

Article

Mobility Hubs: A Way Out of Car Dependency Through a New Multifunctional Housing Development?

Arvid Krüger and Uwe Altröck *

Department of Urban Regeneration and Planning Theory, University of Kassel, Germany

* Corresponding author (altröck@asl.uni-kassel.de)

Submitted: 26 October 2022 | Accepted: 26 May 2023 | Published: 25 July 2023

Abstract

Today's urban design of new quarters in the fringes of German metropolises shows a renaissance of the garage building as a cluster for car parking. In contrast to the past, parking garages are planned as multifunctional "mobility hubs." Planners enrich them with new mobility and sharing options and incorporate sports or social infrastructure facilities on the roof and the ground floor, thus contributing to vibrant neighborhoods. In contrast to the internationally renowned example of Nordhavn (Copenhagen), we observe a decentralization in the mainstreaming of the approach: Mobility hubs are to become constitutive parts of small subcenters. In this respect, they can be seen as a common leitmotiv for urban design in Germany's metropolises. The hubs form a new model of local mobility, guaranteeing a certain flow of pedestrians and freeing the adjacent streets of car traffic. Integrated into a system of alternative modes of transportation and nearby mass transit, those infrastructural and mobility clusters might contribute to a change in mobility habits and ultimately reduce car dependence. If their underlying mobility policies can be implemented and if they are ultimately more successful than traditional parking garages or even create an incentive not to use private cars at all remains open to further investigation. For this purpose, the article will trace the emergence of mobility hubs in the discourse and practice of urban design with a particular focus on major new developments at the periphery of German cities. It analyzes urban design competitions and the formal planning and implementation following them.

Keywords

car dependency; Germany; housing; mobility hubs; parking; suburbanism

Issue

This article is part of the issue "Car Dependency and Urban Form" edited by Kobe Boussauw (Vrije Universiteit Brussel), Koos Franssen (Vrije Universiteit Brussel / Ghent University), and Enrica Papa (University of Westminster).

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1. Introduction

The following article analyzes the debates around and the planning of decentralized "mobility hubs" in the context of urban development on the periphery of German metropolitan areas. In this context, mobility hubs are essentially understood as a spatial link between overground parking garages, facilities for non-motorized modes of transportation, and other neighborhood-related services. Interestingly they evolve around renewed models of overground parking garages despite the negative experiences that have been made with them in recent decades (McDonald &

Sanders, 2007). Mobility hubs, instead, are considered attractive options for organizing neighborhood-related traffic as they combine regulatory, design, and functional elements of development that promise to make a user-friendly and significant contribution to reducing car dependency in suburbs.

Our disciplinary perspective is urban design from a governance point of view. We do not elaborate, from a transport planning perspective, which modes under which conditions can be shared by whom (Bell, 2019; Rongen et al., 2022; see also CoMoUK, n.d.-a) or which consequences this might have for the modal mix—ideally, fewer cars than before (Czarnetzki & Siek, 2022;

Deffner et al., 2014; Frehn et al., 2019). Certainly, in Germany, especially in its metropolises, we have strong public transport in a global comparison, which serves as a prerequisite for all Germany-centered discourses from a global perspective.

Multimodality and the reorganization of local traffic are playing an increasing role in a desired comprehensive change in mobility behavior (Guth et al., 2012; Libbe et al., 2010). Practice, therefore, strives to both attract public transport to the periphery and stronger regulation of parking (Kodransky & Hermann, 2011; Rammler & Schwedes, 2018). At the neighborhood level, this entails a reorganization of parking as such.

The article is to a part based on a literature review and interviews with housing actors from Berlin, Hamburg, and Frankfurt, of which seven of 14 interviews are used as direct sources in this article (I1–I7). These seven interviews with representatives from different housing institutions from Berlin, Hamburg, and Frankfurt, involved in development projects in the outskirts of their city and/or active members of the municipal housing discourses (e.g., as honorary members of local lobby organizations) were conducted in 2019–2020, anonymized for review, and randomly numbered as I1–I7. Interviewees are predominantly representatives of housing companies from Berlin, Hamburg, and Frankfurt, but also from public offices and/or work on behalf of the public. Additional background talks regularly happened since 2019 with (anonymous) public officers from Hamburg’s district Bergedorf, Berlin’s Senate of Housing and Urban Development, or Frankfurt’s administration on the occasion of venues of the research project “New Suburbanism” and during on-site visits. This enables us to contextualize the perspective of housing actors into the current local urban development discourses of these three German cities with emerging and planned new neighborhoods in their outskirts. We emphasize that we cover by our selection three of the five metropolitan regions with a core of more than one million inhabitants; Frankfurt is accounted as the territorial entity of its common zoning plan area with 2.4 million inhabitants of the so-called Regionalverband. We skipped Munich and Cologne. As an additional case, we chose Freiburg to avoid a “metropolitan bias” and to gain knowledge about one of the many “mid-sized” big cities of polycentric Germany with a population between approximately 250,000 and 600,000 inhabitants (in a ranking by population these would be #6 and #30 of the German cities). We chose Freiburg because of its fame in terms of progressive urban development phases (see Section 3).

The interviewees of our three cases, Hamburg, Berlin, and Frankfurt, are either involved and/or close observers of the developments in their municipality. We consciously chose the housing perspective on mobility, because, eventually, it is up to them to implement planning by building something. Our selection derives from our research project “New Suburbanism” where

we predominantly explore the role of real-estate actors within the overall governance schemes of development areas in the fringes of metropolitan areas. The focus on mobility has been one of several themes of our interviews in 2019–2021; nonetheless, we received sufficient information on mobility questions from this particular perspective.

