Integration through city space-form

Using space syntax, traffic modelling and geoprocessing tools for evaluating new urban developments

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Key words: space syntax, traffic modelling, urban expansion, urban design

Abstract: New boroughs are continuously being built in Brasilia, Brazil's Capital City. The paper deals with the performance of such boroughs concerning sociospatial segregation. A comparison is made between two proposals for a new borough to the West of the North Wing of the Pilot Plan, which was originally designed by Lucio Costa. The first proposal was made by a well-known architectural studio in Brasilia and is beginning to be implemented. The second proposal is an exercise made by undergraduate students from the School of Architecture of the University of Brasilia, under the supervision of one the authors of the paper. The two proposals present very different performances. In the first case, the borough is set apart from the immediate urban surroundings; there is no direct connection between inner roads and the main arteries that surround the site. In the second case, the students have proposed a scheme that connects the interior areas of the borough to the vicinity; we hardly know where the new borough begins *vis-à-vis* the neighbouring areas. We argue that there are serious traffic implications in the first case, as well as sociological implications. We deal with traffic modelling, space syntax techniques and geoprocessing tools to prove so. Furthermore, we will show how the building types are as well socially inadequate, for they will imply homogeneous social layers among the inhabitants – namely exclusively high-middle class living in the new area.

1. INTRODUCTION

In projects for new boroughs, modern urban design often creates enclaves which do not relate well to the surroundings in terms of continuity of traffic channels or public spaces. Discontinuity with preexisting urban tissue is the

rule. This is also the case with Brasilia. The paper examines one of such instances, a borough which is an expansion to the Northwest of Costa's Pilot Plan. It is being implemented after a proposal by a well-known architectural studio in Brasilia, with the basic attributes commented above. In contrast to this, a proposal by undergraduate students of the University of Brasilia adopts a completely different attitude. The two proposals are compared.

Various *design and decision support systems* are used: space syntax theory, geographic information systems (GIS) and traffic modelling. We start by characterising the metropolitan structure as a whole. The global structure of the city is depicted by the *axial map*, a reduction of its street/road system to a map of line segments corresponding to the axes of the streets/roads. This offers the wider background against which the two proposals are contrasted. Secondly, we comment on sociospatial stratification of the metropolis and relate this to building types; GIS tools are used to cross socioeconomic data from census tracts with spatial attributes which characterise their insertion in the city. Thirdly, we compare the two projects in terms of 1) topological integration with the city at large, 2) sociological implications of the two projects in terms of sociospatial segregation and 3) traffic implications of the two proposals.

2. THE METROPOLIS AS A WHOLE

To talk about Brasilia demands an initial explanation. The Brazilian Capital is a metropolis with 2,455,903 inhabitants (IBGE, 2007) within the borders of the Brazilian Federal District (FD), plus about half a million more in urban areas which sprawl beyond the borders of the FD into the neighbouring State of Goiás. (For lack of proper data, however, only urban areas within the borders of the Federal District are considered.)

Since 2003, the city is subdivided into 28 Administrative Regions (AR). However data here refer to the 19 ARs into which the FD was subdivided before last administrative reorganisation, for lack of disaggregated data for the new regions so far. ARs are improperly called "cities". We should rather call them boroughs of the metropolis – this is what they actually are. The elements initially proposed by Lucio Costa's Plan, dating from 1957, constitute today only a small part of the whole city and are situated in three ARs, officially called "Brasilia", "South Lake" and "North Lake", in which only circa 12% of the metropolitan population live (*Figure 1*). However, in this text, "Brasília" is the metropolis. Along time it became common to use the denomination "Pilot Plan" (or simply "Plan") only for the residential "wings" and its immediate surroundings originally proposed by Lucio Costa. The dichotomy thus adopted – "Brasília" / "Pilot Plan" – is justified

historically and is found in traffic signals and in people's imaginary: inhabitants of the "satellite cities" consider themselves inhabitants of "Brasilia" (Branco, 2006). This is a correct reading, for they live in parts of the metropolis and rightly capture the nature of the whole city and the complementarity of its various bits.

