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Tiering strategic environmental assessment and project environmental impact assessment in highway planning in São Paulo, Brazil

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ABSTRACT

Constructing highways in dense urban areas is always a challenge. In São Paulo Metropolitan Region, heavy truck traffic contributes to clog streets and expressways alike. As part of the traffic neither originates nor head to the region, a peripheral highway has been proposed to reduce traffic problems. This project, called *Rodoanel*, is an expressway approximately 175 km long. The fact that the projected south and north sections would cross catchments that supply most of the metropolis water demand was strongly disputed and made the environmental permitting process particularly difficult.

The agency in charge commissioned a strategic environmental assessment (SEA) of a revamped project, and called it the *Rodoanel Programme*. However, the SEA report failed to satisfactorily take account of significant strategic issues. Among these, the highway potential effect of inducing urban sprawl over water protection zones is the most critical issue, as it emerged later as a hurdle to project licensing.

Conclusion is that, particularly where no agreed-upon framework for SEA exists, when vertical tiering with downstream project EIA is sought, then a careful scoping of strategic issues is more than necessary. If an agreement on 'what is strategic' is not reached and not recognized by influential stakeholders, then the unsettled conflicts will be transferred to project EIA. In such a context, SEA will have added another loop to the usually long road to project approval.

1. Introduction

Like sustainable development, Strategic Environmental Assessment (SEA) is an all-encompassing idea that admits multiple interpretations. Hence, the meaning of SEA is potentially very broad and, unless it is narrowed by legislation, regulation or some kind of mutual agreement, its purpose and scope can be easily misunderstood.

The broad definition of SEA as the environmental assessment of policies, plans or programs, as opposed to (or as a complement to) the environmental assessment of projects has, at one time, both a positive and a negative connotation. Under the former viewpoint, SEA is not restrained to any strait jacket, thus can be applied to a variety of contexts and situations, the so-called flexibility. On the other hand, a broad understanding or SEA may result in almost any kind of planning document to be called SEA.

This characteristic of SEA is reflected in the literature. It has been argued that there is not just one form of SEA (Partidário and Clarck, 2000, page 6), that SEA is one concept that features multiple forms (Verheem and Tonk, 2000) and that SEA can be adapted to all forms of decision-making and planning rationalities (Partidário and Clarck, 2000, page 6). However, as put by Partidário (2000, pages 656–7), "a wide diversity of approaches to SEA developed which, while enriching debate, are critically confusing minds on the actual role of SEA in decision-making and on the relationship of SEA with other planning and impact assessment tools." Retief (2007, page 86) synthesizes: "some have perceived being flexible and adaptable as synonymous with being vague and confusing."

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Hence, even in the absence of a "generally agreed-upon framework for the evaluation of SEA" (Thissen, 2000, page 125), the need to agree on some kind of common denominator has been recognized, as expressed in "principles, standards and terminology" (Therivel and Partidário, 2000, page 272) or "performance criteria" for SEA (IAIA, 2002). A possible solution to this feature of SEA was advanced by, among others, Verheem and Tonk (2000, page 178): "one way to create flexibility (…) [is] to focus SEA principles on goals to be achieved, rather than on specified process requirements".

If no agreement is reached on the scope of a SEA prior to starting the process, then it is likely that the *validation* of its findings will encounter skepticism or even resistance from stakeholders. This is exactly the situation of a SEA experience conducted in São Paulo State, Brazil, relative to the planning of a new highway.

The idea of tiering assessments at different planning levels (from policy and plan to program and project) pervades SEA literature. "Tiering means that by preparing a sequence of environmental assessments at different planning levels and linking them, foreclosure may be prevented, postponement of detailed issues may be permitted and assessments can be better scoped." (Arts et al., in press), However, Tomlinson and Fry (2002) argue that although tiering is an important notion to SEA and environmental impact assessment (EIA) in academic literature, it is hardly discussed in a critical manner in real applications. Potentially, tiering could lead to better decisions and to more efficient resource allocation, since assessments would be conducted at the "right" timing and would feature increasing levels of detail, as needed. Fischer (2006) calls for a framework for transport planning SEA, suggesting specific assessment tasks that should be performed for different SEA tiers.

In this paper we introduce the context in which SEA for a highway development initiative was undertaken, then we summarize the SEA report methodological approach and its main findings. The shortcomings of an environmental impact statement (EIS) prepared after the SEA report and based on its major findings and recommendations are briefly reviewed. Conclusions are drawn regarding this case and general recommendations for tiering are made, especially for countries where no legal SEA requirements are in place.

2. The project, the region

São Paulo Metropolitan Region (SPMR) is the largest urban concentration in the Southern hemisphere, featuring 17.8 million inhabitants in 8051 km^2. Its vehicle fleet outreaches 5 million cars, buses and trucks. In addition, the population of São Paulo State attains 40 million inhabitants and its radial highway network converges to the capital, São Paulo city. This design drains a significant amount of traffic, and several dislocations are not meant to SPMR, but need to cross it heading to another destination. One important destination is the Santos seaport, the biggest in South America.

