METRO LINEA 1

PRIMERA LINEA DEL METRO DE BOGOTÁ

METRO BOGOTÁ

EXECUTIVE SUMMARY - PLAN DE MANEJO AMBIENTAL Y SOCIAL PARA LAS ACTIVIDADES DE LA FASE PREVIA (INTERCAMBIADOR VIAL DE LA CALLE 72)

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1 INTRODUCTION

Empresa Metro de Bogotá (EMB) and the Concessionaire METRO LÍNEA 1 SAS (ML1), signed Concession Contract No. 163 of 2019 for the construction, operation and maintenance of the First Line of the Bogotá D.C. Metro (PLMB for its Spanish acronym) whose commencement deed was signed on October 20, 2020.

The purpose of the contract is "the granting of a concession so that, in accordance with the provisions, the Concessionaire on its own account and risk, carries out all the activities necessary for the financing, main studies and detailed designs and other studies, execution of the construction works, works of the Previous Phase, building works, works for networks in charge of the Concessionaire, works of adequacy and repair of detours, works for special intersections, the operation and maintenance of the project, social and environmental management, partial reversion and reversion of the infrastructure corresponding to the PLMB, as well as the financing, design, installation, supply, individual and overall tests, certifications, start-up, operation, replacement, maintenance and reversion of the rolling stock and the metro-railway systems and the provision of public passenger rail transport service in Bogotá, through the PLMB".

The Concession Contract is divided into three (3) stages, which in turn are structured in phases, as follows:

- Pre-operational Stage: Divided into the following Phases:
  - Preliminary Phase (estimated duration: 810 days).
  - Construction Phase (estimated duration: 1710 days).
  - Testing, Certification and Start-up Phase (estimated duration: 180 days).
- Operation and Maintenance Stage: Starts with the subscription of the Act of Completion of the Testing, Certifications and Commissioning Phase and extends until the date of completion of the Operation and Maintenance Stage.
- Reversion Stage: It begins with the conclusion of the Operation and Maintenance stage and concludes with the subscription of the Reversion Act.

In accordance with the provisions of Technical Appendix No. 17 - Chapter VII Milestones Table 1, during the Preliminary Phase of the Preoperational Stage, the Concessionaire will start the works of 72nd Street, whose description is detailed in numeral 8.1 of this document.

Technical Appendix 15, Environmental Management and Occupational Health and Safety, Chapter three (3) Numeral 3.1, establishes "Obligations during the Preliminary Phase: Letter (a) Adjustments, complementation, updating and implementation of the PLMB Environmental and Social Management Plan for the Multilateral Entities and PLMB Monitoring and Follow-up Plan for the Multilateral Entities for all the works to be executed during the Preliminary Phase".

In accordance with the above, this document contains the adjustments, complementation and updating of the Environmental and Social Management Plan (PMAS for its Spanish acronym) and the Monitoring and Follow-up Plan for the First Line of the Bogotá Subway, which the Concessionaire will implement in the development of the works of the Preliminary Phase of 72nd Street. The Concessionaire has established contractual clauses in the contracts with its Contractors, Subcontractors and Suppliers that oblige compliance with the requirements of this PMAS, including its annexes and appendices.

This PMAS is structured as follows:

- Introduction
- Objective
- Scope
- Methodology
- Definitions and Abbreviations
- Responsible Parties
- Development of the abiotic and biotic component.
- Description and location of works during the Previous Phase.
- Areas of Influence
- Characterization
- Demand, use, exploitation and/or impact on natural resources.
- Identification and Evaluation of Environmental Impacts.
- Environmental Management Programs
- Environmental Follow-up and Monitoring Plan
- Environmental Management System
- Occupational Health and Safety Management System
- Occupational Health and Safety Management Plan
- Disaster Risk Management Plan
- Biosafety Protocol
- Social Development Component
- Bibliography
- Annexes

Compliance with and application of this PMAS shall be mandatory for all Metro Line 1 contractors and subcontractors. The Concessionaire has established within its contracts, contractual clauses that obligate compliance with the requirements of this PMAS including its annexes and appendices.

2 OBJECTIVE

- The general objective of the PMAS is to have an instrument for environmental, social and environmental management and to manage occupational health and safety risks; complying with the contractual requirements (Technical Appendix No.15), the applicable national regulations and the environmental, social and occupational health and safety safeguards of the Multilateral Entities for the works of the Previous Phase of the 72nd Street Underpass.
- Present the location of the intervention areas taking into account the biotic, abiotic and socioeconomic environments.
- Describe the construction activities to be developed in the 72nd Street Underpass in order to identify the aspects and evaluate the environmental impacts associated with them, as well as identify the hazards and determine and evaluate the risks to occupational health and safety.
- Define and characterize the areas of influence according to the environmental impacts generated in the biotic, abiotic and socioeconomic components.
- Evaluate the environmental and social impacts and risks that could arise from the implementation of the activities of the Previous Phase of the 72ND STREET UNDERPASS and define the environmental and social management measures of the projects that allow compliance with the safeguard policies of the Multilateral Bank.
- Provide effective prevention and protection measures to ensure safe and healthy workplaces.
- Define management plans and programs to prevent, mitigate, compensate, and control environmental impacts and minimize occupational health and safety risks.
- Ensure compliance by the project, its contractors and suppliers with applicable national regulations and Multilateral Bank safeguards policies.
- Define a schedule and budget to ensure the availability of resources necessary for the implementation of the PMAS in compliance with national regulations and Multilateral Bank safeguards policies.
- Inform the corresponding entities of the measures, procedures, programs, plans and other tools to be implemented in the Project, to comply with the applicable normative and regulatory requirements.

