

## Guidelines for intervention in streams, as border landscape structurers in Medellín, Colombia

Lineamientos para intervención en quebradas, como estructurantes de paisaje de borde en Medellín, Colombia\*

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### Abstract

The present work highlights the necessary inclusion of the landscape approach in the territorial ordering, particularly in wild-rural-urban borders, paying balanced attention to the categories that determine this approach: natural, built and human. The aim is to consolidate the streams as structurers of the border landscape on the slopes of the Aburrá valley, on which the city of Medellín extends. By taking advantage of the privileged geography, the natural wealth, the abundance of water and the significant landscape that the valley enjoys, it avoids progressive loss. The main result of this work is an approach to intervention guidelines in streams, particularly in its sections coinciding with the edge; these are directed to public administrators, designers and promoters involved in projects to be developed

in this conjuncture area or *ecotone*, and therefore fragile landscape, specifically when it involves water currents. The proposal is to facilitate the conversion of landscape ideals into reality, to translate them from ambiguous thoughts to real facts in the territorial organization and appropriation of the daily space and the identity of the local landscape. As a first local attempt, it constitutes an invitation to expand the urgent and applied research, in the near future, on this relevant topic.

**Keywords:** Border landscape, Landscape approach, Hillside streams.

### Resumen

El presente trabajo resalta la necesaria inclusión del enfoque paisajista en el ordenamiento territorial, particularmente en borde silvestre-

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rural-urbano, con atención equilibrada a las categorías que determinan dicho enfoque: natural, construida y humana. Se propone consolidar las quebradas como estructurantes del paisaje de borde en las laderas del valle de Aburrá, sobre las cuales se extiende la ciudad de Medellín. Esto, aprovechando la privilegiada geografía, la riqueza natural, la abundancia de agua y el paisaje significativo de los cuales el valle disfruta, y evitando así su pérdida progresiva. El principal resultado de este trabajo es una aproximación a lineamientos de intervención en quebradas, particularmente en sus tramos coincidentes con el borde; dirigidos a los administradores públicos, diseñadores y promotores que participan en proyectos ubicados en esta zona coyuntural o “ecotono”, y por ende de frágil paisaje, específicamente cuando involucra corrientes de agua. Se propone facilitar la conversión de los ideales del paisaje en realidad, traducirlos de pensamientos ambiguos a hechos reales en la organización y apropiación del territorio, del espacio cotidiano y de la identidad del paisaje local. Como un primer intento local, constituye una invitación a ampliar, en el futuro próximo, la investigación urgente y aplicada sobre esta relevante temática.

**Palabras clave:** Paisaje de borde, Enfoque paisajista, Quebradas en ladera.

## Introduction

Every place in the world has its own landscape character, synthesis principally of its geographical location, natural degree of diversity and local culture. Consequently, landscape is dynamic through time, expressing social and physical evolution.

Facing the contemporary urbanization growth, the wild-rural-urban borders are even more dynamic and also fragile as *ecotones* that they are. This phenomenon is not just strong but overwhelming in the Valle de Aburrá, Medellín, Colombia.

From the institutional point of view, the “edge” is often seen as a line drawn by planners on a map, attending more to the urgency of finding land to

occupy than the natural realities. A line with no thickness, sometimes described as “membrane”, is fragile, as an administrative boundary that ignores or contradicts the *arcifine* limits.

The convergence of two prominent components of the Aburrá valley natural landscape: streams and hillsides, always present and abundant, which offers a unique opportunity to think about the condition of the natural territory where the city grows and about the resultant landscape, after intense and unaware anthropogenic intervention.

Some aspects contributing to such complexity are in human time, the very slow dynamics of the hill-side, the endless water dynamics –absent or hidden for many people eyes– and finally the dynamics of occupation, though less graspable, but depending on determination and political will, the most manageable of the three.

From the landscape point of view, it is to say, from a perception that overlaps natural forms, dynamics, values, expressions of permanent occupation, consolidation, and appropriation of the relationship with the place, the border is not a line or even not a strip. It is an elongated space, composed by fragments or subspaces, portions of watersheds occupied and deformed when not battered; portions curiously designated by the city administration, perpendicular to the axis or essence of the watershed: the creek. This happens because of the consolidation and prevalence of settlements on the place, more evident and apparently deserver of the whole attention and interest.

In a culture where either, institutions, developers or communities have ignored nature as the urban basis, it is not expected that landscape values be addressed. Orientations for landscape management are very scarce in regional or local public policies consulted. If what has been planned generally is not easy to materialize, much less could be expected from what has not been planned or even identified. Spontaneous actions of the community, in which identity and idiosyncrasies emerges, gives real lessons of landscape valuation, which has not

been potentialized. However, these examples are generally of a small scale within the considerable extension covered by the wild-rural-urban edge.

Within the context of an academic institution and based on the experience, though short, of the Master program in Landscape Design<sup>1</sup>, and also in the context of LALI<sup>2</sup>, an approach from the landscape discipline corresponds as a social responsibility. Fundamental concepts for the development of the research are shown as follows. Those represent as well the spatial scopes for the analysis of the landscape components on the border landscape of Medellín hillsides.

A synthetic advance of this work has been published by the Instituto Alexander von Humboldt under the title of *Miradas quebradas*, in the book *Naturaleza urbana* (2016, pp. 90-92), and also as *An approach to landscape planning in borders*, in the book *Landscape planning INTECHOPEN* (2012).

## Landscape

Due to its polysemic character, it is convenient to clarify the meaning of the concept *landscape* taken for this work and also to point out the aspects emphasized along.

The landscape, as perceived by people, is the result of the interaction of natural and anthropogenic factors with an impact on ecological, human, social, functional and economical aspects. This means an interdisciplinary, comprehensive and inclusive focus.

It is worthy to take as an axis, the definition of the concept of landscape, registered by the Latin American Landscape Initiative - LALI: "Landscape is defined as a space/time resultant of natural and human, tangible and intangible factors, that being

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1 The first one in Colombia on this discipline.

2 The Latin American Landscape Initiative is part of the International Landscape Convention, at present in process by ONU. Thirteen countries, signed it in Medellín, Colombia, during the IFLA regional Conference, in October 2012.

perceived and shaped by the people, reflects the diversity of cultures." (Medellin, October 2012).

Also in the Latin American context, the Brazilian landscape planner Lucia Costa (2006) states that landscape and city are intended for permanent relationship of complicity and supports her statement on a text by Lawrence Halprin (1981) where he argues that the most interesting cities are those in which such a relationship is reflected.

