VALUE CAPTURE IN URBAN MASS TRANSIT CORRIDORS

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ABSTRACT

Urban peripheries consolidation from mass transit construction project in Bogota, propitious increases in land values on urban lines that are intervened, in which the city hasn´t had returns for value capture that make public investments more efficient.

This investments, made from public sector in mobility projects of mass transit Transmilenio, have had significant impacts on land offer increase along lines, with important effects in terms of a major land value, that are being exploited by private real estate, without any possibility of investment recovery by public sector.

Mass lines projects concretions with an exclusive participation on investments from Nation and District will continue providing new land, without many possibilities of value capture through land management mechanisms, allowing acquiring resources for the city, making required investment for next Transmilenio TM phases in Bogota lower.

The trend can be reversed by thinking on transit construction projects as Integral Urban interventions of mayor scale, exceeding line looking and directed to urban pieces, on Urban Development prospect where District through guidelines that Law 388 has defined and have been developed on Territorial Order Plan determine, along with the lines planning that are going to be intervened, the areas that can generate a higher land value and propitiate the mechanisms to enhance all the urban land on the service zone (Lines and Portals).

Simultaneously, summoning the private sector for the real estate projects development, previous regulatory control over those areas, for public investment to have an economic return that allows the action from private state under clear rules. Conducive resources generation for the District from the increase of that land value and promote enhanced equity processes for value added benefits, making investments on Mass Transit sustainable and build mechanisms for investments social appropriation that are part of the Development Plans.

This paper is part of a most extensive research developed by the author, as part of the thesis about Urban and Regional planning. Below we develop its principal

scopes, from which are incorporated the methodology and the most relevant findings.

Main Objective

The research sought determine the value added level in the urban land at the service zone in one of the Transmilenio Avenues (80th street), (surplus value effect for public works), from comparative Urban analysis between 2002 and 2007, applied to two representative sections of the line, in function of the distance variable to the Transit line.

Specific Objectives

- To propose an analysis method that allows establishes the differences before and after the Avenue 80th street line building, in the selected sections.
- To establish the surplus value level that is being actually generated at the studio zones.
- To determine by comparative analysis the effects on land occupation in the city periphery, of the Transmilenio Portals service zones.
- To inquire about the urban quality of the Transmilenio investments and its effects on land value and the public space quality on the Avenues service zones.

Reach

Academics: contribute to the urban research in Bogota, about the generated impacts for the Transmilenio construction and its effects in terms of the generation of surplus value opportunities.

Urban management: to know and deepen about urban effects produced by a great scale intervention of Government and District resources, on the generation, implementation and consolidation of the most ambitious urban project that Bogota has developed in the last ten years and its remuneration in terms of surplus value.

Urban planning: analyze from the economic side, the process of planning and investments decisions, as well as the investment return, obtained from the urban management that has been generated because of the surplus value, with the Transmilenio building over the study line.

Contribute and deepen on the elements, actors and effects of the participation in surplus value and its real possibilities as a tool to promote investments sustainability in mass transit from the evidence of a consolidate line, after nine year of its entry into operation.

1. CONCEPTUAL FRAMEWORK

To make clear how Transmilenio investments managed as integral urban projects, can be based on schemes that guarantee its own financing with due conciliation public-private, where public administration takes a part of the land value increase that generate

Government actions, two central concepts are elucidated in this research: Land value and surplus value.

1.1 Land Value[1]

To locate the land value formation, we initiate considering this formation in a capitalist activity that doesn't depend on the land existence. Under this scenario the costs of a specific property depend on the production costs and the utility margin that the producer expects. In this case:

PB = CP + G.

Where: PB= Property price
CP= Production cost.
G = Utility expected.

In this scheme, under an increasing aggregate demand without inputs or capital assets limitations, the offers will be disposed to put product on the market, under fixed production costs and with proportional utility margins and imply demand graphs parallels in time.

When analysis moves to assets that imply agricultural land presence, market conditions change significantly, in function of the lack of it and the greater or lesser production ability.

Agricultural land has particular characteristics that change, in function of its fertility, its production aptitude, which imply than a land with better conditions has differentials of production costs.

Assuming that the rest of the production elements remain constant, price formation, however, have a similar genesis implies for the different producers, variable production costs, making producers who have lands with greater aptitudes get in function of that aptitude, incomes for their production.

This greater obtained value as a product of the production process is not given by any intervention of the producer, it is implied in the land, and it can be hold by the owner of the land and transferred to that one as an income.

PB= CP + G

G= (g + r)

Where: g = producer utility
r = land income.

[1] This numeral is building from the adaptation of the text "Precios inmobiliarios y método residual de estimación de precios del suelo", Samuel Jaramillo CEDE. Andes University. 2006. Document CEDE-2006-041

This income deflation from a specific opportunity rate gives land cost.

PS= G/i

In the case of urban assets transaction, considerations has a deeply change, having most complex dynamics, that includes implied incomes to agricultural production, called primary urban incomes, as well as incomes linked with the consume of the property building, called, secondary urban incomes.

In this case, beside land differentials, there are another attributes like accessibility and land use making vary property price to acquire. The market still for assets with the same construction cost is ready to pay a greater value in function of the advantages that a specific attribute can impress in a real estate.

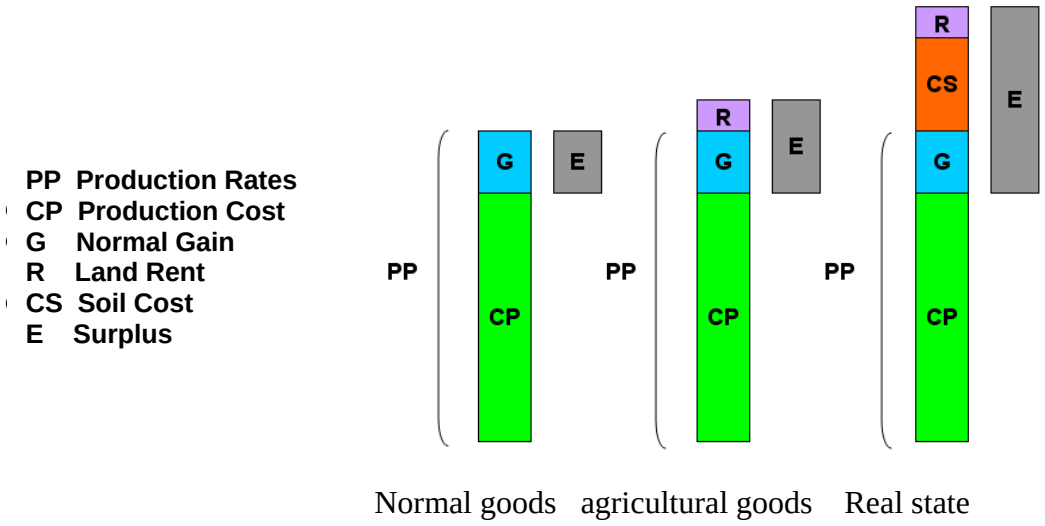
Unlike the consumption of an agricultural property, in this case, the applicant besides paying for the property, also pay for the land where this property is built, so property value is built from the land, real state production costs and the utility that the offer expects for the property traded.

The formation of this price is given by:

PB= CS+CP+G+r

Where: Cs= land cost.

The comparison of these prices formation in a free market is illustrated on Graphic 1, adapted from the original source.



Graphic 1: Price composition of different types of assets.

Source: Construcción en altura y distribución de cargas y Beneficios. Samuel Jaramillo.

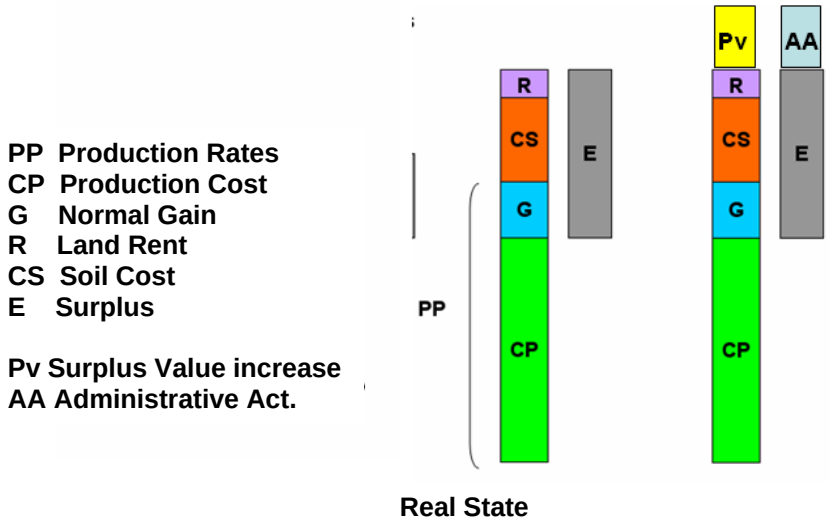
Additional to this way of price composition of a real state, there is a different methodology for price composition, denominated hedonic value, which allows relating for different options for site selection, quality in the composition, environmental attributes, accessibility, among others, shadow costs that market attributes to a specific asset or assets set. The method also allows estimate economics values for ecosystems and environmental services that have a positive o negative influence on the prices established by the market.

"…*The method basic premise is that a property price in a market is related to its characteristics or the services that provides…This method is frequently used to value environmental amenities that affect the price of residential assets*…"[2]

Hedonic prices methodology based its hypothesis on the valuation that market makes of the utility of a specific property in relation with its attributes and characteristics. Rosen (1974) defined that like "…*Inferred prices of the characteristic that are revealed by people that make market transactions, since that differenced products prices can be observed on them like different quantities of attributes that the property has*…[3]

1.2 Surplus value generation [4]

Urban surplus value is an additional resource to the "normal land" value. It is generated by clearly administrative acts derivate from the decisions made on urban development topic, as shown graphic 2.



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Graphic 2 Assets composition with surplus value

Source: Construction in height and distribution of charges and benefits. Samuel Jaramillo.

[2] valorhedonico\Federico G_ Salazar.htm
[3] Leonardo Morales Zurita. La calidad de la vivienda a partir de enfoques hedónicos individuales y agregados espaciales: Un caso aplicado a la ciudad de Bogotá. Valle University. 2005.
[4] Alex Smith. Los precios del suelo urbano en Santa fe de Bogotá 2003 – 2010. SDP 2003 Pag. 25

On this way, increase urban perimeter, build public works, are administrative acts originated by the development and urban dynamic. In this sense, urban surplus value aren't taxes, because there are product of public acts like the mentioned, which are like a delivery of a "check" of important resources to assets owners and properties located on benefit zones affected for the decision, whom doesn't have to do any action and less any investment for that value increases.

The importance of surplus value generation is that those contributes on resources that public entities can take advantage to make integral urban investments, in which formulation includes a resources diagnose than can be attracted for the generated surplus value. With this, the public administration will dispose enough resources to make higher impact buildings, overcoming the sector division made when the financing sources are reduced and destined to punctual interventions.

There are four reasons in the city on which a plus on land value is generated. Two of them are derived from a situation in which because of the advanced state of urban development the incorporation of land for new activities is required. Below processes that generated surplus value are summarized.

A) **Expansion:** land use change of rural areas that are incorporated to urban perimeter. For cases where surplus value is generated for urban perimeter expansion the process to calculate is made by the comparison between two properties at a given time. One of the properties is located on the urban zone and the other on the rural zone. It is supposed that the property on the rural zone reached the level of the urban zone once the change on land use is declared.

B) **Densification**: in which land use intensification is given within the urban perimeter, establishing higher densities of construction. In the affected zones identification because of the administrative decision on increasing construction rates in the city, two areas are defined in accordance with pattern change and the sectors of development determined by the new rule. Potential surplus value refers to the difference between land price derived from permitted exploitation by the previous rule ant the land price derived from the exploitation defined by the new law.

On the other hand, an urban land value plus is generated when there is:

C) **Use change:** given that there is an urban activities hierarchy which is derived a wide range of land prices, on public space activities of a major hierarchy moves the other uses of lower hierarchy to sectors that offer lower prices. In this way, use change on a sector where an activity that doesn't generated great economics benefits is permitted, for another use in which activities with a higher economic hierarchy are permitted, generated an increase on land rent.