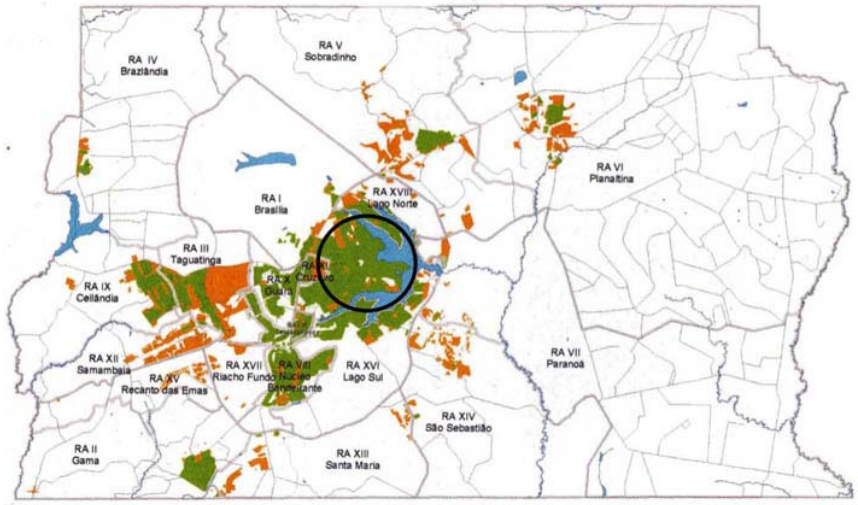

Figure 1. Federal District. Urban zones dating from the 1990s (orange) and from previous decades (green). The circle indicates the area originally planned by Lucio Costa in 1957.

However, the history of the FD's cityscape is more complex than the dichotomy Pilot Plan/Satellite Cities suggests. There were two urban nuclei which preexisted the Capital, the configuration of which resembles Brazilian vernacular cities (e.g. Planaltina); slums were self-produced by workers who migrated to the FD during the initial stages of the construction of the city (the last one, Old Paranóa, has been bulldozed by the local government in 1989); also in initial times, companies built camps in order to house architects, engineers, technicians and manual workers, the remains of which still exist; there are significant differences between the "classic modernism" of Costa's plan, the "peripheral modernism" of satellite cities and the "post-modernism" of more recent times; gated communities are the new pattern of urban expansion.

The Pilot Plan plus the other elements of this varied panorama constitute the dispersed "morphic patchwork" of the metropolis. *Figure 2* compares Brasilia's axial map with São Paulo's (Medeiros, 2006, 2007): within a radius of 30 km, São Paulo (11,016,703 people) has almost five times more

people than Brasilia. Both the Pilot Plan and the "patchwork" of the whole city make Brasilia such a fascinating place to investigate.

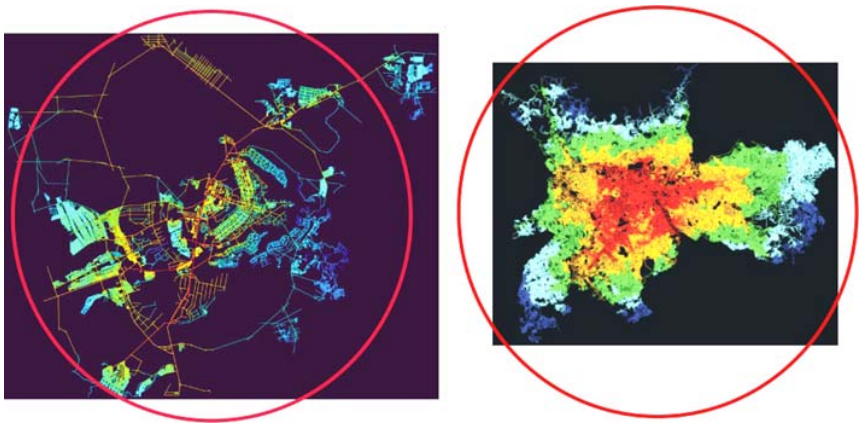

Figure 2. FD (left) and São Paulo (right). Axial maps in a radius of 30 km (red circles).

