Xavier Calderon

Condensing Sprawl

Olten Region Switzerland

Mexico City's periphery

Social insecurity: Chicago's periphery

Life quality as *Critical Density*: Buenos Aires

This study confronts some issues of contemporary urban design with relevant aspects from the vast notion of urban sustainability. Since the Rio Earth Summit in 1986 the concept of sustainability has bond the future of the city with the forecast that the human kind and the planet are facing as a whole. Sustainability has been defined as the capacity of a civilisation to develop its environment using resources in ways that would permit future generations to develop their own. Away from the notion of sustainability as a constraint, this term is viewed here through its imperative need of triggering a creative process able to produce an idea for the evolution of the way the city is conceived and built. Even if the human kind is today able to perceive its effects on a global level, it has problems formulating the necessary measures that would deal with them. Scientists have still not yet come to a common voice regarding the issues provoking global warmth. For some it is a clear product of civilised behaviour that has a direct effect on the so called "ozone holes", but for some this cannot yet be proven. Predictions on global issues such as climate or demographic growth are uncertain and volatile. Nevertheless cities take a long time to crystallise. The problem that urbanism faces is the fact that urban projects once finished face a reality that evolves beyond the imagination of its creators. How can we talk about city planning while acknowledging the unpredictability in today's world? Uncertain as they are, predictions on the imminent future are still one of the tools the urban discipline has to deal with when "planning" any kind of development. Every plan addresses a future and to make the plan credible it has to relate to a vision of the future. The notion of a future is here viewed as a necessary source for the ideas that apply to it.

Life quality and *critical density*

The city is today the most abundant product of mankind. This urban production is concentrated in the so called periphery. While this happens, issues of insecurity, crime, and urban violence have found in these urban conditions a fertile ground stressing the contemporary political discourse in a growing number of nations. Contemporary political rallies, from Mexico, Brazil, and Europe to the U.S., have as a main topic the issue of security. Beyond temporary measures of law reinforcement, the management of countries is facing the imminent need of a better life quality in these "centers" of urban discontent. Decent urban life quality exists when the urban program available to the people enhances their freedom in ways that use resources reasonably. Life quality in our urban peripheries is usually low. The urban periphery has grown into a global built network. This means that low life quality is a global phenomenon in a state of exponential proliferation.
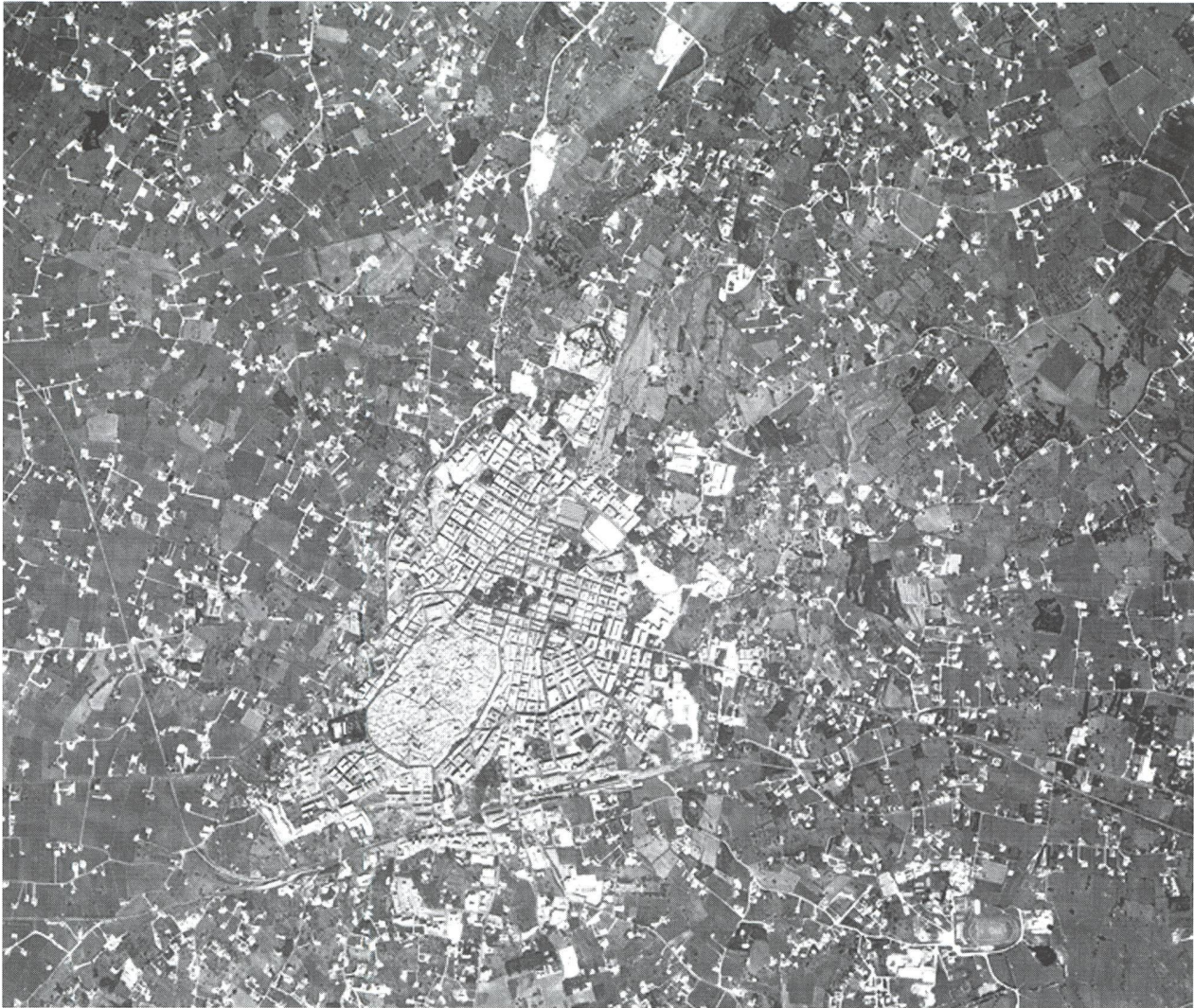
Martina Franca, Italy. Center and Periphery