The basic example is when a residential sector, in which commercial activities are not permitted, change when commercial activities are permitted. Given that business is an urban activity with a higher economic hierarchy than housing, an extra land value is generated on that sector. The process indicate that the affected zones should be determine with land use change established by the new rule and, in second instance, residential zones reference prices

Then, prices of commercial blocks located on the same homogeneous areas (blocks with similar urban and location conditions). The difference between residential price and the new use is the plus value per m^2. This value is multiplied by the respective block area to obtain the block plus value and, then the aggregation of these values forms the total capacity volume of plus value.

D) **Public works:** when government institutions do a public work that benefit a sector in a urban way (accessibility, landscape, services, safety) above land and the estates that are in its in area of influence a plus value is generated.

1.3 Infrastructure for mobility: strategy for an integral urban development

The increasing urban complexity, well as the population increment on developing countries cities has generated, besides the urban land informality problems and the increasing employment and urban services deficit, a significant increment on transit services demands and a higher quality and road system coverage to meet the increasing mobility rate. Every day the relationship between urban development and transit networks is more evident. A right management of urban life can't be conceived without integrate into the bag of problems to be solved: transit deficit, added to the health deficit, education and safety, inter alia.

Urban growth, increase of population, increasing migration to big cities and the extension of the urban boundary, generate an increment on land value of areas that are more accessible to production and consumption centers (generating employment and demand of goods and services), encouraging that lower resources people that are an important percentage of new residents migrating to the city, see the possibility of access to an urbanized land market limited, contributing to a periphery land occupation, where besides the public services and urban infrastructure deficit, their options to access to a labor market are hampered by the absence of public transit, which implies a double exclusion, first to the possibilities to the basic urban services: water, electricity, sanitation and transit, and second, to the accessibility to services that make desirable and possible life in the city: health, education, recreation, employment and culture.

According Jordi Borja:"*Transit and mobility policies are the main axis on which urban and metropolitan agglomerations space policies rotate nowadays. Notice that are based in mobility notion and for that, transfer facilities, logistics organization and all terminals take a special relevance; but also is understood that this mobility policies are intimately linked to the urban development type that is intended and that they propitiate. But the most important is that, and existing event in most cases, transit authorities or metropolitan or regional entities, its conception and planning in not a problem that it concerns exclusively to these agencies: The decision of the form, coverage and even presence on the system of each one of the mobility forms is an eminently urban problem, and constitutes the essence of metropolitan planning*[5]."

The traffic to a world more urbanized every day questions local governments about mobility management, as one of the principal points to be solved in order to decrease the

[5] Borja, Jordi. Estrategias Urbanas. Fifth public policies international seminar. Mexico. 2006.

gap between a minority of higher incomes, highly motorized in privates modes (less efficient on energetic consumption and land occupation) and a majority of lower incomes, captive of public transit (more efficient on energetic consumption and land occupation).

However, in mobility terms, getting the concept of Eduardo Bericat Alastuey[6], we are in front of a modernity that involves three types of mobility differentials: physiological, mechanical and electronic or audiovisual. Each one generates its own development space and implies different circumstances to solve the proximity to what was achieved.

"*Multispatial mobility is immanent to the every human being existence within a developed society. In this existential context only can survive being mobile. The plant-man, perfectly sedentary and immobile, is doomed to starvation and fatal boredom. From this perspective, therefore, mobility right is something more than an expression of liberty right, is an expression of the right that every human being has to life and survival*."[7]

Land use planning that is mediated by a motorized society to access city services, affects the quality of life and the access that different human beings have to agglomeration benefits.

Transit (the traffic) that is set from human rights declaration, generally classified citizens into two classes in an unequal process: **public transit users and private car users.** For the first one, the access to a lower cost of displacement implies, space and temporal supply restrictions as well as a sacrifice of their time, their access and the coverage of their desire to travel. For the second ones, to the extent that a great number of owners access to the private mode, the number of vehicles increases, causing congestion problems that are equally translated into a greater travel time, with a higher cost per undertaken travel that means a loss of competitiveness for society because of citizens resources, energy and time consumption on transit network and a increased emission of pollutants to the atmosphere.

Transit network evolution, its urban order incidence and the interaction between transit and city should be understood under three dimensions on this research: temporal, space and social.

From ***temporal*** point of view, each historic event on transit network configuration, responses to preexisting and leads to transformations that generate, from the urban side, a mutual symbiosis where these two elements complementary and mutually in time.

From ***space*** dimension, which define new urban elements, new lands to be occupied and also, that same occupation propitiate certain assets and services exchanges.

On ***social*** dimension, this exchanges energy the territory, causing displacements, new human settlements, cultural and racial mixtures, in a incessant process that sets city in a changing way, on complex scenarios and increasing diversity.

[6] Valladolid University. Sedentarismo nómada. El derecho a la movilidad y el derecho a la quietud. Valladolid report, 2005.
[7] Ibidem. Page16.

According to World Bank:"*Transit deterioration conditions associated with the disordered urban growth and the increasing motorization, are affecting the economy in large cities. Structural policies as a good planning of transit infrastructure expansion can help, as well as a planned un-concentration, an integral management of land use infrastructure, or land markets liberalization, but they required careful policies coordination in transit sector within a broader strategy of city development...*"[8]

The previous reference frames the strong relationship that exists between urban development, transit and land management, the central aspect that this research is resuming and it is aligned with the ideas on transit projects that World Bank is promoting.

In the national level, is clear the necessity to promote a better transit and land use integration in Colombia, as Santiago Montenegro (National Planning Director) established on his publications: *"We are conscious that urban transit plays an important role on cities performance and development, directly affecting territory occupation patron. We have to bet on majority and urban environment mobility transformation, more than on isolated works that are oriented to few private vehicles users.*"[9]

Part of the problem is associated with public administration weakness that hasn't privileged general interest with transit decisions. *"In addition to the integration of urban transformation with transit challenges, exists the challenge, not less, of change the relationships between government and private providers of public transit. The lack of a correct function and responsibilities distribution, or better, the transit public service regulation and control inability, allowed in the past that our urban public transit became in a private incomes wild hunting from part of the agents and a oblivion, contempt shall we say, to the citizen as a system user."*[10]

Based on the above, research auscultation path the paper that transit (public and private) have had on the city construction, the way how symbiosis between transit is still unresolved, understood today as Town Planning and Mobility, that calls duality between Transit Planning and Urban Planning, reflects on the territory, inequities in city services access, a privilege on infrastructure use and a recovery of real estate assets and lands from investments decisions of public agency, for few actors, indifferent to the planning process and that only expect public actuation to activate decision of large capitals investments.

The search for the best management response for raised duality and its inappropriate consequences on land market is reflected through an assessment of the different components that link the transit infrastructure interventions, wondering how these influenced on urban territory, generating a greater or lower private actions attractiveness, (exploded by public action). In this way, how these private actions are translated on isolated urban bets that should be regularly promote to a greater governability and legitimacy on city construction processes and urban actives generation, to potentiate equity on different areas that are involved on public interventions and should be promote

[8] World Bank. Mooving cities. World Bank Strategy Urban Transit review of 2002.
[9] Montenegro Santiago. Colombian National planning department. Mass transit seminar. 2005.
[10] Ibidem.

more visible public-private alliances for communities where these are seated, to promote city development and resources acquisition from the potential riches that urban land has.

2. TRANSMILENIO: AN SUCCESSFULY TRANSIT IMPLANTATION, A DEFICITARY URBAN INTERVENTION

Before going to the space analysis of urban actives valuation on the selected avenue, this chapter develops an analysis of what Transmilenio infrastructure proposal has meaning and its insertion on urban scheme, valuating just from the urban optics, project implications in terms of city and coherence among objectives that were conceived at fits time, and the answer that has joined the city.

The elaboration that is established doesn't look for a transport component review, with surpass qualifications, from the point of view of number of users and covering, Transmilenio excels with increases the exam. It neither looks for to make a review on an architectonic component (understood as constructions and interventions on public spaces), the kindness or imperfections that the project has meant on lines that has been developed.

The point that is proposed looks for go over into urban attributes that an infrastructure project should mean, the real contribution from town planning, boundary configuration and social appropriation, have had the project development. However, review in urban complex terms, like the management scheme that exists for avenues design, construction and maintenance, contributes or limits the generation of urban incomes, and the economic investment recovery that society makes for Transmilenio avenues constructions.

Planning and strategy have boarded urban project impacts in an isolated way. Unknowing that is finding the right mechanisms for project management, the best way to affect in urban development and in the way as impacts are oriented positively, interventions will have a more coherent distributive effect with cities urban development. Under this optics as Ferran suggests it, project effects go over urban topic and have a multi-facet character above:

- *"Urban system provoking space integration or isolation.*
- *Economic and social conditions, accenting riches concentration or stimulating a better distribution.*
- *City role and its competitiveness.*
- *Government way, because this may fall upon democracy, city-dweller participation and decentralization in a different way.*
- *Urban planning because the specific regulation may debilitate or potentiate it.*
- *The environmental, spoiling it or contributing to its development.*
- *Identities and cultural values, which stimulate new values emergency.*

- *Urban land management which generates new conditions for land markets functioning and increases its prices"*.[11]

Transmilenio is not the exception; it is implied for the previous premises. Is the most ambitious project for the city of Bogota in economic and transit terms, signifying just for I and II Phase a cost of 1.410 dollars millions and in terms of users, mobilizing about 1.400.000 travels a day over the avenues of the two Phases in 2008.

In transit practice, it is the obligatory example of a right planning, operation and control scheme. However, in urban practice, the evidences founded on the affected boundaries; don't allow pointing an approbatory note on the integral intervention that should go with its concretion.

However, this deficiency may have an explanation, without justifying the urban result, on the existing evidence about the absence of a strong urban vision of the project gestation. The next numerals will board TM context in the city and they allow know, approximately, the way TM reference was built and which were their implementations on the city, from urban point of view.

2.1 Construction costs

On "Transmilenio System Setting Plan" prepared by TRANSMILENIO S.A. on 2006, on 2.6 numeral is exposed a detail comparison of infrastructure costs per unit of system's I and II Phases. System costs for I and II Phase obtained from the Transmilenio Setting Plan, which resume the system infrastructure construction experience, are specified below:

The administration contracted with Steer Davies Gleave Company the Phase I operational system design including an infrastructure design component. There were included only road infrastructure designs values (They didn't include public services networks detailed designs, environmental impact studies formulation and traffic management plan). On Phase II the administration through Urban Development Institute take of the infrastructure designs execution without including operational design. Besides design details level is increased (geotechnical, pavement analysis and public services networks). Different of Phase I, in this phase the formulation of an environmental impact study and traffic management plan is requested.

2.1.1 Phase I

Phase I was built between 1999 and 2001 and it has three avenues, as it is illustrated by graphic 3.

[11] Lungo Mario. Greater urban projects. UCA Editors. San Salvador. 2005.

Graphic 3. Phase I interventions.

Source: Tm presentations. 2004

Caracas Avenue: it is one of the principal urban road in Bogota; it goes across south and north of the Capital District. For a better accessibility to the southern of the city, from this road a branch-line connects Caracas Avenue with Boyaca Avenue, going to the axis from Ciudad de Villavicencio Avenue. In addition, this avenue includes Jimenez Avenue or 13street Eje Ambiental, this Eje extends from 3 street up to Caracas Avenue.

Medellin Road or 80street: urban-regional character road that integrates the western with Bogota downtown, at the same time, it integrates the travels from the nearer towns like: Madrid, Funza, Mosquera y Cota, among others.

North Road: it is Caracas Avenue continuation up to the north part of Bogota. Urban-regional character road that integrates the travels from the nearer towns of the north part, like: Chia, Cajica y Sopo, among others. Table 1 presents Phase I Avenues construction costs.