Referring to other aspects of the landscape, La Gro (2008, pp. 158-159) expresses that visual quality plays an important role in decision-making about landscape and territorial planning. He also notes that in assessing the visual quality of landscape two approaches or paradigms are often used: the objective approach that assumes the visual quality as an inherent attribute of landscape, and the subjective approach that assumes the visual quality depending only on the eye of the observer (Lothian 1999). Those conceptions of beauty are influenced, first by experience and second by culture; the only significant difference between the two approaches is the position to be adopted to evaluate the visual quality.

La Gro also provides an interesting point of view, shown in the first and second columns in table 1, about "landscape meaning".

Table 1  
*Perceptions and landscape meaning.*

Seeing landscape as:	Associated with:
Nature	Fundament and essence
Habitat	Resource adaptation
Artifact	Utilitarian platform
System	Dynamic, equilibrium
Problem	Flaw challenge
Wealth	Property, opportunity
Ideology	Values, ideas
History	Chronology, legacy
Place	Local experience
Aesthetics	Scenery, beauty

Source: La Gro (2008).

This panorama gathers the integral approach of landscape professionals, focused on the integration of multiple aspects, where each one of them plays an important role and deserves a response from planning land use and collective habitat design.

## Edge

Although strictly speaking, the word *edge* refers to the idea of a defined limit, the concept of wild-rural-urban edge prefigures the contrary, a fuzzy space of transition, which actually is composed by many more issues than those that *urban* and *rural* involve themselves.

The edge could be a transition zone between the city and countryside, described as a diffuse territory characterized by overlapping parts and phenomena, difficult to define areas determined by problems inherent to the conceptualization of two primitive worlds: rural and urban. Toro et al (2005, p. 64).

The interaction of spatial, environmental, social, economic, historical and others events is vibrant in the urban-rural edge. Its main expression is the nature changing and shifting, “... *behind this image one of the most significant problems of the peripheral is concealed: its complex texture and porosity difficult to establish the limits that allow analysis and therefore, their understanding.*” (Arias 2003, p. 21)

The constant dynamic complicates the spatial definition of border. Measure it and quote it as difficult, and also because it changes according to the discipline that studies the landscape. The place studied here offers a particular natural feature: the hillside. The geographical characteristic of the Aburrá valley, fosters a special way to think on landscape of borders because it is always present in the scenery, whether viewed from the bottom of the valley, in its heterogeneous and mobile composition, or from the top that offers a distinctly urban view. This place of transition is gradually transformed into a more urbanized setting day by day.

It has kept in an upwards movement since the time when Medellín became the Colombian economical center at the beginning of past century, and gradually menaces to rise up to the top hiding the green silhouette forever.

The edge landscape in this condition, becomes an omnipresent visual environment, outright in the identity of the inhabitants with their habitat and daily life.

## Slope

As a characteristic of the natural morphology, the slope constitutes the main structuring feature of the local landscape. The Aburrá is a narrow and contained valley, the silhouette of the mountains, facing each other, reaches a maximum height of 3100 feet above sea level. A transversal section makes evident gentle slopes near the river, followed by steeper slopes in the middle and hilly areas in the upper reaches.

By topographic, geological, hydrological and climatic characteristics, the slopes of the Aburrá Valley are exposed to a range of natural and cultural hazards, such as landslides, floods, torrential floods and earthquakes, whose consequences have been compounded by the processes of occupation in the territory, threatening populations, infrastructure and ecosystems.

In the Metropolitan Agreement 13th of 2011, the Metropolitan Land Planning Guidelines are complemented with the adoption of the structuring systems of occupation and strategic intervention scenarios. It states that the edges of the slopes and streams are multifunctional green corridors (...), contribute to the reduction of natural hazards associated to the geomorphology of the slope (...), will enhance the regional ecological network, fostering connectivity between components and increasing their biological flows. Nevertheless, the actual concretion of these important criteria in real material is still incipient.

## Streams

The streams have to be understood as part of the hydrologic cycle, not as a punctual (linear) object or even “obstacle” for the urban development. Watersheds are the basic units of planning and land management, as they are the landforms within the hydrological cycle that collects and concentrates water supply. This makes water system as a structure of the natural heritage, within processes of spatial planning. From the water component it is possible to recognize interrelationships and interdependencies of the natural system and the socio-economic-cultural (IDEAM, 2004).

It is important to note the definition proposed by the Medellín Environmental Office over a stream: *“It is a dynamic body of water, formed by a channel or permanent runoff and a round or strip afferent in each side, which act as shock absorbers of the natural flooding processes”*

Undoubtedly, water is an outstanding factor for human life, but not only as essential resource for living, but also as a playful and inspiring resource. As Costa (2006, p. 12) expresses: “(...) to understand the urban river as landscape, means also to grant it an environmental and cultural value that goes beyond the idea of a sanitation and drainage piece. It is also to recognize that urban waters and cities are mutants and have intertwined destinies.”

## Methodology

The methodology was based in the usual process of diagnosis, development, synthesis and proposal, of guidelines in this case.

The diagnosis focused on identifying the status and trends of the landscape of borders, took as axis six landscape components: biotic, abiotic, social, morphological, regulatory, and spatial/perceptual, to analyze their impact on the landscape edge. Although placed in the Aburrá valley, this theoretical research is not referred to particular

cases, studies or specific detailed areas; in this context, the analysis relies 80% on secondary cartographic information, advanced by the public and academic sectors for other territorial issues, which provide abundant information available publicly. This task reinforced by selected field journeys tests, working in the manner of transects, let a clear understanding on the emphasis and or voids, particularly from the landscape discipline point of view, of the secondary information used.

At least, one researcher in the group was in charge of each component. Wide and selective documental review was carried out and frequent workshops let overlapping exercises for articulation of contributions from each component analysis.