How should urban design approach the definition of life quality as the "availability of things to do" in ways that increase freedom? Mathematical equations of urban programs determine that dense settlements offer more facilities at neighbouring distances than settlements with a low density. Density is the mere relation that confronts the amount of inhabitants with the area they occupy so sheer density does not necessarily achieve life quality, it also causes problems. This problematic density was the main concern at the time of the massive developments of the reconstruction in Europe after World War I and II, and during the time of the urban proliferation that succeeded it. Opposed to this notion of density, a *critical density* is defined as one that produces life quality by relating the amount of inhabitants of a place, the area they occupy, and the amount of urban programs available to them at a walking distance. Hence, producing this kind of density does not mean increasing the population of a place.

Introducing sheer density is not enough: Swiss town montage

Opinion polls collected in some major cities throughout Europe, America, and Asia, refine further the concept of life quality relating it to the following pragmatic issues:

- In settlements without critical density, long distances oblige a dependency on the car. This leads to a higher expense of finite mineral fuels and a higher pollution of the atmosphere: Furthermore vehicular dependencies reduce the freedom for the young, the old, or the disabled persons that are not awarded a driving license. Worldwide, traffic and population at the urban periphery are increasing. This means a bigger handicap for a growing percentage of people who are excluded from urban life and one day might be engaged in illegal activities.

- Without critical density a place cannot support a feasible public transport network. The relation between the amount of users and the distances that are prevalent at the periphery, either make the journeys irrationally long, or the routes fail to cover enough ground to serve a sufficient percentage of the total population of a region.

- Without critical density pedestrian or bicycle networks fail to function as an alternative for motorised means of transport. Either the distances become too long for the alternative mode of transport, or the actual price of making and maintaining these facilities becomes too expensive once their cost is divided between the inhabitants actually served by them.

- Without critical density the distribution of a settlement divides free space by compromising its identity and its performance. Space that once used to be the perceptual background of the built territories is often asphyxiated by inconsistent developments that trap and isolate portions of free space. This fact renders them useless for anything else than another development that might take years to happen. The engineering of free space is, in these terms, as important as the engineering of the built city. Free space, whether used for agriculture, cattle, or for the wild life that ultimately supports the food chain, is the perceptual base for the city. Its performance and quality depend on its size and on the sheer fact of being continuous.