Furthermore, we conduct a brief review of planning history of the approach to parking in suburban developments since the 1950s with the aim to embed case-based knowledge on German planning practice into a global international discourse. For lack of space, this review remains sketchy and we look exemplarily only into Vauban (Freiburg), then focus on two cases of emerging housing projects in Hamburg (Oberbillwerder) and Berlin (Buckower Felder; Frankfurt’s developments are delayed for political reasons and shall start around 2024–2025). There we can demonstrate a significant change of approach to parking; ultimately aiming at a way out of car dependency. We thereby discuss mobility hubs not only functionally, but also as buildings with an infrastructural prominence.

2. The Organization of Stationary Traffic: A Retrospective View

The triumph of the automobile was a major driver of suburbanization in the 20th century (Buchanan, 1963; Fishman, 2008; Jackson, 1987; Kopecky & Suen, 2010; Newman & Kenworthy, 1999; Ward, 2002). In particular, mass motorization after the Second World War led to the ideals of urban modernism, not only becoming the program of suburban development to an extent not seen before. Rather, with parking spaces above and below ground, it inevitably changed not only everyday traffic but also the character and amenities of public and private open spaces. We will not retrace the well-known history of the enforcement of car dominance here. However, for the question of why today there is (again) an increased focus on a concentrated accommodation of passenger cars in overground parking garages, we will briefly discuss the decline of this model in the context of an increasingly critical assessment of urban modernism.

Whereas in more owner-occupied single-family and terraced house areas, the allocation of parking to private property can be realized in many places to this day without major questioning and is an everyday practice, in connection with considerations of cost- and space-saving construction and a reduction in individual traffic from the 1970s and especially the 1980s onwards, in many cases smaller parking lot systems and garage yards were initially conceived. These are intensively used because of their individual allocation of parking spaces to the user’s unit and are indispensable for keeping private properties and residential paths free of parking traffic—often the goal of the respective urban development concept (Kirschner & Lanzendorf, 2020; Selzer, 2021; Selzer &

Lanzendorf, 2019). A stronger concentration of parking spaces in garages is not very well accepted due to their poor design (e.g., poor lighting and safety aspects).

Modern large housing estates in both parts of Germany from the 1960–1980s had in common that parking facilities—following modern models—were geared towards a functional separation between car traffic and other uses and between car traffic and pedestrian traffic. The usage intensity of public space was, therefore, less dependent on how they are spatially designed, but rather on purpose, they assumed for individual and social life and how intensively people spent time there accordingly. In particular, the enclosed parking garages offered few qualities in this regard (for the international debate, see McDonald & Sanders, 2007). In contrast, the garage yards in large East German housing estates, for example, represented an important place for private craft activities despite their limited space.

Criticism of urban-architectural modernism went along with a reduced number of social housing and the waning of the image of large housing estates. The urban planning debate of the late 20th century focused more on the use of already built-up areas as part of an increasing re-urbanization trend (Brake & Herfert, 2012). In this context, it was largely determined by three practical trends: the emergence of cautious urban renewal starting in the late 1970s, the retrofitting of large housing estates since the 1980s (West) and 1990s (East), and the restructuring of numerous conversion areas starting in the 1990s (Federal Institute on Building, Urban Affairs, and Spatial Development, 2021; Nelle, 2018). In many cases, neighborhood-wide traffic calming and attempts to make public and private open spaces more attractive and more amenable to an appropriation by citizens played a particular role. To the extent that new settlements originated in the suburbs, these in turn tended to be smaller than the previous ones. Overall, this created opportunities for reorganizing both moving and stationary traffic in residential neighborhoods, with a focus on inner-city spaces. One motivation for this was urban ecology concerns in planning, so the first car-free housing developments were also planned and implemented at the time.

Overall, a policy shift eventually occurred in major German cities to restrict private motorized transport by reducing the total number of available parking spaces on a project-by-project basis (Kodransky & Hermann, 2011). In the areas of cautious urban renewal, their high building density made a reorganization of stationary traffic advisable due to the very limited space of the street-grid dating back to the 19th century. Thus, there were better opportunities for completely new traffic concepts on inner-city conversion sites (Frehn et al., 2019). Innovative new quarters, especially in Southern Germany redefined the model of the European city in the spirit of re-urbanization. They attempted to realize a “city of short distances” (Feldtkeller, 2001; Gertz, 1998), which also included a series of traffic-calming measures within

the project development. With a consistent separation of private and public open space and the dedication of private open space as quiet, unsealed retreat and recreation space, coupled with a high building density and the desire to keep the local streets free from stationary traffic, the question of accommodating cars inevitably arose. The perimeter block concepts inspired by the street grids and block structures of the 19th-century city required structural integration and compact arrangement, which for cost reasons mostly resulted in overground garages. Hence, freestanding parking garages, as they were built in the large housing estates of the modern era, hardly ever appeared, not least because of their design problems.

3. Current Approaches and the Renaissance of the Neighborhood Garage

Since the turn of the millennium, planners and project developers in inner cities have in some cases gone even further in their parking space solutions. Even commercial project developers have revised their parking space ratios downward in corresponding re-densification projects. Decades ago, they assumed that a high-end condominium, for example, is “naturally” accompanied by the ownership of two cars, which needs space in an underground garage. However, today there are parking space ratios in projects in the inner city of 0.3 to 0.6 cars per residential unit (I1, I2, I7). On the denser outskirts of the city, 0.6 applies. Inner-city milieus are now also mobile in other ways than by car—They apparently make up the clientele of public transport as well as car-, bike-, and other ride-sharing services (including conventional cabs). It even no longer seems outlandish to offer the inner-city residential property without any parking space of one’s own (I7).

Based on these experiences, it no longer seems very surprising that people would like to eliminate parking traffic from public spaces not only in inner cities but also on the outskirts, although the level of motorization is still much higher there (Huber-Erler, 2010). In addition, there are crucial real estate economic conditions. Underground parking is still the ordinary case (I1), but no longer a matter of course in times of careful evaluation of construction costs (I2, I3, I6). Thus, there are different reasons to organize parking in the neighborhood differently. Overground garages still seem to offer a perspective for this, especially against the background of recent experiences in neighborhoods on conversion sites.