3 SCOPE AND METHODOLOGY

3.1 SCOPE

This PMAS applies to the works of the Previous Phase to be carried out in the Underpass of 72ND Street between 13th and 17th Avenues, in the district of Usaquén in the city of Bogotá, taking into account the identification of environmental and social impacts and risks associated with the activities, as well as the identification of hazards to determine and evaluate the risks to safety and health at work. The Underpass will have a length of 296 meters, depth of 8 meters and width of 15 meters, so that it will have two lanes in each direction. Structurally a system of pre-excavated screens with a clearance of 5m is proposed, on the bottom plate there is an asphalt concrete plate with a thickness between 0.10m and 0.30m, the location of the Underpass is determined at the following coordinates:

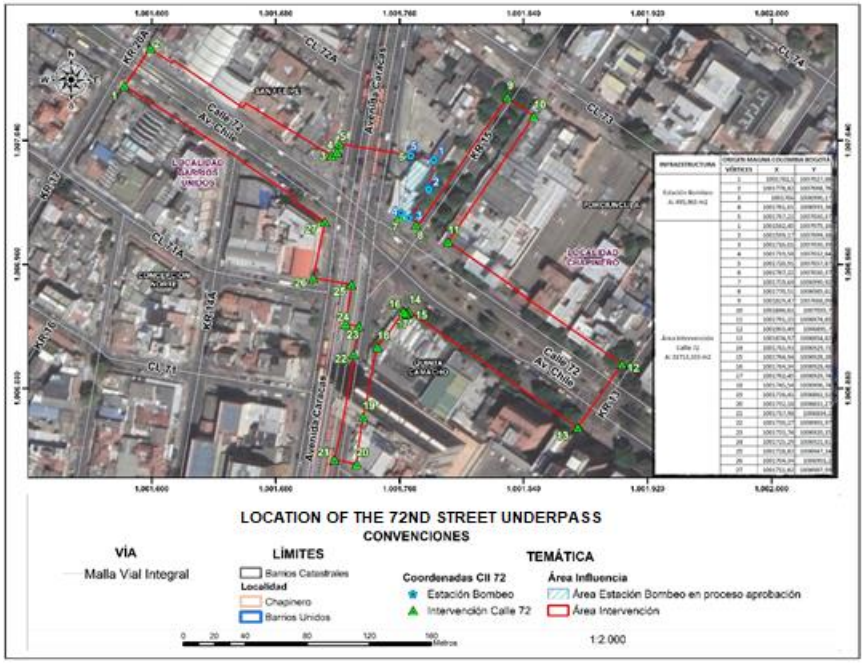

Figure 1 Location of Underpass - 72nd Street

Source: Metro Línea 1 S.A.S., 2021

3.2 METHODOLOGY

The methodology implemented for the preparation of the PMAS of the works of the Previous Phase of 72nd Street, was developed based on Annex 1 of Technical Annex 15 of Contract 163 of 2019, where the technical criteria for updating the Environmental and Social Management Plan and the Monitoring and Follow-up Plan of the PLMB for Multilateral Entities are described.

The areas of influence of this PMAS were defined based on the areas to be intervened, the design of the works to be executed and the construction processes to be implemented, information that, as of the

date of preparation and delivery of this document, is in the process of approval. A cartographic overlay was generated on these areas in the abiotic, biotic and socioeconomic environments, ensuring that all the areas where significant environmental impacts are manifested are covered.

With the help of primary information taken in the first half of 2021 by the Metro Linea 1 Consortium (flora and fauna inventories, air, noise and water quality monitoring) and secondary information from specialized literature, previous studies and especially, the Environmental Impact Study prepared in the Feasibility Stage, in 2018 by EMB, for the PLMB; the characterization of the abiotic, biotic and socioeconomic environments was developed.

Subsequently, the identification and evaluation of environmental and social impacts and risks was made using the methodology adapted from Vicente Conesa in interactions without project and with project and as results of the analysis, the Environmental and Social Management Programs of the environmental management, abiotic, biotic and socioeconomic component were generated. Finally, the Environmental and Social Follow-up and Monitoring Plan was prepared to evaluate the effectiveness of the management measures planned to address the environmental and social impacts of the activities in the Previous Phase of the project, in order to be able to adjust the measures defined in a timely manner.