In SPMR, heavy truck traffic contributes to clogged streets and expressways alike, as well as to increase noise levels and air pollutant concentration. As part of the traffic neither originates nor head to the region, several years ago a peripheral highway was proposed to reduce traffic problems. This project, called *Rodoanel* (the "ring road"), encompasses a 6 to 8 lane expressway approximately 175 km long linking all major highways radiating from São Paulo (Fig. 1).

A first section (west) was built between 1998 and 2002, while construction of the remaining south, east and north sections was postponed both due to financial and environmental constraints. The fact that the projected south and north sections would cross catchments that supply most of the metropolis water demand was strongly disputed and made the environmental permitting process particularly controversial and difficult.

The metropolitan population is growing, although not at the high rates it reached during the period 1950–80. Urban area, however, keeps expanding, as low-income households leave central districts and settle in the outskirts. In fact, between 1991 and 2000, the population of several central districts actually decreased, whereas peripheral districts featured sustained growth rates. As a consequence, total urbanized area increased from 1703 to 2139 km^2 in 15 years (Emplasa, 2007).

Urban sprawl encroaches over designated water protection zones, where a combination of "clientelistic" political behaviour at the municipal level, short-term economic interest, and increasing poverty outweighs law enforcement efforts led by State officials. Many mayors and other municipal political leaders see land-use restrictions enshrined in a State watershed protection law passed in 1975 as hurdles to local development.

In this context, the continuity of this sprawling process seems highly likely and a key and strategic question is will *Rodoanel* contribute to its acceleration, will it act as a barrier or will it have a neutral effect?

3. The SEA process

Currently, there are no formal requirements for SEA in São Paulo State. Despite early attempts in 1994, put forward by the State Department of Environment, of introducing a light form of SEA for a limited number of government decisions, the topic ranked low in the political agenda and featured no advance.

Nevertheless, the agency in charge of the highway project, *Dersa*, dependent upon the State Department of Transportation, sighted SEA as a possible path to ease project approval, through a potential tiering downwards to the construction permit (called installation license under Brazilian legislation). Such an approach arose from perceived difficulties in obtaining approval, which, in turn, was rooted in past experience, as it will be explained below.

One departure point for Dersa was to consider that each major section of the *Rodoanel* project (i.e. South, East and North) would be self-standing, defending this position from both an economic and an environmental point of view. In other words, if approval were not obtained for, let's say, the North section, the project would still remain feasible if they could build South and East sections. This premise was disputed by environmentalists and other interest groups who felt it to be a mere stratagem to get easier project approval.

Before developing this strategy, and after completing the West section, *Dersa* had filed, in 2002, an environmental impact statement (EIS) for the remaining South, East and

