# SUSTAINABLE URBANISM: IDEALS, IDEAS, AND IMPLEMENTATION IN VAUBAN

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## ABSTRACT

This paper describes the guiding urbanism principles and their implementation in the planning and design of a new major development of a sustainable city district that is currently nearing completion: Vauban, a 38-hectare former barracks site near the town center of Freiburg, Germany. The site was purchased by the city in 1994 with the goal to convert it into a flagship environmental and social project. It comprises 2,000 homes to house 5,000 people, as well as business units to provide about 500-600 jobs. The paper presents the main ideas of two important documents that articulated ideals and ideas for Vauban: "Ten Guiding Principles for the Planning and Development of a New City Quarter", authored in 1993 by the former Head of the Building Department of the City of Freiburg and "Ten Theses for Sustainable Urban Development", a publication that articulated results of the 1999 Freiburg UrbanVisions conference. The paper then discusses how the ideas and ideals embodied in both the Principles and Theses for sustainable urban development were made into comprehensive policies, regulations, and initiatives that would lead to the desired results, and describes how the formation of citizens' groups empowered to reify the goals of such a development. The topics include building regulations, building co-operation (participatory models), community building, building programs, green spaces, mobility concepts, traffic infrastructure, and public space. In its conclusion, the paper evaluates Vauban's achievements in terms of the social and environmental sustainability goals articulated in Principles and Theses, and discusses to what extent the new city district can be seen as a viable and real alternative to sub-urbanization of neighborhoods and the loss of the sense of urbanism and citizenship in residential developments.

**Keywords** Co-communities, environmentalism, sustainable architecture, sustainable housing, sustainable urbanism

## 1. INTRODUCTION

### Context

Freiburg, a university town in the southwest of Germany has a young and motivated population, and with some twenty years of environmentally sensitive policies and practices, it has often been called the European capital of environmentalism. The purchase of Vauban, a former French barrack quarter, which was used from post-WWII to German Reunification, presented the excellent opportunity for the city to build a flagship environmental city quarter with a vibrant social mix. The project was to be completed in three phases between 1998 and 2006.

**Freiburg: capital of environmentalism**

Freiburg's environmental leadership was apparent already in the mid-80s, when city authorities in co-operation drew up a rational energy plan for the city with regional energy and water companies. By the 90s, two regional schemes were in place for citizens' active participation in sustainable development principles. In 1996, an environmental protection plan to reduce CO2-emission by 25% by year 2010 was put in place by the City Council. To date, Freiburg enjoys a well-developed public transportation system that gives pedestrians and cyclists priority on the roads and where half the journeys in the city are made on bicycles, household waste sorting and recycling and widespread use of solar energy has long been part of daily life in the city. As a positive impact on the city's economy, more than 10,000 jobs are created in the fast-growing environmental sector, based on the combined efforts of businesses, the university and municipal authorities. The city also houses the headquarters of Solarfabrik, one of Germany's largest solar paneling manufacturers, and the Fraunhofer Institute for Applied Research into Solar Energy. A wide-ranging program entitled "Freiburg – Solar City" was exhibited at the Hanover EXPO in 2000.

Figure 1: aerial photograph of Vauban, July 2006, source: authors' own

**The Vauban Quarter**

Following the fall of the Berlin Wall in August 1992, French troops stationed at Freiburg, Germany vacated the barrack quarter known after WWII as Vauban. In 1994, the city purchased the 38-hectare site from the Federal State, and by 1995, a decision was made to convert this into a flagship environmental and social project. The main aims of the project were to achieve:

- A good mix of housing and workplaces
- Alternative modes of transport – by foot, bicycle or public transportation instead of cars
- Preservation of existing mature trees and the protection of the green area in the environs of an adjacent stream
- Balanced relationship between external and internal spaces
- Low-energy buildings

Three phases were planned for implementation between 1998 and 2006, and comprised 2000 homes for a population of 5000, plus small businesses to provide 500 to 600 jobs within the quarter. (Gauzin-Müller, 2002)

## 2. TEN GUIDING PRINCIPLES FOR THE PLANNING AND DEVELOPMENT OF A NEW CITY QUARTER

In 1996, the proposal for Vauban was presented as a best German practice on HABITAT II, the United Nations Conference on Human Settlements, in Istanbul, Turkey. Between 1997 and 1999, LIFE, the European Union's financial instrument for the environment, supported the project under the title "Realization of the Sustainable Model District Vauban". (European Union – LIFE, 2005)