At the same time, the approach to cluster parking in buildings promotes both the electrification of cars and the changed usage patterns (Vrhovac et al., 2021, p. 26). A garage building facilitates the necessary energy supply for charging as a collective infrastructure. Furthermore, at a location like this, it is more easily possible to provide sharing vehicles—cars and beyond (I2, I3, I4; skeptical: I6)—another incentive for the use of alternatives to the private car. Vehicles are then not only cars but possibly

also (electrified) bicycles, cargo bikes, vans, scooters, etc. The yet unresolved question is how the operator models of the sharing providers and the calculation models of the real estate players should mesh (15, 16; Coenegrachts et al., 2021). To get away from car dependency, another prerequisite is to link housing and mobility immanently on an institutional level.

Of the aforementioned precursors in conversion projects, Vauban (Freiburg), built as a partially car-free neighborhood in the 1990s, 2000s, appears particularly instructive (Broaddus, 2010; Gies et al., 2021; Growe & Freytag, 2019; Mahzouni, 2018; Späth & Ornetzeder, 2017). The central Vauban Avenue, half of which is designed as a pedestrian zone, and the adjacent residential streets are completely traffic-calmed. Two neighborhood garages (reserved for residents) are located at entry points to the neighborhood, and the third (public) neighborhood garage is located at one end of Vauban-Allee (Figure 1). For the majority of residents, pedestrian flows are either oriented from the residential building to the garage and the car or Vauban Avenue with public transport and local amenities. There were no considerations yet to spatially integrate parking into everyday situations, on the contrary: It should be inconspicuously pushed to the edge of the neighborhood. Parking should disappear from the central public spaces. From this point of view, Vauban has become a model for current urban development projects. Thus, what began 20 years ago as an ecological niche, is now becoming

the standard in numerous large cities. Freiburg itself is particularly revealing in this regard: Where Vauban still managed with three neighborhood garages, contemporary Dietenbach has 12 neighborhood garages planned (mostly along a development ring). Compared to the older and smaller neighborhood of Vauban, the everyday mobility on foot raises to a higher level. This results in similar path lengths to the nearest neighborhood garage as in Vauban, but also smaller proximities to local supply facilities and streetcar stops.

Copenhagen serves as a different role model (Freudental-Pedersen et al., 2020; Herrmann et al., 2021). The approach thereof combining a garage with playgrounds—and this with a rather extroverted architecture—attracted attention, even if the object is a unique piece and as such not easily scalable for housing development. The building itself, called Park'n'Play, is an ordinary parking garage in terms of its structural design but has a public play and sports area on the roof, which is accessible via a curtained staircase structure. In addition, an outstanding façade design ties in with the historic use of the harbor. Nevertheless, in Germany's new development areas, high-quality green spaces with sports and play facilities are provided anyway, so there is no need to resort to garage roofs for this purpose as in the cramped situation of the inner city. The inspiring moment of the design rather results, on the one hand, from its multifunctional usability and, on the other hand, from the horizontal linking with curtain wall uses, which



Figure 1. Vauban overview map. Source: Orientation map provided by the Freiburg Wirtschaft Touristik & Messe GmbH, situated in Freiburg, photographed by the author.

are accessible by an exterior staircase and show completely new possibilities for the integration of a parking garage into the urban environment in terms of design.

If the aim is not only to create parking more cost-effectively, however, a garage building must go beyond parking. In recent years, the term “mobility hub” has been increasingly used for this purpose, also in Germany (for further considerations and precursors, see Miramontes Villareal, 2018; see also Czarnetzki & Siek, 2022; Federal Institute on Building, Urban Affairs, and Spatial Development, 2015; Jansen et al., 2015; Miramontes Villareal et al., 2017; Suthold et al., 2015; for the unfolding international debate on the same term, especially in the US and the Netherlands, see Arseneault, 2022; Bell, 2019; Rongen et al., 2022).

Initially, the idea of a mobility hub continued to be primarily a parking space, which thus unreservedly follows the logic that the car is of relevant importance for the development of a neighborhood and must accordingly be stored, potentially in a garage to save space. Conventional car dependency is therefore not fundamentally restricted as such. However, it is made more “inconvenient” by not offering parking spaces everywhere.

Nevertheless, mobility hubs are often understood as means to promote alternative modes of transportation: “Mobility hubs bring together shared transport with public transport and active travel in spaces designed to improve the public realm for all” (CoMoUK, n.d.-a).

Those can go hand in hand with restrictions for parking individual cars. The idea is to concentrate on parking facilities within walking distance of apartments. This is legally accompanied by the renunciation of almost all on-street parking. This is enforceable, but always means a conflict for the housing company during the planning process (I3, I5). In this context, mobility hubs are complex facilities that combine regular parking garages with the promotion of alternative modes mentioned above by attaching sharing and other facilities to the garages:

When reimagined as mobility hubs, car parks are no longer just places to store vehicles. Instead, they become positive places that offer co-located services such as electric vehicle...charging and shared mobility services. Mobility hubs also represent the next step in the evolution of park & ride services, which will become genuine interchanges where people can switch from private cars to buses, trains, cycles and walking. (Landor LINKS, 2023)

Interestingly, the planning of greenfield sites in Germany goes beyond this understanding. They promote an ever more complex idea of a mobility hub that aims at bringing transport functions together with central functions of a neighborhood and social amenities. Thereby, they try to make their alternative transport facilities more feasible, as a greater part of the local residents has strong incentives to use the hub for other purposes, too.

Besides, they make use of the opportunity to encase the parking garage part of the hub with other, more pleasing amenities and uses in terms of urban design. In the following, we discuss those ideas in more detail.