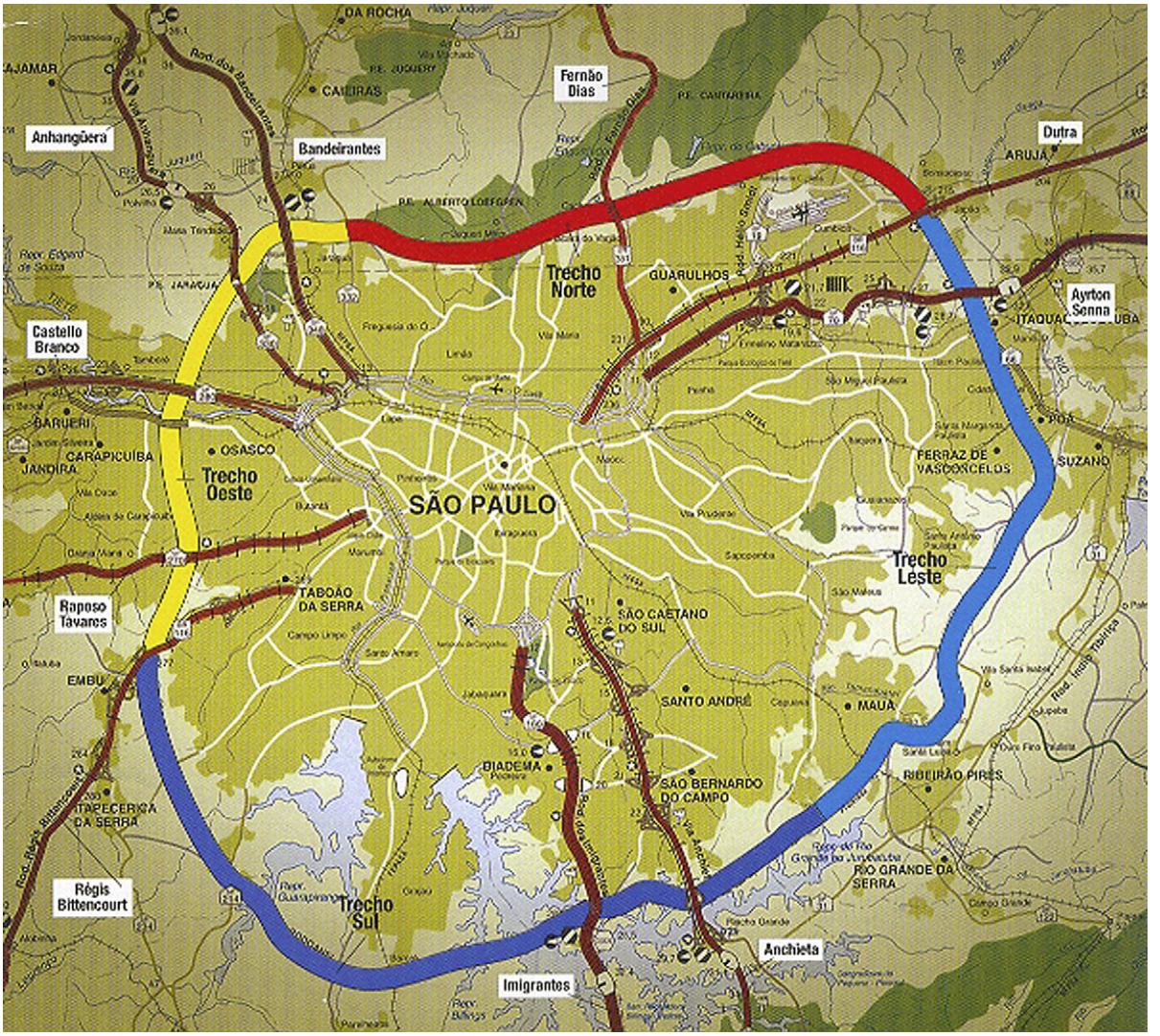

Fig. 1. Schematic representation of *Rodoanel*. In yellow, the West section, already built; in deep blue, the 57 km long controversial South sector. Radial deep grey lines represent existing highways. In light blue, water reservoirs used for public supply. [source: Dersa]. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

North sections. However, in the process of reviewing the EIS, the State Department of Environmental Impact Assessment (DAIA) was collecting enough evidence to declare it as insufficient. Facing a potential denial of its license application, *Dersa* withdraw the EIS before DAIA had finished its review, thus suspending the procedure.

The potential refusal of the project prompted *Dersa* and the Department of Transportation to review their plans and their strategy. Thus, SEA emerged as a potential solution. It could test the hypothesis of independent, self-standing, sections of a revamped project, now called the *Rodoanel Programme*. The so-called programme is defined as a set of "integrated multi-sectorial actions" (pages 1–10) led by an "anchor project" (pages 3–3). An SEA could set the guidelines for future projects, discuss location alternatives and, as negotiated with the State Department of the Environment, would set the terms of reference for upcoming new EISs.

The SEA was commissioned as a technical report (as opposed to the notion of SEA process), with no provision for public input. Of course, there had been several previous opportunities for the public to advance their views on the project, and the most significant issues seemed to have been well enough voiced. Therefore, it was expected that the SEA would deal with these issues and would provide some answers to concerns such as watershed integrity and water resources quality. The report explicitly states that public expectations were taken into due account (pages 3–4).

In the absence of any particular legal provision or administrative guideline, the State Department of Environment treated the SEA report (Dersa, 2004) very much as if it were an EIS. It was filed with the Department, reviewed by DAIA and submitted for approval of the State Council on the Environment, a multistakeholder body composed of representatives of government, civil society and businesses. In fact, the

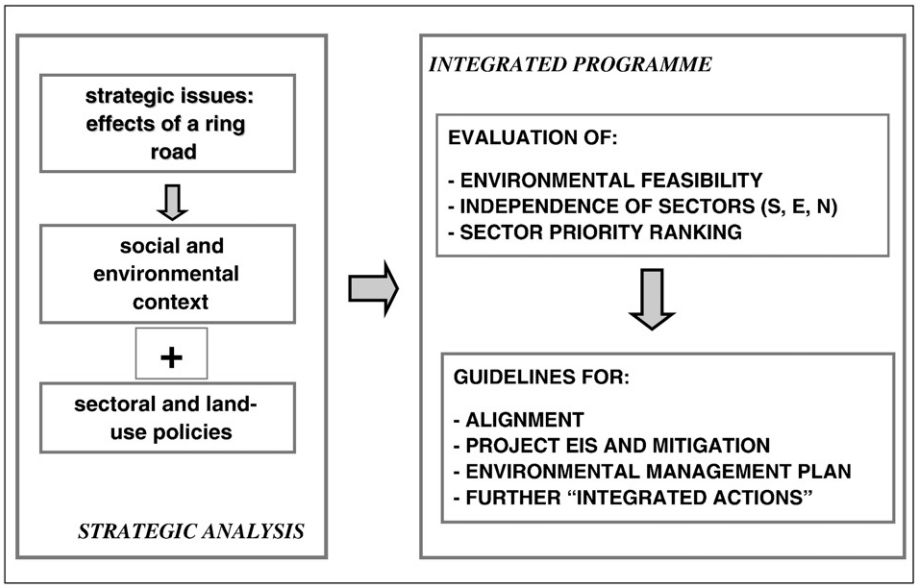

Fig. 2. Methodological approach in the *Rodoanel* SEA. Source: adapted from Dersa (2004).