In 1999, the Landesentwicklungsgesellschaft (State Development Authority) Baden-Württemberg and the City Planning Department Freiburg published a document on the planning and design of Vauban that included a document with the title "Ten Guiding Principles for the Planning and Development of a New City Quarter". This document, authored by the former Head of the Building Department of the City of Freiburg already in 1993, outlines the vision applied to Vauban. (Jehle, 1999) The following sums up the main ideas of the document:

(1) *A vision of a pluralistic community* – city planning and design as a communal task: a city quarter that is designed and built today should mirror today's social needs and anticipate a desired future. City planning and design should not be limited to urban planners and engineers but embody an interdisciplinary approach so that it becomes a communal task.

(2) *Responsible city planning and design unites* –pluralistic societies demand variety. Responsible city planning and design should avoid the deadening zoning ideology of the past. It should be under the shared responsibility of city authorities and citizens. This approach rejects the currently dominant model in that private developers plan, design, build, market, and sell on a large scale. The approach favors instead a involving of a multitude of architects working with different possible design solutions.

(3) *A thorough mix* –what should be achieved is a mix of working and dwelling, old and young, locals and foreigners, handicapped and non-handicapped. Wherever possible public institutions should bring together the various generations. Social housing should be mixed with privately financed housing. Buildings should be designed in a way that stigmatization of social groups is absent.

(4) *New layouts* – openness for a multitude of uses: farsighted city planning and design should adjust to changing demands and anticipate the future. Single-households, single parents, and traditional families all have different needs and require specific solutions. This requires flexible layouts that allow for a multitude of uses.

(5) *Quality through public safety* – visibility and social control: public safety is a topic that requires increasing attention in city planning and design. Public safety can be achieved at relatively low costs through the careful constellation and design of public, semipublic and private spaces.

(6) *Public space as experience and meeting space* – the design and appearance of public spaces play a crucial role in the creation and cultivation of neighborhoods. A good city quarter should have a farsighted mobility concept. Public transportation in cities should be conceived with tramlines that can serve as backbones for city development. Buses should only take on complementary routes. Urban planning and design should pursue a bicycle-friendly city and experiments with car-free or at least parking-free neighborhoods should be pursued wherever possible. Public spaces, streets and squares should increasingly be regained as experience and meeting spaces. They should be accessible for all citizens, independent of their status and age and be a "designed invitation" for all citizens to meet, discuss, and encounter.

(7) *Clear guidelines for ecologically responsible city planning and design* – city planning and design should be ecologically responsible. Guidelines should apply to mobility concepts that seek environmentally friendly solutions in combination with reasonable restrictions. It also applies to energy concepts through low energy standards, the use of solar energy, resource-conservation such as the collection and use of rainwater, and recycling.

(8) *Creation of public buildings and institutions on manageable small parcels of land* – decentralized concepts of city development need public buildings and institutions. This applies not only to social and cultural institutions but also to the location of public amenities for everyday life that can help to achieve pedestrian-friendly neighborhoods and reduce car traffic. The development of large shopping centers should be avoided, whereas small-scale commercial and retail facilities are desired.

(9) *Flexibility of city planning and design for future developments* – city development should be oriented towards the future. Therefore it has to be able to adapt to future developments and changing social needs of the next decades. A farsighted city planning and design therefore has to include flexibility in the layout of housing, public institutions and allow for future densification.

(10) *City planning and design for and with the citizens* –participatory models should be introduced in an early project phase. This leads to stronger identifications of citizens with new city quarter and as well as to unique individual and personal articulations of neighborhoods. Larger city quarters planning and design should be approached in building phases. This allows a learning-by-doing approach that can take into account the experience of earlier phases.

## 3. SUBSTANTIATION OF GUIDING PRINCIPLES: TEN THESES FOR SUSTAINABLE URBAN DEVELOPMENT

In 1999, the Deutsche Bundesstiftung Umwelt (German Federal Foundation for the Environment) funded an international conference on sustainable urban development under the title "UrbanVisions". Forum Vauban and ICLEI, the International Council for Local Environmental Initiatives, organized the conference that included over 100 participants from 21 European countries. UrbanVisions was a preparatory event for Urban 21, a global conference on the urban future that took place in Berlin, Germany in 2000.