- Without critical density the cost of maintaining the networks of water, electricity, gas, drainage, asphalt, telephone, fiber optics etc. is proportionally higher. There is a certain density that sustains the collective establishment of urban facilities. This is one of the primal motives of urbanism. However, it seems as if our technical evolution has liberated the city from its need for density. World population is growing in numbers while at the same time it is developing a need for isolation and for a 'contact to nature'. The problem with these tendencies coexisting together is that the cost of sprawling civilisation is too high. The friction this is provoking in terms of the transformation of the resources necessary to stretch the city infinitely is irrational. The primal matter used to extend the city is as finite as the size of the earth.

- Without critical density the presence of transportation infrastructures is not mediated or buffered. The often abrupt presence of large scale infrastructures in the periphery produces noise, and intimidates other, more local, means of transport.

- Without critical density the periphery fails to capture the capital that circulates through its territory in the form of transit. Peripheral urban territories are today immersed in a kind of economic paradox. The territories of peripheral communities serve as a vehicle for a large flow of persons and goods, yet they fail to transform this 'latent capital' into the tourism that can derive from that flow.

- Without critical density recreational facilities are insufficient or lack maintenance. Amusement facilities are often only found in the nearby historic centers that can sustain them, but on peak times they overflow.

Car dependency: Zofingen, Aargau, Switzerland

Car pollution: Bombay India

Inefficiant public transport: Aargau, Switzerland

Dangerous vehicular environment: Switzerland

Discontinuous open space: Aargau, Switzerland

Discontinuous open space: Aargau, Switzerland

Biotope disruption: Zofingen, Aargau, Switzerland
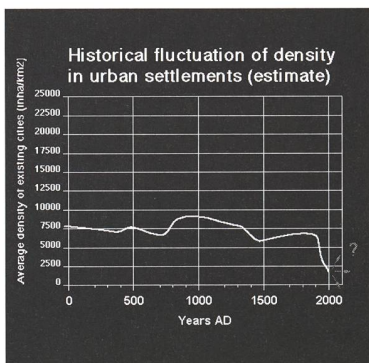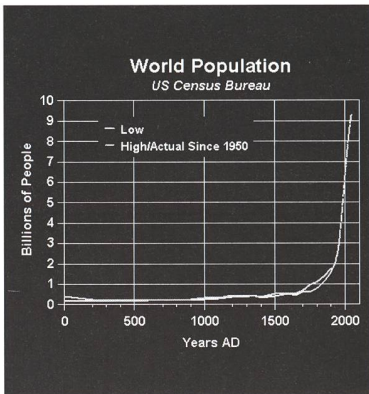

Overwhelming presence of infrastructures

Insufficient recreation: Oftringen, Switzerland

Marginal tourism: Aarburg, Aargau, Switzerland

World Population
US Census Bureau

Historical fluctuation of density in urban settlements (estimate)

Statistical data by US Consensus Bureau, 1989.

Global statistical forecast

Future global state of affairs will have a determinant role in defining the issues that relate to the way land will be used, and to the way life quality will be achieved in it. Predictions have arguable positions about global future. In a time frame that oscillates between one (CNN) and three (UN) generations, the population of the planet will grow from 6 to 12 billion inhabitants. Regardless of the source of information we choose, this kind of growth is far beyond any historical experience. Mankind has never before confronted the consequences of its own growth on such a proportion. Sociological studies point towards a worldwide population shift from rural areas into urban centers. In the last 50 years the greatest proportion of urban growth was registered in the territories that correspond to the mentioned urban periphery. Oil reserves will be extinct to 90 or 80 percent of their totality in 25 years.

A world population study by the US Census Bureau states: "Given no improvements in agricultural yields and continued population growth, if everyone in the world were to eat a "Northern" diet (i.e., eat approximately the quantity and quality of food eaten by people in the "North" - U.S., Canada, Europe, Australia, New Zealand, Japan), humanity would run out of enough arable land to grow food to feed everyone in 9 years. This is assuming all potentially arable land is used and no land is held aside for species conservation, preservation of wilderness, etc."