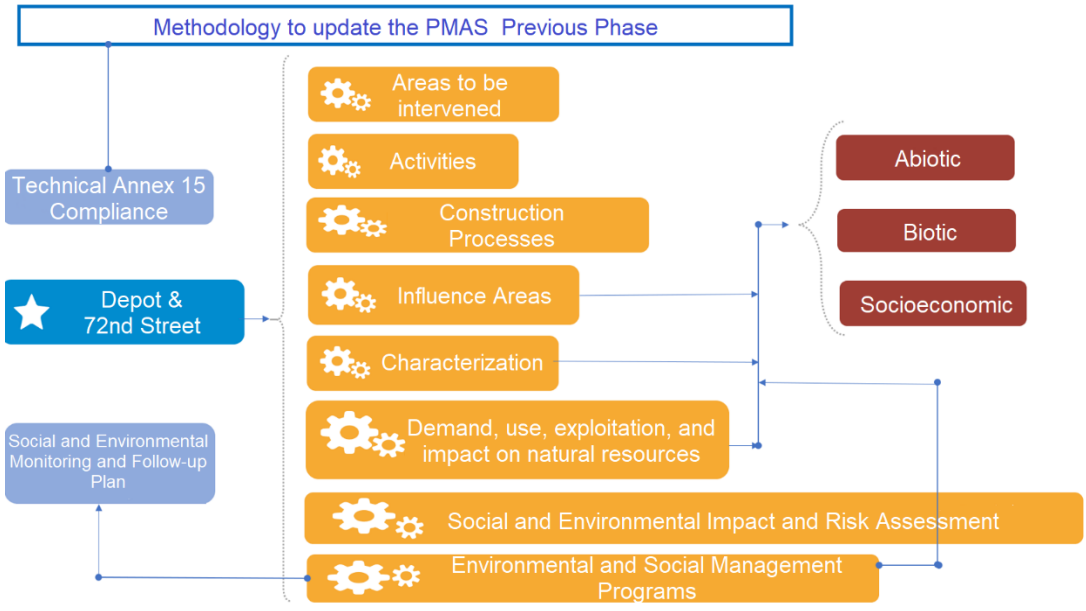

Figure 2 Methodology to update PMAS - Previous Phase

Source: Metro Línea 1 S.A.S., 2021

In addition, an evaluation of the demand, use, exploitation and/or impact on natural resources was developed, taking into account the consumption of resources such as water, construction materials, fuels and the production of solid waste, construction and demolition waste (RCD by its Spanish acronym), liquid waste and the impact on green areas, landscaping and trees.

Based on the above and taking into account the applicable and current regulatory references, as well as the safeguard policies and standards of the Multilateral Bank related to the project, different plans and programs were developed containing the necessary measures to prevent, mitigate, control, and compensate for the impacts during the development of the works:

- Environmental and Social Management Programs
- Environmental and Social Follow-up and Monitoring Plan
- Occupational Health and Safety Management System
- Risk and Disaster Management Plan

In addition to these, there are the documents previously approved by national entities and authorities that contribute to risk and impact management, such as the Traffic Management Plan, the Demolition and Construction Waste Management Plan (RCD), and the Integrated Waste Management Plan (PGIR by its Spanish acronym).

As is generally known, every project goes through different adjustments, optimizations and modifications during its different stages so it is important to clarify that this PMAS document may be adjusted, supplemented or improved when necessary in accordance with what is reflected in Chapter 4, paragraph (g) of Technical Appendix 15 of the Concession Contract, which states: "when new impacts arise due to the development of new activities, or it becomes evident that the programs proposed in the PMAS do not meet the objective of preventing, mitigating, correcting and controlling the identified impacts, the Concessionaire shall adjust and update the PMAS, through the procedure indicated in said section, including approval by the Interventoria, EMB and No Objection by the Multilateral Entities".

Likewise, in order to guarantee operational flexibility and ensure compliance with the work schedules, whenever, for technical reasons of design changes arising in the detailed engineering or during the execution of the works, the need is identified to: (i) develop on-site activities that had not been identified in the current PMAS, or (ii) modify the scope, methodology or technology used in the planned activities, the Concessionaire may, with prior approval of the Interventoría, use the provisions and mitigation measures provided in the current PMAS in force for the mitigation of impacts arising from such activities, supplementing them if necessary, provided that it adequately justifies to the Interventoría that:

- The new activities identified are similar in nature and magnitude to the activities originally foreseen in the current PMAS.
- The analysis of environmental and social impacts and risks ensures that the new activities do not imply the appearance of significant impacts, nor determine significant consumption or demands of the project that are not covered in the current PMAS.

In these cases, the impact of this adjustment on the document, the chapters to be adjusted, the required modifications or adjustments will be determined jointly with the supervision office and will be presented as a scope to this PMAS for validation. The Interventoría will be in charge of sending and notifying EMB, which in turn will notify the Multilateral Entities.

Once EMB announces receipt of this update, the Concessionaire may immediately proceed with the works or activities that are the object of this update.

4 RESPONSIBLE PARTIES

The ML1 Consortium has an organizational structure that allows it to ensure compliance and implementation of the Environmental, Social, Health and Safety Management activities required for the development of the Project.