Besides this "morphic patchwork" two other important attributes characterise Brasilia as a peculiar city: its *dispersion* and the *eccentricity* of its urban core. As to the former, Brasilia is the second most dispersed city in the world, according to a comparative study among 56 cities of all continents (Ribeiro & Holanda, 2006, elaborating on a previous study of 48 cities by Bertaud & Malpezzi, 1999). On the other hand, Space Syntax Theory (Hillier & Hanson, 1984, for basic concepts) is used to show, through the axial map, that the metropolitan centre, located in the Pilot Plan, is eccentric concerning the city as a whole (Mota et al., 2001, Holanda, 2006). Once drawn, the axial map is processed by proper software (Turner, 2007), which offers two kinds of output – *graphic* and *numerical.* FD processed axial map is represented in *Figure 2* (left). Lines in "warm" colours (red/ orange band) represent the most *integrated* axes in the system, i.e. the most accessible ones, in average, from every other axis in the city, in topological terms (in the method, topological accessibility means least number of turns between axes). (In Space Syntax Theory, *integrated*, *more accessible* and *shallow* are synonymous expressions; the same holds for *segregated*, *less accessible* and *deep*.) Notice how the centre of the Pilot Plan (*Figure 2*, left, in the centre of the image) is "cold" – lines in the green/blue colour band. The problem is that only 10% of the metropolitan population live in this area (Pilot Plan and immediate surroundings), but it concentrates 80% of formal jobs of the whole city.

In numerical terms, the software ascribes a value to each line, which again expresses the topological accessibility of that line to the rest of the

system. In another inquiry, studying a sample of 164 cities from all continents, Medeiros (2006) offers a broad view of urban spatial systems along a great number of variables, among them *average integration* of the entire city (values range from 0.1819 – deepest city, Phuket, Thailand – to 2.7071 – shallowest city, Hollywood, USA). In this paper, we normalise the values in a scale from 0 to 100. In this scale Brasilia still belongs to the more segregated half, but it is not as peculiar as it is in terms of dispersion: world average integration is 29.22 and Brasilia's is 26.50, thus 9.3% less integrated than world average. Still, Brasilia's low integration depicts quantitatively what was commented before, i.e. the "patchwork" nature of the city, its urban tissue being formed by discontinuous fragments, which make it difficult to 1) *move around* from one bit to another and 2) *form a clear city image* for lack of strong unifying spatial elements.

All this – dispersion, eccentricity, depth – has direct implications concerning urbanistic policies: in order to rebalance the city, measures should be taken in order to decentralize jobs from the Pilot Plan, at the same time that demographic densities in the latter area (i.e. number of inhabitants) should increase. We shall see how these aspects pertain to the evaluation of a local intervention (as a new borough) and how they will inform the assessment of the contrasting proposals of the two case-studies examined in this paper.

3. SOCIOSPATIAL SEGREGATION

The development of the city has made Costa regret the high social costs involved, that he has criticised: the uniform pattern of apartments did not respond to "the three economic layers in which, in the capitalist world, people who work in the public administration and in the private enterprise are divided" (Costa, 1995, p. 319). It was "as if present society were already a classless one" (id., p. 302). To ignore his proposal of varied flats for diverse income layers would have resulted from "vices of a centuries-old socioeconomic reality, by which the bourgeois, despite the familiarity with which they deal with servants, have always kept them at a distance" (id., p. 315). But he adds: "this would not have solved the problem, since the great majority of the working people is even less than poor" (id., ibid.). Implicitly he acknowledges that many people would not have access to the building types of the Pilot Plan, but he does not reevaluate the spatial patterns he has proposed, he prefers to keep the "original physiognomy" he has designed.

In more recent proposals for social housing, he proposed the construction of buildings up to four stories high, over pilotis, without lifts or underground garages. Still, although the building type implies access to housing by lower income people, it by no means satisfies the broad spectrum of income layers.

To a good measure, sociospatial stratification has its origin in the project. Let us see how an inquiry under way allows us to characterise this process.

The traditional discourse on Brasilia states that the rich live in, or near to, the Pilot Plan, whereas the poor live in the satellite nuclei. We suspected that this was not quite so, and to check this we have calculated the R-square between income and two global characteristics of the city's configuration: 1) distance from the metropolitan CBD and 2) Space Syntax Theory integration measure, both referring to the census tracts (IBGE, 2002). In order to do so, we have used a Geographical Information System (GIS) tool (ArcView®). We have found R^2=0.44 between income and distance from CBD, i.e. a lot more was at stake concerning the distribution of family income layers in space, besides distance from city centre.