Critical urban density without population growth

Traditional strategies to build the city in the past 50 years have used growth as a main economic medium. Construction needs capital and sheer growth brings it along. Away from the problems of allocating population, the above mentioned forecast points towards a different problematic. The question is not any more: How does a city house a population overflow but rather: How do we remodel the existing settlements in ways that ameliorate the living qualities of the people that work and live there, and in ways that use resources in a sustainable way? Population growth will happen unevenly throughout the planet, and it will be highly concentrated in developing countries. In such places economical conditions have naturally provoked an efficient use of the available urban resources. The friction of the urban world on the planet is often proportional to the level of development observed. In the developing world, the proportion of resources used by the population is more favourable than in the developed countries. This means that the problem of sustainability has to be addressed regardless of population growth tendencies.

Life quality can be improved implementing critical density. This critical density determines the size the position and the use of each portion of settlement in ways that offer urban programs to a population with a degree of individual freedom. Since the problems derived from a poor life quality in the periphery grow independently of demographic tendencies, the implementation of such land usage should be adapted in each case regardless of local tendencies of population growth. The question is how can an urban design implement critical density in existing urban fronts even in places facing little, or even sometimes observing a negative population growth?

Relative increase of urban density by a forest: Central Park West, N.Y.

Critical density and territorial contrast

Territory and population are the main factors in city planning. If the population growth factor becomes marginal to the need of ameliorating the living qualities of places everywhere, then how can an urban design implement a relative increase in its density through the use of its territory? How can the existing footprint of a settlement be reduced? How can sprawl be condensed?

Relative increase of urban density by a river: River Side Drive, N.Y.

Territories are mainly classified in two rubrics: open and built. The open territory can be further divided in water, agriculture, forest, desert, tundra, etc, and the built territory can be further divided in infrastructures and settlement. Urban examples prove that, once an area is urbanised, often, relative congestion is produced at places where there is a lasting contrast between the urban territories. It seems as if there is a natural human tendency to settle there where the fascination of the "other" or of the "unknown" is present. In a territorial point of view this "otherness" can be achieved by juxtaposing an open territory abruptly next to the built one. A beach shows that a strong contrast between water and settlement seduces a relative density at the point where the city meets the "hidden wilderness" of the ocean. Similar contrasts occur when the city is confronted with a river, or a lake. A Park produces density around it through the strong contrast that exists between the territory of forest and settlement. A piazza produces density through the contrast that exists between settlement and a mere open space. A city surrounded by a forest might produce congestion through the contrast that exists between the forest and the settlement at an outer condition. A hilltop also produces density through the contrast of height that exists on the territory of settlement.

Relative increase of urban density by the sea: Long Beach California

Relative increase of urban density by a lawn: Bath Crescent

The present extension of the periphery, its imminent growth and its low level of life quality prompt for a change in the urban disciplines that failed to control it. Since the origins of modern town planning, urbanism has been a remedial discipline. There were two schools of thought: one believed in a conceptual urbanism that created ideal cities based on a tabula rasa, the other in concrete case-based remedies. Today both schools of thought seem to be necessary. The addition of local positions has global consequences. Changes towards the amelioration of the life quality at the periphery have to deal with the existing conditions. But, no local urban design can be relevant today without taking a position towards the additive consequences implied in the performance of local urban operations. The consolidation of a global-built-network multiplies the role of any settlement adding to its local performance a simultaneous global agenda. Urbanism has today a double task: on the one hand it is locally remedial while on the other it has to fabricate a global conceptual framework.

Critical density can be implemented using the strategies of high contrast that have proven the capacity to increase the demand of settlement at certain portions of land. If successful, this strategy would cover the local dimension of the problem. The global dimension of such a project appears if the conversion of those territories into open space can achieve the amelioration of the world's natural complex at a larger scale.
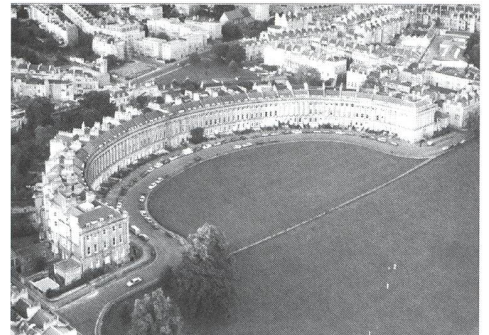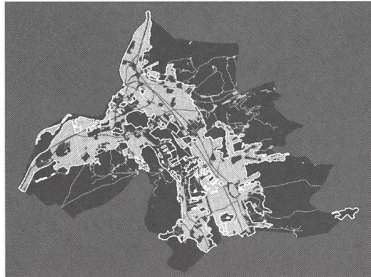