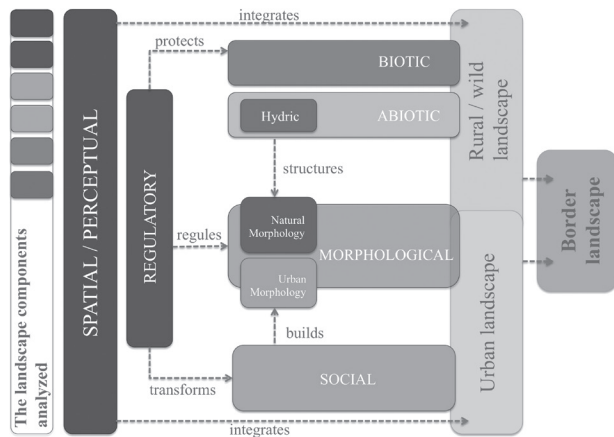
During the development stage a few selected conceptual guiding bases were profiled and appropriated. This represented the most defining stage, demanding diverse approach discussions, problems prioritization up to final agreements. An important input was the participation of international visiting professors to the Master of Landscape Design program, in workshops discussions, analysis and formulation.<sup>3</sup>

The synthesis allowed the extraction of the real and multi-faceted problematic situations and also opportunities for landscape development on streams in borders.

The proposal focused on the declaration of landscape guidelines to orientate any sort of development projects concerned with streams on its route through the Aburrá valley urban-rural borders, and classified for the stages of planning, design and materialization. The emphasis was on three particular physical situations of the streams: waterbed, waterside, and intersection with service or transport corridors.

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3 Mg. Nathaniel Cormier, from University of Washington, Seattle; and PhD Juan Carlos Vargas from Harvard and MIT Universities.

Figure 1. Relationship between components.



Source: the authors.

## Identification of problems and potentials

As stated in the methodology, the process is oriented by variables, although disaggregated for the analysis stage, the six components are closely related as it is shown in Figure 1.

## From the biotic and abiotic components

The natural scope, disaggregated into abiotic: relief and water, and biotic: flora and fauna, shows an overview to the natural system of the territory where the city Medellín has developed. The purpose is to draw attention into the fundamental role of these elements, as unified system, within the border, focused on the streams and their afferent areas.

The valley enjoys a very wide and valuable nature diversity. Its climate facilitates the development of exuberant native vegetation and allows adaptation of flora from higher and lower altitudes. Consequently, the place also offers wide variety of associated fauna. Relief wrinkles add favorable niches and microhabitats that increase the diversity conditions of the place.

The natural diversity is being increasingly violated to supply buildings, accomplishing utilitarian and economic interests. This phenomenon is common in Latin American cities and repeatedly recognized in Medellín, as Zuluaga (2008, p. 11) states:

New typologies in urban and metropolitan peripheries have decisively affected the spatial occupation mainly for the residential growth. All these occupations have contributed direct and indirectly, to destroy the land and alter ecosystems and landscapes, breaking rural activities developed in peri-urban areas, absolutely overflowing the existing planning frameworks.

This situation is worsened by the local predisposition to copy patterns from abroad, selecting vegetation almost exclusively for their urban functions or particular fanciful tastes, consequently privileging fast and cheap utility over ecological value. On the other hand, the weak attention of official planning bodies to assess the natural scope, doesn't transcend clearly in the public interventions or even in the big private condominiums, perhaps because of the compartmentalization of knowledge about landscape and its important role in human life and habitat quality.

According to the Aburrá river's POMCA<sup>4</sup> (AMVA, 2007), there is still a lot to be investigated and known about the local natural richness. Also it is urgent the valuation that should follow this knowledge; the diffusion and integration of that knowledge into an interdisciplinary work with the professions which lead the development and planning of the territory that should have a primary landscape vision.

Within the natural component, the water outstands, represented by the streams viewed from the hydro-logical cycle and from the watershed. That is, from the process through which water renews itself and from the territorial unit that makes it possible to understand and quantify the

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4 Plan de Ordenamiento y Manejo de la Cuenca del río Aburrá.

cycle. The streams are the running water channels resulting of the hydrological balance in a minor watershed.

This variable contributes to the landscape assessment criteria from the hydrological, ecological and environmental functions of the streams in a watershed scale, as the base unit to the planning and management of the territory and the hydric source, as well as the riparian zones, forming the transition between the aquatic and terrestrial ecosystems.

According to the natural morphology diversity, the presence and organization of streams in the territory is diverse. As could be seen in Table 2, within the area of Medellín, few watersheds with abundant number of streams are found in the southwest zone, while many watersheds with a few streams

each are found in the northeast zone. It suggests a different look for different zones, avoiding standardization for a sound landscape.

The methodology used by POMCA, to establish the minimum waterside strip, takes into consideration a higher number of criteria than the Medellín POT<sup>5</sup>. However, it is susceptible to be improved and incorporated into the plans' wider criteria that include the whole dimensions of the aspects that affects the hydrology, geomorphology and ecology of riparian zones. For example, there is lateral, longitudinal, and temporal dimensions, but in the plan, the vertical and longitudinal dimensions were not clearly established. The POMCA does not consider the high gradient, structural complexity and tolerance to hydric stress associated to riparian vegetation, in the lateral dimension either.

Table 2  
*Medellin micro watersheds classification by geographical zones.*

Zone	Number of watershed	Number of stream	Watershed length
South west	5	139	5-20 km Type B
Western center Q. La Iguaná	1	101	>20 km Type A
North west	17	27	< 5 km Type C and D
South east	18	95	< 5 km Type C and D
Easter center Q. Santa Elena	1	69	> 20 km Type A
North west	13	42	< 5 km Type C and D
Total	55	473	Not applicable

Source: Instituto Mi Río (1996).

Image 1. Aburrá river watershed, study zones.



Source: the authors, based on Google Earth.

## From the social component

The social component in this research addresses different relationships between human beings and the edge landscape, and the slope and streams of Medellín. Being the two major transformer actors, the territorial planning institutions and of course the communities who inhabit the border, both recently arrived habitants– and their environment.

Actions facing the streams, whether arising from institutional agents or from the communities themselves, result in the conditioning of a narrower waterbed. These actions –of alleged mitigation– result in strong impact on natural and hydrological dynamics, as well as in a transformation of the natural landscape, losing the ecological and identity functions of the hydric system of the valley. Spaces that once represented supply and recreation gradually disappear, even as a social benefit, and only raise attention when a disaster comes.

This situation evidences a society of inhabitants that largely ignore the condition of a water shaped landscape, while the ideal landscape Lineamientos para intervención en quebradas, como estructurantes de paisaje de borde en Medellín, Colombia

has been also sought as dominated nature, as opposed to adaptation and appropriation. This constant struggle against natural laws, makes the border landscape associated with poverty, very low productivity and geological or ecological vulnerability.