Secondly, Brasilia's CBD is morphologically eccentric (see above): it is not crossed by the most integrated lines of the axial map. It was then interesting to calculate the correlation between integration measure of census tracts and income. We found R^2=0.04, i.e. integration measure explains even less income distribution in space than distance do CBD does. These low correlations have then confirmed the first hypothesis: there is little relation between income and global insertion of the areas in the city, depicted either by the measure of integration or the distance to the CBD. We have then looked at local properties of eight places which strongly vary both in income and in built form-space.

The first area is the South Lake (*Figure 3* – for lack of space, few images illustrate the areas), which presents a suburban type of occupation: exclusively residential use, isolated shopping malls, semi-express roads with generous green areas along traffic lanes, tree-like street schemes with many cul-de-sacs that are presently tending to be enclosed and thus privatised, single family house plots (minimum 800m^2). This is the richest region in the FD, with an average income of US$ 3,189.23. The rich amount to 80% of the population, and the medium-medium and lower strata do not reach 10%. This was a first surprise: even in an area like this, there are "non-conforming (poor) families" who live in the interstices of the dominant order.

The second area is part of the Southwest Borough (*Figure 3*), which is rather recent (1990s). There are two different bits to it, which differ in configuration and income layers: they are popularly called "noble" Southwest and "economic" Southwest. The "noble" bit is this second area of analysis (the "economic" bit is commented further on). It has apartment buildings six stories high, pilotis, lifts, underground garages; there are high-tech facilities (internet plug-ins, intranet, internal security circuits, cable TV etc.) and the fashionable post-modernist cosmetics – lots of crystal façades, aluminium or stainless steel, supposedly Greek or Roman columns, arches, pediments… The price per built square metre amounts to US$ 3,000.00 or

more. Average income is US$ 2,897.77. The rich fall to 65%, there is a clear increase in the middle-superior strata (now almost 25%), but the medium-medium and lower strata (11%) differs little from the South Lake.

Figure 3. South Lake (left) and Southwest (right).

The third area is a traditional superblock of the Pilot Plan, the 103 South. Buildings are six stories high with lifts but do not present the characteristics of those of the Southwest and the built square metre price is half as much. Average income is US$ 2,662.81. The rich fall to 56% and medium-medium and lower strata almost double: 20%.

The fourth area are gated communities of the Colorado Borough (*Figure 4*), 26 km northwest of the Pilot Plan in the satellite city of Sobradinho. They are constituted by single family houses, typical examples of the migration of medium strata away from the Pilot Plan, intensified in the last 10 years. Distance to the Plan is rewarded by the price of the plot (circa US$ 38,000.00) and by the possibility of building a house of good standard for US$ 360.00/m^2 of built area, against US$ 3,000.00/m^2 of the new flats of the Plan or the Southwest. Average income is US$ 2,508.78. Compared to the 103 South, the rich fall slightly (from 56% to 53%), medium-medium and middle-lower strata together increase from 14% to 16%, and the poor increase from 3.7% to 5.5%. It is usual to build the house in various phases, with the family moving in from the very first phase, a typical process among families with lower economic resources. This certainly explains the increase in the bottom income layers.

The fifth area is the “economic” Southwest (*Figure 4*), constituted by apartment buildings three stories high over pilotis, rarely with lifts and underground garages. It does not have the high-tech facilities of the “noble” bit (area 2, above). Average income is US$ 2,259.80. The decrease among the rich and the increase among the medium-superior layers are clear: both are now 38% of the total. Flats are much cheaper than those of the “noble” Southwest.

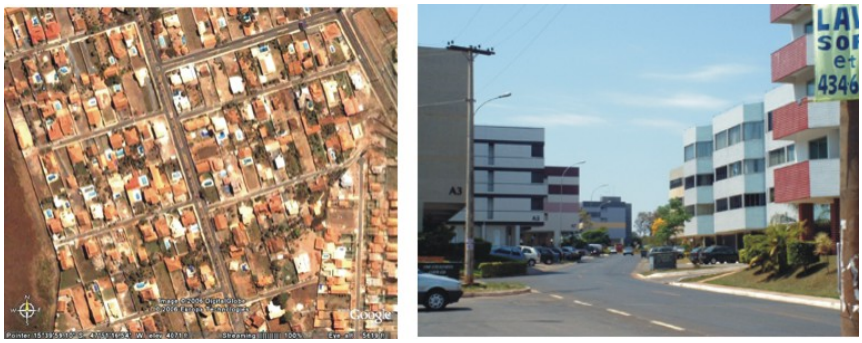

Figure 4. Colorado gated communities (left) and "economic" Southwest (right).

