upon complex streets, an atmosphere naturally conducive to the close collaboration of these experts may be elusive.

Interviews

Shared aims?

The extent to which practitioners were working towards common aims was consistently brought into question in these discussions. Whilst it has been recognised that significant work has been done at the level of guidance and policy, most commonly to imbue traffic engineers with a greater understanding of the non-traffic requirements of streets, how effective this has been remained a fraught question. The lingering influence of practices, standards and rules from obsolete guidance were suggested in many instances to continue to serve as barriers to the open collaboration with other professions. However, what was particularly noted from those with a background in engineering was the feeling that a culture of self-criticism within the profession itself remains lacking. Many I spoke to recalled encounters with non-transport specialists, be they architects or urban designers, which posed fundamental questions they had never previously been confronted with, revealing not just a difference in mindset and understanding, but also a stark difference in professional culture. As it was noted previously that engineers are not taught to *design* in the sense that perhaps comes more naturally to the design professions, they are also not typically immersed in a discursive culture.

This was often related back to the education and early career experiences still having a tendency to train people from all professional backgrounds in a relatively narrow way. Urban designers I spoke with agreed they didn't necessarily feel equipped by any of their studies to understand the complexity or nuances of movement, whilst transport specialists I spoke to often remarked that the bigger picture of the functioning of the city and urban life, which transport should in essence serve, were not sufficiently considered in either their training or early professional experiences. In this way, an understanding of the professional remit of those with whom you were expected to collaborate on urban street schemes was not necessarily portrayed as something ingrained or 'natural' but something developed in the course of experience and in some cases hard-won. That so many of those I spoke with had consciously retrained, either formally or informally, in another discipline was striking in this regard and suggested collaboration and interdisciplinary working needed conscious work on the part of those active in the field of urban streets.

"TFL was so dogmatic about bus priority they were blasting through bus lanes everywhere and I kept thinking to myself there's got to be more than this"

(Traffic Engineer)

Whilst working with those from other disciplines sometimes presented challenges, perhaps more conflict was noted as arising when working with those with a responsibility and interest in only one aspect of the street. The most prominent example mentioned more than once was the inflexibility of those whose primary responsibility was buses, which highlighted that despite a general agreement on the necessity to re-calibrate our busy mixed-use streets

away from the dominance of traffic amongst the designers I spoke to, it was unlikely to be the case that every stakeholder in a scheme was pulling in this direction.

It the specific case of TfL it was suggested the internal culture had changed over the years. Where once the TLRN network of primary routes under their direct control was effectively controlled by engineers, there was now a wider input of professionals of differing backgrounds. Alongside this, policy attempts to elevate considerations of the cultural, economic and social roles of streets have decreased the overall dominance of the engineers' concerns. For those involved in their design, one general theme that came out of my interviews is that the work done in evolving the policy and guidance away from a traffic-centred view of streets has generally contributed to a changing of the environment within which collaboration happens. The perhaps once very commonplace figure of the 'unenlightened' engineer altogether unfamiliar with, or entirely in opposition to the constructs of urban design, is now much more marginal and marginalised. Almost every mention of encounters with those most inflexible or unwilling to deal in the complexity of urban streets portrayed these figures as vestiges of a previous era.

Despite this favourable change in context, it remains the case that open dialogue and an interchange of ideas have significant remaining barriers, the most basic of which, identified in many cases, is the challenge posed by the nature of mixed-use streets themselves. Given there is no single right answer to their design, and any proposal is likely to provide some level of compromise between the array of potentially competing demands placed upon them, simple agreement where everybody's needs are met can be elusive. As such, proper agreement on ways forward required serious consideration of the professional pressures of others, where successful ways forward meant helping others to deal with the 'problems' presented to them and understanding legitimate concerns.

"The worst thing is designers just saying it should be like that because it looks good"
(Architect and Urban Designer)

Frustrations remained that a full understanding of their own intentions had not always seemed to translate on a basic level to those they were working with. It was almost universally agreed upon that each profession had their own nuances of language and their own specialist knowledge or expertise, but that these were most distinct between transport professionals and those from the design professions. Thus, architects and urban designers speak very closely related languages, as might transport planners and engineers, but a meeting of these two broad categories of professional was more challenging. In speaking with one architect and urban designer they described initial meetings with the transport consultants on a job as like being on two distinct planets. This positions the practitioner not just as having to argue or convince for a specific measure of element of a design, but often feeling they had to explain their position and its essential rationale.

Dealing with disagreement

There remain significant differences in perspective, aspirations and responsibilities between professionals engaged in the redesign of urban streets, so it may be unsurprising that disagreement was a salient theme. This was particularly noted *between* rather than

within professions, where barriers in language and a lack of common understanding as to the intentions and requirements of the other present obstacles. One dominant theme from these conversations, was a sense that in these scenarios of disagreement the transport professional was very often likely to emerge 'victorious'.

"There is no point urban designers saying it's a black box; they have got to prove it is a black box"

(Traffic Engineer and Urban Designer)

More than one design professional I spoke to remarked on the seeming impenetrability of traffic modelling, or the continued insistence upon seemingly impenetrable, inflexible or dogmatic numerical and geometrical principles as examples of the continued barriers put up by traffic engineering. However, it was generally recognised that the considerations of traffic capacity, or the loading and servicing needs of shops and businesses, rightly continue to carry significant weight, particularly with scheme funders like local transport authorities, and are something that cannot simply be wished away.

It was frequently identified that urban designers often fall into the trap of making objections which appear to be in some way cosmetic, which can be unconvincing. In one example a specific disagreement over a corner radius was won, in one traffic engineer's account, because they had the ability to test them. This was related in part to the earlier observation that urban designers, perhaps by nature, tended to look to work from precedent rather than a 'rule book'. One experienced traffic engineer I spoke with recalled architects and urban designers referring in specific instances to streets they had seen elsewhere, often internationally, as justification for an approach, without understanding the constraints specific to the particular context.

More than one transport planner I spoke with noted that in their experience architects in particular were averse to dealing with the numerical data presented to them by transport professionals, not least because it's "not cool". One traffic engineer related continued frustrations in working with a noted architect who had told them on multiple occasions that "once you've got into the numbers you've lost the argument". Yet it was commonly argued that developing an understanding of requirements of movement generally, and the nuances of specific modes of travel, was a useful and necessary task for urban designers with a particular interest in streets to consciously develop, and this this involved some understanding of the principles of traffic engineering and their numerical expressions. For those practitioners with a grounding in both urban design and transport, which accounted for many of the people I spoke to, having developed an understanding of both worlds was seen as important in navigating disagreement.

There was a conscious recognition from virtually everyone that they would speak differently to a traffic engineer than they would to an architect. One urban designer I spoke to, who had collaborated very closely with a traffic engineer on a 'shared space' treatment of a busy high street, recalled the crucial importance of having that engineer argue for the scheme with the local highways team. A close understanding of their requirements and body of knowledge made it much easier to justify the decisions made in the scheme's design. Similarly, those who work in interdisciplinary companies had a benefit to draw upon in this

regard, with the possibility to refer specific elements to a friendly specialist, thereby constructing a more robust case for an overall design.