At the first level, it has personnel hired directly by the Concessionaire, who leads the studies, management and processing of permits and licenses, leads the implementation of the Systems and represents the Project before EMB and the Interventoría.

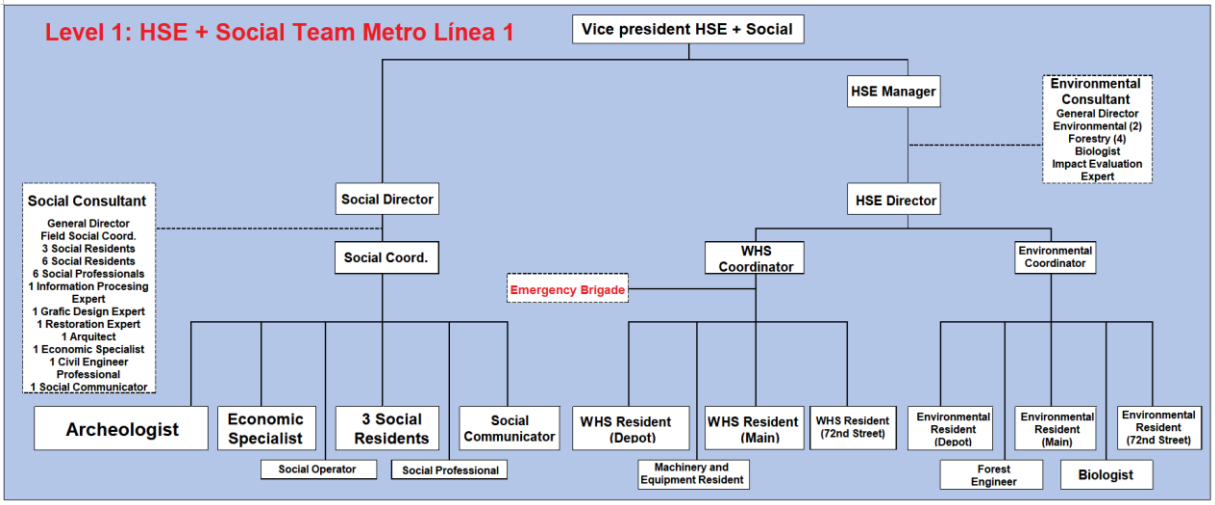

Figure 3 Organizational Chart Environmental, Social and OHS Teams

Source: Metro Línea 1 S.A.S., 2021

On a second level, there are the ML1 contractors' personnel in charge of the different activities for the construction of the works of the Preliminary Phase in 72nd Street that support the environmental, social and OSH management, which are responsible for the implementation on site, environmental, social and occupational health and safety management. The Contractors Manual (Annex 1.2) is the contractor monitoring tool.

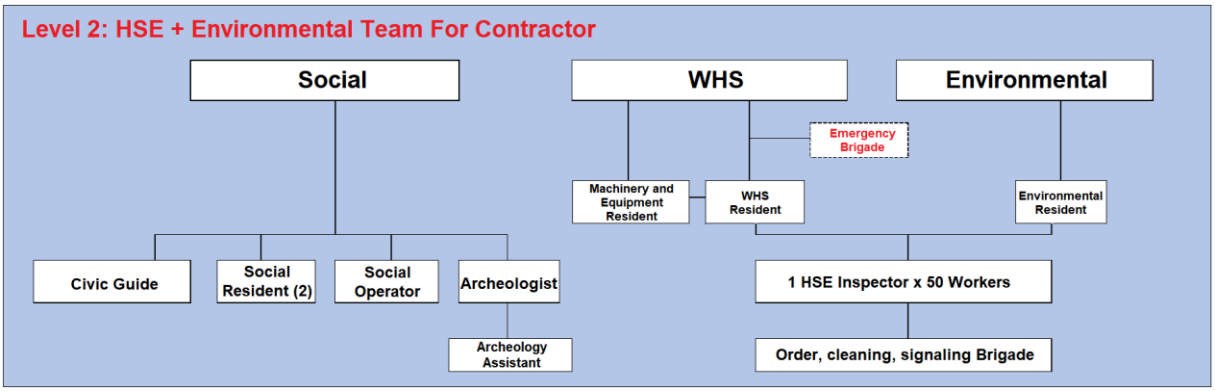

Figure 4 Organizational Environmental, Social and OSH Teams

Source: Metro Línea 1 S.A.S., 2021

5 DEVELOPMENT OF THE ABIOTIC AND BIOTIC COMPONENT

5.1 DESCRIPTION AND LOCATION OF WORKS DURING THE PREVIOUS PHASE

The work corresponds to the construction of a depressed passage (Underpass) on 72nd Street under Caracas Avenue, whose purpose is to decongest this sector of the city before the start of the viaduct works. The length of the 72nd Street interchange will be 296 meters, the maximum depth will be 8 meters and the standard width will be 15 meters. The side of the smaller length of the box culvert will be approximately 100m long, 8m wide, and the spacing between the sides of the box culvert will be approximately 8m.