The origins, cultures, settlement forms, appropriation, landscape values and social identities in borders are very diverse. That situation produces a border character marked by its variability and high social dynamics that are expressed in the spatiality of the built landscape. Therefore, the social variable in Medellín and in the landscape of borders, is a high impact actor, both in their settlement practices and in the way to interact with their surroundings. In turn, administrative institutions focused on solving housing, infra-structure and urban facilities, that cause major impact on landscape, as they are not completely aware of the ecosystems value and vulnerability in border areas.

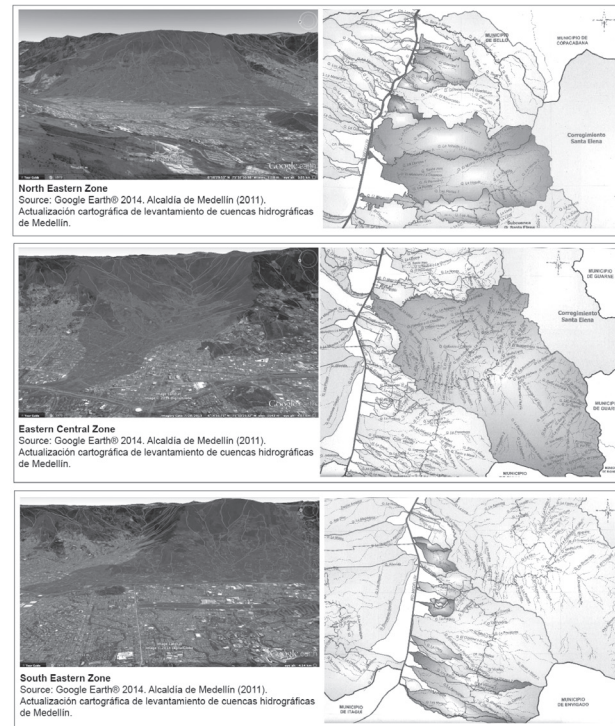
### From the morphological component

The morphological component, in this research, refers to the way that physical elements structure the living spaces in the wild-rural-urban edge. This shape is determined by the various relationships between natural and urban morphologies, converging in the edge situation.

Spatially, the Aburrá valley narrows in the south, widening in Medellín area that reach about 7 km wide, to close again in the north. Altitudinal variations occur in the valley, from 1450 m, up to the mountains at 3000 m in the highlands. Each side of the valley offers a particular grade and distribution of creases on the surface, and also of watercourses patterns (Image 3).

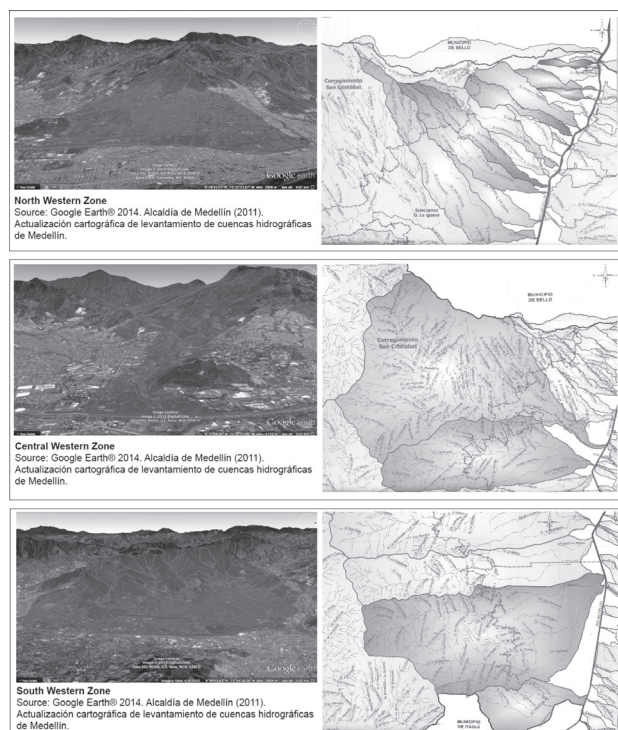
Natural morphology represents the shape of the territory, mainly determined by natural relief and cracks where the streams run. This morphology constitutes the basis of human settlement shaped by geology, climate, and water involved in the appropriation of the landscape by human groups.

Image 2. Micro watershed classification Eastern zones.



Source: the authors based on Google Earth and Alcaldía de Medellín, Secretaría del Medio Ambiente (2011).

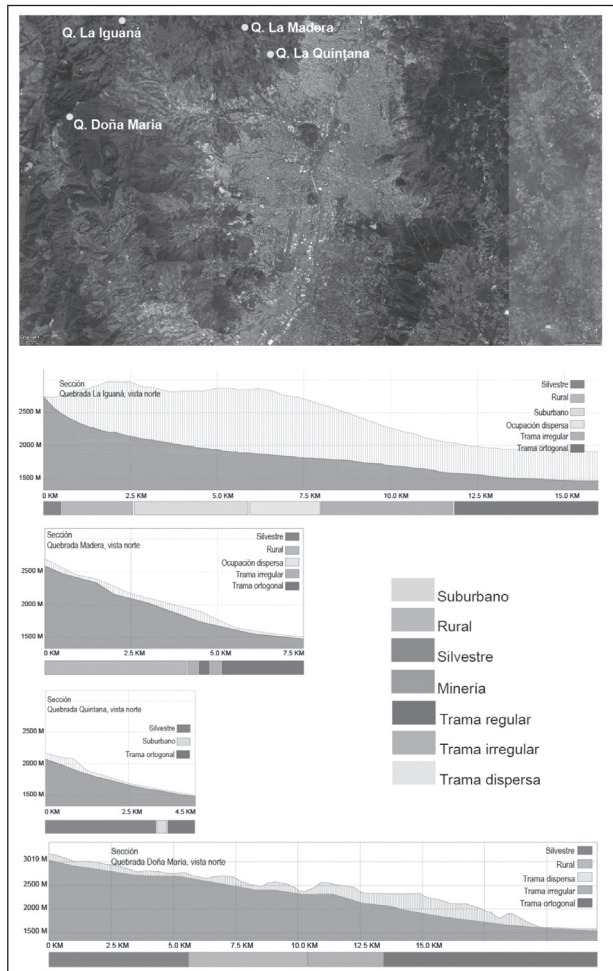
Image 3. Micro watershed classification Western zones.



Source: the authors based on Google Earth and Alcaldía de Medellín, Secretaría del Medio Ambiente (2011).