Council approved the report on September 15, 2004, thus setting a green light for three forthcoming project EISs, one for each section of the highway.

4. The SEA report

SEA was structured around four major sequential steps (Fig. 2): (i) selecting key strategic issues derived from a ring road in the region; (ii) compiling information on the social and environmental setting, as well as on land-use policies; (iii) evaluating impacts and recommending a sequence of construction; (iv) proposing mitigation and other recommendations. Steps (i) and (ii) form a strategic analysis", whereas steps (iii) and (iv) form an "integrated programme" for action.

Table 1 shows the contents of the SEA report. In order to delineate the "strategic issues", the analysis "starts by identifying" (pages 2–1) the potential (i) direct and indirect impacts of the construction phase: (ii) impacts of operation; (iii) long-term impacts on the transportation system and on the land-use. In the sequence, the report lists "emerging" strategic issues under two categories: "general issues that guide the decision-making process" and "issues related to the construction and operation phases" (pages 2–5). This somewhat unclear terminology and classification permeates the whole report.

Table 1
Structure and contents of the SEA report

1. The Rodoanel project	10 pages
2. Social and environmental strategic issues	12 pages
3. SEA purpose and methodology	08 pages
4. The "no program" scenario	29 pages
5. The region with the program: appraisal	41 pages
6. Feasibility of constructing independent sections	08 pages
7. Guidelines for developing the highway project	09 pages
8. Recommendations for management	13 pages
9. Conclusions	04 pages
10. References	04 pages
11. Team	
Appendices	
Transports in the Metropolitan Region	78 pages
Air quality	35 pages
Natural resources and their utilization	48 pages
Social, economic and demographic data	08 pages
Social and economic impacts	106 pages

source: Dersa (2004).

A fundamental hypothesis that underpins SEA analysis and conclusions is that *Rodoanel* will intersect only other existing highways (called a "class 0" highway), a concept that ideally would prevent *Rodoanel* from inducing urban sprawl. The SEA report supports that if extensive land development is in the future observed in its influence area, the root causes would be current forces driving urban expansion over designated watershed protection zones, not *Rodoanel*. This position will be discussed later.

Another departure point is that the SEA would not deal with issues pertaining to economic feasibility of *Rodoanel*, because "the political decision to implement it had been previously made" (pages 3–6). The scope of the "strategic" assessment could not be stated in a clearer and more direct way. The objectives of the SEA are relatively modest:

> "(i) to assess the magnitude and the relative importance of the effects and strategic relationships between *Rodoanel* Programme and the environment; and
>
> "(ii) assess the social and environmental sustainability of the Programme" (page 3–1).

Based on these assumptions, the report concluded that *Rodoanel* will be beneficial for land development, attracting only adequately planned initiatives that conform to water resources protection legislation. In particular, the project would have an effect on the location of warehouses and distribution centres, and would deeply influence the transportation logistics within

SPMR. The SEA analysis also showed that each major section could be treated as independent projects, both under an economic and an environmental point of view. Moreover, it concluded that the priority should be to build the South section, in order to link the end of the West section to the major highways leading to the Santos seaport.

The effects of the highway on traffic, air quality, water and vegetation, and on land-use are modelled in the appendices. The latter, the most controversial issue, is dealt with in the "social and economic impacts" section. It concludes that *Rodoanel* will have a negligible effect on the expansion of the urban fringe in SPMR: such an expansion has its own dynamics and driving forces, which, in the most affected zones, could lead to 80% increase in population until 2020, but the contribution of the project would not exceed 0.2% (pages 9–3). As a consequence, the fears of a significant impact on water resources "has no basis" (pages 9–3).

5. SEA-EIA tiering

The SEA report made several recommendations for the forthcoming EIA (Sections 7 and 8 of the SEA report). These included the definition of the project's EIA spatial boundaries (study area), a list of issues to be dealt with in the EISs, general guidelines for routing and general recommendations for mitigation. Furthermore, for each major section of the *Rodoanel* project, the SEA report selects alternative routing corridors to be studied in detail in the EISs. Clearly, tiering was a major drive for SEA. In several passages it is stated that the ensuing EISs would take account of the SEA conclusions.

Environmental licensing (which depends on the EIA process) is presented as a relevant theme for the SEA. Surprisingly, the SEA report strongly criticizes the EIS review process for the West section. Amazingly, the report does not mention Dersa's poor compliance with terms and conditions of the environmental license for the West section. More important, however, the report does not seek to draw lessons from the West section experience that could be useful to the construction and operation of remaining sections.

In theory, it should not be assumed that SEA would automatically signal a green light to downstream projects. Tiering, although desirable, does not mean that project alternatives and mitigation do not need to be considered in detail through standard EIA process. Rather, effective tiering suggests that a project EIS could be focused mostly on local impacts and analyze routing alternatives within previously selected corridors. In fact, the expectations of the proponent were that the preparation of an SEA would resolve the most serious potential disagreements, thus paving the way for a straightforward and quick project EIA process.

An EIS was presented for the South section (Fespsp, 2004). A number of routing alternatives were analysed in detail, considering recommendations of the SEA report. The preferred alternative is about 57 km long, and its cost is estimated at US$ 1.3 billion. The EIS is an extensive document (9 volumes), as usual for large projects potentially affecting valued resources.