Ways of working together

"Even if you have the right solution, it doesn't mean anything unless you can get it across"
(Transport Planner and Traffic Engineer)

From many of the urban designers I spoke to, there was a feeling that the natural order of things, or at least the most favourable to the purposes of making urban streets vibrant public spaces, might be that traffic engineering's rightful place is in a sense *beneath* the physical design. That engineering exercises and expertise were required at least to provide an evidenced way forward at the outset was uncontroversial, but it was generally seen as ideal that proper consideration and understanding of the potential traffic impacts on a wider area happened first. This would leave an envelope of options in terms of road space allocation, and effectively a set of constraints within which detailed design could happen.

Where tensions were much more commonly developed was in engineers particularly, but also transport professionals more generally, critiquing or trying to reject or adapt elements of the physical design at a later stage. This revealed a continued frustration with the typical process of a street redesign scheme for many of the street designers I spoke to, from the full range of backgrounds, that their involvement tended not to follow through the construction phase, resulting in details being lost or compromised by site contractors or overseeing engineers. In some cases, working 'collaboratively' was actually framed in practice as 'picking your battles', and it was stressed in any case that prioritisation of elements of any design was an important skill to navigating through the competing priorities put upon them from multiple stakeholders. present.

Working with the same people over a period of time was almost universally recognised as a benefit, with multiple urban designers stressing that their collaboration with a specific transport consultancy had strengthened over time as a mutual understanding and trust had developed. In these cases, a clear division of labour of the type envisioned in 'Link' and 'Place' seemed to be generally established whereby a transport consultancy dealt with the practicalities of the traffic elements of the street and designers concentrated upon the pedestrian spaces and the associated public realm elements.

Working in the same room

Truly multidisciplinary firms, which incorporate specialists in urban design and transport within the same team, or better still, in the same room, are recognised as something of a rarity. Yet a handful of those I spoke with did work in such conditions. In these cases, the division of labour was much less sharply made upon the grounds of a particular specialism, with those working on redesigning urban streets attempting to consider and design them in the round. In these cases, it was clearly seen to be a strength when it came to designing mixed-use and busy urban streets that something approaching the full range of specialist knowledge was available and a range of perspectives could be drawn upon to inform any design.

"Where are all the public spaces? Where are all the trees?"

(Landscape Architect)

One landscape architect I spoke to who worked in such an environment was emphatic, however, that even though collaboration between practitioners of varying backgrounds and a constant process of discussion characterised their working environment, real differences of perspective remained. As such, every street redesign which is intended to proceed to construction would pass through them and they would add things that typically traffic engineers had omitted. In turn, any scheme designed by the landscape architect would be put to the traffic engineers to get signalised junctions correct. Others I spoke to who worked in similar environments similarly characterised them as places of constant disagreement and debate - rather than places where the distinctions between disciplines had been entirely transcended.

It was suggested in any case that the most common working environment today for those practising the built environment professions represented in this study, was possibly more siloed than ever. Many of those I spoke with raised it as a barrier to a broadening of perspective for professionals, and the close collaboration between specialisms in practise, that the large consultancies and corporates are not set-up with interdisciplinary teams. Allied to this it was suggested there is a danger that young professionals are also being trained in in a single discipline with a relatively narrow focus. The sense that this is exacerbated by a working environment whereby everybody working closely together on the same projects, in the same room is the exception rather than the norm, makes the close collaboration between professions harder rather than easier.

Discussion

A greater appreciation of the complexity of mixed streets has potentially positioned collaboration between professions in a more favourable light. Yet the continued differences in language, ways of working and competing priorities continue to present barriers to the idealised collaboration that typify the recommendations of guidance. It was striking how common a theme fundamental disagreement was, emphasising that a clear acknowledgment of the importance of every specialism and its conceptions and preoccupations remains wanting. In this regard, the continued absence of an agreed protocol with a clear division of responsibilities may present something of a barrier to effective collaboration. That so many of those I spoke with highlighted the importance of working repeatedly with the same collaborators, where a clear understanding of the other's remit and processes was established, may suggest more work in developing guidance in this area might be beneficial.

Even those in multidisciplinary environments, who were quick to identify the benefits of the constant interchange of ideas and learning that characterise their workplaces, still appear to rely upon the specialist knowledge of colleagues. This perhaps suggests that whilst close collaboration is beneficial and productive in developing a more multi-faceted approach, the ideal *urbanist* in the context of street design may still be a rare bird. Even the practitioners I spoke to with a strong specialism in the design of streets still recognised themselves as having a partial view, and that their working process benefited from the input of practitioners from other disciplines. This may suggest collaborative working is something of fundamental importance to developing holistic designs predicated upon a fully-formed and multifaceted

view of the street and the best methodology towards their design is an iterative and discursive one.

Despite the increased importance now placed upon the non-transport functions of mixed-use streets, it was a recurring theme that a developed knowledge of the methodologies behind transport planning and traffic engineering were an important asset to anyone working in the field of streets. For those with a primary specialism in urban design, this was not just important to developing a thorough understanding of mixed-use streets, but also to be also to advocate properly with all parties for any proposed solution. This was necessarily because it was seen as in the nature of complex streets that functions necessarily intersect and indeed compete for space and resources. This casts doubt upon any proposed working process that relies upon the separation of responsibilities between professions, given disagreement was so often emergent in the areas where the interests of professionals overlapped or intersected.

Whilst an elevation of the importance of 'place' in the broadest terms has given urban design a strong foothold in street design generally, the needs of traffic and transportation continue to benefit from the historic importance placed upon them. This is particularly apparent through the continued weight given to now well-developed traffic models and transport appraisal which allow the measurement of impacts and benefits of any intervention. That such work on the economic benefits of public realm improvement is relatively nascent and underdeveloped has made the considerations of urban designers to mixed-use streets harder to justify. It is notable in this regard that attempts to quantify the characteristics of urban design and 'place', to perhaps give them more policy weight, was widely welcomed by the urban designers I spoke with, with the *Healthy Streets* approach and its associated methodologies being a key example. As it is, the collaboration between professions was quite commonly identified as one typified by imbalances of power between parties and not insignificant disagreement over what should be prioritised.

Integration or Separation

Introduction

The extent to which the planning and design of streets should look to separate users and functions is a question with a long and sometimes fraught history. Attempts to separate, by varying degrees, the networks for traffic and pedestrians, or places of high activity from places of significant movement, have been a recurring response to the challenge of accommodating motor traffic. Yet the influence of both material and theoretical attempts to do so continue to influence the philosophy and practice of the design of streets today. In particular the theme of the perceived failures of modernist planning are an enduring one throughout the urban design literature.