Relative increase of urban density by a lake: Lugano, Switzerland and by a square: Piazza San Polo, Venice
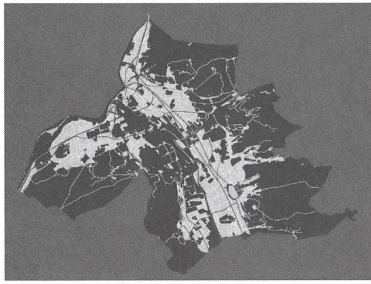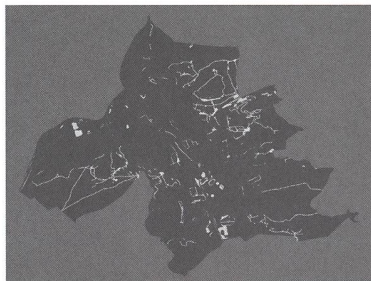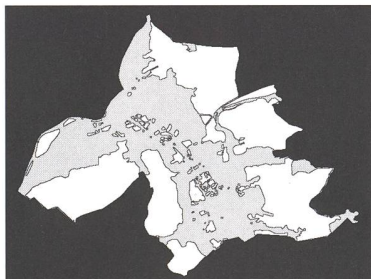
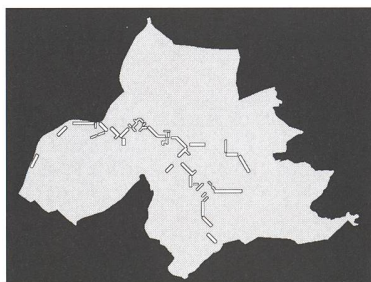Existing urban network: Aargau, Switzerland

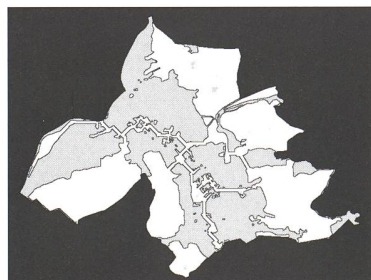Critical density line: Aargau, Switzerland

Urban Sprawl: Aargau, Switzerland

Liberation of open space: Aargau, Switzerland

green-open-space-bridges: Aargau, Switzerland

Open space as network: Aargau, Switzerland

Networks

The performance of open space, whether it is used for agriculture, cattle, for wildlife preservation, or as the sheer perceptual backdrop for the city, is determined by its sheer amount of land, and by the continuity or its territory. A big portion of arable land that is divided by settlement of infrastructures might be less efficient than a smaller portion that is continuous. The fabrication of a two dimensional network on a given surface implies the emergence of a residue. Residues have different performances according to the different types of networks. The crystallisation of the built territories around the planet into a network is slowly transforming the open territories into a discarded residue. While this built-network expands with a low density it compromises the performance of the open territories it uses as a support. Networks have three basic conditions: continuity, pervasiveness, and exclusion. The global-built-network is continuous and pervasive but fails to be exclusive. The boundaries between natural and built territories are blurred. This lack of definition enlarges the footprint of cities rising the cost of maintaining them and reduces the efficiency of the open territories. Without a boundary capable of determining where a city stops, and where nature begins, the identification that the inhabitants of a place make of their environment is also compromised. The city is perceptually everywhere and yet consistent urban life quality is rare.

In general terms the density of a city diminishes as it approaches its periphery. The careful relocation of a minimum amount of residents at the periphery of a city could considerably reduce its footprint bringing substantial savings in the maintenance of urban infrastructures. This strategy defines a line that signals the place where it is possible to create a relative density. The line performs two actions: It assures a free open territory, and it increases the density of the portions of the built territory that have views into it. Implementing exclusion in the built-network results in the simultaneous definition of an open-network. Through bridges or underpasses this network can achieve the continuity necessary to recuperate its performance as open-space. The ideal network strategy for the city would be to achieve two synchronic networks that complement each other by exacerbating their corresponding roles.