Authors such as Tomlinson and Fry (2002), among others, consider tiering as an improvement over project-level assessment, since "experience with EIA has demonstrated that its use in individual transport projects can fail to address long-term, cumulative, global or policy issues, such as the effects of traffic growth and atmospheric emissions or changes in land-use" (page 2). In theory, broader issues could be dealt with at SEA level, whereas details on routing, impact mitigation, avoidance and enhancement would be better accommodated in a project EIA.

6. Discussion

As the *Rodoanel* study is the first self-denominated SEA to be publicly presented and debated in São Paulo, it could potentially influence future SEA developments in the State. This should have been an important enough reason to place great caution on the critical review of this document. Nevertheless, the report was easily and quickly approved by the State Department of Environment and endorsed by Consema, in sharp contrast with standard EIS review and approval process, which not infrequently takes years.

In the absence of legal requirements, the decision to voluntarily prepare an SEA after withdrawing the EIS (which was on the brink of being declared as unsatisfactory) was clearly a proponent's attempt to ease the approval of the subsequent project EIA.

Rodoanel is a case were the project precedes the program, confirming the statement of Arts, Tomlinson and Voogd (forthcoming) that "in planning practice all too often project decisions and EIAs may precede strategic plans and the SEAs that should provide the framework for project decision-making". In such a context, which is the value of SEA?

Both the process and the report have been criticized by environmentalist non-governmental organizations for a number of reasons, including:

(i) SEA was based on narrow assumptions that precluded the development and choice of the best environmental option;
(ii) the SEA report assumed that *Rodoanel* is the only practical alternative, hence the report clearly tries to put forward arguments to justify this previous decision;
(iii) the report did not satisfactorily consider cumulative impacts of the likely urban sprawl effect induced by *Rodoanel*, especially those on water resources essential to metropolitan public supply.[1]

The latter point is certainly critical (and strategic) for any major project in the region, since water supply in SPMR is scarce and urbanization has been encroaching over areas legally designated for watershed protection. A State law passed in 1975 aimed at regulating land-use in watersheds upstream of existing and projected water reservoirs in order to protect water quality and ensure water availability. However, this purely command-and-control law has been poorly enforced and the Southern fringe of SPMR has been occupied by dense, low-income and "spontaneous" settlements that severely deteriorated the quality of two reservoirs, exactly those that would be crossed over by *Rodoanel*.

[1] These arguments, among others, have been advanced at various public hearings and public meetings. They are synthesized in a short unpublished report prepared by a coalition of NGOs (APCM et al., 2004).

Therefore, public concern about the future of water resources in this zone is unquestionably genuine. Nevertheless, the issue was downplayed in the SEA report and the subsequent South section EIS. Worldwide, it is not uncommon to find approaches identified as SEA whose actual strategic nature could be questioned (Partidário, 2000, page 655).

The highway potential impact on urban sprawl was modelled in the SEA. The EIS did not further elaborate on this modelling, but incorporated its conclusions, accepting that in 15 years the population of the study area would have grown mostly as a consequence of current dynamics, the contribution of the highway being a modest 0.2%. These conclusions were contended by NGOs and a number of academics (Ferreira et al., 2005), based, essentially, on disbelief in mathematical modelling of complex urban phenomena, and on the proponent's refusal to undertake an *ex post* analysis of the urban expansion that took place after completion of the West sector. Ferreira et al. (2005) undertook this latter study to conclude, essentially, that the West section apparently had a low effect on new settlements, but some irregular settlements (slums) actually increased, both in area and in population size, and new businesses were established in the main intersections, whereas some municipalities offered exemptions in local taxes, thus stimulating urban development. In addition, Ferreira *et al.* argue that mathematical modelling is inadequate to explain a complex situation where social and economic processes intermix with political phenomena and politics. To a large extent, they echo critics such as Ravetz (1998). Earlier reports prepared by the NGO *Instituto Socioambiental* also questioned the sensibility of modelling results to changing variables and its main assumption, namely, that no access will link *Rodoanel* to the existing urban roads and avenues.

When implementation of voluntary, agreed upon or imposed commitments involves multiple parts, it is the weakest link that governs real outcomes. If political and economic pressure to open access to *Rodoanel* succeeds sometime in the future, then land development and urban sprawl very probably will occur, both in accordance with municipal land-use regulations and in the form of irregular occupation.

The SEA should have tested at least one alternative, i.e. the hypothesis that sometime in the near future the proposed highway will come to have intersections with roads other than the existing highways. It is likely that the urban expansion model would feature different results had this scenario been tested.

Such threats are not uncommon in most countries. For example, Kennet (2005, page 4) reports that Canadian Federal government efforts to establish wildlife corridors and wildlife highway crossing structures in a zone adjacent to Banff National Park (a "jewel of the Crown" in the Canadian Parks System) have been undermined by a municipal decision to allow land development to proceed close to one crossing.