Background

Modernism and Separation

There is no figure who is seen to epitomise the spirit of modernist planning more fully than Le Corbusier whose antipathy towards streets, and especially mixed-use streets, are well-known and much discussed (Marshall, 2004; Mehta, 2013; Hass-Klau, 2014). What typified his approach was a wholesale rejection of the historic layout of the city and its associated mixing of functions, in favour of a rational separation of living, working and leisure facilitated by a clear hierarchy of channels of movement to enable expeditious movement between these spheres of life (Marshall, 2004). In this modernist vision, a thoroughgoing separation of the traffic and pedestrian networks was argued for in large part as a mutually beneficial solution to enabling the free unimpeded flow of the other (Hass-Klau, 2014).

Though often positioned as the most influential voice for separation between traffic and pedestrians in the British context, *Traffic in Towns* (Ministry of Transport, 1963) only favoured complete segregation in conditions where there are high densities of both. In conditions where traffic speed or volume are low, mixing is largely deemed an acceptable situation. Yet it has been raised as a longstanding issue that the 'rooms and corridors' analogy that underpinned Buchanan's conception of proper traffic management was unable to deal adequately with the mixed-use urban streets that play a key role as both (Marshall, 2004; Jones, Marshall and Boujenko, 2008).

In any case, the historic street patterns of urban areas in Britain have largely been understood as a barrier to the implementation of separate networks for vehicles and traffic. As a result, redesigns made upon the general principle of implementing a traffic-led hierarchy of streets have manifested in busy streets being configured in such a way that a compromise is struck. The competing priorities of efficient vehicular movement and an acceptable environment have in effect been traded off, within constrained conditions, resulting in "an incongruous patchwork of standard and non-standard roadspace" (Hebbert, 2005).

"One of the most venerated of planning concepts has been the separation of vehicular from pedestrian traffic. And for whose benefit has this been? Vehicles."

(William H. Whyte, 1988)

The perceived failures of the grand plans of modernism, where implemented, to adequately address the needs of the pedestrian have informed much of the current mainstream of urban design, and much of contemporary thinking on how streets should be configured. Jan Gehl's study of the Danish suburb of Albertslund (Gehl, 1969 in Gehl and Svarre, 2013), for example, came to conclude that modernist systems of separation failed on their own terms. Though the separate network for pedestrians may have been safe, pedestrians opted to take unauthorised shortcuts across the traffic system for reasons of directness. A similar theme is central to Allan Jacobs' *Great Streets* (1993) which argues that many of the most well-loved well-used urban streets carry high levels of pedestrian and high levels of traffic flows harmoniously. That they are 'unconventional' by modern standards, and contrary to the principles of modernist planning, is taken to demonstrate the inadequacy of the highway rule books and manuals in allowing the creation, or indeed re-creation, of multifaceted and beautiful streets.

Shared Space

Perhaps the most radical rejection of the principle of the separation of motor traffic and pedestrian movement have come from advocates of 'shared space' approaches to street design. This is most commonly traced back to the Dutch traffic engineer Hans Monderman, whose experiments with removing traffic signals, road markings and in some cases the delineation between the pedestrian and vehicular zones altogether attracted international attention (Vanderbilt, 2008). These designs were informed by longer-standing Dutch experience developing *woonerven*, where low-traffic residential streets are designed as public realm first, using landscaping to physically limit vehicular speeds and emphasising cars are 'guests' in the street environment (Biddulph, 2012).

Monderman himself emphasised the uneasy meeting of two worlds. The 'traffic world' - standardized and characterised by homogeneity and predictability and designed to be legible to the motorist as speed, and the 'social world' - where interaction is expected and an appreciation of the wider environment, including the architectural elements of the street are all seen as important components to influencing behaviour (Vanderbilt, 2008). In the British context Monderman's ideas were most vigorously picked up by Ben Hamilton-Bailie, an architect who became something of a campaigner for the widespread applicability of the principles developed by Monderman, as well as a designer of noted ground-breaking shared space schemes which applied the philosophy in England. Taking up Monderman's idea of the two conceptual worlds, Hamilton-Bailie stressed the importance of signalling to the driver they were to be transitioning into the 'social zone' with a clear visual change provided by visual 'entry gateways' (Hamilton-Baillie, 2008).

Hamilton-Bailie's writings on the principles of 'shared space' tended to foreground their psychological aspects, and particularly an interpretation of risk compensation theory which suggested clear delineation of the traffic zone in some sense desensitized the driver to their surroundings (Hamilton-Baillie, 2004; Hamilton-Baillie and Jones, 2005). This general concept was perhaps best summarised by Whitby:

"The central idea is that traffic behaviour is improved by removing the rules rather than by enforcing them ever more strictly. Where roads are predictable and pedestrians fenced-off

with crash barriers, people are tempted to excess, but when the reverse is true and when roads become unpredictable and with no particular place allocated to pedestrians, people drive in an altogether different way." (Whitby, 2002)

How widely such concepts can be applied has been contested, with the CIHT review of shared space *Creating better streets…* (CIHT, 2018) representing an important attempt to introduce more precise language to the discussion, by categorising applications of these principles in practice into more closely defined typologies. A useful distinction was made here between 'pedestrian prioritised' streets, where the full width of road space looks and feels like a pedestrian zone, and what it called 'informal streets' (e.g. Poynton – figure 6), where there is some differentiation between footway and carriageway zones, either with a change of material or a (usually small) change in level.

Figure 6: Poynton (Hamilton-Bailie, 2020)

One of Ben Hamilton-Bailie's most famous redesign schemes at Poynton. Exemplifying what he called the "integration of traffic into the public realm" (Hamilton-Baillie, 2008), the space for traffic is designed with the use of non-standard highway materials and the removal of 'standard' traffic control systems such as traffic lights and give-way markings. Colin J Davis', another architect by background, highlights this scheme as the apotheosis of good street design, arguing that its brilliance lay in the bringing together of three essential elements: its efficiency at moving traffic, its improvement of the pedestrian environment, and how aesthetically pleasing it is. The latter consideration is seen to be met particularly by how thoroughly it has removed what he calls the "usual depressing clutter" associated with busy junctions (Davis, 2018).

A later Government 'pause' on shared space schemes, which it applied only to all treatments with a level surface between footway and carriageway on streets with significant levels of motor traffic (DfT, 2018), has cast further doubt upon the their future. This was seen as in large part a reaction to the concerns of disability groups, especially representing the blind and partially sighted, though concerns clearly remain around the lack of precise definitions as to what constitutes 'shared space' (Ibbetson, 2018).