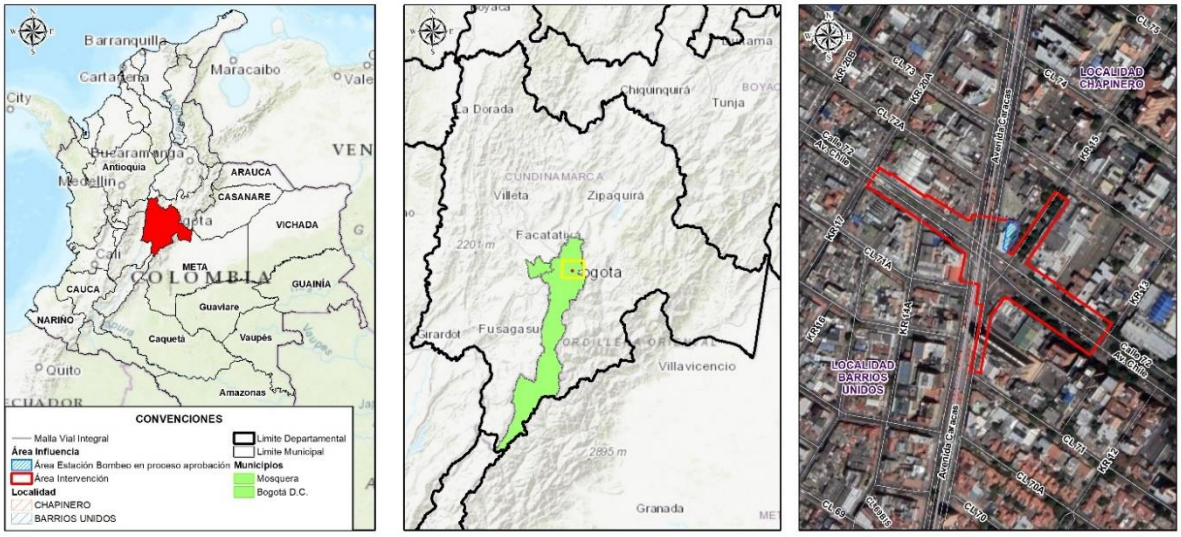

Figure 5 72nd Street Underpass

Source: Metro Línea 1 S.A.S., 2021

The limits of the area of influence of the depressed vehicular intersection of 72nd Street are described below, defined by the characteristics of traffic management and detours.

- North: 76th Street between 7th Avenue and Autopista Norte; 80th Street between Autopista Norte and 24th Street.
- South: 67th Street between 7th Avenue and 8th Avenue; 66th Street between 8th Avenue and 24th Avenue.
- East: 7th Avenue between 67th Street and 76th Street.
- West: 24th Avenue between 66th Street and 80th Street.

For the 72nd Street intersection, two scenarios are considered: one for the year 2022 in which the Underpass is in operation and the scenario for the year 2028 in which the intersection is in operation and

which establishes a possible harmonization with the project of the Mayor's Office of Bogotá called the Green Corridor and the construction of the PLMB.

The specific scope for this PMAS is the 2022 scenario with the construction of the 72nd Street Underpass passing under Caracas Avenue from 13th Avenue to 17th Avenue. Included are developments in the disciplines of geometric design, geotechnical design, structures, urban planning and landscaping, pavements, wet networks (drainage of the Underpass) and transfer of networks (wet and dry).

5.2 DESCRIPTION OF THE WORK

The work corresponds to the construction of the Underpass under Caracas Avenue, whose purpose is to decongest this sector of the city before the start of the viaduct works.

The Underpass has a total length of approximately 296 m. The geometric design considers two 3.50m wide lanes in each direction, a central separator on the western side with a minimum width of 1.0m, and a 0.50m protective element (wheel guard). The design speed is 40km/h. On the eastern side, the structure is made up of two branches, which join towards the central zone, i.e., under Caracas Avenue. On the eastern and western sides, the maximum slope of the road is 8%. In the central zone, the maximum slope is 4%. Transversally, there are maximum grades of 3.25%. Structurally and due to geotechnical conditions, a system of pre-excavated screens is proposed with the use of upper shoring where possible to guarantee a minimum clearance of 5.5m. Screens with 5.0m long modules are proposed, with the possibility of using shorter modules if required for the final areas of the interchange. The general view of the Underpass is shown in Figure 3.

An asphalt concrete plate with a thickness of between 0.10m and 0.30m is placed on the bottom plate to provide the superelevation required by the geometric design. This system of plate and beams serves to control the effect of water from the water table and all the effects associated with the joint behavior of screens and shoring system.