The sixth area are the "JK" buildings of the "400" row of superblocks at the Pilot Plan South Wing (*Figure 5*). They are three stories high but without pilotis nor lifts nor garages. Flats are small and green open spaces around them are more modest than in other superblocks. Average income is US$ 1,719.49. Despite the privileged location concerning jobs and services, the rich fall to 22% and the medium-medium strata and below are 43%; within the latter, the poor amount to 6.4%.

The seventh area is Vila Planalto (*Figure 5*), only 1,500m away from the Square of the Three Powers – the heart of the city (and of the Republic!...). The inquiry has revealed here the most rewarding results. The Vila dates from the beginnings of the construction of the city and had its origins in a building firm camp that provided housing for the company employees of all layers – architects, engineers, technicians, manual workers. It was quite varied concerning plots, houses, blocks, streets, alleys, sidewalks etc., according to the respective social categories therein. Today (2008), 48 years after the inauguration of the city, such variation is still clearly imprinted in its configuration. The average plot is very small (143m^2) and 46% of all plots have less than 100m^2 of area. Some streets are so narrow that they almost forbid cars from passing through. And yet the Vila presents an income stratification that is very close to the stratification of the FD as a whole – it is almost, as it were, a microcosm of the entire metropolis: there is a bit more of rich people in the FD (10.4% in the Vila, 11.9% in the FD), medium strata are also larger in the FD (49.8% in the Vila, 57% in the FD), and there are circa 7% more poor families in the Vila than in the FD (39.7% in the Vila, 32.5% in the FD). Average income is US$ 897.61. There has been some gentrification. The picturesque character of the Vila, as well as its privileged location, has attracted middle class intellectuals. The best houses are suitable to adaptations that correspond to middle class expectations and are situated in streets which allow generous parking space. But such houses

are a minority. The larger part of the Vila's architecture and townscape is not fashionable to medium strata, let alone the rich. Thus, gentrification seems to be reaching a limit, imposed by architecture of the place and by the impossibility, enforced by law, to change some of its fundamental characteristics (it is within the perimeter of the area considered World Cultural Heritage by UNESCO, 1989).

Figure 5. "JK" buildings (left) and Vila Planalto (right).

The eighth area is Recanto das Emas, 26 km away from the Pilot Plan. It is the poorest administrative region of the FD. Plots have been given for free to poor families by the local government and houses have been self produced. Average income is US$ 290.98. Poor and medium-low strata amount to 89%. Recanto das Emas is the only case in the sample which supports the common assumption we have been challenging in the paper, i.e. physical segregation, as indicated by syntactic axial maps, comes together with poverty.

Now, what is clear from the inquiry is that the "utopian" view of Lucio Costa's, by which all classes could inhabit the modernistic superblocks, was wrong: the profound variations in income implied that a much more varied built form was needed to account for the demand of all social strata. The result of this inquiry contributes with fundamental aspects to the evaluation of new boroughs, as follows.

4. A NEW BOROUGH – THE NORTHWEST

In 1987 Lucio Costa has proposed various urban areas in which urban expansion of the Brazilian Capital should happen (Costa, 1987). One of these areas was the new Northwest Borough, which is now coming into reality. It is situated in an area of 819 hectares to the west of the North Wing of the Pilot Plan (*Figure 6*). Following the guidelines of the FD government,

a well-known local architectural practice (Zimbres Arquitetos Associados) has proposed a design for the new borough, in 2002. In 2005, a group of architectural students at the University of Brasilia has proposed an alternative study for the same area.[1] The two proposals differ in fundamental aspects. In what follows, they will be compared. In each topic, a specific aspect is considered. The argument is constructed with reference to the foregoing discussion about the overall structure of the metropolis. For economy of speech, Zimbres' proposal will be referred to as *Z-project* and the students' proposal as *S-project* (*Figures 6* and *7*). We are aware of the political implications behind the Z-project – guidelines of the government etc. We are not discussing its determinations (architecture as a *dependent variable*). Our critique is not directed to the architect and his associates, whom we highly respect for their recognised expertise, but to the *implications* of the proposal as it came to be configured: we are discussing architecture as an *independent variable* – i.e. its *consequences* once built.