Image 4. Urban morphology in interaction with Natural morphology, Studied streams Doña María, La Iguaná, La Madera, La Quintana, La Madera.

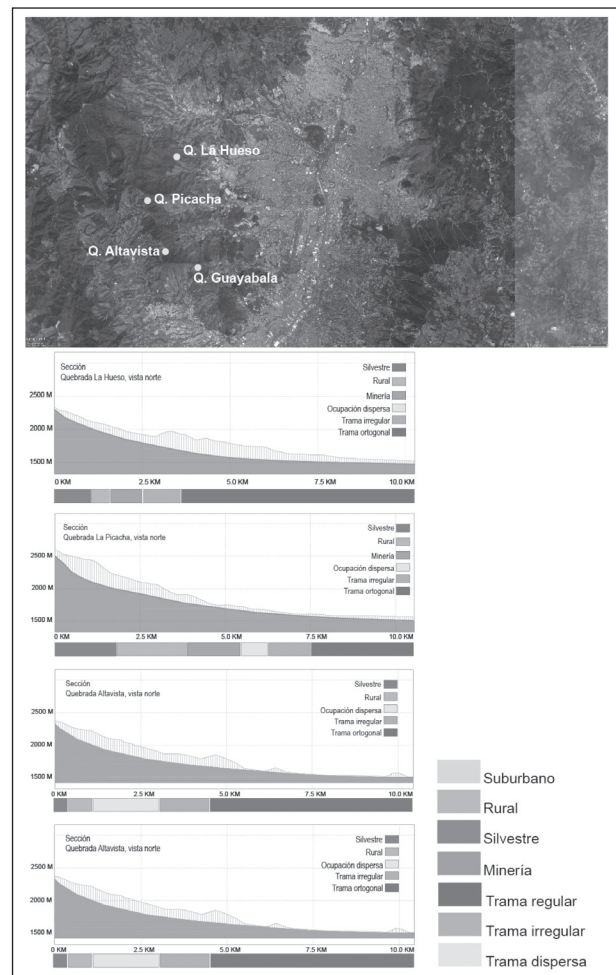


Source: the authors.

Urban morphology means the resulting form of land after occupation and settlements, the configuration of common open space, and appropriation of a particular landscape. This is represented in multiple ways of adaptation, with main interest in the areas close to streams.

The urban morphology of Medellín has varied in an accelerated way in the last 25 years, principally because of migratory displacement of people attracted to the city by industrial development, and also because of the demographic explosion that adds complexity to the city's overflow limits and the sprawl over the edges on the hillsides.

Image 5. Urban morphology in interaction with Natural morphology, Studied streams La Hueso, La Picacha, Altavista, Guayabala.

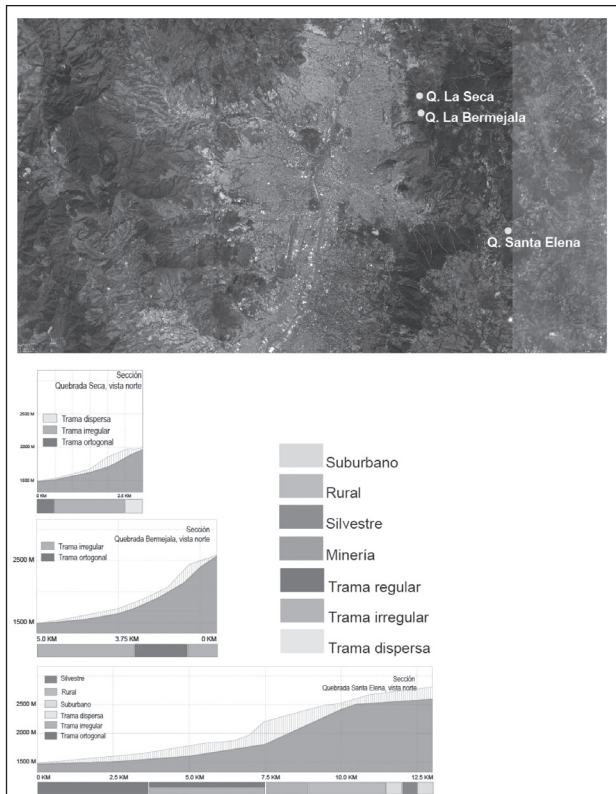


Source: the authors.

This occupation is reflected in compositional patterns, often geometric –sometimes not– that goes up gradually on the hillsides. These pieces, with defined or dispersed geometry, unintentionally create new and ephemeral urban-rural edges that are quickly replaced by others, and devours the traces of natural landscape that are rapidly increasing.

The relationship between the natural and urban shape determined various situations of edge, characteristics for each one of the six geographical zones identified in Medellín and established by Instituto Mi Río (1995), from hydrological basins:

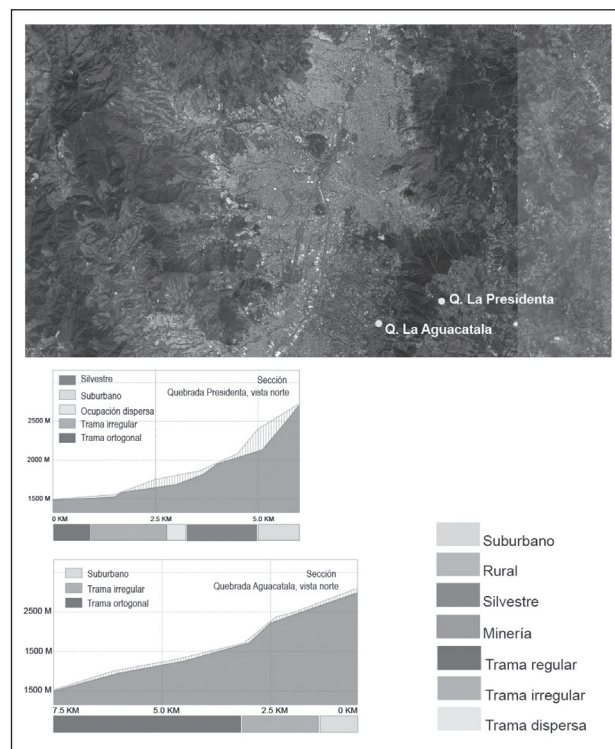
Image 6. Urban morphology in interaction with Natural morphology, Studied streams La Seca, La Bermejala, Santa Elena.



Source: the authors.