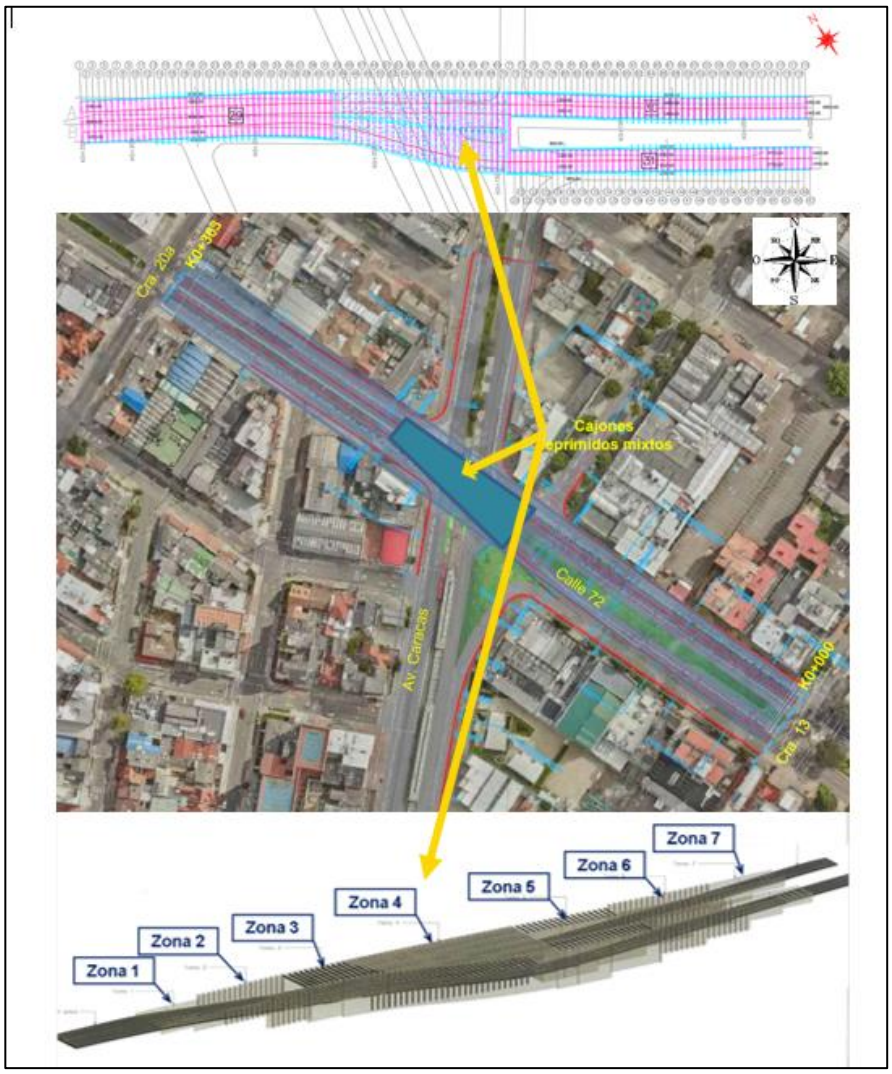

Figure 6 General view of the 72nd Street Underpass

Source: Metro Línea 1 S.A.S., 2021

Figure 7 below details those initial general works or activities:

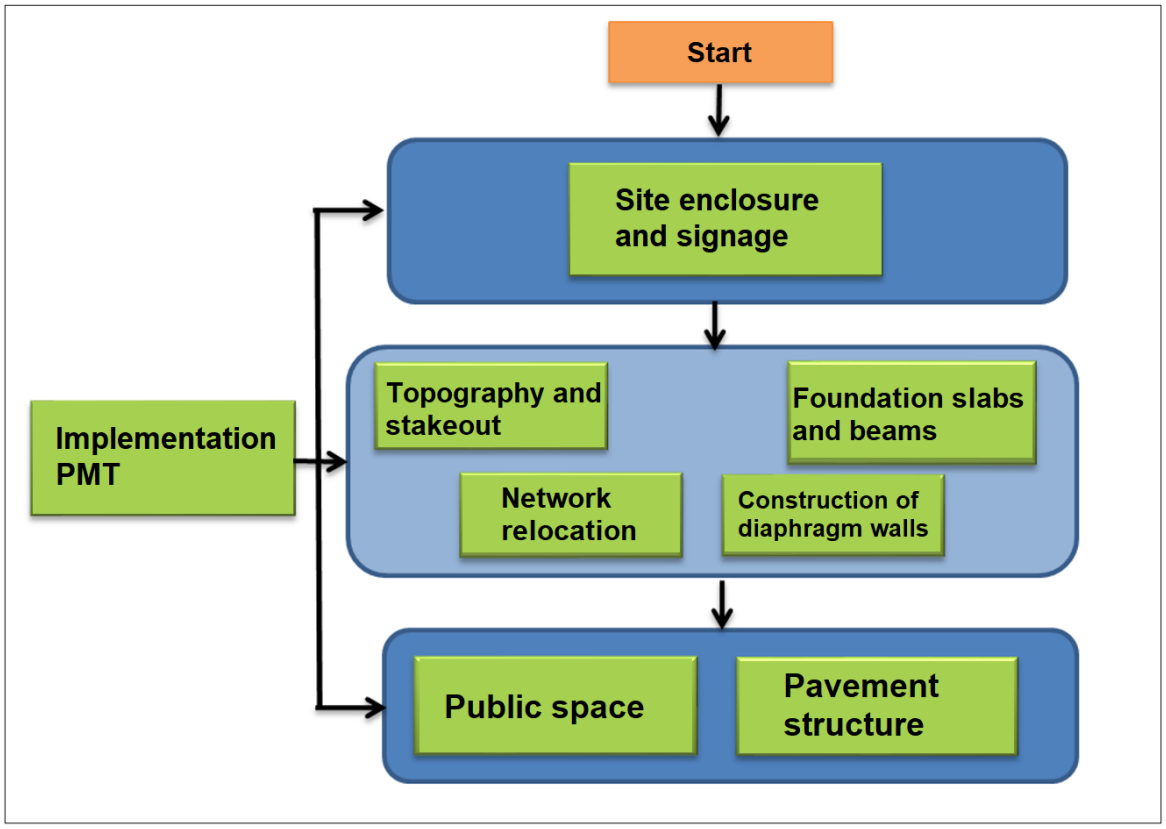

Figure 7 Stages and Works for the 72nd Street Underpass

Source: Metro Línea 1 S.A.S., 2021

5.3 AREAS OF INFLUENCE

The construction of the PLMB includes a Pre-operational Phase and a Construction Phase. For the activities of the Construction Phase, compliance with the requirements for updating the Environmental and Social Impact Study, as well as the Monitoring and Follow-up Plan for Multilateral Entities established in Annex 1 of Technical Annex 15 has been defined. However, the project contemplates in Technical Annex 17, among others, the works of the Underpass of 72nd Street with Caracas Avenue, for which in Chapter 3 (ii) and (iii) establishes the obligation to update the Environmental and Social Management Plan, as well as the Monitoring and Follow-up Plan based on Annex 1 of this document.

To identify, delimit and define the area of influence of the intervention zone, the provisions of section 5.1 of Annex 1 of Technical Annex 15 were used as a basis, taking into account the abiotic, biotic and socioeconomic characterization presented in numeral 7.3 and schematized in the Definition of Areas of Influence.

For the analysis of the area of influence of the 72nd Street and Caracas Avenue interchange, an analysis was made of the areas of direct and indirect influence as a result of the integration or overlapping of

areas for each of the environments (abiotic, biotic and socioeconomic). Thus, for the abiotic environment, geology, hydrogeology, landscape, land use, hydrology, atmosphere and noise were taken into account for the direct and indirect areas, but in particular, particulate matter, noise and geospheric material were taken as the unit of analysis; in the case of the biotic component, flora and fauna were the elements taken into account to define the area of direct and indirect influence; the most significant negative impacts (minimum unit of analysis) were identified and quantified in each of the components of each environment

Finally, for the socioeconomic environment, the demographic, cultural, spatial, political-administrative and economic dimensions were taken into account, the direct area being demarcated by the neighborhoods located immediately adjacent to the intervention areas and the indirect area by the UPZs to which the intervention area corresponds (see Figure 8).

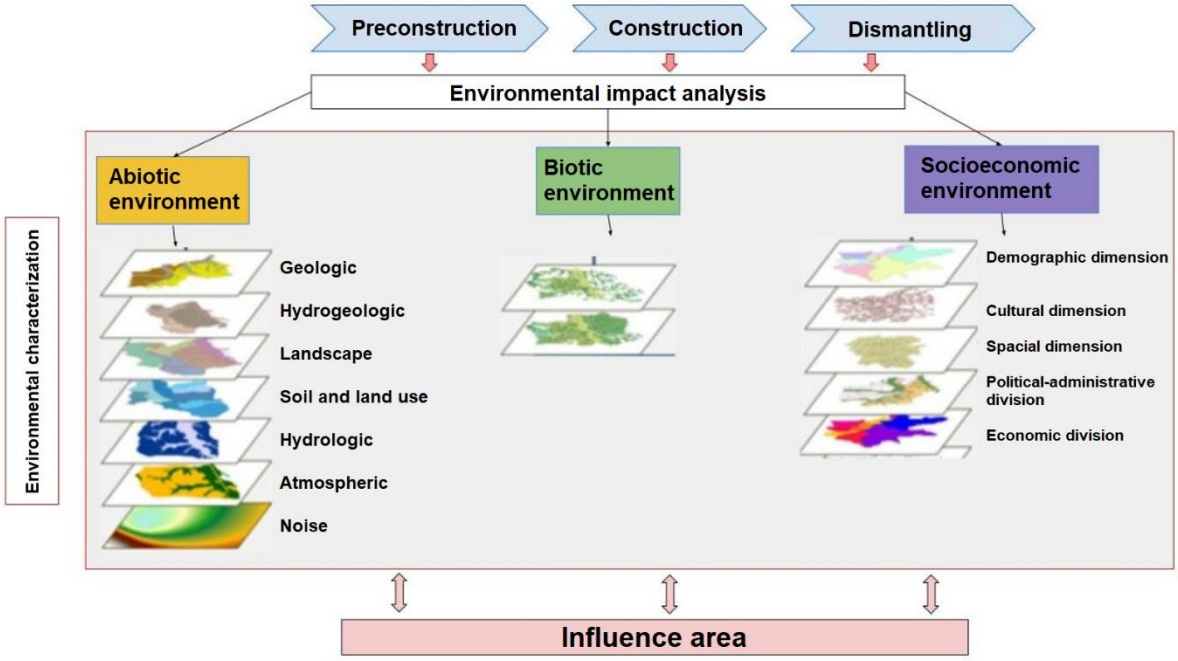

Figure 8 Definition of Areas of Influence

Source: Metro Línea 1 S.A.S., 2021

Based on section 5.1 of Annex 1 of Technical Annex 15, the areas of direct and indirect influence were defined as follows:

Direct Area of Influence: In the construction activities of the Underpass of 72nd Street with Caracas Avenue, the areas of influence were defined for each of the environments (abiotic, biotic and socioeconomic) taking into account the impacts generated by the construction activities vs. the associated infrastructure and the available information.