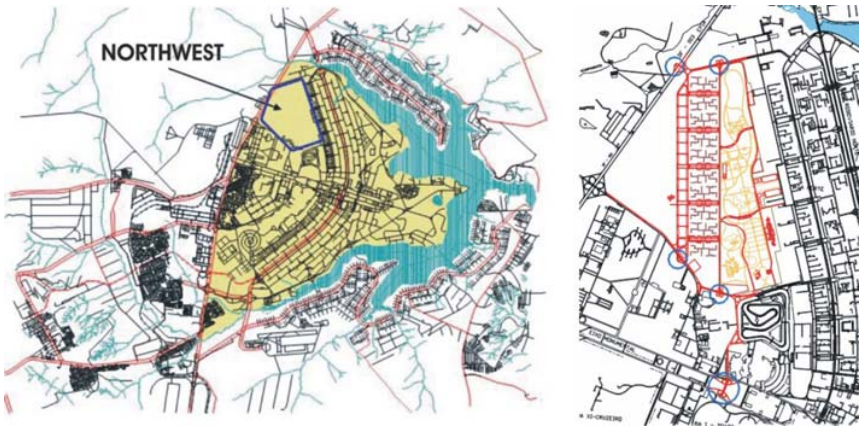

Figure 6. Situation of the Northwest borough in the FD (left) and Z-project's street scheme (right). (The authors thank *Zimbres Arquitetos Associados* for the images of Z-project.)

4.1 Size of the borough

Z-project proposes a borough for 40,000 people and leaves idle a vast portion of land. S-project suggests all available land should be occupied and a total target population of 120,000 inhabitants is proposed. The latter is consistent with the need to fill in all urban blanks in this discontinuous

[1] The students were Reinaldo Germano dos Santos Jr., Damaris Borges, Bárbara Ávila e Ana Carolina Vaz.

metropolis: the area is very central and is richly fed by a highly idle infrastructure. There is no reason why it should be kept empty, even more so when we consider that much more distant areas have long since been the object of priorities of the local government concerning land occupation. It is time to revert such policy. The desirable balance of the city requires *more people* to urgently inhabit the large and numerous voids that still exist within, and in close vicinity to, the very core of the metropolis.

Figure 7. Z-project (left) and S-project (right, plan), showing in blue, in the latter, the mixed areas strips (commercial and residential).

4.2 Land use

Z-project proposes two main areas, concerning land use: the residential superblocks and an area for institutions which will attract people living in other boroughs of the city. S-project suggests a much more limited land use: only housing and its complementary facilities. This is correct, if we consider the highly imbalanced land use structure we have in the city (remember: 80% of formal jobs concentrate in the Pilot Plan). Defining a significant portion of the borough for “institutions” will bring more jobs to the place, beyond those which are strictly necessary to serve the inhabitants. And will thus enhance the imbalance of the city.

4.3 Urbanistic types

Z-project’s proposal for the residential part of the borough is very similar to the Pilot Plan’s superblocks: urbanistic units measuring about 250 x 250 meters, constituted by residential elongated buildings, six stories high over pilotis, with lifts and underground garages (20 of these superblocks were proposed). There is innovation in the rows of local shopping: two opposite

façades are served by access streets, instead of just one, as in the North Wing of the Pilot Plan; they are three stories high, streets serving them also give access to the residential superblocks and there are curbside parking spaces (small residential units will be allowed in upper floors).

The proposal is based in the argument that "the superblock is a success". Therefore it should be replicated everywhere in the FD. Wrong. It is very controversial to use the same urbanistic type of the Pilot Plan outside its original context: this will weaken the image of the Plan and will imply problems of legibility for the city at large – where are we exactly, while strolling (or driving) along the new borough? In a new area, dating from the 2000's, or back in time (1960's) in a bit of Costa's plan? (Lynch's classic question comes to mind: "what time is this place?"…) (Lynch, 1972).