*Suroccidental, Suroriental, Centro-occidental, Centro-oriental, Noroccidental, Nororiental.* The streams and overall water systems, unavoidably structured the growth of the city in the sense that it gave food resource availability to the emerging urban communities, and in turn, the possibility of healing to dispose housing sewage downstream. That has been manifested in the occupied water nearby, then urban growth over expansion lengthwise and as well crossing to overcome watersheds, and streams, often covering them completely. This fact increases the vulnerability to events such as landslides and torrential floods associated with landforms, streams and illegal occupation of the watersides in a representative way. This feature is typical in the development of the city throughout the territory, characterized as a dynamic landscape in geological terms, and occupation of high risk areas in social terms.

Image 7. Urban morphology in interaction with Natural morphology, Studied streams La Presidenta, Aguacatala.



Source: the authors.

## From the regulatory component

The development of this component consists of reviewing the available regulations of the international, national, regional, metropolitan and municipal scales, about issues like environment, water, landscape, biodiversity, land planning, public space and waste management. All this in order to find the basic concepts and criteria, that could support protection and regulation of the landscape values, associated to border and streams, while also identifying regulation gaps about landscape.

Human actions impact the natural space and transform the territory. The origin of environmental regulations are in need to organize those performances and have the purpose to control them, moderating the human behavior, based on principles that allow living according to the natural space (natural and morphological components)

and coexisting peacefully with the congeners (social variable). The spatial/perceptual variable articulates, while the regulations protects.

It is easy to observe the lack of landscape reference mostly in the local regulations. In many of them it is used only as an analysis unit or simply talking about the outstanding beauty or scenic and interesting landscapes. Therefore, guidelines and specific norms about landscape do not exist, thus risking the quality of the existing landscape.

It is essential that development models with various scales provide for special treatment of wild-rural-urban edges because these places are particularly dynamic and changing, demands comprehensive postures and inclusive visions of these particular scopes of landscape planning.

The valuation of the natural environment is necessary when planning and managing the territory, not only as a supplier of food, but considering all environmental supply and ecosystem services associated with bringing their importance in the development of a place or a region as a local and identity landscape.

### **From the spatial/perceptual component**

This consists of an approach from the spatiality, that is, from the compound of the three dimensions that traditionally define the space: length, width and height, and partly from the understanding or interpretation that people have “their” landscape. Those visual conditions offered by the particularity of the Aburrá river valley, in the portion corresponding to Medellín, clearly stands out.

Also from the perceptual relationships, often unconscious, people establish individually with different places and particularly, for this case, with the streams and their surroundings. Relationships that can explain the attitude of response to the perceived situations: contempt, ignorance, indifference, ownership, identification, identity, orientation, and many others.

This is the least quantifiable of the variables considered, and the least measurable because it changes easily –more than the others– with every intervention on the territory. However, it is the strongest in its dynamics because it greatly depends on the location of the observer, and in more detail on the direction of his glance.

The interpretation of the relationship between visual and spatial perception is very important. As the observer gets closer to the object of observation, the visual perception decreases, and the spatial and sensory perception increases. However, it is well known that the view plays a protagonist role, but is advisable not to discard the influence of the other senses in perception.

The work includes the different spatial/perceptual scales in the relationship between the observer and the landscape in the streams on the hillsides: panoramic, middle distance and short distance or *experiential*. The main aspect here is recognizing the mistakes made in the experiential scale, when repeated many times, promote an inconvenient landscape situation and a negative cultural impact.

What the research found was, scattered and incomplete intentions to address the matters of landscape in some projects. But given the current lack of agreement and testing of instrument or tools that could measure, to quantify and translate its benefits in economic terms, landscape is unfortunately ignored.

The landscape, despite its importance, is highly vulnerable to human intervention. It is then up to this research to make contributions in this regard, and in forms to objectively approach, to identify and analyze landscape, and allow assessment from the diverse disciplines involved in the territorial development.

Planning practice can be understood as a collaborative effort to work within and across various experiential, scientific, and normative conceptions of place – a task that acknowledges the diverse positioning of all concepts, approaches, and observers (Williams, 2014, p. 131).

## Guidelines proposal

The guidelines are directions to accomplish landscape oriented interventions in the wild-rural-urban borders and are addressed to consolidate the streams as structural axis of the local landscape.

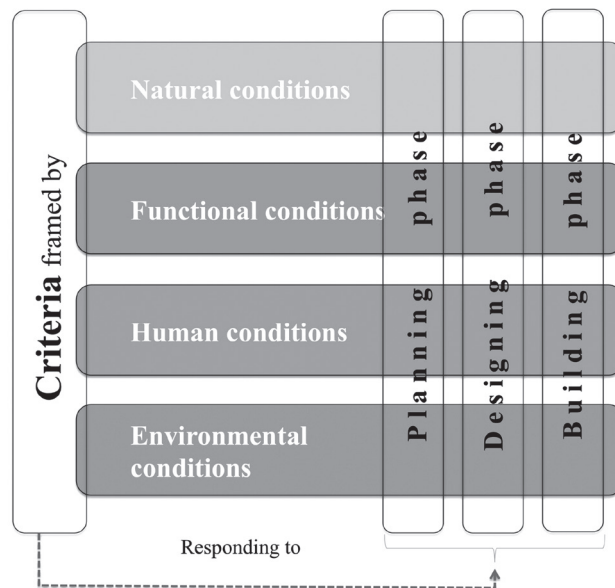
As a theoretical fundament for the guidelines, this work starts responding with its own position to La Gro's thought shown in the conceptual basis.

We cannot continue channeling and corralling in boulevards and avenues, the rivers and hydric systems of our cities. The agricultural area, the mountain and the forest are not the "outside" of the urban. Design cannot be unable to find the meaning of things as simple as the rain in the urban context. (...). The urban design can undertake new connections with nature, living tissues supported in landscape features, in the biologic symbiosis, in the teaching of science (De las Rivas, 2013, p. 91).

The guidelines represent a tool to concrete the facts of some of the landscape ideals, in order to change from an ambiguous idea to tangible realities in the territory planning and particularly in the daily space.

The tool is oriented by criteria, framed in the following conditions: natural, functional, human and environmental. The document proposes specific actions responding to those criteria organized for three key moments in the definition of

Figure 2. Guidelines structure.