Similar fears are firmly grounded for *Rodoanel*. According to NGOs, Dersa did not satisfactorily implement the terms and conditions of the West section (ISA, 2004), such as building noise protection barriers or completing human resettlement programmes. In another example of poor implementation, legal procedures were initiated by public prosecutors due to lack of compliance with archaeological resources protection legislation; as a consequence, an out-of-Court settlement was reached that included compensation for environmental and cultural damage, especially as related to archaeological resources.[2] As Dersa features a poor record of compliance, NGOs fear that many commitments for the South section will not be honoured, in particular the assumption that *Rodoanel* will intersect only existent highways.

The extent to which SEA contributes to satisfactory or adequate tiering could be a criterion to evaluate SEA influence on decision-making. Runharr and Driessen (2007), having reviewed 15 recent papers reporting factors contributing to SEA actual influence on decision-making, found that most authors refer that both a flexible SEA process that fits into the decision-making content and stakeholder participation are key elements of influential SEAs. Furthermore, other factors contributing to SEA influence on decision-making cited by the reviewed authors are heterogeneous, thus suggesting "a context-specificity of these factors" (p. 5). Arguably, planners and project proponents could recognize value in SEA only to the extent that it facilitates plan implementation or project development, even if additional constraints are imposed on them.

7. Evaluating the Rodoanel SEA

If no regulations exist to perform SEA and no terms of reference have guided its preparation, which yardstick could be used to evaluate it? Internal consistency and influence on decision-making are taken here as guidance to evaluate the SEA process and its outcomes, in order to highlight both positive and negative facets of the *Rodoanel* process and its report as evidences to support the conclusions featured in the next section.

Several authors agree that SEA effectiveness is dependent upon its context, including the decision-making process in which it is carried on (Fischer, 2002; Marsden, 1998; Retief, 2007, among others). Fischer and Gazzola (2006) argue that even within the European Union, whose member States must adhere to the very same guidelines set upon by the European SEA Directive, different criteria should be applied to evaluate SEA effectiveness in Northern and in Mediterranean countries, due to "different planning systems". The need to consider that elements and criteria selected to evaluate SEA effectiveness are not equally valid in all countries is probably undisputed, but it remains open to further discussion to what extent should SEA be adapted to the decision-making context where it is applied or should the decision-making practices be reformed to accommodate new demands arising from SEA.

Retief (2007) developed a detailed set of criteria and indicators to evaluate performance of SEA in South Africa. Based on South African guidance for SEA (DEAT, 2000), Retief selected six key performance areas and 16 key performance indicators to evaluate performance and then applied this framework to six case studies, out of more than 50 SEAs prepared in that country. Such a sophisticated approach, adapted to the SEA context, cannot be conceived at the present stage of SEA practice in Brazil, due to the absence of guidance and little practical experience (less than a dozen SEAs have been prepared in Brazil as of early 2007).

[2] Rossano L. Bastos, National Institute of Historical and Artistic Heritage, personal communication, April 2005.

Alternatively, a minimum set of criteria "to provide general guidance on how to build effective new SEA processes and evaluate the effectiveness of existing SEA processes" was developed by the International Association for Impact Assessment (IAIA, 2002). According to its preamble, "A good quality Strategic Environmental Assessment (SEA) process informs planners, decision-makers and affected public on the sustainability of strategic decisions, facilitates the search for the best alternative and ensures a democratic decision making process. This enhances the credibility of decisions and leads to more cost- and time-effective EA at the project level." (IAIA, 2002). Although these criteria are very broad and focus more on the SEA process rather than in reports, they can be used to evaluate SEA in a context of absence of regulation and little country experience with strategic assessments.

Despite the existence of a number of other proposals for evaluating SEA effectiveness (Fischer and Gazzola, 2006, p. 400), including Retief's elaborate scheme, IAIA principles were retained here because they were prepared by professionals from different countries and endorsed by an independent organization. In principle, they should reflect an international perspective, in contrast to criteria defined in accordance to some national or regional guideline or regulation.

Hence, if IAIA's criteria are a test, then *Rodoanel* SEA is far from fulfilling SEA potential to enable more effective environmental assessment at the project level. Taking the proposal made by Fischer (2002) that these performance criteria should not be equally valid for every kind of SEA (i.e. policy, plan or program level), and admitting that *Rodoanel* SEA is at the programme level (i.e. a compilation of concrete projects), it should at least have addressed the land-use/urban sprawl issue assuming that several hypotheses about the future are possible, that multiple scenarios are plausible, not just one. Table 2 summarizes *Rodoanel* SEA appraisal as related to IAIA's criteria. Ratings were based on qualitative judgment by the authors; justification for the ratings has been presented throughout the text and is summarized in the table's footnotes.

An additional pertinent consideration to evaluate SEA is whether or not has it been influential? (Ahmed et al., 2005). In this case, SEA did influence subsequent environmental impact statement and outlined routing alternatives to be evaluated, but did not influence the decision to build the highway, which had been made several years before.