In the case of an existing city the position of this line is defined by three concepts: a minimum critical density, a ratio of resistance for change, and an intention for spatial identification where applicable. Minimum critical density is the relation that establishes that a reasonable amount of settlement should be assigned to each complex of infrastructures. The resistance for change of a piece of settlement is defined by the cost of buying it, by the effort needed to transform it, and by the type of property it is. (Public property is easier to change than private property.) The will for future development is defined by a forecast on the population growth expected to live in a certain area in 50 years. The intention of spatial identification adjusts the position of the line that separates open from built land and it is defined by the local conditions of topography, and by local perceptual interests. If a line defining open and built territories defines simultaneously a built and an open network green-open-space-bridges make it possible for both networks to be continuous simultaneously.

Urban plan and democracy

In a world evolving towards democratic societies, the urban plan that focuses on the transformation of existing settlements works altering existing communities ruled by common interests. At times where urban transformations are framed by commercial activity, an urban plan has to work its changes manipulating the prevailing status of the real estate market. The implementation of critical density through territorial redistribution is thinkable when it achieves maximum life quality relocating as little existing settlement as possible.

The strategic liberation of land must be chosen so it performs as an urban attractor once it is liberated. The plan must perform two simultaneous operations: Removal and Densification. Removing settlement attempts against the property of individual or organisations. A plan to implement congestion is similar to a plan to implement a railway system. The properties directly affected by the railroad expropriated with the gain that the plan means for the rest of the population.

In order to realise the removal of property the plan must generate:
- enough reasons to sustain a democratic consensus to do it
- the capital to pay for the removal, and
- the capital to buy the property that needs to be transformed.

The transformation process can be pictured as follows:

1. The plan that is presented to the public contains information about better future conditions in terms of life quality improvements that relate to the implementation of a critical density.

2. The plan is submitted to a democratic process.

3. If admitted the plan becomes a forecast for the future value structure of the site. The plan changes the commercial desire on specific properties.

4. In a community level a forecast for reducing the future cost of the city can be mortgaged into a bank-loan. In other words, the money that a community can guarantee to save in the future can be used now.

5. Once implemented, the new plan reduces the cost of running the city. This will reduce the taxes on the site, but they will not go down until the loan used for the transformation is paid back. Extending the old tax rates into the future condition pays the loan.

6. In an individual level there are three kinds of owners: winners, losers, and those whose land is not directly affected but only benefit from the overall gain.

7. Part of the money loaned to the community is used to buy the properties that need to be taken away, and to remove the overflow of infrastructures that they imply.

8. The existence of the plan prompts for the land of the winning owner to rise in value. He can mortgage this value into a loan to built and gain a higher rent on his property.

9. The loosing owner can move to the densified sites using the capital that he got for his property.

10. The liberated land is conditioned to work as urban attractor.

11. Further growth happens in the areas around the attraction fronts.

By this rationale, the foot print of the settlement is smaller, the urban costs are undersized, fuel consumption is reduced, the need for cars is shortened, public transportation is more efficient, and bike and pedestrian networks become possible.
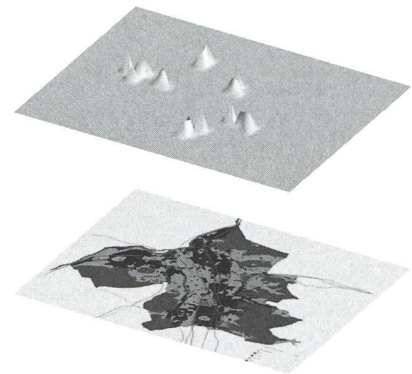
The existing value-structure of the territory determines that the degree of desirability is reduced to the properties that are close to ancient urban structures: history is the only focus of attraction.
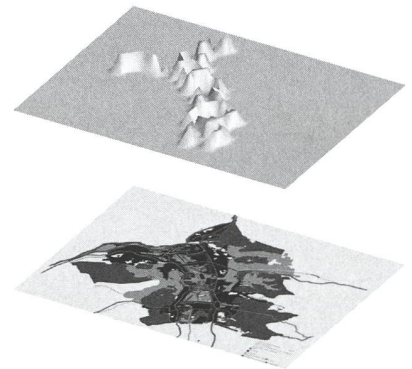
The plan implements a series of connected parks in order to enhance the landvalue structure of the place. This has the potential of increasing the density and sets up the appropiate ground to implement the urban needs that are able to improve the life quality of the place.

Xavier Calderon is architect and assistant at ETH Zurich. The above text is a summary of his research on strategies for the *Densification of Peripheral Urban Landscapes* that will soon lead to a more extensive publication.

Dennis Hopper, *Double Standard*, 1961