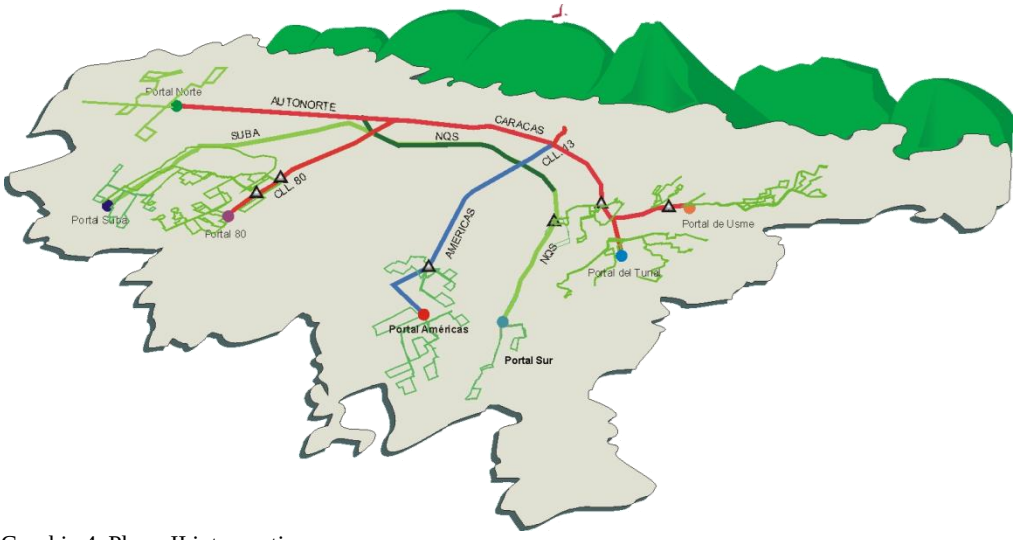
Table 1. Phase I Infrastructure Costs (millions of pesos 2006)

Avenue	Km. Cost. Millions of constants pesos 2006)	Km Cost. (Millions of constants dollars 2006)
80street	$ 35.434	US $ 15.541
Caracas	$ 20.945	US $ 9.186
North Avenue	$ 28.877	US $ 12.665
Eje Ambiental	$ 12.999	US $ 5.701
Phase I average	$ 25.984	US $ 11.396

Source: Transmielenio System Setting Plan – 2007.

2.1.2 Phase II

Phase II was constructed from 2001 and it is composed for three additional avenues:



Graphic 4. Phase II interventions.

Source: TM presentations. 2004

Americas – 13street Line: it is one of the principal communication roads of the city southwestern zone. It attends residential character zones with average and low stratums with principal industrial zones and city's center.

Suba Avenue: from the beginnings of the Bogota Savannah urbanization project, this important line was the principal connection between the ancient town of Suba (now a locality) and Bogota city.

Norte-Quito-Sur Line (NQS): this is the principal entrance from the southern to the Republic Capital. As an urban line, this road connects Bogota southwestern with the north; it borders what is known as the city expanded center. Table 2 presents Phase II Avenues constructions costs.

Table 2. Phase II Infrastructure Costs. (millions of pesos 2006)

Troncal	Km Cost. Millions of constants pesos 2006)	Km Cost. (Millions of constants dollars 2006)
13street - Americas	35377	US $ 15.516
NQS	56132	US $ 24.619
SUBA	53117	US $ 23.297
Phase II average	$ 49.042	US $ 21.510

Source: Transmilenio System Setting Plan – 2007

2.1.3 Phase III and system future.

The city advances on 26street, 10th avenue and 7th avenue construction, with an estimated cost of 1.6 millions of dollars. None of these avenues has entered in operation. Today, resources for next avenues construction after Phase III aren't available. It is necessary to

look for alternate financial sources to continue with System expansion costs and cover the costs its prolongation will demand (table 3).

Tabla 3. TM Future avenues infrastructure costs estimation (millions of pesos 2006)

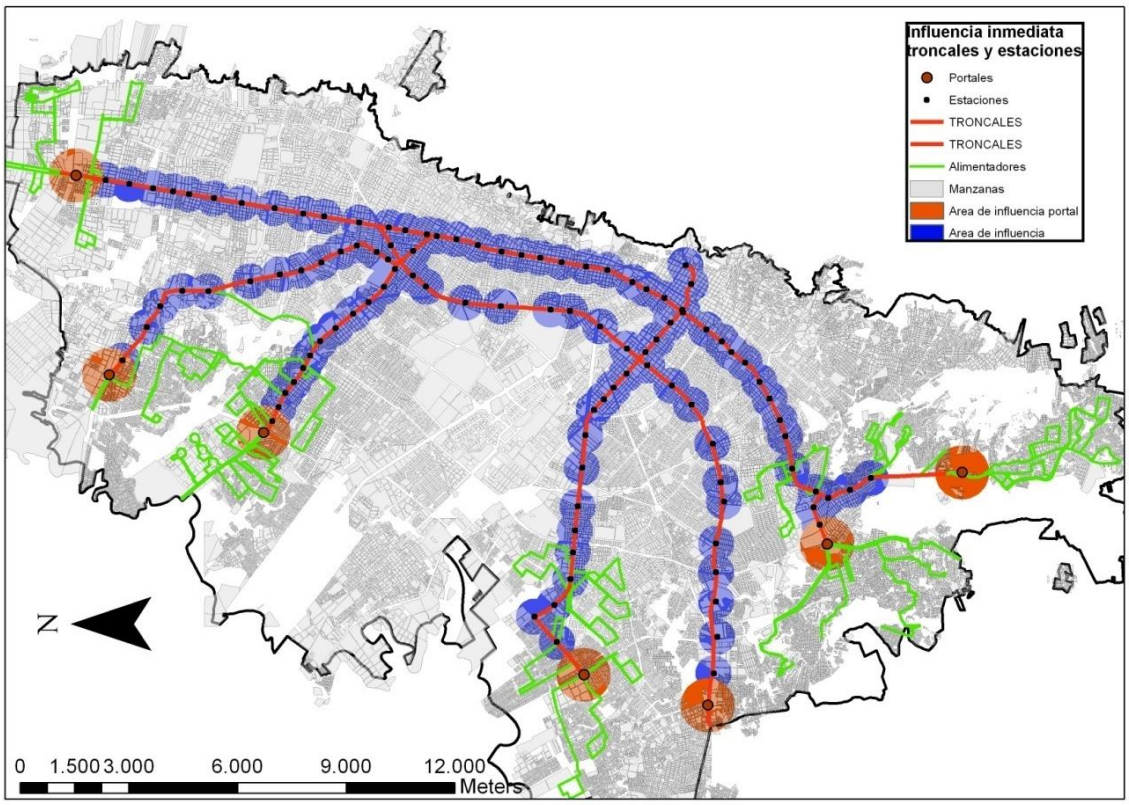
Phase	Component	Km.	Infrastructure cost	Maintenance costs. 5 years	Total
IV	North Avenue extension	7,8	211.423	13.742	225.165
	80street extension	2,5	91.853	5.970	97.823
	Caracas extension	3,2	140.124	9.108	149.232
	6A street Avenue	4,9	216.588	14.078	230.666
	63street	7,5	360.311	23.140	383.451
	Boyaca Avenue	24,1	992.296	64.499	1.056.795
	170street	4,1	161.097	10.471	171.568
V	Caracas 2	8,3	770.249	50.066	820.315
	1ro de Mayo Av.	11,3	538.896	35.028	573.924
	Ciudad de Cali Av.	15,1	702.700	45.676	748.376
	Villavicencio Av.	6,8	317.309	20.265	337.574
	170street	5,2	182.347	11.853	194.200
VI	North Avenue 2	10,3	41.882	2.722	44.604
	68 Avenue – 100street	16,9	819.079	53.240	872.319
	63street	7,7	392.838	25.534	418.372
	13street	11	491.978	31.878	523.856
VII	Americas Av.	3,1	108.897	7.078	115.975
	Cerros Av.	7,4	303.988	19.759	323.747
	ALO Av.	27,2	414.718	26.957	441.675
	Boyaca Av.	9,3	326.121	21.198	347.319
	Ciudad de Cali Av.	5	205.397	13.351	218.748
	200street	12,3	548.929	35.680	584.609
VIII	ALO Av.	12,7	229.165	14.896	244.061
	NQS Av. 2	9,2	377.931	24.566	402.497
	ALO connector	1,2	49.295	3.204	52.499
	Americas connector 2	1,3	53.403	3.471	56.874
	Villavicencio connector 3	1,8	73.943	4.806	78.749
IX	Cali Av.	4,7	193.074	12.550	205.624
	South Correfor Rail	11,8	510.396	33.199	543.595
	Boyaca connector 4	13,5	513.396	33.371	546.767
	6A street connector 5	1,5	61.619	4.005	65.624
Total		268,7	10.401.242	675.361	11.076.603

Source: Transmilenio System Setting Plan – 2007

The system expansion chronogram established in the Transmilenio Setting Plan of 2007, correspond to the established avenues on 3093 CONPES and the priority established on

the Setting Plan in 2003, and it supposed a project extension until 2032, counting with resources availability.

The presented costs are estimated for each of the future avenues. They were calculated based on Phase II Avenues components average values. Nevertheless, avenues definitely costs will depend on researches and designs.[12] Having in mind the previous, future avenues total cost it's estimated in a value of $11 billions of pesos in 2006. With this numbers the cost per kilometer it's approximated to 20 millions of dollars, which reflects the investment that will has in the city the project consolidation and suggest explore the risk mechanisms of this investment, for its later recovery by valuation or value capture by public work. Graphic 3 illustrate the Transmilenio network that has consolidated the city at present.



Graphic 3. Transmilenio Avenues direct influence area.

Source: own making.

Avenues, stations and portals are observed, as the configuration and the covering that this infrastructure and transit infrastructure contribute to the city, based on a 500m influence area.

[12] Source: Transmilenio System Setting Plan – 2003

2.2 TM projects urban impacts

Urban impacts valuation is going to be made referred to Mario Lungo classification suggested on his book "Grandes Proyectos Urbanos" that classified great scale project elements, like TM, in five aspects. The adopted characterization is referred on Table 4.

Table 4. Great urban projects consequences.[13]

	Favorables	Unfavorables
City development	They unchain positive dynamics by stimulating great public or private investments, promote a city positive image and increase its productivity.	They accentuate the fragmentation (duplication) of the city, and produce great quality and urban modernity islands in front of unfavorable areas that don't receive investments: "vision of city" is lost.
Urban plannig	Projects provoke innovator changes and a new dynamic on urban planning focus, besides stimulating new ways of participation and valid urban norms transformations.	Because of its partial character, these projects contribute toward the urban development uncontrolled and generate privileges in urban law aspect; in addition, they help actors with a greater power participation and a urban management privacy.
Land market	Projects allow setting new and flexible types of land management between public and private sectors, based on special norms for land use.	Land prices are incremented increasing urban inequality; generated surplus values are, in most cases, individually attracted, without any benefits on city develop.
Urban social structure	Big projects improve infrastructure quality and urban services that they offer, contribute to increase, in general, live condition level of many social sectors.	They tend to displace old habitants, provoke etilization processes, reinforce existent social-space segregation patterns in the city and modify urban identities.
Urban environmental	In most cases projects produce sanitation processes of degrade environmental areas.	Constituting isolated urban interventions projects tend to produce, in some cases, perverse effects on environmental terms, by modifying positively an area to the detriment of other areas or the city united.

Source: Lungo Mario. "Grandes proyectos urbanos".

In a general way, it may be asserted that TM project execution, base on the previous characterization and using the same matrix, it has represented for the city the next consequences:

Table 5 Transmilenio project consequences.