Table 2
Rodoanel SEA evaluated against IAIAs performance criteria

IAIA SEA performance criteria		Rating
Is integrated	Ensures as appropriate environmental assessment of all strategic decisions relevant for the achievement of sustainable development	n.a.
	Addresses the interrelationships of biophysical, social and economic aspects	(+)
	Is tiered to policies in relevant sectors and (transboundary) regions and, where appropriate, to project EIA and decision-making	(−−)[a]
Is sustainability-led	Facilitates identification of development options and alternative proposals that are more sustainable	(−)[b]
Is focused	Provides sufficient, reliable and usable information for development planning and decision-making	(−)[c]
	Concentrates on key issues of sustainable development	(+/−)[d]
	Is customized to the characteristics of the decision-making process	(−)[e]
	Is cost- and time-effective	?
Is accountable	Is the responsibility of the leading agency for the strategic decision to be taken	(+)
	Is carried out with professionalism, rigor, fairness, impartiality and balance	(−)[f]
	Is subject to independent check and verification	(++)[g]
	Documents and justifies how sustainability issues were taken into account in decision-making	(+)
Is participative	Informs and involves interested and affected public and government bodies throughout the decision-making process	(+/−)[h]
	Explicitly addresses their inputs and concerns in documentation and decision-making	(+)[h]
	Has clear, easily-understood information requirements and ensures sufficient access to all relevant information	(−)[i]
Is iterative	Ensures availability of the assessment results early enough to influence the decision-making process and inspire future planning	(−−)[j]
	Provides sufficient information on the actual impacts of implementing a strategic decision, to judge whether this decision should be amended and to provide a basis for future decisions	(−)[k]

ratings key: (++) criteria satisfactorily adhered to.
(+) criteria partially met.
(+/−) both positive and negative aspects.
(−) unsatisfactory compliance with criteria.
(−−) very unsatisfactory compliance with criteria.
? could not be evaluated in this paper.
n.a. considered not applicable to this case.
[a] tiering with project EIA not fully achieved in practice, effective consideration of water resources and land-use policies and plans has been disputed by stakeholders.
[b] did not consider options or alternatives.
[c] information and analysis on urban sprawl deemed insufficient.
[d] key issues were addressed, but at not a detailed enough level.
[e] SEA was prepared having in consideration the environmental licensing process, but not transport planning practices.
[f] impartiality and balance, although a subjective judgment, were criticized by stakeholders.
[g] SEA report was reviewed by the Environmental Impact Assessment Branch of the State Environment Department and approved by the multistakeholder State Environment Council.
[h] no formal consultation for SEA preparation, but considered inputs from public consultation before and after, though regular EIA process.
[i] not all finding of the SEA were validated by interested parties.
[j] decision to build the highway had been made years before SEA.
[k] did influence subsequent environmental impact statement and outlined routing alternatives to be evaluated; did not influence decision to build the highway.

8. Conclusions

Rodoanel SEA deserves the credit of effectively introducing a long delayed debate on strategic assessments in São Paulo. As a voluntary initiative, SEA is welcome as a positive and innovative contribution. Although the State Department of Environment tried to introduce the concept and the practice in the mid-nineties, it never succeeded. With *Rodoanel*, impact assessment professionals faced the need to plan, to prepare a report, and to defend their findings.

Although the project EIA process is quite robust in the State, featuring 20 years of continuous experience, lack of guidelines, insufficient experience and low levels of expertise on strategic planning within the staff of the State Department of Environment converged to a quick approval of the SEA report.

This void and the lack of formal procedures also reflects the absence of agreed-upon rules for interaction and decision-making, a "necessary precondition for effective and efficient substantive deliberations between participants in the decision making process" (Fischer, 2003, page 167). In other words, the "fast track" approval of the SEA report by no means equals stakeholder agreement on strategic issues.

Arguably, planners and project proponents could recognize value in SEA only to the extent that it facilitates plan implementation or project development, even if additional constraints are imposed on them. For the proponent, SEA has proved advantageous, as it demonstrated to be justifiable that each highway section could be constructed (and assessed) as individual projects, thus upturning a previous decision that the project could only be appraised *in totum*.

However, for NGOs and concerned citizens, SEA outcomes have at least one strongly negative aspect, that is to legitimate upcoming individual projects. It seems that effective tiering would have been achieved if, after acceptance of the SEA report, it became harder to challenge the project's need. (One requirement under Brazilian EIA regulations is to demonstrate the need for a project). In fact, the EIS for the South section has not been easily and quickly approved. Review has been lengthy due to the complexity of the project, the size of the EIS and the unresolved dispute over the project's effects on land development and its repercussion on water quality. In addition, lawsuits delayed public hearings. Hence, under this point of view, no effective tiering has been achieved, as the most controversial issues have not been resolved in the SEA.

Rodoanel SEA confirmed that the ideal of an assessment of particular issues being made at "appropriate decision-making levels (…) is seldom likely to occur in practice, at least in the transportation sector" (Tomlinson and Fry, 2002, page 4). Perhaps it can be suggested that, after all, the SEA was not very strategic, as suggested by Dalal-Clayton and Sadler's (2004, page 10) statement that "there is continuing discussion of what is strategic in SEA".