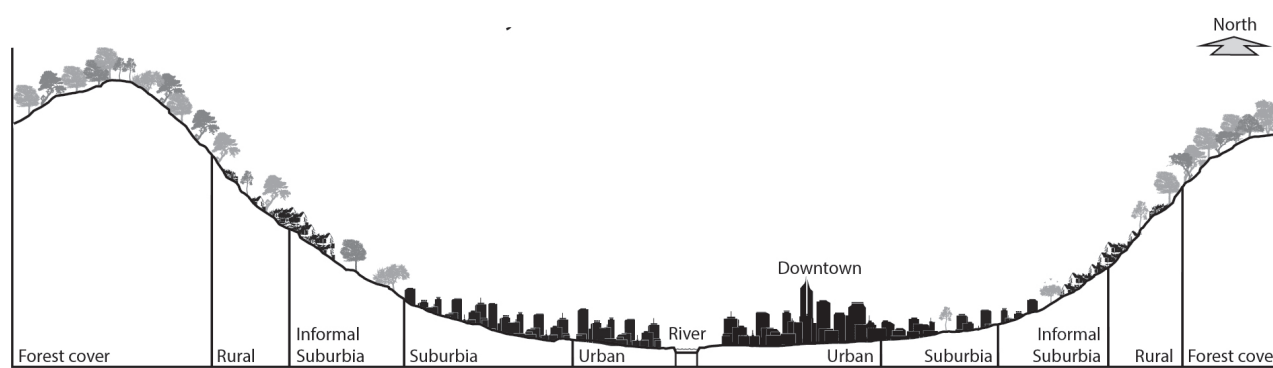


Source: the authors.

the interventions: planning, design and building. The structure of the guidelines is shown in Figure 9.

Complete tables were constructed for three main parts of the stream spatiality: the waterbed, the waterside and the intersection with mobility, towards optimal habitat configuration. It is to say: respectful of the abiotic and biotic circumstances, correspondence with social behavior towards the streams such as conscience of their presence, appreciation of their meaning and ecosystemic role, landscape identity, environmental services;

Figure 3. Schematic cross section of Aburra valley.



Source: the authors.

better understanding of risk, educational and recreational benefits, and environmental sustainability.

The key to our future will be the development of human beings with a greater sense of wholeness and connectedness and a more integrative philosophy of knowledge (Scott, 2002; cited by Bärbel et al., 2005, p. 188).

Portions of the completed work are shown in Tables 4, 5, and 6, in order to offer one panorama of the guidelines.

These guidelines are addressed mainly to the municipal city halls, but they are also useful for environmental authorities, planning offices, Área Metropolitana del valle de Aburrá AMVA, the Empresa de Desarrollo Urbano EDU and other government agencies, private or mix, that are concerned with the habitat configuration in borders. On the other hand, they are also useful to non-governmental institutions, private developers or community groups that undertake actions nearby streams in the wild-rural-urban border tract.

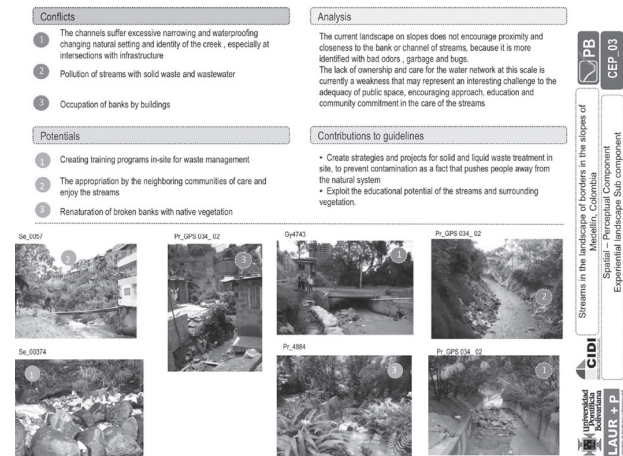
While the application of this tool does not guarantee the economic development and the urban sprawl contention, they are not contrary to these purposes and clearly contribute to the border identity as a fact, as an *ecotone* between the wild, rural and urban habitat.

Table 4  
Example of guidelines for waterbed interventions for water side.

		Water side			
Functional conditions		Criteria	Planning	Design	Intervention
	4	Valuation of riparian landscape on hillside	<ul style="list-style-type: none"> <li>To enhance water sides as attractive and relaxing spaces, climatic stabilizers and landscape articulators</li> </ul>	<ul style="list-style-type: none"> <li>To reinforce site or corridor identity</li> <li>To condition the design to natural landscape and follows its image, without imposing capricious geometry</li> </ul>	<ul style="list-style-type: none"> <li>To take advantage of relief, rocks (if there are some) and vegetation formal qualities</li> <li>To avoid interruption on user and water relation relationship</li> </ul>
	5	Conscience of the historic present	<ul style="list-style-type: none"> <li>To contextualize planning of these areas into landscape premises, instead of the application of foreign urbanism patterns</li> </ul>	<ul style="list-style-type: none"> <li>To recover local cultural and natural values and features.</li> </ul>	<ul style="list-style-type: none"> <li>To value and reintroduce artisanal principles and techniques</li> </ul>
	6	Responsible appropriation of streams in hillside	<ul style="list-style-type: none"> <li>To favor Understanding of hydrological functionality by the community</li> <li>To coordinate positive rapprochement from inhabitants to streams</li> <li>To involve them in assignments that lead to the stream enjoyment</li> </ul>	<ul style="list-style-type: none"> <li>To keep 80% of the area in soft surface to make drainage easier</li> <li>To take creative advantage of natural morphology</li> <li>To provide generous spaces for permanence and slow walks</li> </ul>	<ul style="list-style-type: none"> <li>To involve local residents in the construction works.</li> <li>To use signposting to inform and welcome visitors</li> </ul>

Source: the authors.

Imagen 8. Example of guidelines diagnosis and the analysis.



Source: the authors.

Table 3  
Guidelines in response to landscape views.

Seeing landscape as:	Associated with:	How do we respond from this research?
Nature	Fundament and essence	With deep responsibility taking it as a design axis
Habitat	Resource adaptation	With creativity
Artifact	Utilitarian platform	Respecting nature, society and applying common sense
System	Dynamic, equilibrium	Facing it through interdisciplinary approach
Problem	Flaw challenge	Displaying intelligence, sensitivity
Wealth	Property, opportunity	Applying social justice
Ideology	Values, ideas	Re-discovery of our roots
History	Chronology, legacy	Tracing the past
Place	Local experience	Perception
Aesthetics	Scenery, beauty	Discovery, enchantment, enjoyment

Source: the authors based on La Gro (2008).