S-project, in turn, proposes a variety of urbanistic types: blocks facing directly the streets, defining public open spaces; a "bucolic" boulevard which connects the borough with the large park to the east; commercial strips which cross at a large central sector of higher built densities; variation in plots' size and geometry etc. Configuration of public spaces do *not* mimic previous types of Costa's plan and simultaneously advances vis-à-vis traditional cityscape. It is expected that the borough would allow the formation of a strong an image of its own in our heads. Also, such space-form variation would imply a much greater family income variation than the one we would find in Z-project, as the inquiry described here has demonstrated. This means *greater urbanity*.

Differences between the two projects also appear as we process the local axial map of street configuration, by means of abstracting the configuration of the borough from its surroundings. Z-project is much deeper than S-project, i.e. it is topologically more difficult, in average, to go from one place to another within the place, it takes a much greater number of turns to do this, in average. This is revealed both in numbers and graphically. Quantitatively, mean integration amounts to 22.50 in Z-project and 60.51 in S-project – a huge difference. Graphically, the tree-like organisation of the superblocks in Z-project is clearly depicted by the colours of the local axial map – see the deep blue colours of the streets in the interior of the blocks. Moving around S-project is facilitated by its grid-like system, despite its rather geometrical irregularity. This helps way finding in the borough and makes infrastructure and garbage collection much cheaper (*Figure 8*).

4.4 Configurational connections with the surroundings

We have inserted both projects, in turn, in the axial map of the whole FD (*Figure 9*). After processing each version, differences concerning the connections with the surroundings appear clearly. Z-project looks like an

enclave. Notice how it does not connect to any of the main surrounding streets/avenues/roads represented by the lines of the axial map. In this, it replicates the traditional way modernist urban projects are inserted in previous existing urban tissues: by negating, or ignoring, preexisting structures, it is rather a *rupture* than a *continuity* with what came before. S-project adopts quite a different philosophy. It not only occupies all land available, it also expands the surrounding streets *into* the new borough. There is no break, no discontinuity. Practically, as well as expressively, this has clear connotations: it will be much easier to arrive *within* the borough when coming from outside, and the configuration will express a sense of *belonging* to the city at large which is absent in Z-project.

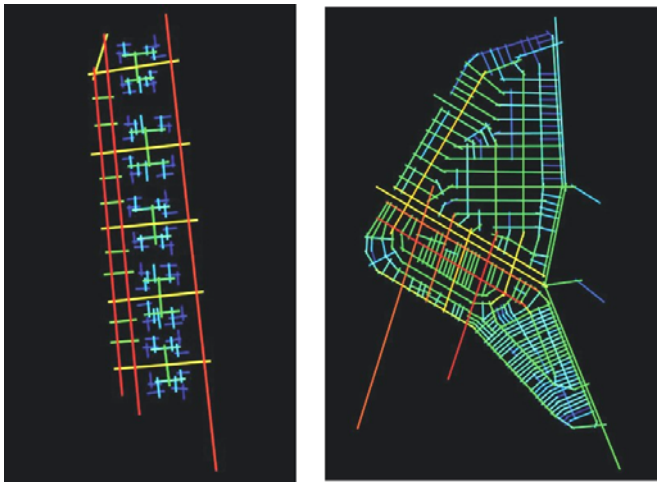

Figure 8. Local axial maps of Z-project (left) and S-project (right).

Such connections with the outside are well depicted by the axial map of the borough, when it is inserted in the entire map of the metropolis. We have calculated the mean integration of the lines within the borough, but now as the measures appear as a result of the insertion in the city at large. Average results were: for Z-project, 20.12, for S-project, 24.48. Of course, these low measures are influenced by the measures of Brasilia as a whole. Because it is a deep city (average = 26.50), naturally the measures of the borough are "contaminated" by the measures of its surroundings. Nevertheless, it is telling how the connections to the outside and the internal configuration of the projects make a difference between the two projects, vis-à-vis the entire city: numbers reveal that S-project is 20% more accessible from the system as a whole than Z-project. The "ghetto effect" of the latter's spatiality, which

is observable graphically from the map, is thus depicted quantitatively by the method.