UrbanVisions culminated in the publication of a document with ten theses for sustainable urban development. (Glatz, 2006) Six years after the articulation of "Ten Guiding Principles for the Planning and Development of a New City Quarter" by the Building Department of the City of Freiburg, UrbanVisions built on the earlier ideas by substantiating these with comprehensive notions of how to integrate sustainable architecture and urbanism with regional economies. UrbanVisions went beyond social ideas to encompass political and economic aspects as well. The following sums up the main ideas of the "Ten Theses for Sustainable Urban Development":

(1) *Promotion of an integrated planning culture* – goals and measures of urban development should be chosen at an early stage by integrating all relevant sectors of the city administration, local politicians, external experts, and citizen representatives or groups. The approach should be on of learning while planning. Measures should be monitored during and after their implementation to ensure the possibility to correct them at a later stage. Structures and procedures of the local administration should be transparent.

(2) *Use of new forms of citizen participation* – citizen participation should be practiced beyond what is required by law with sufficient time and financial resources. Participation should be visible, i.e. results should have a direct impact on the implementation. Existing neighborhood structures can serve as starting points for local participation. Citizens should be empowered and become crucial actors in achieving a sustainable city.

(3) *Implementation of sustainable transport and mobility concepts* – planning should aim at reducing and avoiding traffic by favoring districts of short distances, high density, mix of functions, and poly-centrality. Ecologically sound mobility should be given priority, i.e. public transport, car-sharing, bicycles and pedestrians. Planning should promote districts with less or no cars and reclaim public space.

(4) *Promotion of environmentally sound and healthy building measures* –building measures should save resources and only use healthy and environmentally friendly materials and processes. Planning philosophies should be integrated with regard to good design. The whole life span of buildings should be taken into account. Natural cycles should be respected, the resources soil, water, and air should be used considerately, and biological diversity should be protected.

(5) *Ecologically sound energy supply and minimization of energy consumption* – the energy consumption of buildings should be minimized, e.g. by building passive houses and adding insulation to old buildings. Co-generation and renewable energies should be promoted, especially solar energy for heating, hot water, and power production. That includes the application of modern energy services, like least cost planning, contracting, and demand side management.

(6) *Strengthening of regional economies* – planning should concentrate on regional structures and diminish the instabilities of economy. It should multiply the net product obtained from national trade and increase the scope for a democratic steering of economic development. The regionalization of material streams reduces transport volume and makes environmental impacts visible and appreciable to consumers and

decision makers. The strengthening of the service sector contributes to the dematerialization of economic activities and creates new jobs. The strengthening of regional economies can offer opportunities for regions undergoing structural change.

(7) *Design of socially oriented living spheres* – planning should assure good accessibility to social and cultural facilities, places of education, shopping facilities, attractive public spaces, recreational areas and public transport. It should promote a mix of live and workspaces and assure accessibility for different social groups in the quarter. Spaces within the neighborhood should be for a variety of needs, ranging from privacy to communication and should encourage the residents' identification with their city. There should be a diversity of lifestyles. Flexible uses of living spaces in the various phases of life should be promoted. There should be far reaching participation and shared responsibilities for tenants.

(8) *Mix of requirements with supporting measures* – certain measures of sustainable city planning (ambitious minimum requirements) should be made part of the building requirements or be required in the contracts. The implementation of additional voluntary measures should be promoted through advisory services as well as by financial incentives.

(9) *Cultivation of good contacts and exchange of experiences* – the exchange of experiences between cities, experts, and projects is vital for the spreading of good practices. Regional, national, and international networks are excellent tools for this kind of exchange.

(10) *Courage to leave the beaten track* – existing opportunities for initiative should be used proactively and follow the goals of sustainable development. Unconventional solutions can sometimes make a big difference.

## 4. IMPLEMENTATION

The ideas and ideals embodied in both the Principles and Theses for the sustainable urban development of Vauban had to be made into comprehensive policies, regulations and initiatives that would lead to the desired results, as well as the formation of citizens' groups empowered to reify the goals of such a development. The following summarizes the implementation tools for the development of the Vauban quarter:

*Building regulations* – the Freiburg city authorities had been able to achieve their environmental and social aims through planning regulations and conditions for the sale of individual plots. These included increased building density, social and functional mixes, flat roof greening, and rainwater disposal within the building boundaries. The requirements for Vauban further some of these aims, some more stringent than national requirements. In the new quarter, all buildings must meet the low energy house requirements of an annual heating energy consumption 65Wh/m2 or less. (Disch, 2006) Also included in the development are houses designed as Passive Houses that are oriented north to south and unobstructed by adjacent buildings and use less than 15kW/m2 per year of heating. Other houses are powered by a wood-chip powered heating plant, which use a renewable source of energy. (Fabian, 2006)