4. Case Studies: Hamburg and Berlin

In the following, current planning cases from Hamburg and Berlin illustrate how planners incorporate mobility hubs into urban design. Hamburg, Berlin, and Frankfurt belong to the group of largest cities in Germany with high pressure on housing; thus, they do not only follow infill strategies, but erect new neighborhoods in their fringes (Altrock & Krüger, 2019). Our research focus is on those cities that do both. Therefore, our interviewees present real estate stakeholders from Berlin, Hamburg, and Frankfurt. Our general interest in talking with them is the proposed urban design of the newly planned areas, especially questions of density and mixture. Our interest in the real estate stakeholders’ point of view derives from their upcoming role to implement the plans the municipalities make.

This interest results in certain aspects of urban design promoting a dense and mixed neighborhood, of which the aspects of active ground floor zones along streets and squares and a pedestrian-oriented public space are suitable to be discussed with a mobility focus in urban design discourses. We will pick up these aspects in Section 5 (together with the obvious question of how a building looks like). They have a considerable impact on the overall urban design of the respective neighborhoods and mark a significant step further in the concept of mobility hubs, as they are no longer just seen as complex and sophisticated infrastructural elements improving the transport system but are also seen as an integral part of attempts to increase vibrancy in peripheral neighborhoods.

Before, we go into the neighborhoods themselves. As Frankfurt’s plans have not been specified yet enough to discuss them with interviewees in 2019–2020, we chose to focus on Hamburg and Berlin. Oberbillwerder, the largest new development currently planned in Hamburg with several thousand residential units, is to consist of five differently profiled quarters as well with high-density multistorey housing near the station and with terraced and single-family houses in the peripheries of Oberbillwerder (International Building Exhibition Hamburg, 2019). In all quarters, there will be one to three elevated garages (11 in total), each of which will be located at a small neighborhood square (see Figure 2). A street axis with a sequence of three squares from the metropolitan train station northwards forms the backbone of the future settlement.

The initial situation in Buckower Felder, a new development on the southern outskirts of Berlin, is quite different (see Figure 3). Situated in the far south, just at the municipal limit, and far away from any rail-transit connection, the area is located in a relatively dense, but in terms

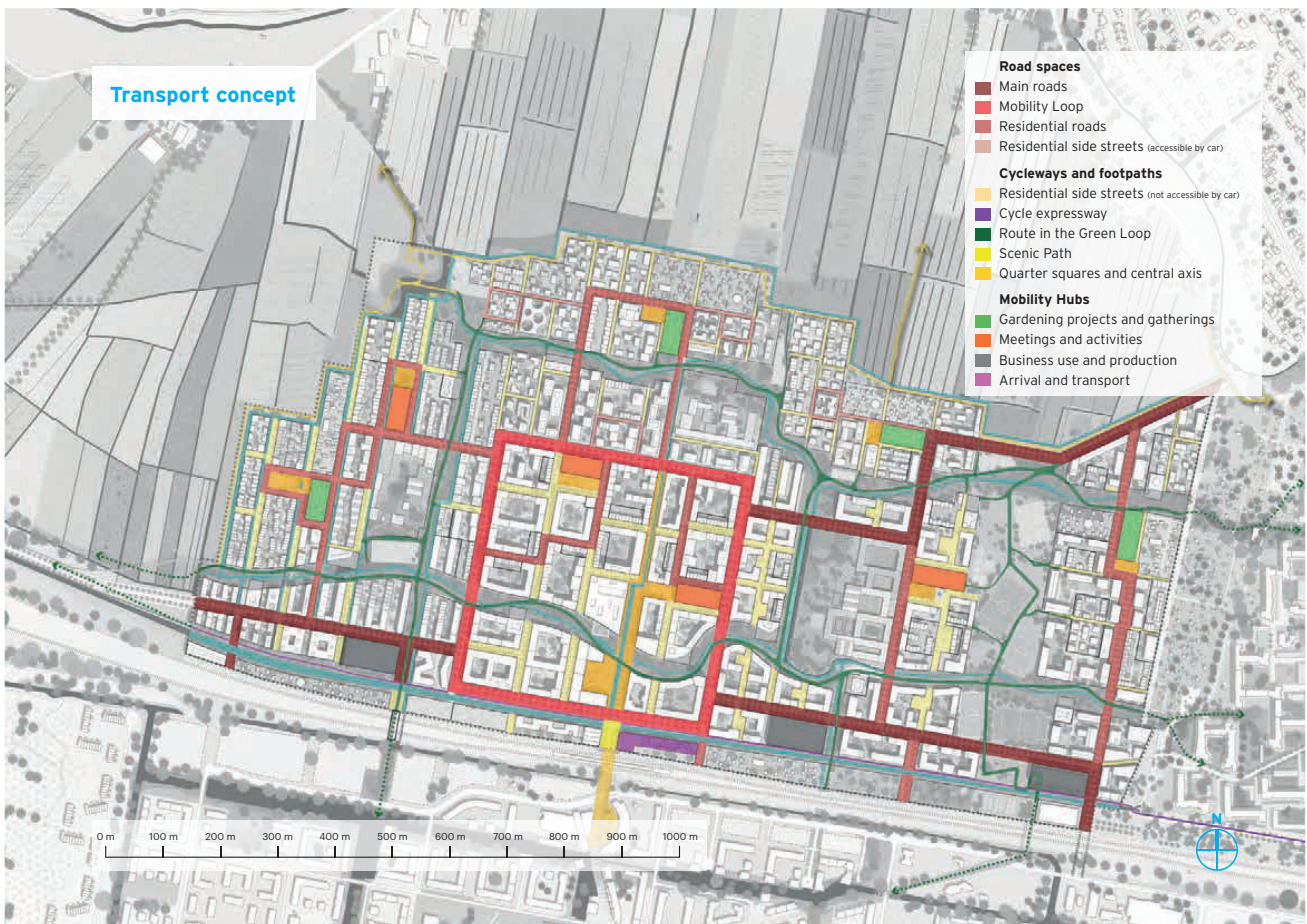


Figure 2. Transport concept for Oberbillwerder. Source: IBA Hamburg GmbH (2019, p. 61).

of urban design hardly structured heterogeneous suburban location between single-family houses and commercial and multi-story residential buildings from the 20th century (this results in the limited options of a walled West Berlin). Under the direction of the public company Stadt und Land, approximately 900 residential units emerge in dispersed apartment blocks in mostly four to five-storey buildings with a high proportion of affordable housing. Two garage buildings replenish them (I3).