Table 5  
Example of guidelines for waterside interventions, for intersections.

Intersections					
Natural Conditions	Criteria	Planning	Design	Intervention	
	7	<b>Minimization of the risk</b>	<ul style="list-style-type: none"> <li>Promote policies that lead to opening and remove broken pipes to recover the natural water balance</li> </ul>	<ul style="list-style-type: none"> <li>Innovate alternative solutions to box culverts and creeks coverings avoiding clogging and minimizing chances of flash floods</li> </ul>	<ul style="list-style-type: none"> <li>Using appropriate technology to soil conditions and accessibility and connectivity of the place</li> </ul>
	8	<b>Recreational benefit</b>	<ul style="list-style-type: none"> <li>Identify the potential landscape of the various intersections and characterize according to their vocation of Use</li> </ul>	<ul style="list-style-type: none"> <li>To promote the visual recreation of the passengers vehicles through the intersection configuration space</li> </ul>	<ul style="list-style-type: none"> <li>Arrangement for pedestrians according to the place and low environmental impact</li> </ul>
	9	<b>Educational benefit</b>	<ul style="list-style-type: none"> <li>Documenting the community at intersections and demonstrate the ecological values of streams</li> </ul>	<ul style="list-style-type: none"> <li>Expand educational processes in demonstration at the intersections of the water relationships with flora and fauna</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate different ways of caring watershed to residents in order to increase the valuation of these</li> </ul>

Source: the authors.

Table 6  
Example of guidelines for intersections interventions for water bed.

Water Bed					
Natural Conditions	Criteria	Planning	Design	Intervention	
	1	<b>Hydrological functionality</b>	<ul style="list-style-type: none"> <li>Guarantee the continuity of the river bed</li> <li>Ensure basin functioning of the hiporreic zone by preserving the original bed</li> </ul>	<ul style="list-style-type: none"> <li>Avoid modifications of the river bed</li> <li>Prevent interventions that disrupt the health of the hiporreic zone</li> </ul>	<ul style="list-style-type: none"> <li>Prefer soft and permeable materials consistent with the hydrologic function</li> </ul>
	2	<b>Promotion of blota</b>	<ul style="list-style-type: none"> <li>Promote the original vegetation of the banks for channel protection</li> <li>Promoting aquatic fauna for a healthy ecosystem balance</li> </ul>	<ul style="list-style-type: none"> <li>Make use of plant hygrophilous</li> <li>Make use of riparian vegetation that contributes to the presence of birds and water quality</li> </ul>	<ul style="list-style-type: none"> <li>Avoid interventions in the streambed</li> <li>Address the different speeds and depth of the streams</li> </ul>
	3	<b>Contribution to environmental conditions</b>	<ul style="list-style-type: none"> <li>Unpack or plow surfaces, preventing vertical connectivity between the flow and the stream bed</li> <li>Promotes sanitations systems to prevent discharges to the rivers</li> </ul>	<ul style="list-style-type: none"> <li>Apply alternative management systems for domestic wastewater treatment in site</li> <li>Projecting rain and run off water harvesting thereby helping to maintain the flow</li> </ul>	<ul style="list-style-type: none"> <li>Remove water proof materials existing in the riparian soil profile</li> <li>Prevent the disposal of debris, garbage, and other materials that prevent the proper functioning of the channel or its possible taponade</li> </ul>

Source: the authors.

## Discussion and conclusions

Periodical revisions of the Territorial Ordering Plan represent excellent opportunities to reflect on wasted values and to redirect the look on the wild-rural-urban border treatment, including actualized concepts that could make a bridge between general principles and practical materialization of them. The Ecological Principal Structure as a net system, proposed more than a decade ago, has not transcended into the urban reality of Colombian cities as it should be.

A public policy that recognizes natural values within the urban context beyond the good intentions is urgent, in order to preserve natural processes in sound dialogue with urban needs, and also to reinforce people local identity in a globalized contemporary world.

The Aburrá valley, offers a magnificent setting for the city of Medellín, abundant in water courses, a visible and audible resource and special feature within the experiential scale that deserves recognition and should be easily taken as the spine for landscape management.

Streams must be taken as a structuring axis on slope occupation and ordering strokes for urban development. Nevertheless, these clear and fundamental features have been unattended, mistreated and finally hidden, wasting a great resource.

To accomplish a landscape assessment and analysis of its quality is an urgent need, facing the intense and progressive anthropogenic activity of formal and informal occupation that ends in environmental pressure and consequent landscape detriment. It could be the first step towards a true recognition.

In order to develop an understanding of individual landscapes and what they mean to those who experience them, there is a need for landscape to be accepted as a democratic entity. As Scott (2012) concludes, “It is time to break with convention and to boldly go beyond the rhetoric to ensure that we can collectively achieve the kind of landscapes that people want”. To achieve the landscape that people want requires awareness of the values and aspirations attached to those landscapes (Butler et al., 2014, p. 448).

There is a need to make the tacit explicit, in order to be able to understand the subject that is being promoted and also to enable those, experiencing a landscape, to justify their opinions and values. This does not mean that the aim of raising awareness of landscapes should be to create a single common understanding of landscapes; it can just as well be used as a means for questioning the authority of those who define what landscape is (Butler et al., 2014, p. 448).

This work is just an attempt to put academic work, around landscape, which matters to the use of the city planning authorities. It could be useful as a contribution for better achievements, in landscape terms, of the efforts and investments in the so-called *Ring road Garden* or *Metropolitan Green Belt*, which is the official name of the numerous physical transformations in process in the wild-rural-urban border.

We clearly need greater dialogue between researchers and society to mark out the boundaries of research. This will help interdisciplinary attitude find its way between being seen as the anchor for solving landscape problems and as an academic experiment (Bärbel et al., 2005, p. 188).

During the development of this work, an integral look on the role of the streams as structuring spines of the landscape of borders, was constructed. A vision of the border territory has driven to conclude that the protection border system should not be a strip, that hardly adapts itself to the relief, but better a system of natural interconnected

fragments, with strong linear green –but truly green– corridors, along the streams strengthened specifically the most vulnerable points of urban rural inflection.

This will contribute to set an extensive net that weaves the territory linking together all those mountaintop sites that surround or conform the valley, not just Aburrá, but San Nicolás and San Jerónimo.

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