Ítem.	Favorables	Unfavorables
City development	The project has meant an investment of 500 millions of dollars (USD 2006) for Phase I and 910 millions of dollars (USD 2006) for Phase II. This has been a complete public investment. About urban image and productivity improvement, the project made recognition of Bogota (national	The dual and fragmentation phenomenon is even evident on TM boundaries. Project lines are intervened in a great scale and the urban benefits are perceived and capitalized by owner that they have in front of the avenues, (direct surplus value attracting) and in the immediately

[13] Lungo Mario. Grandes proyectos urbanos. UCA Editores. San Salvador. 2005.

	and international) and its bet for a sustainable transit. Since the intervention of the peripheries areas access roads, the project has generated the improvement of important areas through maintenance and construction of feeder roads. Within other urban interventions, TM has contributed positioning the city on the 8 place of the competitively ranking in Latin America.	influence area. For afferent area habitants, the utility that they get is a better access to the transit service. There is any contribution for these areas as regards town planning. In the same way, although desirable, project reach doesn't coverage the greater public space and town planning quality deficiency, of an informal city, in order the city fragmentation is affected by the project.
Urban planning	There in any contribution about this aspect for Phases I and II implementation. Although some acts that linked other sectors projects were promoted, this doesn't have a general policy character and the project were conceived, under an infrastructure and transit project logic. Only for Phase III, nine years later, the first public-private participation mechanisms are being explored. The project on its conclusion, is aligned with Order Plan and it has penetrated Developments Plans for four administrations, that transfer it a permanence character and an own dynamic that contributes to its consolidation. Lay modifications haven't been evidenced since the project. Only that modification in some of the Zonal Planning Units, for renovation processes possibilities, still on paper.	The project has generated private resources mobilization for important real estate projects development. Although is not the research objective, it will be necessary increase over areas before TM owners inclusion, on promoted construction projects. A polygonal planning was handled, that makes a diagnostic and propose the norm over big urban pieces, without propitiating and encourage greater opportunities of densification for new lines and their integral treatment, an own reflection was necessary to promote a greater active valuation that means a mass transit lane and the generation of activities concentration sub-basins because of the demand on transit service access. Order tools weren't advantaged to make real on intervened lands, the social function of the established property by the Order Law.
Land market	About this aspect, the city hasn't advanced in the recognition of the project potentiality. In fact, there is a greater valuation of the properties located on the lines influence areas. It is evident that surplus value attracting from individual actors has really happened.	On TM boundaries it might exists a surplus value attracting, a central element related to properties valuation hasn't been capitalized by the administration, for any of the avenues. The private actor's favoritism with a greater acquisitive power and with property is clear.
Urban social structure	TM project has meant live quality improvement from an important number of people from Bogota, specially, the ones that are located over its influence area, as transit users in the city. About modification and appearance of new urban identities, project shall be considerate as a positive consequence, and not, as an	About habitant displacements, there is not a certificated research. About etilization processes the project has promoted a different phenomenon. Displacing public transit to another lines and liberate capacity on mixed lanes, displacement times for private transit users were improved (on the first years), which motivate the valuation of new locations on the

	unfavorable condition, given that lines associate an order and organization perception as a whole that is necessary in a development and cultural evolution processes.	Avenues extreme areas, specially 80street and North Avenue and an invitation to private vehicle on the modal decision for urban transport..
Urban environmental	Sure enough, TM has substantially improved, with its infrastructure development, public services networks, electricity, aqueduct and sewer system, gas nets, among others, making greats contribution on the recovery and conservation of hydria binds and waterways on the areas that they intervene. The practices of control emission and wastes of transit activity, has strictest environmental checking that try a right waste disposition of TM vehicles operation.	The different phases, has developed for complete lines. However, urban dimension hasn't been integrated in a good manner and the first intervention made from curb to curb on Caracas avenue, and then the amplify made on the next lines from face to face (80street and Americas avenue), generate urban scars, because a wrong management on extra properties and just for the phase three (without initiating), urban pieces were amplified still in a timid way, although with a complete urban intervention, that still doesn't summon private actors and its effects are far from being concluded.

Source: Own making.

2. 3. Building activity impacts.

With the objective to contrast the licenses expedition behavior, it is taken as a base; the geo-referred data supplied by urban guardianship, about construction licenses proceedings in all of its modals that are being management during 2000 to 2007. The data report 40.886 licenses in all of its modals.

About supplied data, some precisions should be done:

- As well, counting on an extremely detail data base, there were no unit among the different files that were supplied, which makes analysis a little bit difficult.
- The classification among the License modal that is requested wasn't included for all the records, which limited this value data evaluation.
- The data is not explicit for all the records about the construction licentiate per m^2 that is made.
- There's no certainty that this data responses to all the issued licenses and as the exact number of them isn't known, is pretty difficult to approximate a coverage average for the analysis period.

However, with the objective to take advantage of the resource, that has a census character, it is assumed that license request activity implies the intention to compound the asset on the real estate. Based on the previous idea, two analyses are presented:

2.3.1. Issued construction licenses on Transmilenio lines influence area

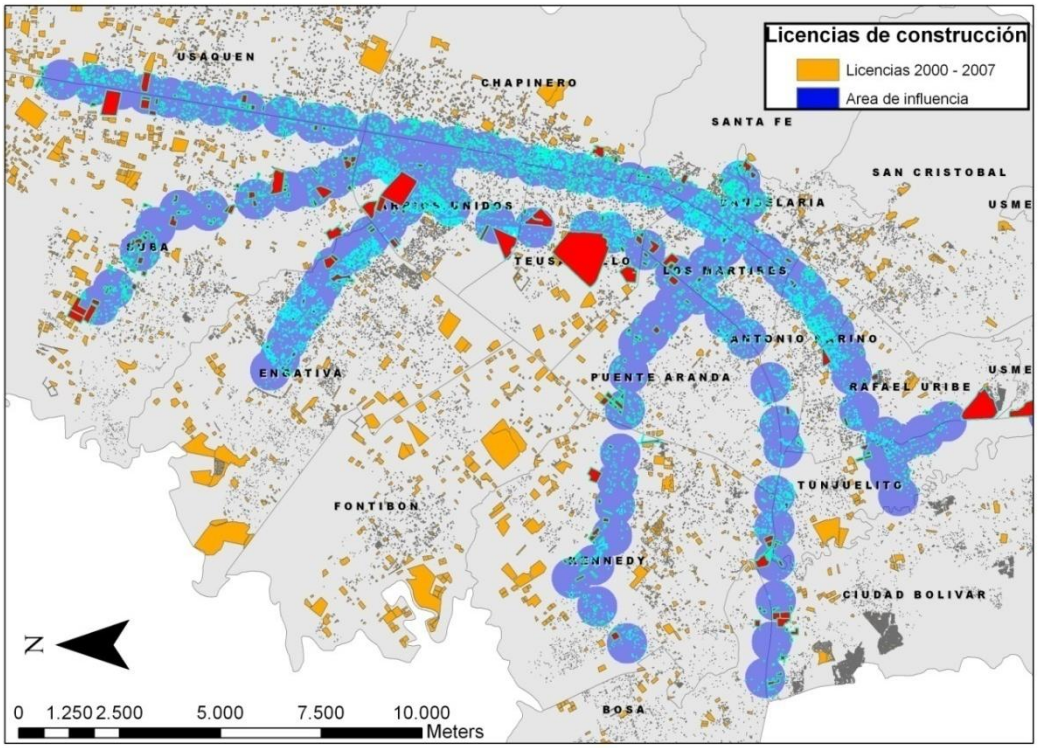
For this analysis, it is taken the reference of a nearness of 500m to the line, a priori considerate, and based on a greater attraction for nearness effect and the distance crossed by feet to access to the system. Table 6 presents the summary of licenses indicator from the evaluated data.

Table 6. Construction licenses on Transmilenio influence area.

	Area	% Area	Licenses	% Licenses
The rest of the district	31.905	83	28.454	70
Transmilenio influence area	6.525	17	12.432	30
Total urban perimeter	38.430	100	40.886	100

Source: own making beginning from Bogota Urban Guardianship association.

It can be observed that space, exists a persuasion effect through the lines, which promotes a greater real estate activity. For Transmilenio and the influence area, the analysis reflects a 17% District area, licenses base report for these areas a 30% of Construction Licenses request.. The space distribution of this behavior is illustrated by graphic 4.



Graphic 4. 2000-2007 Construction licenses on Transmilenio influence area.
Source: own making beginning from Bogota Urban Guardianship association.

The previous analysis allows affirm that there is sure enough an important dynamic on Licenses request, for these lines. An interesting line research may suggest an analysis in a research level with a greater detail, about the different types of development that has given on these areas, given that the perception from the visits that were made and based on photograph records, is that the greater density effect hasn't been generated.

As for the area discrimination where over the lines licenses are located, it was detected that there is an 81% located on the lines, while in Portal areas has been registered a 19%

of requests. The total number of licenses requested over the Avenue lines responses to 12.432, as table 7 shows:

Table 7. Influence area construction licenses.

	Number of licenses	%
Avenues	10.108	81
Portals	2.324	19
Total	12.432	100

Source: own making beginning from Bogota Urban Guardianship association.

In a portal areas level, it can be implied from licensed areas, that there are m^2 intensive projects intervened, given the character of a greater accessibility that nearness to lines and transit system gives, they form important urban opportunities, that are being developed based on lines consolidation. Table 8 shows issued licenses discrimination on avenue lines and influence area.

Table 8. Licenses classification per avenues.

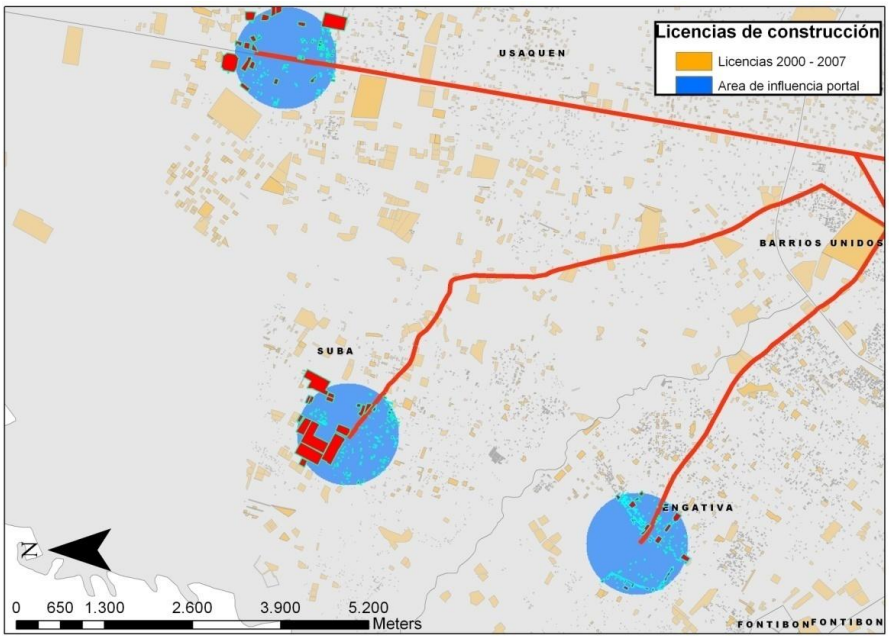
Avenues	Number of licenses	Percentage
Suba	1.682	14
30 Avenue	1.893	16
North Avenue	1.773	15
80street	1.934	16
Américas Avenue	1.341	11
Caracas center	1.007	9
Caracas south	1.515	13
Eje ambiental	625	5
Total	12.432	100

Source: own making beginning from Bogota Urban Guardianship association.

A graphic information of the space analysis of portal influence areas make more evident the impact for Lines implantation. Graphic 6 show for Suba, 80street and North Portals, the space incidence and the licensed zones.

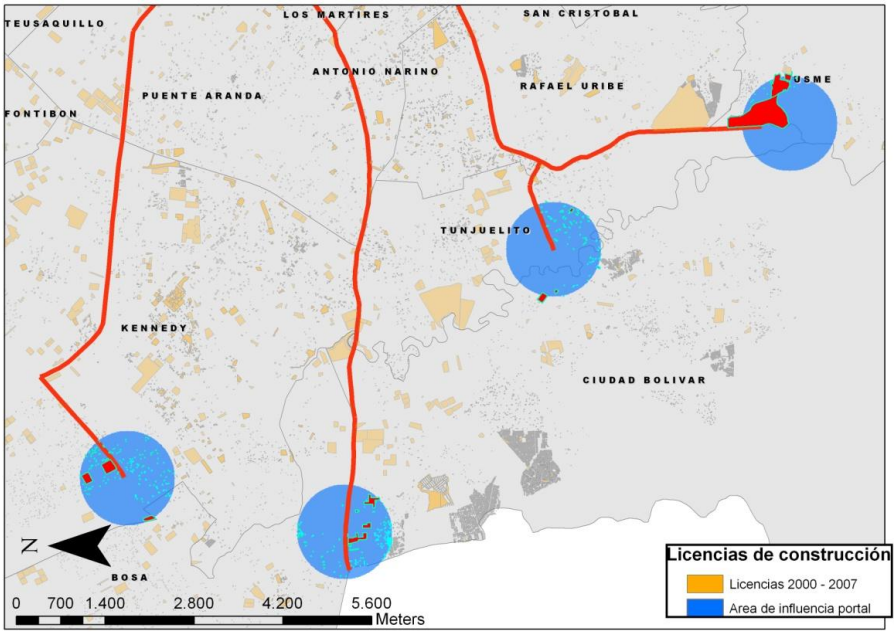
In a portal areas level, it can be implied from licensed areas, that there are m^2 intensive projects intervened, given the character of a greater accessibility that nearness to lines and transit system gives, they form important urban opportunities, that are being developed based on Lines consolidation.