One of the two garage buildings will also accommodate various shared mobility services as part of its multifunctionality. In addition, a kindergarten and youth club will be located next door, as well as the (already-built) school (diagonally across the street), and the first-floor zone of the garage itself will offer social infrastructure (counseling and meeting places). The upper floors of the other two buildings will be residential (I3). The three buildings enclose a square, which will form a hub for everyday mobility through their bundling of functions. Ideally, one can imagine a parent walking with his or her child from the apartment to the square in front of the kindergarten and “dropping off” the child not from the car, but on foot—as well as picking up a vehicle to commute to work afterwards. Although the different uses (daycare center, garage, residential) are combined in a building ensemble and not in an individual build-

ing, this still results in a small-scale functional bundling around the garage. The integration of a square situation in the center of the U-shaped building ensemble is also already an important further development compared to the role models presented above: the combination of open space and building. While the neighborhood is predominantly an experimental site for contemporary serial and affordable housing, it is likely to be as well an experimental model case in terms of a parking concept less car-dependent than before.

While the allocation of the garages became the starting point for considerations of decentralized neighborhood squares, similar to Buckower Felder, the complexity of the overall neighborhood in Oberbillwerder is much greater (International Building Exhibition Hamburg, 2019). Using Vauban as a model, garage buildings align with existing or planned main access roads according to previous designs (this also applies to Buckower Felder). In simple terms, the garages arrange along smaller access roads in such a way that this circumstance results in a kind of “automobile entrance situation” to the residential quarters, which minimizes car traffic in the latter and replaces it with footpaths between the home and the car.

However, the design approach in Oberbillwerder goes much further. A green loop as a central, ring-shaped



8 Entwicklungsteifäden Buckower Felder

Abb. 5: Rahmenplan Buckower Felder (RHA; Förder LA) Stand: 14.06.2018

Figure 3. Buckower Felder. Courtesy of Stadt & Land Wohnbauten Gesellschaft mbH.

open space links the individual neighborhoods. A largely orthogonal system of streets and paths makes use of a few conventional streets with separate footpaths, along which most of the neighborhood garages are built. They arise at traffic-calmed neighborhood squares, whereby one building front of the neighborhood garage will always face the street (for the car access) and another the square. With the establishment of an “active” first-floor zone in the garage building facing the square and—in the majority of cases—in the other buildings adjacent to the square, a plaza situation is accomplished. Again, different everyday uses are bundled. Now and then, school and daycare buildings also adjoin these squares; school properties in particular then mediate spatially between the neighborhood square and the green loop (International Building Exhibition Hamburg, 2019). A possible typology of urban infrastructure emerges that can be arranged around such a square.

As already described in the case of Buckower Felder, it is the attempt to bundle spatially mobile footpaths in such a way that a corresponding liveliness of the public space is created at the node of bundling, without the covered distances in the neighborhood being perceived as a burden. The path combinations should be suitable for everyday use and possibly even facilitate everyday life. The approach, therefore, bases on the sectoral problem of accommodating stationary traffic, hence goes bey-

ond the mere infrastructure sector of traffic, because it rather integrates overarching socio-infrastructurel planning. Doing so, it uses infrastructural planning to integrate its needs into the urban figure of the neighborhood square, which in turn should shape the character of the settlement. The squares serve as a serial element. Admittedly, this approach only works if the sectoral problem of accommodating stationary traffic actually succeeds in this way, as outlined in the master plan (I6).

5. Design and Planning Elements of a Mobility Hub

Abstracting from the cases just mentioned, we will analyze relevant design and planning aspects to evaluate whether the mobility hubs acquire such a model quality and if they are more than just a new edition of the customary garage. For this purpose, we also include current debates taking place in the German planning context (Bergedorf District Office of the Free and Hanseatic City of Hamburg, 2021; International Building Exhibition Hamburg, 2021; Rehme et al., 2018; Senate Department for Urban Development and Housing Berlin, 2018b), not only from documents and publications but from insight views from interviews and background talk with the very actors. A changed approach is thus not only a means to get away from car dependency, but also a transformation of public space and functional mixed-use in

suburbia (see Figure 4). The leitmotiv to allocate and equip these garage buildings also means that the spatial (re)configuration should have positive effects on public life at the neighborhood level. This links to the leitmotiv of transit-oriented development (Loukaitou-Sideris et al., 2017). We will discuss four aspects that have both a functional and a design dimension.

5.1. Active Ground Floor: Commercial

The novelty of the planned mobility hubs is the divergent use of its ground floor. As hubs, they represent traffic nodes of local pedestrian traffic (Deffner et al., 2014). This is because when everyone walks to their vehicle to the same location in the neighborhood, numerous pedestrian traffic flows intersect here. This should not be underestimated for turning around traffic on the urban fringe and creating revitalized places in the neighborhood: In many, especially suburban new development areas of whatever urban type, people have so

far used their own vehicles (cars, bicycles) to travel directly from the property (above ground or coming from underground parking) to schools, supermarkets, leisure venues, etc. Besides sporadic walkers, only those who walk to the public transport system pass through the suburban neighborhood. It is, therefore, no wonder that pedestrians are rare in the suburban neighborhood.