*Building co-operation* – a large part of the success of the Vauban development could be attributed to the ground-up community planning process facilitated by the non-profit organization, Forum Vauban (now Stadtteilverein Vauban), founded in 1994 at the inception of the project as a forum to initiate public participation that went far beyond what was legally required. (Fabian, 2006) The *Baugruppen* model (groups of future builders) proved to be crucial for Vauban. The extended citizen participation in Vauban led to a large number of workshops in that participants discussed topics like designing residential streets, green spaces and energy consumption that often led to suggestions, which were presented to the official planners and often became part of the planning and design of the new district. (Glatz, 2006) The Forum is still active and has 200 members and provides a continual public platform for discussions of community needs and issues.

*Community building* – the implementation of joint building projects and public participation through Forum Vauban helped to forge a mix of residential buildings and workplaces. Community relations were built even before physical building. (Glatz, 2006) In an attempt to determine a heterogeneous community, a model called the "Blockprofil" was developed along categories of resident types in terms of martial status, number of children, occupation, etc, to ensure that the desired diversity was fulfilled. Where Vauban fails to meet the ideals stated in the documents discussed in this paper is goal of a mix of age groups. The large majority of the district's population is between 18-24 and 45-49 years old followed by the 6-9 years and the 10-17 years old. The age group over 60 does almost not exist in Vauban. (Fabian, 2006)

*Programs* – Vauban houses its population not only in new buildings, but also included the use of some renovated barrack buildings as student housing, an asylum-seekers' center and functions to service the quarter, such as schools, shops and various offices related to the new city quarter.

*Green spaces* – in anticipation that at the completion of the development, the built-up areas would have taken up about half of the surface area of the ground area, provisions for rain water collection in the form of large 1 meter wide trenches along the streets to ensure that rainwater could be returned to the soil to maintain the natural water table.

*Mobility concept* – the new city quarter is designed to reduce the need for car-use and to cut overall journey distance. A city bus already runs through the district and in 1998, the city authorities approved the extension of the existing tramline to run the length of the main street in the development, with the plan to enable connection between tram and the rail network in the near future. The compactness of the development reduces the need to use a car between home, workplace, school and amenities, while tram stops are placed not more than 500 m from buildings in the neighborhood. The car parking garages located at the edge of the development support the creation of car-free Vauban – car access is limited and restricted to the main access road. In Vauban car ownership is 35% under that of other city quarters. Less residents own cars but use alternative forms of transportation. (Fabian, 2006), (Sperling, 2003)

*Traffic infrastructure and public space* – in car-reduced Vauban, the streets are taken over by a multitude of public functions besides being access roads. On the development's main tree-lined thoroughfare that links the quarter to the city, the street is bounded by a 6 m wide footpath-cum-cycle track, which buffers the housing developments and community gardens. There is a speed limit of 30 km/h on the main thoroughfare, while the 4 m-wide side access roads have a limit of 10 km/h and are no-parking zones, aside for set-downs and deliveries. As such, they take on the function of "communication spaces," or "urban courtyards." Furthermore, these linear spaces function as space under which utility networks run and are bordered by rainwater ditches and a 1.5 m-wide planting strip. The main public square of the quarter is surrounded by shops, offices, medical facilities and cafes. Other types of public spaces include the arcade spaces created by lifting apartments above ground floor businesses and retail units and are fronted by a 1.5 m wide pavement and short-term parking area. The north-end of the quarter has streets, which are entirely residential and have a lush quiet ambience.

## 5. CONCLUSION

The substantiation of ideas from stated ideals to policies and tools for implementation for the Vauban project illustrate in many ways on a micro-scale how sustainable urban development can be implemented. The initial ideas embracing environmental and social ideals have found shape and structure through becoming entrenched in local economies, politics and social infrastructure. Drawing from the impetus found through the viable economics and political and social capital, the notions of sustainable Vauban were fleshed out over less than a decade of building. The project history of Vauban illustrates the complexities of environmental city planning and design. A multitude of new ideas and goals that were articulated in the two documents presented here were realized: the use of new energy concepts through the consequent application of low energy standards for all buildings, innovative ways of dealing with storm water and use of solar energy to name just a few. The ambition to make Vauban not just another example of sustainable building but to address sustainability on a city scale is what makes it a unique project.