A sector is observed over Suba Avenue which formed an important intervention on business and housing construction areas, that is linked to the portal forming an important urban node that has a own real state dynamic on land values.



Graphic 6. Issued licenses on North, Suba and 80street portals.
Source: own making beginning from Bogota Urban Guardianship association.

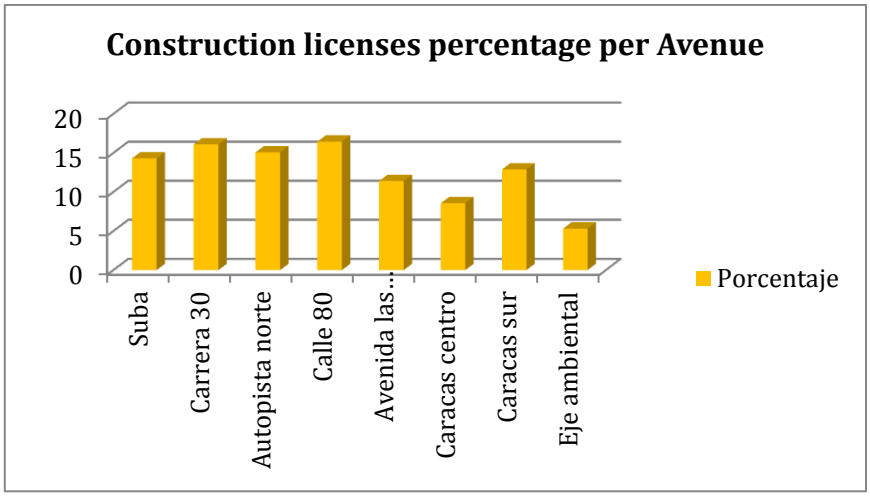
About Southern and Western portals, the information is illustrated on graphic 7. On Usme, Tunal, Americas and South Avenue it is observed a behavior con licenses request that was also important, showing in some of them a high real estate activity, that give an account promoted projects in a priority way by private sector. Are excluded from this condition the urban projects like Metrovivienda, developed on Ciudadela el Porvenir neighborhood on Portal Americas.



Graphic 7. Issued licenses on Usme, Tunal, South Avenue and Americas Avenue Portals.
Source: own making beginning from Bogota Urban Guardianship association.

A mention deserve Usme Portal, in which urban piece consolidation, management from private initiative, exploded bye Portal Construction, starts to form an urban character centrality, with own identity and quality urban spaces in a one or two stratum sector.

Graphic 8 clearly shows, which has been the behavior for each ot theses lines about this pointer. The line that reports the most number of licenses is Caracas Avenue. It is follow by 80street Avenue and the Eje Ambiental is located on the last place.



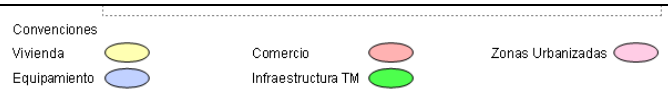
Graphic 8. Construction licenses percentage per Avenue.
Source: own making beginning from Bogota Urban Guardianship association.

2.3.2. Urban effects on Transmilenio Portals influence area

With the objective of counting with a visual record of how land occupation has behaved and the appearance of housing projects, business, infrastructure and transit infrastructure, there's going to be a comparison between two moments of areas close to Portals development. The base information are aerial pictures of 1998, that allow observe the urban configuration of this zones, before TM, the existence of important ground areas, some with undeveloped construction Licenses, and others grounds, that weren't incorporated to urban development, that are compared with pictures up to 2007.

On a land market, stimulated by the increasing dynamic that real estate sector had until 2008; the process can be evidenced by the important numbers of activated projects located near the Portals, whereas on Avenue boundaries this hasn't happened. This evidence can be graphically shown in the next analysis, which reflects the important impact that big Transit infrastructures have in the city, that have promoted the appearance of big surfaces, housing and education infrastructure projects, in areas close to the seven operation portals of Phase I and II. The comparison was made by visual contrast, emphasizing on the influence areas that are analyzed, the projects that have been concluded between 2007 and 1998. Basically a difference of a decade that confirms one of the hypotheses established by the author: periphery land occupation has been potentiated by Avenue construction, generation an urban tension between central areas renovation process and accessible land appearance, with possibilities of development nearness TM Portals.

Graphic 9. North Avenue Portal over 170 street. 183 street parking.



Source: own making.

Graphic 10. Usme Portal (Caracas Avenue – road through Usme)

Source: own making.

2.4. 3 Comparison between real estate dynamic with influence area of 4 principal city roads

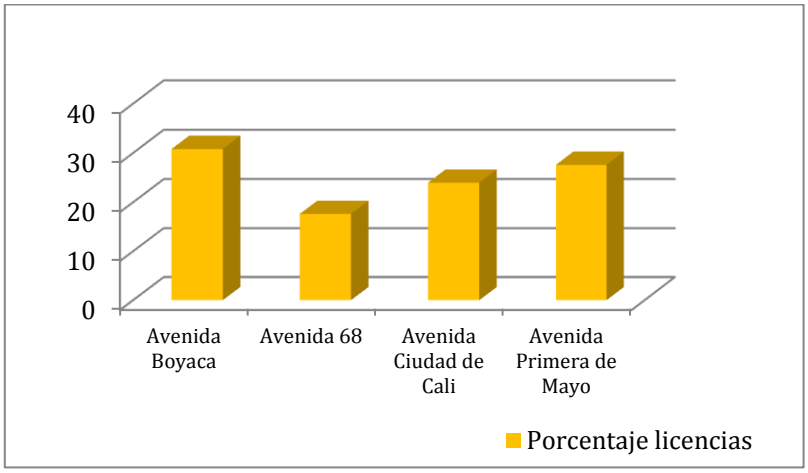
Within the information of construction licenses a comparative analysis was made for a 500m influece area, between Transmilenio Avenues intervened and four roads of the principal artherial system that doesn't have Transmilenio (Boyaca Avenue, 68 Avenue, Ciudad de Cali Avenue and Primera de Mayo Avenue), that proves the attraction that Transmilenio Avenues have had for real estate and construction development. 9.306 licenses procedures were detected on the influence area of the four roads.

Table 10. Issued construction licenses on 4 principal roads.

	Number of Licenses	Percentage
Boyaca Avenue	2.862	31
68 Avenue	1.637	18
Ciudad de Cali Avenue	2.227	24
Primera de Mayo Avenue	2.564	28
Total	9.306	100

Source: own making beginning from Bogota Urban Guardianship association.

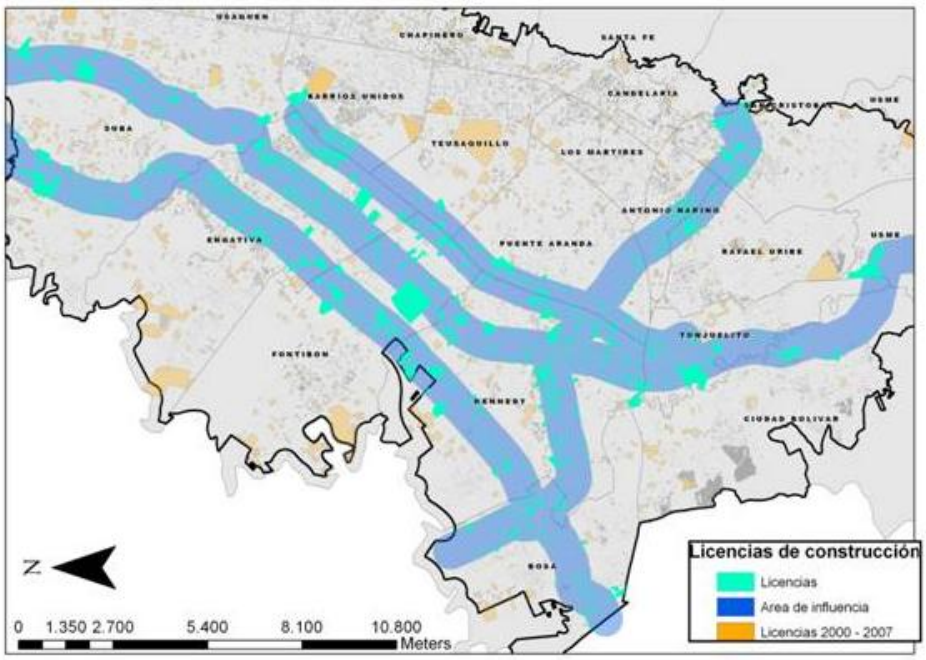
Graphic 16 show the percentages for each line:



Graphic 16. Issued construction licenses on 4 principal roads.

Source: own making beginning from Bogota Urban Guardianship association.

Of the four analyzed roads, 68 Avenue is the one that register fewer numbers of licenses. However, it is related with its length, well then as it will be shown below its licenses per hectare indicator is higher than the other roads. Each of the rest of the roads registers more than 2000 licenses, being Boyaca Avenue the one where more licenses have being issued, as it can be observed on Graphic 17.



Graphic 17 Issued construction licenses in 4 principal roads. (Longitudinal Lines 68Avenue, Boyaca Avenue and Ciudad de Cali Avenue and Primera de Mayo Avenue Transverse Line)
Source: own making beginning from Bogota Urban Guardianship association.

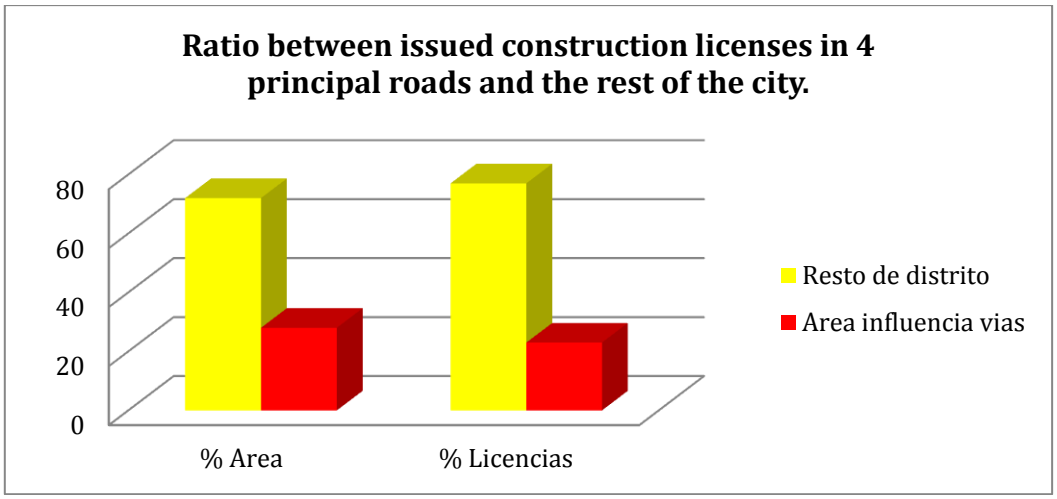
Having in mind the influence area of each one of the roads, estimated in 500m, it was found that this is equivalent to 10.601 hectares that represent a 28% of the total district urban area.

Table 11. Construction licenses in 4 principal roads in relation with the city area.

	Area	% ÁAea	Licenses	% Licenses
The rest of the district	27.829	72	31.580	77
Roads influence areas	10.601	28	9.306	23
Total urban perimeter	38.430	100	40.886	100

Source: own making beginning from Bogota Urban Guardianship association.

On its site, the 9.306 licenses represent the 23% of the total issued licenses between 2000 and 2007 that are in total 40.886, as graphic 18 shows.



Graphic 18. Ratio between issued construction licenses in 4 principal roads and the rest of the city.
Source: own making beginning from Bogota Urban Guardianship association.

These issued construction licenses percentages on the 4 roads influence area, compare with the results of the Transmilenio Avenues influence area, show that the last ones are more attractive to the real estate and construction market. While in Transmilenio Avenues influence area, that represents a 17% of district urban area, a 30% of the construction licenses were issued (Table 25), on the selected roads influence area that represents a 28% of the urban area, and only a 23% of licenses were issued.