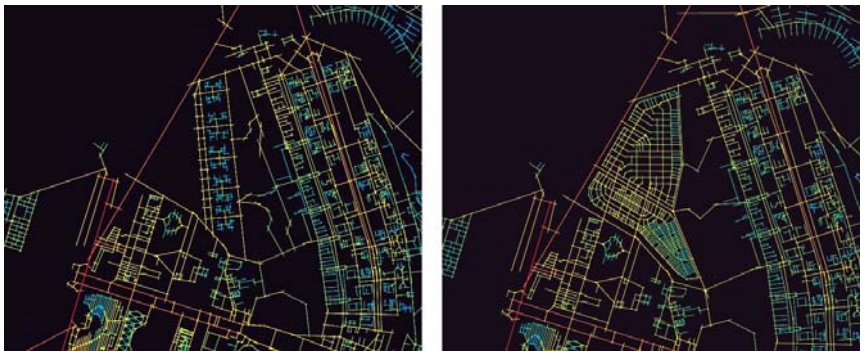

Figure 9. Axial maps of Z-project (left) and S-project (right) inserted in the surroundings.

4.5 Traffic implications

We have simulated traffic assignment in the two projects, another form of verifying their relations with the surroundings. SATURN® (Simulation and Assignment of Traffic to Urban Road Networks) was the software utilized, a computer program for network analysis (Van Vliet, 2004).

Differences between the projects (one more integrated, the other more segregated vis-à-vis the surroundings), are reflected in traffic flows which have been simulated. In Z-project there are a smaller number of vehicles in internal streets, which illustrate, from another point of view, its autarchic nature (1,400 pvh – private vehicles per hour – in one of the main entrances of the borough). In S-project internal flows are bigger: because of the connections with the surroundings, through traffic is generated, which is beneficial for the central activities of the place, even if they support predominantly local population (in this project, we have found, in an entrance to the borough of similar importance of the previous one, 1,800 pvh, i.e. an increase of 28.6%). (*Figure 10* and *11*.)

Different accessibility of the borough also implies different distribution of flows in the streets/roads of the surroundings. Z-project presents only one connection with the Pilot Plan to the east and none with the EPIA, the road to the west; S-project presents two connections with the North Wing and two with the EPIA. The result is that, from the simulation, flows in the EPIA will be of 1,300 pvh (north-south direction) and 2,515 pvh (south-north direction), while in S-project flows are, respectively, of 1,199 pvh and 1,811 pvh. S-project alleviates flows in the surroundings for it absorbs part of

them in its interior. This is positive. We know of the functional problems implied in more tree-like schemes, in which traffic jams occur in arteries and local streets remain practically idle – this would be the case with Z-project, and the opposite occurs with S-project. We also know of the sociological importance of intermingling "locals" and people from outside the neighborhood. The permeability of S-project to the outside would, in this way, contributes strongly to the urbanity of the place.

Figure 10. Traffic assignment in local axial maps of Z-project.

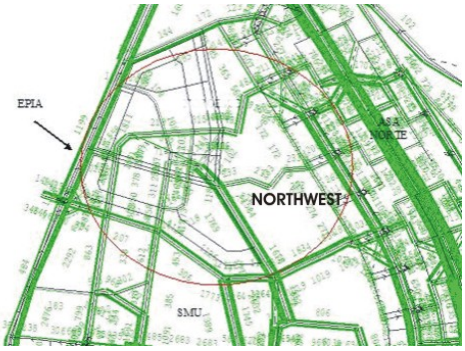

Figure 11. Traffic assignment in local axial maps of S-project.

5. CONCLUSION

It is not that Z-project has only problems and S-project only qualities. The former has innovations (e.g. local shopping) and replicates the pleasant

bucolic character of the residential tissue of the Pilot Plan. The latter might be better structured internally. For lack of space, we have selected a set of analytical tools to contrast them in important aspects, i.e. their impact in the metropolitan order, their performance as to distribution of income layers, and their connections with the surroundings. Problems of Z-project arise mainly in these variables: it brings more jobs to a region which is already saturated with them; it is homogenous as to a residential configuration which corresponds to high-middle class expectations; it replicates the enclave-like character of traditional modernistic proposals. In turn, S-project proposes an almost exclusively residential area (safe for essential urban facilities for local population), has a greater variety of building types, invests in greater cohesion with the surroundings and presents a greater continuity among its internal parts. Other variables will be explored in future work, more related to local characteristics of the proposals. Still, we hope that the analysis made so far already contributes to improve the quality of forthcoming projects.

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