The achievement is to make the pedestrian traffic numerous enough for a little centrality—i.e., to enable the proverbial corner shop. It is thus sensible to allocate the mobility hubs not only according to in- and outgoing traffic (as back in Vauban’s 1990s) but simultaneously at neighborhood squares (as in Oberbillwerder and Buckower Felder). The planning aim as such is questioned by no one we interviewed or talked to, neither is it in the conclusions of the documents (e.g., Bergedorf District Office of the Free and Hanseatic City of Hamburg, 2021; Senate Department for Urban Development and Housing Berlin, 2018b). However, the path to that aim remains fuzzy, with one exception: There have to be

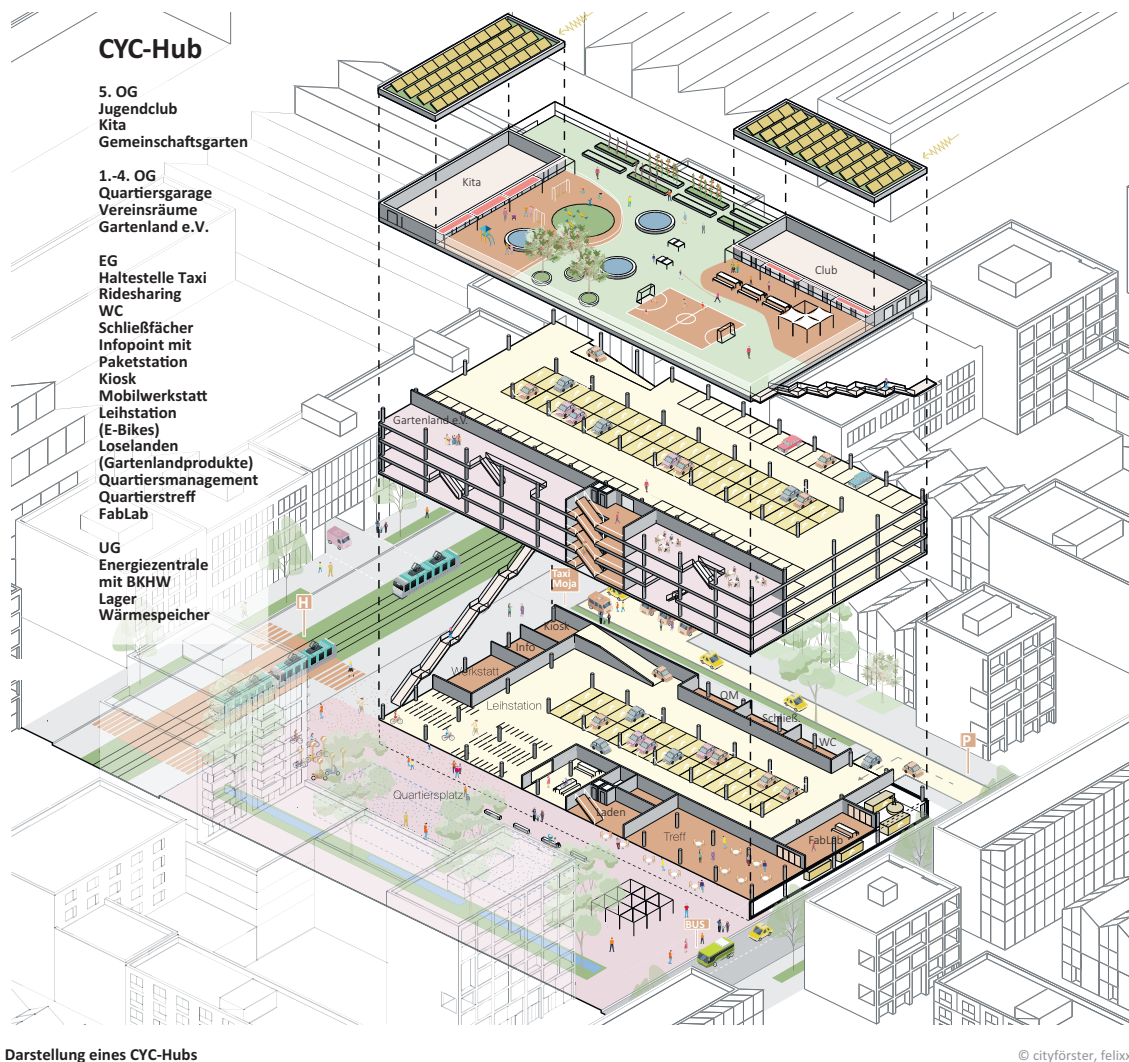


Figure 4. So-called “CYC study” on garage levels, commissioned by Senate of Berlin. “CYC” plays with the word “recycling” and denotes a concept that integrates a decentral CHP station, a multimodal mobility hub and a community center. Source: Senate Department for Urban Development and Housing Berlin (2020, p. 20).

people walking around and they have to be walking around for a reason. The different spatial patterns of parking and centrality locations need thinking together: Everyday walks for everyday errands inside the quarter and to get a vehicle away (and back) cross at the mobility hub square. Additionally, we can assume an emergence of specific offers in the context of new mobility such as, for example, bicycle repair workshops, service offices of sharing providers, back-office units for maintenance, or automatized delivery stations (I2, I3, I6). Interestingly, housing actors assume, they need mixed calculations to enable certain centrality offers to enable enough “pedestrian traffic” to contribute to the overarching aims of the development—which they shall, as the distribution of property by the public will take that into consideration. That is one particular reason the view of housing actors is crucial for the development of these areas.

In particular, potentials are conceivable for uses facing away from the street in ground floor zones. Courageous project developers are already thinking about offering co-working spaces, space for start-ups or something similar between these units. These are activities not necessarily dependent on the interactivity of the ground floor. However, their sheer presence—even behind windows—already contributes to a (re)vitalization of public space on these squares (I3). Ideally, all buildings on the square have corresponding ground floor zones—it is therefore of secondary importance what emerges in the garage building and what does in the building as long as the ground floor use faces the square.