To confirm the great real estate attractiveness, a basic Number of Licenses per influence hectare indicator for each analyzed road and each Avenue is built. With this, is clearly observed that all the Avenues have a higher indicator than selected arterial roads. While 30 Avenue presents the lower indicator among the Transmilenio Avenues with 1.30lic./he, the higher indicator for arterial roads is presented by Primera de Mayo Avenue with 1.30lic/he. (Tables 12 and 13).

Table 12. Transmilenio Avenues Lic./he Indicator

	Licenses	Area	Lic./he
Suba	1.682	805	2,09
30 Avenue	1.893	1.376	1,38
North Avenue	1.773	856	2,07
80st Avenue	1.934	658	2,94
Américas Avenue	1.341	1.009	1,33
Caracas center	1.007	681	1,48
Caracas south	1.515	954	1,59
Eje ambiental	625	123	5,08
Total	12.432	6.525	1,91

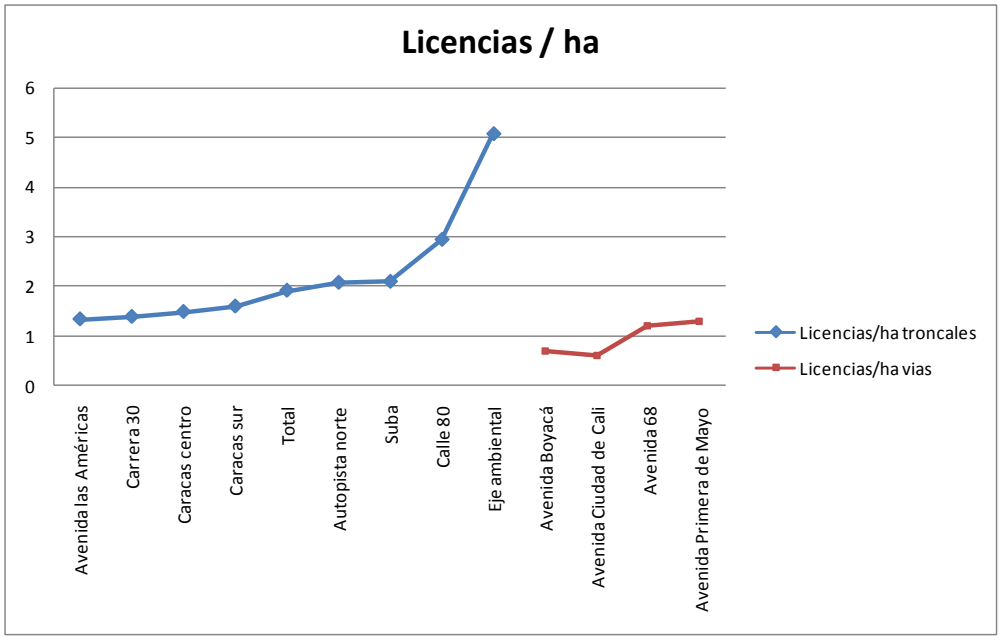
Source: own making beginning from Bogota Urban Guardianship association.

Table 13. 4 Principal roads Lic./He indicator.

	Licenses	Area	Lic./he
Boyaca Avenue	2.862	4.071	0,7
68 Avenue	1.637	1.334	1,2
Ciudad de Cali Avenue	2.227	3.558	0,6
Primera de Mayo Avenue	2.564	2.029	1,3
Total	9.290	10.601	0,9

Source: own making beginning from Bogota Urban Guardianship association.

As graphic 19 shows, a license per hectare indicator on arterial roads is under in all the cases of the presented by Transmilenio Avenues.



Graphic 19. Comparison between Lic./he indicator of Transmilenio Avenues with principal roads.
Source: own making beginning from Bogota Urban Guardianship association.

Now, if it is demonstrated by the previous analysis the building activity incentive, produced by the Transmilenio Avenues intervention, below it will be shown that this was developed in the margin of an integral public management and it obey to private unarticulated intentions, which promoted effects by privates acts were produced and there isn't exist a public administration orientation to fall in the territorial order about urban acts, that marked evident territorial inequalities on Avenue influence areas.

2.3.4 Urban Impacts on densely areas

The graphic evidence was certificate succeeded, this allows affirm that the project on its implantation, give a portion of higher public space indicators to the areas that it intervene for the square construction and the sidewalks recovery, as well as an order and cleaning on its boundaries, accompany with the continuous policy control presence, it doesn't have

in urban terms an effective habitants appropriation and clear order alignments for urban management, from the Administration.

Is evident that in line important areas, a lack of identity is shown, which is only broken in the intersection, where interventions, really increase properties value, (greater accessibility, mass mode nearness), but in areas among stations, urban qualities are lost and pauperism land process are observed. In some cases, accented by an inadequate intervention made in construction process, that has left suburb areas, of a great urban poverty over important Avenues sections of 80st Avenue, Suba Avenue and NQS Avenue, among others.

This lack of projects that are in accord with the preexistent urban environment and the lack of instruments to dynamic this intervened and without appropriation areas, is causing **damaging urban metastasis** phenomenon, that are inadequate interventions in boundaries that causes urban scars, they fall into an attractiveness waste of certain areas and into to processes of social and administration abandonment, for important city sectors, Avenue immediate neighbors, that previously the project implementation, response for social, economic and vital human web dynamics, that guarantee their sustainability.

It is possible determine that the important cost of Phase I and II intervention and the mobility benefits of an important percentage of citizens, can't be on urban spaces quality damage, and the possibilities that urban land can offer with the accessibility that TM promotes. There is a quite pronounced inequity when important afferents to the project areas are valuated, how is shown below, and others, because of construction insufficiencies and urban management pursuit problems, are devaluated, they slowly lost their attractiveness on the land market, becoming on places that citizens avoid and are sentenced to a irremediably lost of its change and use value.

The greater licentiate process incidences, evidence real estate actor's interest on develop projects in the margin of an accessibility and mobility rise which the line is endowed with.

However, this emergency that is greater in other lines where there's no mass transit, in not accompanied with an Administration management, and there's no an evident promotion of Habitat sector Entities, articulating a greater accessibility, with land management on the boundaries and the acclaimed, but still missing renovation, that lines have as a potential.

When there is talking about Bogota density process, that mass projects promote, is still contradictory that important TM lines afferent areas, keep reflecting construction of one, two or three stories, in contra-position to an apparent land need of urban project development, that is consistent with the mass transit mode and the public space quality offer, that with some appropriation and consolidations deficiencies TM offers.

2.3.5. Real estate impacts on developing areas

On developing areas, those are for these analyses linked to Avenues peripheries and areas near to portals, important real estate processes were highlighted (in most by private Sector), that take advantage of the accessibility and nearness to the TM routs tops, to

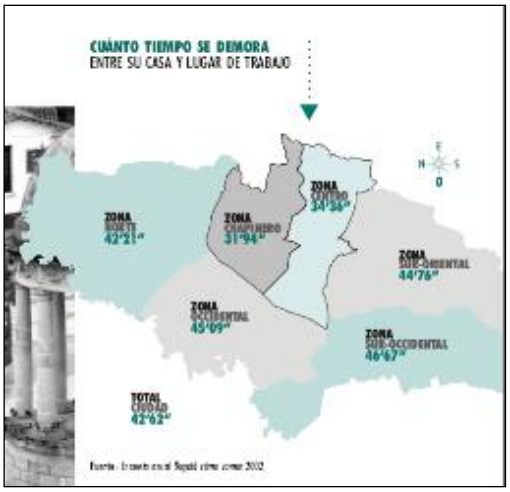
implant huge business and housing projects, on which the generation surplus value for public work phenomenon couldn't be more evident.

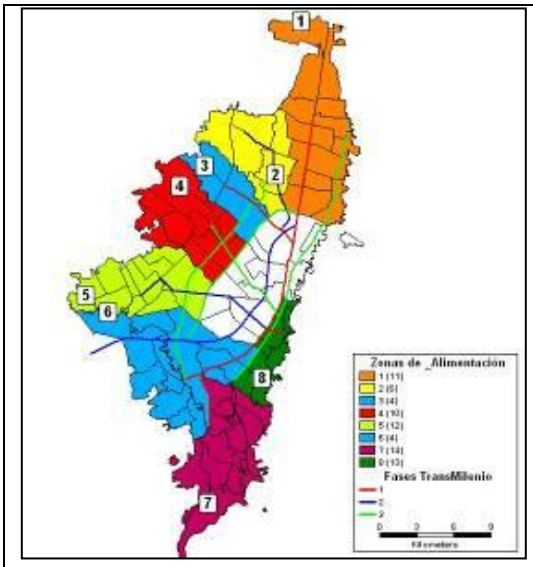
About this topic can't stop being paradox, that being Central Administration the one that promote projects and feel resources limitations effects for infrastructure construction, mechanisms to support next transit projects Phases investments haven't been generated, from TM lines generated surplus value attracting.

2.4. City urban development contributions

Table 14 refers some general aspects that the project generated to the city and intervene areas in terms of opportunities and limitations.

Table 14. Urban development contributions made by Transmilenio.

Urban development elements	Intervention contributions
Poverty 	It offered formal job alternatives by linking locations workers where projects were developed.
	It improved traveling times of poor areas householders, as well as the public transit access through a single fare. TM traveling times for 2001, 2002 and 2003, in avenues, were less than 42 minutes. As JICA in 1997, rush hour traveling times were to 70 minutes.

<table>
<tr>
<td> 
</td>
<td>On city peripheries areas, feeder routes decrease for lower incomes communities, transit access impact. “Intermediate portals and stations feeding: 50% of the System travels with an integrate fare paid more than one passage before.”[14]</td>
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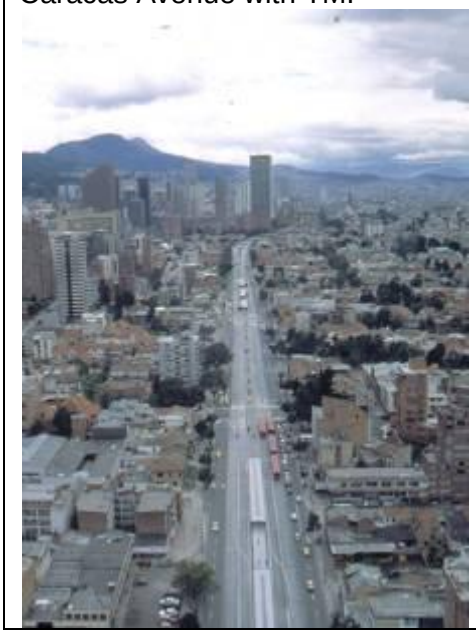
<td>Environment
 

Caracas Avenue with TM.
  </td>
<td>It decreased CO2 emission by reducing public fleet. However, it contributes with greater private motorization rates because it doesn’t offer rights service levels for higher incomes stratums.

It removed an important number of trees generating environmental compensations, that don’t benefit the areas where those are replaced, especially on North Avenue, Americas Avenue and Caracas Avenue. The elimination of these elements is given for the necessity of using central separator as user’s ascent and descent platform operation areas.</td>
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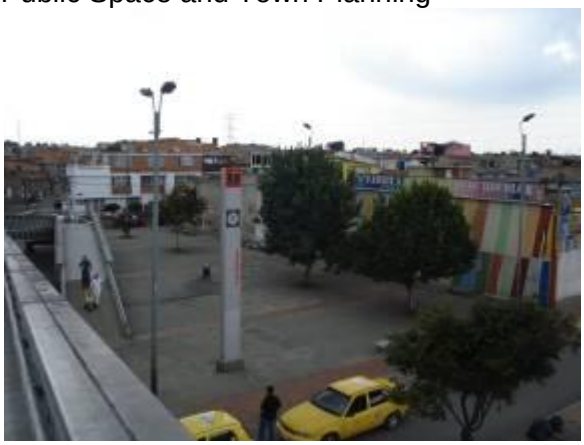
[14] Source: Transmilenio S.A.