It appears that a major shortcoming of *Rodoanel* SEA is the scoping of strategic issues. The unsettled issue of uncontrolled urban sprawl and the potential role of the project in fostering urban land expansion is probably the most important gap.

The *Rodoanel* experience suggests that, in countries where no agreed-upon framework for SEA exists, if vertical tiering with downstream project EIA is sought when undertaking an SEA, then a careful scoping of strategic issues is more than necessary. If an agreement on 'what is strategic' is not reached and is not recognized by influential stakeholders, then the unsettled conflicts will be transferred to project EIA. In such a context, SEA will have added another loop to the usually long and time consuming road to project approval.

References

Ahmed K, Mercier JR, Verheem R. Strategic Environmental Assessment—concept and practice. World Bank Environment Strategy Notes, vol. 14. 2005. p. 1–4.

APCM (Associação Pro-Capivari Monos), Fundação SOS Mata Atlântica, Instituto Socioambiental, Polis. Questions about the Rodoanel Strategic Environmental Assessment Report; 2004. 6 pp., [in Portuguese].

Arts, J., Tomlinson, P., Voogd, H. (in press), Planning in tiers: linking EIA and SEA, in: Sadler, B., Ascherman, R., Dusik, J., Fischer, T., Partidário, M., Verheem, R. (Eds.), Handbook of Strategic Environmental Assessment, Earthscan, London.

Dalal-Clayton B, Sadler B. Strategic Environmental Assessment: A Sourcebook and Referral Guide to International Experience. London: Earthscan/OECD/UNEP/IIED; 2004.

DEAT, Department of Environmental Affairs and Tourism. Strategic environmental assessment in South Africa: guideline document. Pretoria; 2000. 36 pp.

Dersa. Strategic environmental assessment of Rodoanel Mário Covas, 2 volumes; 2004 [in Portuguese].

Emplasa. Metropolis data, São Paulo Metropolitan Region. www.emplasa.sp.gov.br2007 last accessed Jan 23 2007, [in Portuguese].

Ferreira JSW, Nobre TM, Castro AQ, Rios HG, Nunes IF, Diniz LT, et al. Urban impacts of Rodoanel West Section. Lab-Hab/FAU, University of São Paulo; 2005. 154 pp., [in Portuguese].

Fespsp, Fundação Escola de Sociologia e Política de São Paulo. Environmental impact study of Rodoanel Mário Covas Program. Modified Southern Section, 9 volumes2004. [in Portuguese].

Fischer T. Strategic environmental assessment performance criteria—the same requirements for every assessment? J Environ Assess Policy Manag 2002;4(1):83–99.

Fischer T. Strategic environmental assessment in post-modern times. Environ Impact Assess Rev 2003;23:155–70.

Fischer T. Strategic environmental assessment and transport planning: towards a generic framework for evaluating practice and developing guidance. Impact Assess Proj Apprais 2006;24(3):183–97.

Fischer T, Gazzola P. SEA good practice elements and performance criteria — equally valid in all countries? The case of Italy. Environ Impact Assess Rev 2006;26(4):396–409.

IAIA, International Association for Impact Assessment. Strategic environmental assessment performance criteria. Special Publication Series, vol. 1. 2002.

ISA, Instituto Socioambiental. Inside Rodoanel; 2004. 8 pp., available at www.socioambiental.org, [in Portuguese], last accessed Feb 15 2006.

Kennet SA. And now from the hard past—lessons for the NRCB from the Three Sisters Wildlife Corridor Saga. Resources 2005;89:1–7.

Marsden S. Importance of context in measuring the effectiveness of strategic environmental assessment. Impact Assess Proj Apprais 1998;16(4):255–66.

Partidário MR. Elements of an SEA framework—improving the added-value of SEA. Environ Impact Assess Rev 2000;20:647–63.

Partidário MR, Clarck R. Introduction. In: Partidário MR, Clarck R, editors. Perspectives on Strategic Environmental Assessment. Boca Raton: Lewis Publishers2000. p. 3–11.

Ravetz J. The emperor's new models? Impact Assess Proj Apprais 1998;16(2):79–80.

Retief F. A performance evaluation of Strategic Environmental Assessment (SEA) process within the South African context. Environ Impact Assess Rev 2007;27:84–100.

Runharr H, Driessen PPJ. What makes strategic environmental assessment successful environmental assessment? The role of context in the contribution of sea to decision-making. Impact Assess Proj Apprais 2007;25(1):2–14.

Therivel R, Partidário MR. The future of SEA. In: Partidário MR, Clarck R, editors. Perspectives on strategic environmental assessment. Boca Raton: Lewis Publishers2000. p. 271–80.

Thissen W. Criteria for evaluation of SEA. In: Partidário MR, Clarck R, editors. Perspectives on strategic environmental assessment. Boca Raton: Lewis Publishers2000. p. 113–27.

Tomlinson P, Fry C. Improving EIA effectiveness through SEA. Paper presented to IAIA'02 Conference. The Hague2002. CD-ROM.

Verheem RAA, Tonk JAMN. Strategic environmental assessment: one concept, multiple forms. Impact Assess Proj Apprais 2000;18(3):177–82.