5.2. Active Ground Floor Zone: Social Infrastructure

More likely is an economically stable lease to providers of social infrastructure. In the history of cautious urban renewal, we can trace back to storefronts increasingly used for social infrastructure since the 1970s and 1980s, especially due to the institutional condition with independent welfare providers (Krüger, 2022, p. 53). In this context, mobility hubs de facto represent social infrastructure buildings, because they not only serve the provision of general interest as a host of welfare. They also act “as social infrastructures when they have an established physical space where people can assemble” (Latham & Layton, 2019, p. 3). The combination of classic social infrastructure and public infrastructure for mobility can create an urban interaction.

However, the installation of social infrastructure within the garage building does not remain without consequences for the social infrastructure facilities that the public usually allocates as single-building structures, be it schools, kindergartens, or sociocultural centers (Grunze, 2017). It is expectable that smaller “welfare stores” like counseling or meeting places can be located in the ground floor structures of these mobility hub squares, too. However, if not there, we experience these kinds of facilities as “extra” uses on school campuses (Krüger, 2022). There was a particular task force

inside Hamburg’s public realm—bringing local and state staff together—to formulate requirements for allocation schemes in Oberbillwerder (Bergedorf District Office of the Free and Hanseatic City of Hamburg, 2021) with links between research (e.g., Altröck & Krüger, 2019; Grunze, 2017) and practice. In addition, more and more housing companies establish their own community spaces. Again, housing actors go beyond their provisional task to build apartments. A certain governance of allocation is necessary though, and we observe exactly this in both cases. The public domain and housing companies cooperate to devise allocation schemes for social infrastructure.

5.3. Pedestrian Node and Public Space

The garage building itself and the associated square situation are to be thought of together as lots for urban infrastructure to jointly achieve a little centrality in the suburban neighborhood—and thus to avoid motorized means of transit to a certain extent. To qualify the mobility hub and square as an infrastructural node within and beyond mobility is a challenge at first, but also offers new options for neighborhood life. Since the square becomes a crossing point for pedestrian traffic because of the mobility offers clustered, it transforms functionally into something like a station. Moreover, if it is comparable, the transit-oriented approach may operate—linking this planning approach to the efforts to reduce car dependency. In view of the pedestrian frequency ensured by the function of the hub, the question arises as to which offers in which design invite users of the neighborhood garage to stay in the square. Thus, it is of high relevance how many square meters of ground floor real estate and public space are projected. It is already noticeable in both cases that, compared to the squares built in the 1990s—back then often dimensioned along the dimensions of “classic” Central European squares—they will be much smaller. In the suburbs, their diversity of use remains smaller, too. This comes especially by request of the housing players (I2, I6) involved. Designing the little neighborhood squares remains a task for planners and architects, noteworthy is the governance to estimate its sizes. Both cases show a crucial involvement of possible or actual housing developers. In Buckower Felder, it was clear from the beginning, that a public housing company will develop the neighborhood; in Oberbillwerder, the developer is a public company allocating property to estate developers at a later point in time (International Building Exhibition Hamburg, 2021). The housing developers we interviewed are not only company operatives but as well “characters” in the political sphere of Hamburg or Berlin. They are not only investors, hence, part of a civic realm (e.g., International Building Exhibition Hamburg, 2021). Their interest in smaller squares might derive from the business calculation. Collaterally, the smaller squares may facilitate the appropriation by citizens (Tessin, 2011) more properly (see Figure 5). As scientific observers, we watch



Figure 5. Neighborhood square with mobility hub: Visualization for Oberbillwerder. Source: Adept & Karres en Brands & IBA Hamburg GmbH (2019).

a concordance of interests between design and mobility demands.

5.4. Cubature and Façade

Finally, in view of the negative experiences with the design of traditional parking garages, the attractiveness of mobility hubs raises the question of the architecture of a garage building. The Copenhagen example is a showcase example of the architectural integration of a parking garage into an urban settlement context. However, we safely assume that a scalable approach on garages with all the complexity of governance in terms of socio-infrastructure use and building calculation the garages in Oberbillwerder, Buckower Felder, and similar places elsewhere tend to have a simple cuboid cubature and a plain façade (see Figure 6). This is because such an object cannot be financed easily, let alone with elaborate architecture (I1, I3). In the two case studies, public real

estate actors are the motors of development and expectations regarding affordable housing are as well burdened on them. If the garages are cross-financed with residential uses in an overall settlement planning, their costs as well as other cost-relevant features (energy concept, parceling, economies of scale in construction, etc.) are included in an overall calculation and surely have an impact on rents or purchase prices. However, if housing policy caps rents to achieve more affordable and social housing, these costly features will have to be borne by a however defined general public. It could be the municipality, national funding, public real estate actors, or a mix of means, which we are not able to elaborate on in this context (yet). Anyway, there will be cost pressure on the structural substance of a garage in order to keep costs that cannot be refinanced by (affordable) rents within limits (I3, I4, I5, I6).

At first glance, this counteracts severely with outlandish design schemes, the Copenhagen example, but also



Figure 6. Garage building visualization for Buckower Felder in Berlin. Source: Stadt & Land (2018).

what visualizations inside the community (e.g., Senate Department for Urban Development and Housing Berlin, 2018b) stand for (see Figure 4). It remains to be seen what the 11 buildings in Oberbillwerder will look like, as the examples of Buckower Felder are presumably not for use in architectural publications. Hence, in contrast to Copenhagen, we do not need architectural highlights but scalable standards for a comprehensive transformation of mobility habits. Another challenge is the lighting and ventilation of the parking floors. If the façade is open, the parking decks are also visible from the outside, which reduces the attractiveness of the building in the urban environment. If other uses such as offices or storage spaces of commercial tenants “hide” the cars, the appearance inside the parking decks does not differ from an unattractive underground parking garage. As a result, the mobility hub is likely to face a difficult tension between cost pressures and design aspirations.