 North Avenue without TM.	Compensation mechanisms don't count with restitution requirements on areas close to transfer sites or tree species elimination. So, there are no determinants that force the Public Space indicator improvement and green areas on influence area. Developable urban border extension, for a better accessibility, that benefits equitably mass and private transit, generates an increase on motorization rate, which added to the border's lack of densification, increase private vehicle dependence.
Housing  80st Avenue between NQS Av. and North Av. 1998.  80st Avenue between NQS Av. and North Av. 2008.	It didn't propitiate real estate projects to give housing solutions on developing areas, promoted by Central Administration. Land banks that the city management on the Southwestern, were concluded from Metrovivienda, entity that was in charge of the town planning making and deliver the projects development to the private sector, which was in charge of the real estate management. It didn't propitiate real estate projects on renovation areas that could be densified in height. The evidence is on the same analysis line, in which sectors that can have an urban requalification, aren't still an objective of regulatory and don't count with a district decided action to promote its market attractiveness. The urban land, closet to the center, rounded by infrastructure, but in low urban quality areas, competes with peripheries land, of a lower value and modern town planning conditions,

 Usme Portal. Caracas South Avenue. Preliminary for VIs construction projects and business infrastructure. 2007.	provided by private sector that is supported in the great infrastructure public investment proportion that the city provided in TM.
Public Space and Town Planning  Las Ferias Square with 80st Avenue.  Garces Navas Neighborhood.	It generated a great quantity of public space square meters in squares which don't have any collective use. In most bridges access, there's no link with urban uses, that should be encourage to a greater areas and business uses utilization, which degrades these sectors character and contributes with land value loss, that analysis evidence. It made sidewalks interventions that don't connect with collective uses (business, recreation, endowments), therefore there is no an intensive urban use and the areas become vitality and identity absent spaces. Also, infrastructure development requires properties acquisition, when being demolished, exposes laterals and suburbs without any incentive to the change of use, even the law allows it.

.  80st Avenue with 77st.	The stations location that mainly promotes perpendicular movements to the line, reduce the parallel pedestrian flow to the avenues, that means a vitality absent on these spaces, promoting business progressive close and low quality and hierarchy activities migration that deepen urban degradation.
 80st Avenue. Suba-NQS- 80st intersection.	Frontage intervention weren't made, leaving in large sectors, buildings butts without an intervention and big urban pieces with no integration to the urban use that the front provides them. In these processes is where can be observed one of the greatest TM project deficiencies, that despite, promoting as the biggest urban project, didn't consider on all the Phase I and II avenues, all the variables that an Integral Urban intervention implies.
 80st Avenue Portal western.	There are low urbanity quality sectors, on which after the boundary of intervention, public space is a lower hierarchy element. Added to that, urban control absent with great impact uses presence (Automotive services).

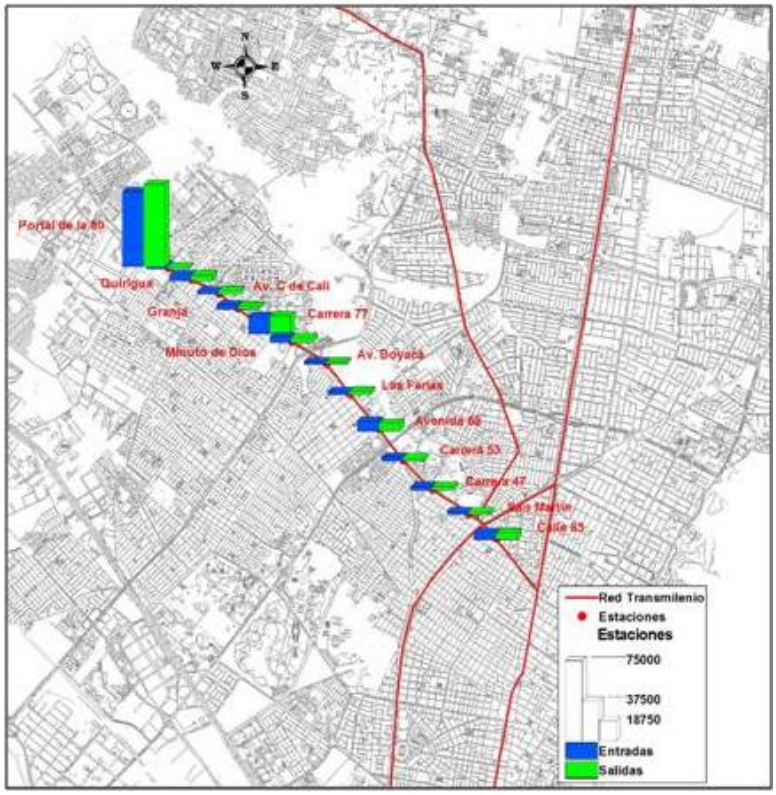
 Northe Avenue over 100st.	There isn't right urban needs integration in terms of mobility, which is reflected in the wrong public space occupation, which replicates in every footbridge and station accesses. These elements natural exchanges are unknown on the design proposal, which contributes to congestion and anarchy problems on entry and exit system points.
Community facilities  Usme Portal-Altavista Mall-Paulo Freire School.  80st Avenue-NQS-Suba Intersection.	As well as land real estate developments were not management, it wasn't taken into account the possibility of land managing for a right community facilities location with an optimal connectivity to housing areas. The interventions have been a product of some properties opportunity, promoted by a sectoral base that find on the avenues the nearness for the city services access, like education, which are the most frequent and the private sector with bigger surfaces. However, in some portals, Super Cades inclusion is well valued. Exchange points among Avenues aren't solved as in modern systems like metro from users exchange ("physical integration", according with TM definitions), they are solved through operational integrations, in which buses are the ones that change the Avenue, with a great land consumption, that doesn't contribute anything to urban topic and contribute with the appearance of anomie places where city loses its identity.

 80st Avenue-NQS-Suba Intersection.	Traveling time excellent indicators for system users and abysmal urban indicators for residents.

Bogota people resources had a 35% of participation in TM costs and from Colombian 65% of participation in TM, ended indirectly thickening construction and real estate company's balances in the country, without any different effort than land property, took advantage from market opportunity and an Administration integral management absence with TM projects, to get important earnings with real estate development, in areas where land value was low before TM and it was increases with Avenues and Portals construction, as will be seeing below with the valuation analysis.

3. CASE OF STUDY: 80st Avenue

80st Avenue selection was made because of the greater investment that was made in the Public Space component with this Avenue construction. Also, by being from the urban consolidation point of view, the line that presents a greater diversity that allow a wide range of sections to evaluate and classify for a detail analysis about land values and real estate dynamic that in the line have woven. The next figure shows analysis stations that are considered in the study.



80st Avenue Stations. Daily user's entries and exits, year 2007.
Source: TM 2007.

3.1 Valuation general analysis on Avenue influence areas

To confront the hypothesis about land value on Avenue influence areas, working with property's information from District Planning Secretariat and it is referenced with the cadastral valuation too.

Looking for explore which have been the property's value behavior the annual cadastral valuations for the line in the period 2002 and 2007 are taken as a reference. This data has the advantage of including in that period, the cadastral update made in 2003, which allow know property's delta between these two years. About this it is necessary to clarify that Suba Avenue construction began con 2003 and therefore, some points on the picture of today doesn't correspond to what existed in that moment, for example, on the 80st Avenue with Suba Avenue exchanger (San Martin Neighborhood- Escuela Militar Station). However it is representative of the cadastral valuation dynamic that was verified for the analysis period.

With the objective of getting general indicators for the line, is chosen working with TM intersections influence areas over 80st Avenue, including the Stretch to the Portal western, which behaves like that, given that has feeding services and an organized fixed stops configuration.

The decision about the distances of analysis is made preliminarily to 100, 250 and 500 meters. Are sought for each one of the strips (buffer), bases on the Information System built, property's value that are located on that area. For this, located in the station, properties to100m are selected in a circular strip. Then the properties located in another buffer between 100 and 250 are taken and finally a buffer between 250 and 500m is selected.

The property's selection includes the appraisal value of all of the properties located within the buffer, without separating their use. Then totals the appraisal value for all the properties for each year and it's compared later the annual delta to get the increase or the decrease in the active urban properties total value that made part of the buffer in analysis. The expression can be summarized as:

$D = (V_i/V_{i-1})-1$

Where:

D= Annual appreciation rate (Percentage expressed)
V_i = Year of the comparison initiation appraisals
V_{i-1}= Previous year appraisals

It is summarized below; some general character data for the three buffers that reflect an optical of descriptive statistics, which we consider necessary for contextualize the numbers, which are shown graphically later.

Table 15 Representative statistics summary of buffers analysis. 2002-2007 period.

Buffer	Total number or considered properties	2007/2002 Appreciation percentage		2003/2002 Appreciation percentage	
		Mean	Percentile 85	Mean	Percentile 85
100	874	57	117	25	71
100 - 250	5.248	55	64	22	28
250 - 100	23.172	60	84	25	46

Source: own making from Cadastral data up to 2007.

A greater detail of the each buffer data is shown in graphic 46, 47 and 48, the analysis that explain the appreciation calculation obtained for this areas from the appraisal prosecution, for the strips to 100, 250 and 500m.

Is required over this graphics that the separated buffer presentation, allow observe the property's area included in each analysis for the evaluation, as well as the magnitude that was actually given in account, with the objective of reflecting a representative coverage. Clarifying the extent of the data increases, the properties intervention made by the owners level impact, but this "noise" in the analysis can be only detracted or confirmed with a greater fieldwork that weren't permitted by time and resources availability, therefore the information shall be taken with this warning, as to the obtained results.

Graphic 20. Properties appreciation percentage variations in 100m of the influence area.

Source: own making from Cadastral data up to 2008.

Graphic 21. Properties appreciation percentage variations in 250m of the influence area.

Source: own making from Cadastral data up to 2008.

Gráfica 22 Properties appreciation percentage variations in 500m of the influence area.
Source: own making from Cadastral data up to 2008.

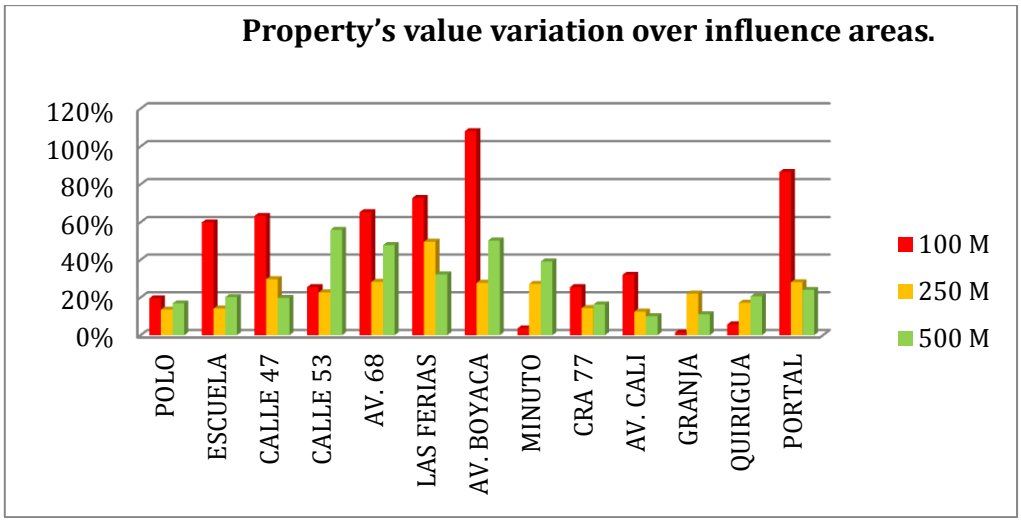
In accordance with the previous findings, it is evident that the surplus value is in fact presented by the TM works and although the variability range is in some cases accentuated by business uses presence and in some cases slows by housing uses presence, it is important in percentage terms.

3,2 Three strips abstract.

It is clearly observed how land appreciation varies from properties with a high increase percentage in the eastern appraisal to properties with a lower increase in the western cadastral appraisal. This trend is broken in the Portal, where business properties development generates important appraisals increase.

With the data system help that was prepared for the analysis, it is translated the deltas of appraisals increase behavior over the line, as well as the worded buffers location, which coincide in their central point with TM stations, preferentially with one of the station entrances.

Graphic 23 reflects the behavior on properties appreciation on the three strips of analysis and reflects a journey from east to west, explicating percentage results of the data processing.



Graphic 23. Property's value variation over influence areas.