Decluttering

Despite this ongoing uncertainty around the appropriateness of a complete unification of the pedestrian and vehicular 'zones' of busy streets, the general principle of simplifying the streetscape and removing *unnecessary* or redundant traffic-related furniture of all kinds, commonly referred to as 'decluttering' has become a key theme of recent guidance. In particular, it has been increasingly argued that the removal of 'clutter' serves the purposes of effective traffic management, lowering the speed of traffic and increasing the attentiveness of drivers, as well as contributing positively to the streetscape (DfT, 2008). In TfL's *Better Streets* documents this impetus to take away traffic-oriented equipment has been formulated by asking designers to adopt the principle of "the presumption of removal" unless a clear reason for retention is given (TfL, 2010; TfL, 2017)

Insights from studies which have in a sense taken on the conventions of traffic engineering on their own terms, especially as necessary safety measures, have supported this tendency. Two key examples are Silcock *et al's* study (1999) revealing that removing or reducing pedestrian activity and active frontages from the street elicited speed from drivers, and TfL's report into pedestrian guard railing which suggested there was actually a safety benefit to be derived from its removal (Street Behaviour, 2017). A conclusion to be drawn from both was that the re-integration of pedestrian activity into the street had a civilising effect on driver behaviour.

Interviews

Less is more?

"[Engineering is] science and it's a way of thinking - its either right or its wrong… you always add, you add factors of safety in, you make things more safe by adding things in, whereas in urban design you realise if in doubt, leave a bit out, you make things tighter, make things smaller, that's the human scale"

(Engineer and Urban Designer)

The mainstreaming of the impetus to look to reduce unnecessary clutter and consolidate existing materials, or simplify the streetscape more generally, was clear. Whilst speaking of specific redesign schemes they had been involved with, it was notable that all the practitioners I spoke with emphasised the importance of removing hostile elements to the pedestrian environment as part of the process, and none was more universally disliked than pedestrian guard-railing. This does show a changing context for urban streets, as one urban designer I spoke with noted how this consensus had not always been there - its inclusion in situations of high potential interaction between pedestrian and vehicles having once been commonplace and a longstanding frustration.

Though the removal of 'clutter' was something of a common aim amongst those I spoke with, it was recognised that the impetus to simplify the streetscape through the reduction of undesirable items was traded off against practical considerations, chief amongst them cost, but also perhaps the *perceived* safety implications of a later road safety audit. Whilst a thoroughly 'decluttered' streetscape might have aesthetic and practical benefits, not least the removal of obstacles to pedestrian movement, as one designer I spoke to stressed, this might well be money better invested in 'useful' things like street trees or benches. It was hugely common amongst urban designers and landscape architects I spoke with to recount their frustrations with the difficulties they had experiencing in introducing human-scale elements into the streetscape. New seating, rainwater gardens and other form of SUDs (sustainable urban drainage), or pedestrian scale lighting, were all highlighted as elements commonly 'designed-out' of street schemes and are recognised as difficult to deliver.

It was very noticeable how many of those I spoke to saw a reduction of traffic as helpful to the implementation of a less visually busy street environment. The reduction of traffic lanes and the reduction of parking or loading requirements, were both in specific instances flagged up as first steps in simplifying the street as a whole. It was noted by one engineer I spoke with that this may not necessarily be surprising, given that the tendency for traffic elements to be added into street was often in part a reaction to the perceived requirements of traffic.

Figure 7:Artists impression of a redesigned Bond Street in London (Publica, 2019)

If the artist's impression of a street redesign represents its idealised and uncompromised form, it was noticeable how often these were entirely free from vehicles, or at least severely traffic reduced. A prevalence of Gehl's 'optional' and 'social' activities are apparent in this visualisation from *Publica*, an urban design studio in London. If there is 'travel' here it seems nobody is rushing. Notably, the level surface envisaged, without clear distinction between carriageway and footway, was not realised.

Limitations of shared space

The CIHT report on shared space (CIHT, 2018) and the subsequent 'pause' (DfT, 2018) on new shared space schemes were both often mentioned, with more than one practitioner I spoke with drawing a direct link between the adaptation or removal of 'shared space' elements in schemes they were in the process of developing and this changed political context. The issue of accessibility, particularly for the blind and partially sighted, was a real concern that had significantly influenced the thinking of designers with regards to the appropriateness of 'shared space' approaches to busy mixed-use streets.

However, nobody dismissed the general principle of level-surface mixed-use streets out of hand and the general sense was that the conversation around street types needed to be more sophisticated and nuanced than the DfT 'pause' perhaps allowed. This criticism was more generally reflected in a reluctance to use the term 'shared space', questioning its

continued usefulness as a term. Whilst many referred directly to the CIHT document and the usefulness of its distinguishing between two key types of 'shared space' treatment, even those that didn't emphasised a need to be more specific in what was being discussed.

Where shared space type treatments seemed generally to have been regarded as most successful were within the 'pedestrian priority' category, particularly within low-speed and low-traffic environments where it was seen as more natural for those on foot to populate the entire width of the street. New Road in Brighton and Frodsham Street in Chester were both pointed to as good examples of appropriate applications of this typology of 'shared space'.

Figure 8: Frodsham Street (McKenna, 2020)

In counterpoint, nobody I spoke to regarded Exhibition Road in Kensington as anything but a failure, though not always for the same reasons, nor always with the same level of criticism. One designer I spoke with, who is something of a specialist in shared space streets in the 'pedestrian priority' typology, suggested that a fundamental problem with the approach taken at Exhibition Road was that it attempted to apply a 'pedestrian priority' design in an environment which conveyed traffic in speeds and volumes that made this unsuitable. Instead, it was argued, the street could have been successful as a shared space scheme in the 'informal street' typology, where more visual distinction would be made between the carriageway and footway elements.

This level of distinction was almost universally regarded as a necessary component of *busy* mixed-use streets. One strong supporter of Ben Hamilton-Bailies's design at Poynton and its principles was keen to argue that it should not be called a 'shared space' scheme, or at least not in the way he considered traffic engineers and DfT to have interpreted the term, because it does delineate between pedestrian and vehicle space. The emphasis here was that

what was done at Poynton was effective because it created a holistic space from building edge to building edge, influencing driver behaviour because it felt enclosed by buildings and unlike a typical road space, but not because it was a zone where pedestrians and vehicles would or should mix freely.

"*shared space is the answer to everything if you're an architect"*

(Traffic Engineer)

One street designer I spoke to with a background in engineering did note that shared space solutions to junctions were most often in their experience proposed by non-transport specialists, for a range of reasons including their appeal as a solution that didn't need a specialist engineer to design, but also their relative modishness. It was noted here, as with others I spoke to, that the problems of traffic and movement are complicated and properly addressed both at the scale of the network and the street in tandem, and could not generally be resolved by design solutions which reframed existing movements within an improved environment.

Driver Behaviour

"The biggest thing I have learnt really is that human beings are not just robots – we don't just behave according to the rules of the road"

(Traffic Engineer and Transport Planner)

Even though the limitations of shared space as an approach to street design were highlighted, there was a common belief that done sensitively, treatments which create non-standard roadspace with 'shared space' elements can positively lower driver speeds and increase both driver awareness and their likelihood and willingness to stop for pedestrians. There was not a singular view, however, on how this is best approached. In one case it was clear that by carrying a continuity of materials from a public square across a minor road, there was an intention to prompt unease upon the part of those driving vehicles as to any priority of users in the space. Another designer was keen to frame this with a quite different emphasis, stressing that in their view shared space schemes of the 'pedestrian priority' typology should clearly resemble, and be experienced as, a pedestrian space. The design therefore makes it clear to the driver that they would be expected to stop for a pedestrian.