It is often said that the proof of the pudding is in the eating, and so we evaluate the Vauban project as it is built against the ideas and ideals embodied in its inception. This analysis also points out possible conflicts that some of these ideals present when implemented as a whole. For the sake of the discussion, these ideals are condensed in the following four thematic areas. The following discussion raises questions of idea versus actual form, and are open-ended as many of these observations may have to be quantitatively verified to be used as actual data:

**Community**

That Vauban was conceived on the site of former French Army barrack grounds government allowed for an experimental community on grounds which in parts offered almost a tabula rasa condition. Such a condition both afforded innovation, but to some degree, detachment from the surrounding environs of Freiburg. These include the adjacent upper middle-class bedroom communities of Sankt Georgen and Merzhausen, the exclusive retirement community of the Augustinum and a

commercial district of Uffhausen. It is also unclear how well the work-live environment expressed in the brief for Vauban has come to fruition. The employment opportunities within the quarter are few, consisting mainly of operators of the small retail outlets, services providers such as cafes, schools, and limited number of small offices. Our field studies show on a typical weekday afternoon at Vauban crowds of women and children. The pluralistic communities mentioned in the ideals translate in the actual quarter to a population that seemed composed of young married couples, middle-class white-collared workers, especially of selected professional fields such as those related to the design industry, college students and those who share the similar progressive mindsets. About 20% of Vauban's current population is under the age of 10. Such a demographic also creates demands for places in nurseries, pre-schools and amenities for children, which might become obsolete once this clustered demographic age-group outgrows these facilities. It is a rare sight in Vauban to see middle-aged to older persons, or those from more diverse racial and occupational backgrounds.

**Planning Paradigm**

Vauban is planned and implemented along very clear guidelines, based on mixed land-use, a particular model of transport and mobility concept, and sustainable building principles, including use of renewable energy sources. Vauban's main street corridor, Vauban Allee is about 35 meters wide, with a street car track and stations situated in the median. However, if one were to consider the urban scale of the project by analyzing a section through its main street in relation to the buildings on both sides, one would expect such a scale to suggest an urban thoroughfare. However, Vauban's policy of limiting cars in the precinct is in contradiction to such a scale. The main street also leads to a dead end on the West of the site, so that the street would not become a vehicular thoroughfare. Such a policy does keep traffic low, but also leads to a cut-off from surrounding neighborhoods. While the clear guidelines for sustainable building leads to interesting and diverse solutions for the house and apartment forms, it is not clear how the ideal of "growth" could be implemented, as Vauban has clear boundaries. The adjacent communities may add to the conviviality of Vauban's town center, but it remains to be seen if these communities form networks.

**Public Space**

The most successful public spaces in Vauban are the small-scale residential streets, which are car-free zones, and function as children's play areas. These streets act like extended front porches, and are often meeting places of neighbors, and provide a good sense of public safety. However, as one moves towards the scale of the main street and the arcaded walkways, a real sense of urbanity is lacking in its public space. it also seems as though there is a lack of critical mass of population to make these lively areas. The scale and nature of the public space at Alfred-Döblin-Platz as it now stands, seem too wide, with little opportunity to linger around except for the beer garden on one end of the square. The occasional space of the market square on Paula-Modersohn-Platz, if adjacent to this square, could have shared the synergy of activity.

**Participation and Networks**

It would be interesting to see how the model of active participation of the community in building the quarter continues as a progressive model to see to the continued growth of the quarter and to a more diversified population. The question is, if and when such a population becomes established in time and place, whether citizen's groups like

Forum Vauban would eventually function like a typical “homeowner’s association” in its narrow interests of protecting property rights. The nature of social networks in Vauban should also be analyzed further – if they extend beyond the boundaries of the quarter, or if they are place-bound communities. As mentioned earlier, the work-live environment and contained space of Vauban, with its “no-through” main street, may result in a contained community of similar interests and family background.

Vauban presents itself as a viable and real alternative to sub-urbanization of neighborhoods and the loss of the sense of urbanism and citizenship in residential developments. Without a preconceived model of architectural typology or urbanism, Vauban is a bold experiment in the planning and design of housing for the future, and bringing back the qualities of the city into neighborhood developments, yet at the same time seeking alternatives such as limiting but not prohibiting car-use by making such a need almost non-existent. Despite the open questions discussed in this paper, the case study of Vauban allows us a glimpse of possible alternatives to urban neighborhood development, which allows flexibility for change, yet not depleting the resources for future generations to come.

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