Source: own making from Cadastral data up to 2007.

Graphic 24 reports generally the three buffer and realize land value increases for the corresponding spit. Is required that the analysis is schematic and what was reported corresponds to the increase avergage.

Graphic 24. Analysis buffer appreciation variations up to 500m.
Source: own making from Cadastral data up to 2008.

3.3 Obtained surplus value by Public Work Appreciation

With the objective of estimate the greater values obtained as a reference level, calculations based on the surplus value founded and for the areas are going to be made, that sure enough based on the made analysis have shown impacts on their assets up to two digits. It reiterates that this calculation is impacted by the value of improves made by their owners on their properties, which the amount should be valued under this optical. However, given that just calculating for areas to 100m and for properties included in there, it's a conservative amount that a greater analysis and sample shall require. Calculation options are varied and here are some established as an academic exercise.

Option One. Given that for each area, exists the cadastral appraisal values before cadastral upgrade, that is 2002, we're going to apply to this appraisal the appreciation average delta value that analyzed areas reported, with a delta greater that two digits, obtained of the comparison between 2003 and 2002, the results are reported by table 16.

Table1 16. Obtained surplus value without a comparison between adjacent spits.

ESTACION	SUMATORIA AVALUOS 2002	Factor total de Plusvalia en Franja de 100 m. 49%
ESTACION SAN MARTIN	$ 31.962.228.000,00	$ 15.661.491.720
CALLE 47	$ 30.565.554.000,00	$ 14.977.121.460
Calle 53	$ 4.778.057.000,00	$ 2.341.247.930
AV. 68	$ 21.643.537.000,00	$ 10.605.333.130
LAS FERIAS	$ 22.438.087.000,00	$ 10.994.662.630
AV. BOYACA	$ 8.756.312.000,00	$ 4.290.592.880
MINUTO	$ 4.141.466.000,00	$ 2.029.318.340
AV. CALI	$ 3.614.076.000,00	$ 1.770.897.240
PORTAL	$ 10.110.488.000,00	$ 4.954.139.120
BOLIVIA	$ 2.650.503.000,00	$ 1.298.746.470
Totales	**$ 140.660.308.000,00**	**$ 68.923.550.920,00**

Source: own making from Cadastral data up to 2007.

This first exercise reports a surplus value only for the 100m spit and for these 9 stations for about 69 millions of 2002 pesos. In the practice, the cadastral update give an account of improves and attributes for town planning conditions and owner developed actions.

Option Two.

A better approach is obtained by the comparison between 100 and 200m, that reports an average value of 28%. This value for 2002 year, will report the results that are shown in table 17.

Table 17. Obtained surplus value, average appreciation spites differences.

ESTACION	SUMATORIA AVALUOS 2002	Factor total de Plusvalia en Franja de 100 m. 28%
ESTACION SAN MARTIN	$ 31.962.228.000,00	$ 8.949.423.840
CALLE 47	$ 30.565.554.000,00	$ 8.558.355.120
Calle 53	$ 4.778.057.000,00	$ 1.337.855.960
AV. 68	$ 21.643.537.000,00	$ 6.060.190.360
LAS FERIAS	$ 22.438.087.000,00	$ 6.282.664.360
AV. BOYACA	$ 8.756.312.000,00	$ 2.451.767.360
MINUTO	$ 4.141.466.000,00	$ 1.159.610.480
AV. CALI	$ 3.614.076.000,00	$ 1.011.941.280
PORTAL	$ 10.110.488.000,00	$ 2.830.936.640
BOLIVIA	$ 2.650.503.000,00	$ 742.140.840
Totales	**$ 140.660.308.000,00**	**$ 39.384.886.240,00**

Source: own making from Cadastral data up to 2007.

Option Three. An alternative that best responses for the singularity of each area, can be associate to the real value obtained per sector. These values are reported in table 18.

Table 18. Surplus value appreciation estimation per station.

ESTACION	2003	Factores	Total plusvalor
ESTACION SAN MARTIN	$ 31.962.228.000,00	46%	$ 14.642.236.766
CALLE 47	$ 30.565.554.000,00	34%	$ 10.268.677.348
AV. 68	$ 21.643.537.000,00	37%	$ 8.010.145.121
LAS FERIAS	$ 22.438.087.000,00	23%	$ 5.208.869.869
AV. BOYACA	$ 8.756.312.000,00	80%	$ 7.032.250.421
MINUTO	$ 4.141.466.000,00	26%	$ 1.057.644.000
AV. CALI	$ 3.614.076.000,00	20%	$ 708.954.380
PORTAL	$ 10.110.488.000,00	58%	$ 5.906.038.879
BOLIVIA	$ 2.650.503.000,00	28%	$ 738.313.475
Totales	$ 135.882.251.000,00		$ 53.573.130.259

Source: own making from Cadastral data up to 2007.

Calculation options are diverse, is not the object to go intro greater speculations about this aspect. However, it is important to have an approach of the effect that a greater scale exercise can mean in terms of future incomes possibilities for the city.

Surplus values estimation for system stations. Making a conservative inference and assuming that work execution surplus value will be applied over properties located to 100m from stations, it could explore an interesting amount of what TM project execution meant in terms of properties appreciation. Specifies that only the factor is applied in properties locates in a circular buffer to 100m from the Station.

For that a simple rule of three exercise is made, assuming *ceteris paribus* conditions, in which all the behavior's stations are similar and a 9 station sample is representative of the 120 of the system components. This simplification result gives the amount of $ 714.308.403.350, applying the delta in 2002 pesos that was detected in the 100m strip increment to each properties group in the station, that means 53.500 millions. (1 dollar equal to 2500 pesos)

That means in monetary terms, as of today, the 0.7 billions of 2003 pesos, indexed with the annual 5%, will be equivalent to a 1 billion of 2008, with what can be said that the appreciation for Phase I and Phase II TM works effect on the 120 stations and in the 100m influence area and with the estimations and the methodology used it can be equivalent to TM Phase III cost.

The amount and the mechanisms that the Administration can get of this greater value are enshrined in Law. However, by a District Council decision, as is shown below, in Bogota surplus value for public works execution (in which an appreciation has not been charged) only exists since 2008.

The previous idea allows affirm that if it's implemented a calculation, collection and distribution methodology and assume public transit system sustainability as a public policy, aimed at improving service levels and with this achieve, at least slow down the migration and the trend to an automobile and motorbikes private transit, part of the infrastructure works of road and transit system components that city requires can be funded by this mechanism, generating an environmental, economic and social sustainable alternative.

CONCLUSIONS

The research attempted to answer questions about city Transit project: Transmilenio.

Is Bogota Mass Urban Transit investment generating surplus value? In fact there is enough evidence to affirm that Transmilenio construction generates surplus value for public work on the properties that are located on its influence area. The research that was focused on 80st Avenue Stations, confirms that exists arguments until 118% for specific sectors, of an exceptional character, for the big surfaces presence that developed extension projects. However, for other areas, the surplus value fluctuates between 28% and 49%.

Does this surplus value correspond only to TM project consolidation?

For some of the Avenue sections can't be affirmed that the detected surplus value from the research on the analysis area among 0 and 250m corresponds just to the project consolidation. This affirmation is given because in 80st Avenue different to the Avenue road infrastructure and public space projects were developed during the analysis period, which can be falling in some way in the greater urban land cost consideration on these areas.

What other elements contribute with surplus value generation?

Even though this evidence was not specifically confronted, projects like Salitre Channel canalization or big surfaces constructions have a direct impact on a greater value of the properties located in the influence area.

In the same way, it is evident that a synergy process among private actor's concurrent actions, detonated by transit project, forms an increasing appreciation scenario that could be better certificated and explained by the economic theory.

Is the city really receiving part of the surplus value?

The city hasn't received the TM infrastructure works generated surplus value. There were since 2008, norm limitations and this incomes collection mechanisms wasn't explored on the District works development.

It's evident that there is an increasing research line, from what this thesis is just another contribution. The desirable think, is that these evidences have a report in terms of public policies about land possession and public investments recovery by 388 Lay mechanisms, with a certain protection of the 1991 Constitution's positions making possible the principles of the prevalence of general interest over particular interest and the social and eco-friendly property function, among others.

The research and methodological propose goes to encourage ***Institutional capacities construction.*** Specially to guarantee that physical interventions developed in the city will be *integral urban development public policies*, based on a right, coordinated and complementary public institutions and private actors act.

Transmilenio project, Transit Planning orientated, by Mass Transit important International experts, but absent of an integral, complex and diverse view that Urban intervention implies, is an excellent transit project, that accentuate traveling trends that the city had and stress in a great way the peripheries land occupation.

Transmilenio project, as a sustainable urban mass transit option, requires with no doubt an urban management, which allows a process government, a generation of additional resources for next phases and extends from the transit project to the urban project that can give Town Planning equity and quality, which is absent in important sectors of Phase I and II intervened Avenues in the last ten year.

The right urban web management around the Avenues must contribute to the city actives enrichment and to a greater attractiveness and private investment correspondent, that must be arranged, planned and that doesn't merge as a real estate opportunity emergency product like it has being so far.

There is in fact an important urban land appreciation level on the Transmilenio 80st Avenue influence area, (surplus value effect for public work), which is confirmed with the comparison of cadastral appraisal among the evaluated periods and the confrontation among the defined influence rings to 100m from the Stations and the area located between the 100m and the 250m.

The previous confirmation being extrapolated with the delta increase to the rest of the Avenues, based on the appreciation that was presented on the influence areas located to 100m from the 80st Avenue stations, allows a price estimator of 2009, of 1 billion for the 120 TM stations on Phases I and II. This surplus vale generated by public work, can be translated to District incomes.

Important construction intention attractiveness is confirmed over TM Phase I and II Avenues, evident for the issued Construction Licenses in the period 2002 – 2007, which is greater in licenses per hectare applications level, when comparing this indicator with other arterial road lines in the city.

About land uses there exists mutation evidences through low hierarchy uses on areas among stations, with contraposition to a stations influence areas great attractiveness, which is certificated by field record.

An analysis methodology is proposed from the confrontation of cadastral appraisal values between influence areas to 100m from the Avenue and the area located between 100 and 250m, which allows find an appreciation delta. Estimated in a 28% average, but could be polished with a great detail analysis, up to get a more exact appreciation gradient, well the variation range is located between the 5% and 88%, being the 85 percentile for about 55% of appreciation on the difference between the two analyzed buffers.

Surplus value attracting process in the urban line is evident for the 73% of the analyzed stations (11). In the 27% remaining (4 stations), the urban analysis must deepen aspects like public spaces quality and properties pauperism effect, which can contribute with low appreciation rates that the analysis evidence (Granja Station, Quirigua Station, 77st and Cortijo).

About this public work appropriation attracting, it is completely private. District didn't collect any resource from this source.

The analysis compared through aerial pictures between 1998 and 2007, reflects construction and Town Planning important processes in the Portals influence areas, which have been developed mainly by Private Sector, without a planned articulation between Public and Private Sector.

About Transmilenio interventions urban quality and their effects on land value, it can be affirmed, that however the deficiencies over Avenues important sections in relation with this component, over it, the accessibility and reliance that mass component gives, as well as the users demand aggregation capacity, propitiate over station areas, an appreciation factor, that added to safety and public space indicators improvements, on the section that the project intervened, are enough for generating surplus value on the immediately influence areas.

The previous confirmations allow suggest a next research phase from all the Avenues information, allows define surplus value indicators for sectors, homogeneous areas, in a detail analysis function, for areas among intersections or inclusively in Avenues access lines levels, indeed an increasing number of circulating users, on their arrival to the station promote use changes and urban mutations that should be analyzed.

Surplus value attracting has a clear justice social message, allowing the recovery of public resources, inverted on the works, from the attracting of part of the greater incomes that land owners that benefit from the word development directly perceived

Mechanisms as Appreciation, Value capture and differential properties rates application for Mass Transit lines, must be the instruments that District explores for additional resources generation, in the appearance of works as the Metro, Nearness Train, and next Transmilenio phases and in general, SITP transport infrastructure projects.

The previous mechanisms must consider works benefits payment capacity, and it's necessary to be translated in fiscal character tools, which guarantee resources attracting from the inscription of properties registration folios, which will guarantee in the extent of the market assets are compound, that the transfer of these resources to the Capital District will be possible.

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