It appears to remain the case, despite 'shared space' no longer being a new concept, that the removal of clear delineation between carriageway and footway almost always required the persuasion of third parties who are typically neither sympathetic nor fully cognisant to the broad design principles nor the finer details. The figure of the resident engineer, who generally oversees the construction phase of work, was a common barrier in this regard. Many designers recounted either pressure to revise elements of their design, or elements being effectively designed out without their input at this stage.

Busy streets and pleasant places?

*"*He's wrong. Well, I met Buchanan, I'm not sure he actually said that, but even if he did he's wrong"

(Architect and urban designer)

This response, to my proposition that *Traffic in Towns* (Ministry of Transport, 1963) suggested high quality places and heavily trafficked environments were largely incompatible, was one of a wide range of disparate responses elicited upon this general theme. Though other objections to this premise were raised, it was striking how strong a consensus there was that great streets to spend time in *with* high traffic are the exception rather than the rule. The example of Park Lane in London was highlighted as such a place, along with others including the Champs-Elysees, which though admittedly exceptionally wide, demonstrated that 'high-quality' environments could facilitate high levels of traffic. More common, however, was an acknowledgement that many of street redesign projects had significantly benefited from a reduction in overall motor traffic along them. In the most simple terms it was highlighted that reductions and removal of traffic made the task of the designer easier, both in opening up space, but also in improving the local environmental conditions for non-traffic activities to flourish.

Discussion

A car-reduced city (is something to be)

In specific examples, as well as upon the wider principle, the re-integration of the streets uses and users and a reduction in traffic speed and volume were often seen as coterminous. As noted earlier in this report, often it was seen as the rightful position of transport planners and engineers in street design to work in some sense below the design level, setting the parameters of traffic or even pedestrian flow. Here it is worth noting how at this pre-design stage to enable the reduction, removal or even simplification of traffic movements were all seen as widening the envelope of design options for improvements in the public realm elements of streets, as well as facilitating greater integration between the traffic and non-traffic elements of the street itself.

This situates attempts in the twentieth century to provide stark separation between pedestrians and traffic as not just a mistake of design, though it was noted that design elements which emphasise the traffic-centred view of the street were likely to exacerbate its dominance, but rather as a corollary of the overall levels of traffic. If the grade-separated pedestrian foot tunnel or elevated walkway have become the 'icons' of modernist-inspired attempts to separate pedestrian and motor traffic, or the blank distributor road the quintessential outworking of the principles of a strict separation of primary routes for traffic from the 'rooms' for living implied in *Traffic in Towns* (Ministry of Transport, 1963), increasingly the reintegration of the various functions of the street seem to be bound up with a shift away from the car as the primary means of accessing or travelling through the city.

'Peak' shared-space has passed?

The underlying idea behind Exhibition Road, that perhaps in Buchanan's metaphor a grand street could simultaneously serve as both a "room" and a "corridor", has been severely tested. Though not everyone rejects the idea high levels of traffic and good places for human-scale street activities can be combined, everybody I spoke to at least agrees this is significantly more challenging than on lower-trafficked streets. Despite a widespread recognition of the

potential for street improvements through designs which apply elements of 'shared space', differences of opinion as to what messages were, or indeed should be, communicated to drivers suggested a continued vagueness as to the psychological precepts underpinning its application.

This presents something of a contrast to the central focus of the proponents of shared space, whose focus has tended to be not upon a reduction of car-use, but in (re)designing streets in such a way as to make the nature of traffic itself more harmonious with the streets other functions. Though 'shared space' has been a much discussed and debated topic, these conversations, as well as a shift in the focus of the wider street design literature, may suggest that it is one whose moment of greatest interest and allure has passed. A large part of its appeal seems to have laid in how starkly it inverted the modernist paradigm of clear separation between modes and priority for motor traffic, as well as the personal charisma of its most famous British champion Ben Hamilton-Bailie, to whom many referred unprompted as hugely influential in its rise to prominence. Yet the limitations often its applicability and potential impact have appeared to sharpen in focus whilst important questions around accessibility linger.

Decluttering is here to stay

A general agreement on the benefits of simplifying the streetscape where possible, with a particular focus on minimising the traffic-specific elements of mixed-use streets, was apparent. It is worth noting, however, that a recurring theme of these discussions were the lamentations of elements unrelated to the movement of people or goods 'lost' in the design process. Ongoing frustrations at the enduring barriers to delivering trees, rainwater gardens, benches were noted by many designers I spoke with, most often due to concerns around ongoing maintenance costs, or potential damage to buildings. This might raise an important distinction, that the urge towards the removal of 'clutter' tends to apply only to *undesirable,* and especially traffic-oriented, objects. Whilst the removal of these materials has a clear visual or aesthetic element, it does not in itself demonstrate a dominant preference towards a sterile or 'empty' streetscape.

Dealing with Cycling

Introduction:

Recent DfT guidance has been emphatic that evidence from the UK and abroad demonstrates that physically protected cycle tracks on main roads and through junctions are "the most important thing we can do to promote cycle use" (DfT, 2020). The recent announcement of the creation of Active Travel England, a new inspectorate which is tasked with the enforcement of cycle design standards laid out in Local Transport note 01/20 (DfT, 2020), perhaps demonstrates a new seriousness of purpose in reallocating road space towards cycling facilities.

These recent developments build upon the increased prominence cycling has taken in the transport policy of various cities in the UK, and particularly in London where nascent but significant steps have been taken to develop physically protected cycling facilities, and emerge within a wider context where the idea that separation for cycling is the way forward for busy streets has been increasingly dominant internationally (Pucher and Buehler, 2012). For those practising in the design of busy streets, providing space for this additional category of movement is perhaps becoming a more pressing concern, and potentially challenges a binary view as to the division of space being between traffic and non-traffic realms.

Background:

Despite increased focus upon the importance of increasing the efficiency and economic performance of mixed-use streets, a role for protected cycling routes has not always been obvious. In TfL's two overviews of completed street transformation schemes, *Better Streets Delivered 1 and 2* (TfL, 2010, 2017), for example, only two out of the fifty-four street improvement schemes identified included the provision of protected space for cycling, whilst one other actually involved the removal of protected cycle lanes.