6. Conclusions

Mobility hubs are currently the talk of the town planning debate. As hardly ever before, they aim at combining three key challenges of “post-modern” urban development: (a) the creation of a system of public places in the urban neighborhood that are as vibrant as possible (Gertz, 1998); (b) the preference for non-motorized mobility and, in particular, the reduction of car dominance in the immediate residential environment (Grove & Freytag, 2019); and, finally, (c) the promotion of a mix of uses that goes beyond the coexistence of housing and residential follow-up facilities (Altrock & Krüger, 2019; Brake & Herfert, 2012; Federal Institute on Building, Urban Affairs, and Spatial Development, 2021). As such, this signals a new stage in the discussion of guiding principles in housing development, which clearly stands out from the earlier attempts to overcome urban architectural modernism in the 1990s (Senate Department for Urban Development and Housing Berlin, 2018a), which were often critically evaluated.

In addition to research projects and experimental preliminary considerations, which are being tested selectively as part of complex public transport transfer hubs and smart city initiatives, however, a noticeable qualitative leap is currently emerging. In the course of an alternative conception of systems for stationary traffic in new developments on the outskirts of cities, increasing efforts are being made to promote non-motorized traffic. They claim to take greater account of sustainability aspects. In return, car traffic is to be gradually pushed back in order to reduce the dependence of suburban living on the private automobile. To this end, the planners envisage a variety of measures in complex integrated urban district development concepts. Due to the ambivalent experiences with car-free neighborhoods and the difficulties of achieving significant reductions in car dependency by means of a significant improvement in public transport connections, the latter starts with a

spatial and organizational reorganization of stationary traffic and its surroundings.

For the currently planned mobility hubs, this means concentrating parking in neighborhood garages and thus freeing public space from car dominance. Beyond attempting to thereby make settlements highly land-efficient while improving the quality of use and suitability of an appropriation of plazas, streets, and pathways in newly developed neighborhoods, the moderate concentration of parking aims to reduce the attractiveness of car use. It attempts at creating places where more sustainable transportation alternatives become available. Placement at neighborhood squares also aims to create synergies between alternative modes of transportation and community uses in the neighborhood. It is assumed that a comparatively high pedestrian frequency is secured at these squares, which makes stores and gastronomic and socio-cultural infrastructures viable to some extent. More ambitious attempts envisage these uses in a building with neighborhood garages so that their urban and architectural integration can succeed better than that of traditional elevated garages in large housing estates of the 20th century.

The cases from Hamburg and Berlin demonstrate that the significant costs created by an overground parking garage will have to be borne directly or indirectly by the residents. To make them feasible, management by housing companies or entities related to them seems appropriate but obviously requires severe restrictions on street parking from the outset. Although the related urban designs can make use of the reduced amount of parking space for other kinds of public space, the restrictions on car use and related reductions of attractiveness for car-owning households seem to limit the use to cities in which the housing shortages make people accept those. Nevertheless, the urban designs for both the small centers around the parking garages and the related public spaces at least in the Hamburg case show that the coordinated planning of housing areas, public spaces, the green loop, and the pedestrian and cycling infrastructures may allow for substantial change in the mobility patterns of the new neighborhood to take place. In the case of Berlin, the urban design solution and our interviews already show that the limited size of the new settlement seriously restricts the possibilities for the creation of vibrant sub-centers with a high concentration of additional facilities. Thus, we can conclude that the attractiveness of the approach towards reducing car dependency, building on a complex cluster of services attached to a parking garage and surrounded by dramatically car-reduced and strictly regulated public spaces, may only unfold its potential if integrated beforehand into a far-reaching and consequently implemented urban design strategy as in the case of Oberbillwerder in Hamburg.

So far, the planning and implementation of mobility hubs are still at an early stage, so it remains to be seen whether the ambitious goals associated with them

can be achieved. In addition to acceptance by users and the attractiveness of the neighborhood locations to be created, unanswered questions also arise as to whether the mobility hubs and the uses attached to them can be operated economically. Nevertheless, a wide variety of design and functional solutions are being developed by architects, urban planners, and traffic planners in a whole series of urban planning competitions and design procedures. So far, there seems to be the will on the part of the planning authorities to implement these solutions consistently, especially in the important urban development measures of large cities. In view of the enormous difficulties in freeing peripheral residential neighborhoods from their dependence on cars, this approach seems appropriate and promising in this respect, even if it is still unclear how great their contribution to a sustainable change in traffic behavior on the urban periphery will really be.

Acknowledgments

We thank the anonymous reviewers for their valuable comments.

Conflict of Interests

The authors declare no conflict of interests.

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About the Authors



Arvid Krüger (1979, Dr.-Ing.) studied urban and regional planning at TU Berlin and KTH Stockholm. He holds a doctorate from the Bauhaus University Weimar (2018) and is a member of the Bauhaus Institute for Theory and History of Architecture and Planning. Krüger is also a researcher at the University of Kassel in the DFG research group New Suburbanisms, as well as an honorary speaker for the Committee on Urban Regeneration of the German Professional Association of Planners (SRL).



Uwe Altrock (Dr.-Ing.) is an urban planner and professor of urban regeneration and planning theory at the University of Kassel, Germany. He is co-editor of the German *Yearbook of Urban Regeneration and Spatial Planning and Urban Development in the New EU Member States* (Ashgate, 2006), *Maturing Megacities: The Pearl River Delta in Progressive Transformation* (Springer, 2014), and *Windows Upon Planning History* (Routledge, 2018). His fields of interest and research are urban governance, megacities, urban regeneration and planning, planning theory, and planning history.