It has generally been the case that studies looking to evidence the positive role cycle infrastructure may have in developing both rates of cycling, but in turn also improving the liveability, sustainability or public health of cities, have tended to focus upon the experiences of countries with the highest rates of cycle use (Handy *et al,* 2012; Carstensen and Ebert, 2012). Distilled in the simplest terms the most important lessons from the Netherlands, Germany and Denmark have been taken to be that making cycling safe and convenient means providing separate cycling facilities along roads and through intersections where heavy levels of motorised traffic are present, complemented by extensive traffic calming of neighbourhood streets (Pucher and Buehler, 2008). Such is the level of agreement on the broad measures needed to raise rates of urban cycling in the transport literature that it has been suggested further research, in policy and practical terms, is largely redundant (Nello-Deakin, 2020).

Whilst this is something of a deliberate provocation, the underlying point is that cycling research in the transport sphere has tended to deepen and further these conclusions rather than fundamentally challenge them. Hull and Holleran's comparative look at 6 European cities, for example, concluded that those looking to develop cycle infrastructure

had the most to learn from the Dutch, and that physical protection for cycling, especially on busy centre and trunk roads, was a crucial component of designing for increased cycle use (Hull and O'Holleran, 2014). The increased subjective safety that physically protected cycle provision on busy streets may provide has particularly been identified as key to diversifying cycling (Pooley, 2011; Aldred and Dales, 2017), though it is recognised that separation from motor traffic is a common preference across ages and genders (Misra *et al,* 2015).

"When designing for cycle traffic, design that primarily considers the needs of cycle traffic is required. This much should be obvious but does not seem to have been understood"
(Parkin, 2018)

The closer detail of how these elements might be designed, or indeed integrated into the wider streetscape, have generally remained within the purview of specialist cycling-specific literature of one type or another. John Parkin's *Designing for Cycle Traffic* (Parkin, 2018) is one of the most comprehensive guides to designing for cycles and can be seen in the broadest sense as trying to redress the neglect of cycling in conventional traffic engineering as a mode of transportation. Here cycling is clearly, and perhaps self-consciously, approached from the viewpoint of the traffic engineer with the primary considerations being the design speed and level of comfort provided to the cyclist, rather than any integration of cycling facilities into the streetscape or the wider urban realm.

London has distilled its own standards into a fairly comprehensive manual *London Cycling Design Standards* (LCDS) (TfL, 2014), which despite situating consideration for cyclists as a specialist area, stresses that elements for cycling should be part of an integrated and collaborative process which will take account of general street design guidance, including TfL's own *Streetscape Guidance* (TfL, 2016) and *Manual for Streets* 1 and 2 (DfT, 2007; CIHT, 2010). Notably LCDS recommends that all those designing for cycling should themselves experience it on a cycle, a request reflected in new government guidelines aimed at integrating cycling more fully into highways (DfT, 2020), perhaps reflecting a concern that an understanding of the needs of cyclists is not currently commonplace amongst those designing streets.

Urban Design and Cycling:

It has been noted that cycling is largely absent from the many classic texts, as well as the standard textbooks, of urban design (Forsyth and Krizek, 2011; Black and Street, 2014). It has been argued this reflects an ambiguity as to the role of urban design as an area of activity when it comes to cycling (Liu, Krishnamurthy and Wesemael, 2017), with its clear focus on the pedestrian experience of the city, which may itself have in significant part been a response to the (perhaps historical) tendency for city planning and highway engineering to design for motor traffic first (Rowley, 1994). As such, in some sense cycling has been unfortunately stuck somewhere between two poles: the transport professional's domain of managing the movement of motor traffic, and the urban designer's concern with the human scale. It has been described thus as the 'forgotten middle', with the cyclist's range or scale of perception, speed and even perhaps relative mass, stranded somewhere between the realm of motorised traffic and those on foot (Black and Street, 2014). Given cycling's *intermediate* characteristics in this sense it has been argued that responsibility for developing cycle networks should lie

"squarely at the intersection of the domains of transportation planners and urban designers" (Forsyth and Krizek, 2011)

Audit Quality Criteria	Descriptors
Imageability	Capturing attention / sense of place / distinct / memorable / vernacular architecture
Legibility	Spatial understanding and ease of navigation / sense of orientation
Enclosure	Streets / definition through buildings, walls, trees / heights, widths and proportions
Human Scale	Size / articulation of physical elements in relation to humans / building and street detail
Transparency	Degree to which people see and perceive what lies beyond / human activity
Linkage	Physical and visual connection from building to street
Complexity	Visual richness of a place – architectural / landscape / streets / signage / human activity
Coherence	Visual order – consistency in scale, character and arrangement
Tidiness	Condition and cleanliness of a place / well maintained
Cycle Scale	The '*forgotten middle*' – unique characteristics of cyclists – height / speed / skill diversity

Figure 9: 'Urban design audit criteria' in (Black and Street, 2014) adapted from (Ewing et al, 2013)

Attempts to redress the neglect of cycling from within urban design have typically suggested that given cycling has only been dealt with in any sufficient detail by those with a transportation specialism, the needs of the cyclist have only been addressed in a *functional* way. An attempt to apply existing theoretical frameworks, which overwhelmingly describe the experience of the city from the pedestrian viewpoint, in some way to cycling being a common thread through the handful of recent works which have attempted to address cycling from an urban design perspective (Black and Street, 2014; Forsyth and Krizek, 2011; Fellowship, 2018)

Cycling and mixed-use streets:

Projects which integrate dedicated cycling infrastructure along mixed-use streets, especially within a wider re-evaluation of the design of the street altogether (i.e. with cycling not necessarily serving as a scheme's primary impetus) are currently rare in the British context. The Avenues Project in Glasgow (Glasgow, 2018), and Camden's West End Project (Camden, 2020), however, provide two current examples where the development of new cycling infrastructure is consciously being integrated into street redesign schemes which have a broad focus. In Glasgow's Avenues project, for example, cycling facilities developed along many of the city's central mixed-use streets are positioned as one component part of a regeneration project, the focus of which has been on improving economic competitiveness, sustainability and liveability.

It might be suggested, in these contexts particularly, that a broad range of skills and considerations might be required to effective incorporate cycling into multi-functional streets. Given the neglect of cycling within the urban design literature, as well as its relative novelty as a point of focus for transport planners and engineers working in the UK, whether a coherent approach or an agreement on the needs of cyclists has emerged across the professions engaged in street design seems worthy of consideration.

Interviews:

Space for cycling:

"most people want to be on the main roads because they are the quickest way from A to B"
(Traffic Engineer)

In general, the benefits of provision which provides some level of subjective safety for cyclists along busy roads were widely agreed upon. Notably, this relative consensus seems to have been transmitted somewhat diffusely, rather than from one landmark or oft-cited text - in fact nobody cited a specific piece of literature on cycling as influential on their thinking, whereas many referred to influential books on city planning and street design in discussing other aspects of their work. More common than references to literature or theory were international comparisons with high-cycling cities in Northern Europe, though caveated with an appreciation of cultural and spatial differences between the UK's cities and particularly the scale of London.

It was noted more than once that this current consensus, whereby a consideration for protected cycle provision along main roads is reflected in transport policy, the thoughts of designers themselves, and from campaigners and advocates, has been a relatively recent development. In speaking with one designer who had been involved in redesigning a busy London high street around 2008, it was remarked that at that time cycle tracks were not raised as a material consideration, even in meeting with the local branch of the London cycling campaign. Rather, the contemporary orthodoxy had been that improvements in the general environment, lowering the speed of traffic and introducing bus lanes, were sufficient steps in improving conditions for cycling. A handful of experienced practitioners, who have been active in the fields of street design and sustainable transport over decades, referred quite deliberately to what they saw as a growing and now overwhelming body of evidence which supports the development protected space for cycling along busy streets. This general feeling, that over time a once live argument had been settled in favour of those advocating segregation for cycling, was noted elsewhere.

Cycling's benefits (the good…):

Developing cycling-friendly cities was very often spoken about, particularly by non-transport specialists, as complementary to broader aims of healthier, happier and more liveable cities. Everyone I spoke to, without exception, who had a professional interest in London's streets saw the continued progression of a range of measures to continue to both reduce car use and reallocate space from motor traffic as the right way forward, with the enabling of cycling seen to be part of this process. Associated with this was a general agreement that deliberate work to increase rates of cycling is a positive step, even if the execution has not always been an unqualified success.

As an example, one transport academic I spoke to pointed to the development of London's cycle design standards as a landmark in achieving 'good' guidance for the development of cycling, whilst many others I spoke to pointed to particular examples of good practice on specific routes, notably the East-West Blackfriars cycle superhighway (CS3), and the north-south superhighway (CS6), as environments that catered for the needs of cyclists

successfully. However, the extent to which the development of such provision has coalesced into a coherent London 'approach' to developing a cycle network was not agreed. Whilst it was raised particularly that TfL now has an in-house group of designers with a specialism in developing cycle schemes, which should provide a consistency of approach, it was still stressed how isolated and fragmented such examples are. It was recognised by almost everyone I spoke to, however, that in technical terms, London had shown improvement in how it deals with the needs of cyclists. Many of those I spoke emphasised that the detail of what was being developed had progressed since the early days of London's cycle-superhighway programme, which notably was typified by less segregation along busy corridors.

Conflicts with other modes (…the bad…):

Though supporting cycling in the form of dedicated space has widespread acceptance, it was striking how many were prompted to caution against planning or designing with this single objective. An essential problem, raised particularly by one interviewee, is that busy streets almost necessarily have competing demands upon them which dictate that not every mode of travel, nor every user group of use, can have exactly what they want. In those cases where cycling routes have been developed, even when they have been high quality and of significant benefit to new and existing cyclists, it was suggested a fuller appreciation of the wider streetscape and the needs of other modes was not fully developed.

"They are very monocultural in a sense… they never plant any trees, they never put any seats in…"

(Landscape Architect)

It was an aspiration of so many of those I spoke to that the ideal condition for designing mixed-use busy urban streets, however elusive, was to have the remit to deal with the space in a holistic way, considering the range of potential uses and with a balanced and coherent approach. One designer described this task as having a set of necessary components that are thought about simultaneously, but without hierarchy or priority between them. That, in practice, route planning for cycling was approached as a problem to be tackled more-or-less in isolation was raised by many as a shortcoming of how we have developed cycle infrastructure.

Of particular concern is how appropriate current approaches remain in dealing with spaces where the movements of pedestrians and cyclists conflict, with bus stops being the most commonly raised example. The idea being that the priority afforded to the cycle track in these situations either directly elicited, or did not sufficiently discourage, fast moving cycling, and as a result failed to create the right balance between users. This general point was raised often, especially those with a background in the design side, that protected cycle lanes in effect prioritise cycling at the cost to pedestrians where they intersect. This was sometimes suggested to be particularly the case where a change of level was present between footway and cycle track, with the idea that it added more barriers to contend with from a pedestrian perspective expressed more than once. For these reasons and more it was notable that most practitioners were quick to caution against the blanket use of separation

for cycling, with 'bad' examples raised often where the conflicts caused with those on foot was seen to potentially outweigh any benefits for cyclists.

Many of those I spoke to associated potential conflicts with pedestrians, directly or indirectly, to a wider failure to sufficiently deal with the levels of motor traffic still seen in all our major cities. Amongst the great majority of those I spoke to actively designing streets there was a sense that more could and should be done to limit motor traffic in important pedestrian areas, both in city centres, but also in local urban high streets to reduce the conflicts for space. In this sense the question of how to deal with cycling along busy streets was often re-framed as a traffic management problem first, with a simplified and integrated solution preferred where cyclists and pedestrians were able to coexist in a much larger space and segregation was perceived to be unnecessary.

Conflicts with 'Place' (…and the ugly):

"It's populated with bollards and crossovers and signs and in terms of a human experience of walking down that street it's too much"

(Traffic Engineer and Urban Designer)

It was an identified issue that the arrival of protected space for cycling as a policy agenda in recent years was seen, at least by some, to conflict with a longer-term trend toward simplification of streets and the wider attempt to reform highway design towards a greater appreciation of urban design and placemaking. Though many remarked that recent attempts have been less visually intrusive or jarring, with a minimisation of associated 'clutter' and an emphasis on continuity with materials used elsewhere in the street, the potential conflict with 'de-engineering' streets and emphasising their importance as places was apparent.

The task of integrating cycling into busy mixed-use street environments was most commonly portrayed as something best done *sympathetically*, with a conscious regard for other uses and the wider streetscape. Where good examples were cited they were praised as such, for their subtlety and minimalism, and as elements integrated *tidily* as one element within existing public space. Though the failures of some existing infrastructure in this regard were noted, more than one transport-specialist suggested that both the mode-specific overlaying of cycle facilities, as well as perhaps even their unrefined qualities, were growing pains. They had served as either a "necessary corrective" or an inevitably unrefined first step, given how low a priority cycling had been historically and how marginalised protected space for cycling was as a consideration.

Figure 10: A visualisation of one of Greater Manchester's new 'CYCLOPS' junctions (Transport for Greater Manchester, 2019)

Perhaps an example of a "highly engineered" junction, it might be noted that the key innovation of the CYCLOPs junction is its 'neutral' impact on capacity for motor traffic with cyclists and pedestrians sharing a single signal phase (Transport for Greater Manchester, 2019). It was noticeable that many of those interviewed when asked to highlight situations where cycling facilities had been less successful, it was often in situations where they were seen to have added significantly to the visual complexity of the street. Though changing the nature of mobility along streets was highlighted as an important goal by almost everyone interviewed, increasing the overall space for movement along mixed-use streets may be seen in some cases as in conflict with improvements to the environment for *staying* activities.

"Highly engineered junctions are fine, but when you start doing that in the city centre, you generally don't really have the room to do it any, so you have to think of a different solution"
(Landscape Architect)

The potential conflict between providing protected space for cycling and the other uses of a street was consistently raised as most pressing in city centres, where it was suggested the intensity of pressures on street space demand a different approach. More than one person I spoke to proposed the way forward, particularly for the central core of London, lay less in increasing dedicated space for cycling, or even footway widening, but rather in treating the area more like a low-traffic neighbourhood, or indeed what Buchanan may have called an 'environmental area' (Ministry of Transport, 1963). This would mean traffic reduction and the creation of new pedestrian-priority environments, with low-speed cycling generally expected to share spaces with other uses. This was a common theme, suggesting that protected cycle tracks were best targeted to serve primary arterial routes to access the

city, or local centres. Separation of uses was seen to be altogether less appropriate once in the street environments with the highest levels of local movements on foot and staying activities, where greater integration might be a better solution.

Discussion:

Policy leadership:

A shared appreciation of the need for physical protection for cyclists along busy streets, as well as a general appetite for the development of more cycle-specific infrastructure, were relatively common across practitioners I spoke with, from the full range of professional backgrounds. Whilst it seems a recognition of the needs of cycling has in a sense transmitted diffusely, without the charismatic advocates or key pieces of literature that other aspects of street design had benefitted from, it seemed the most crucial element of all was the impact of political leadership.

This may not be surprising, and in fact mirrors accounts of international practice, which have highlighted political leadership as the most important component of developing cycling as a mode of transport (Dales and Jones, 2014). A seriousness of intention to develop a cycling city in London has made designers working here develop a more detailed understanding of cycle infrastructure, whilst attempts at integrating cycling into mixed-use streets that have been developed in effect percolate through the wider professions. It is worth noting here the impact of inter-disciplinary exchange that takes place through fora like the Urban Design Group or the Academy of Urbanism, indeed, many practitioners I spoke to referred to these events and their associated publications in one form or another as points of reference.

That said, the prioritisation of cycling in the transport policy of London, and attempts to develop cycle networks in cities like Birmingham and Manchester, were noted as a relatively recent transformation and perhaps thereby a development with an uncertain future. Whilst it was generally accepted that an integration of cycling facilities into the fabric of cities is right in principle, a weariness as to the changeable feast of transport priorities may sound a note of caution as to the longevity of any cycling-revolution potentially in process.

Making Space:

Particularly in the areas with the most pedestrian activity, it was consistently emphasised that current cycling facilities have a number of drawbacks and need careful consideration as to their appropriateness. Bound up with this is a general discomfort, also noted in the literature, seems to be a feeling that cycling in the UK still has some considerable way to go to becoming ‘mainstream’ (Aldred and Dales, 2017). Cycling behaviours and speeds, perhaps in London particularly, are still often seen as in tension with the aims of urban designers looking to create pedestrian-oriented and human-scale street environments.

Steps to developing what we might call a ‘cycling culture’, whereby cycling is both everyday but, importantly, also conducted in a manner which is more harmonious to other street activities was consistently positioned as about much more than mixed-use street environments themselves. In particular it was highlighted consistently that not enough

priority had been given to measures which reduced traffic in residential streets and develop connectivity for safe cycling on a wider scale. A focus instead on linear routes was often seen as running in tandem with the tendency to potentially follow an 'engineered' solution for cycling, which can add conflict to busy mixed-use streets which already contain the most interactions between modes.

Figure 11: "London Cycling Behaviours Matrix" (Fellowship, 2018)

This attempt to re-apply the concept of movement and place to typologies of cyclist comes from an architect-led report which argues against the development of protected cycling facilities in favour of shared space approaches. What it calls the 'ordered' infrastructure of the Netherlands or Denmark is deemed 'impossible' to apply in London due to its scale and morphology. A running theme is that the perceived certainty dedicated cycle infrastructure provides both encourages high-speed cycling and attracts high-speed cyclists. Whilst its claims and proposed methodologies are unusual, the concern that cycling in London is typified by high-speed commuting, and potentially at odds with creating simplified, beautiful, and 'de-engineered' streets was a concern raised in the interviews conducted towards this report.

A holistic approach:

The importance of integrating any consideration of planning for cycling as thoroughly as possible within a more complete understanding of mixed-use streets was consistently emphasised. In speaking with professionals who had been involved in both the Camden West End Project (Camden, 2020) and the Glasgow Avenues project (Glasgow, 2018) mentioned earlier in this report, it was clear that these approaches ran much more in tune with the aspirations of the professionals themselves than mode-specific planning that dealt only with a limited aspect of the street. Though for practical reasons such scale and ambition may not always be possible, it was palpable that the emergence of protected space for cycling was seen to present the potential for new conflicts between street users. In a sense, a new emphasis on cycling has disrupted the field of street design and asked designers to think more carefully about interactions between transport and urban design, and beyond the binary of walking and traffic. It seemed there was significant appetite amongst those interviewed to embrace this complexity, with clear benefits to the development of cycling in cities accepted by everyone. However, it was suggested that this also required a wider focus at the planning level, as well as further development and refinement of the design approaches taken to providing space for cycling in complex environments, in order to strike the right balance between users.

Conclusions

It is clear that attempts to reconsider urban streets as more than just movement corridors have had significant impact, not least in the evolution of the professional field of street design becoming an increasingly multi-disciplinary concern. The long-term strategy of rebalancing the design of streets to account for their role in the social, economic and cultural life of cities, appears to run with the grain of professional thinking in the field.

Notwithstanding these positive steps taken towards embedding a new paradigm for urban streets, significant barriers to inter-disciplinary working were identified in this study. That these appear particularly acute between transport professionals with a primary interest in the network efficiency for movement, and those practising urban design with a primacy in 'place', suggests fundamental conflicts of professional interest remain. Despite these differences, there was widespread acceptance of the fundamental rationale underpinning guidance and policy which has attempted to bring the concerns of urban design and transport together. This may offer promise for further integration of these two distinct spheres, particularly in the case of mixed-use streets where interests and areas of responsibility clearly overlap significantly.

The ideal model of collaboration perhaps remains to be formulated, yet in the discussions undertaken for this study, as well as in the wider literature, little appetite was evident for further narrowing of professional interests along strict disciplinary lines. Instead the ways forward appear to be in the encouragement and facilitation of greater interplay between disciplines and the rolling-back of specialisation, both in the learning and working environments of those involved in the design of mixed streets.

It was suggested in this report that many of the radical and grand plans which have peppered the history of street design and planning have cast long-shadows, with modern views of the street cast often in opposition to historic practice and theory. An emerging view appears to be one which embraces complexity, pragmatism and compromise, with an acceptance that it is in the nature of existing urban streets that the re-designer is likely to face severe constraints.

It is in this context that integrating new demands upon our streets, even in *old* forms of transport like the bicycle, was situated as a task to be taken with due caution to their existing forms and uses. A salient theme of this research was an appetite for policy to be more forthright in targeting the reduction of car-use in cities and reallocating street space to other users and uses. However, moves towards more sustainable forms of urban living and travelling were generally seen as likely to be most successful where a multi-faceted view of the street, and its full range of users, informed their design.

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