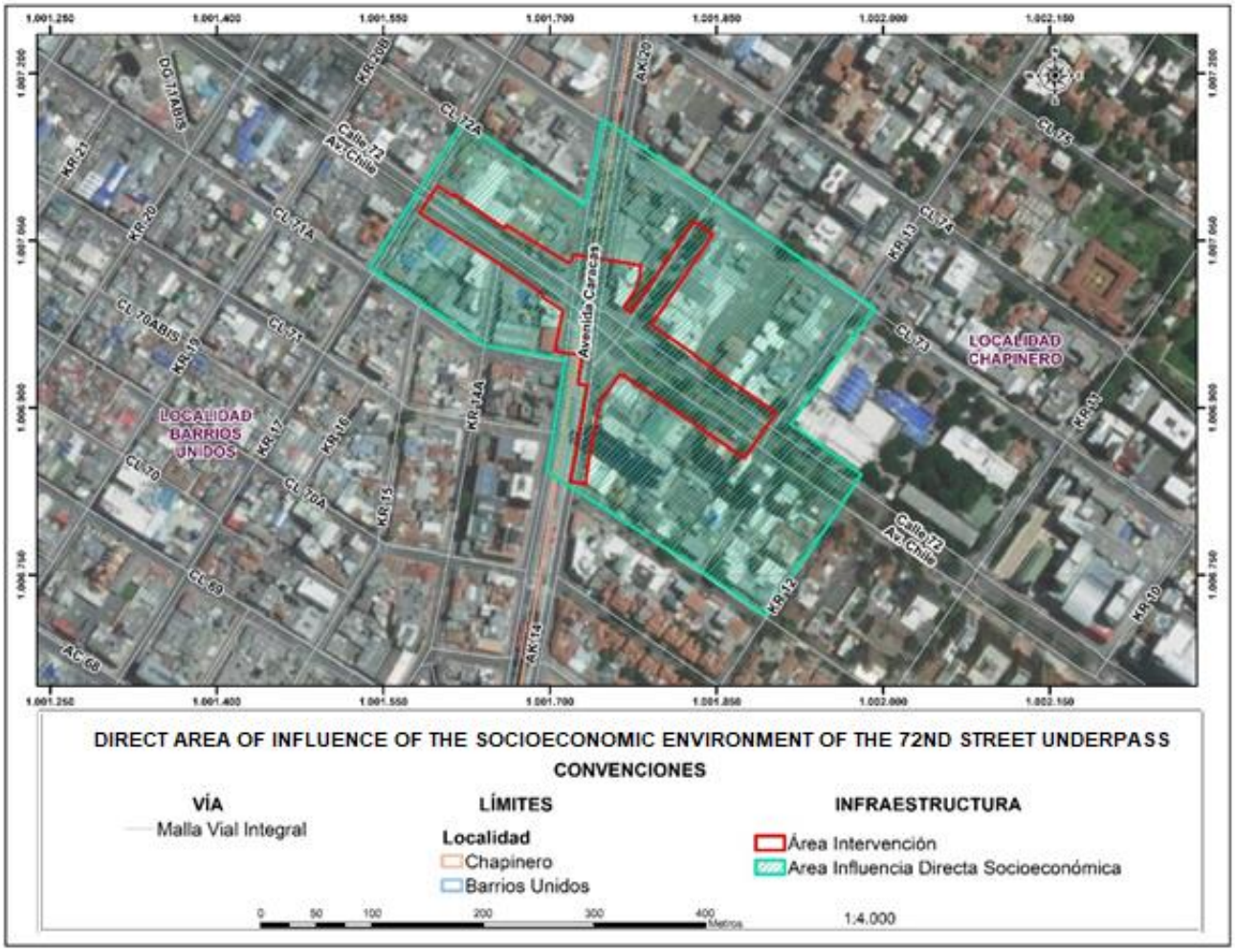

Figure 9 Map of the Area of Direct Socioeconomic Influence of 72nd Street

Source: Metro Línea 1 S.A.S., 2021

Area of indirect influence: The area of indirect influence of the 72nd Street and Caracas Avenue Interchange for the Preliminary Phase was defined for each of the abiotic, biotic and socioeconomic environments, taking into account the impacts that transcend the physical space of the intervention areas and the available information, i.e. the external zone of the area of direct influence and extends to where environmental and social impacts are manifested.

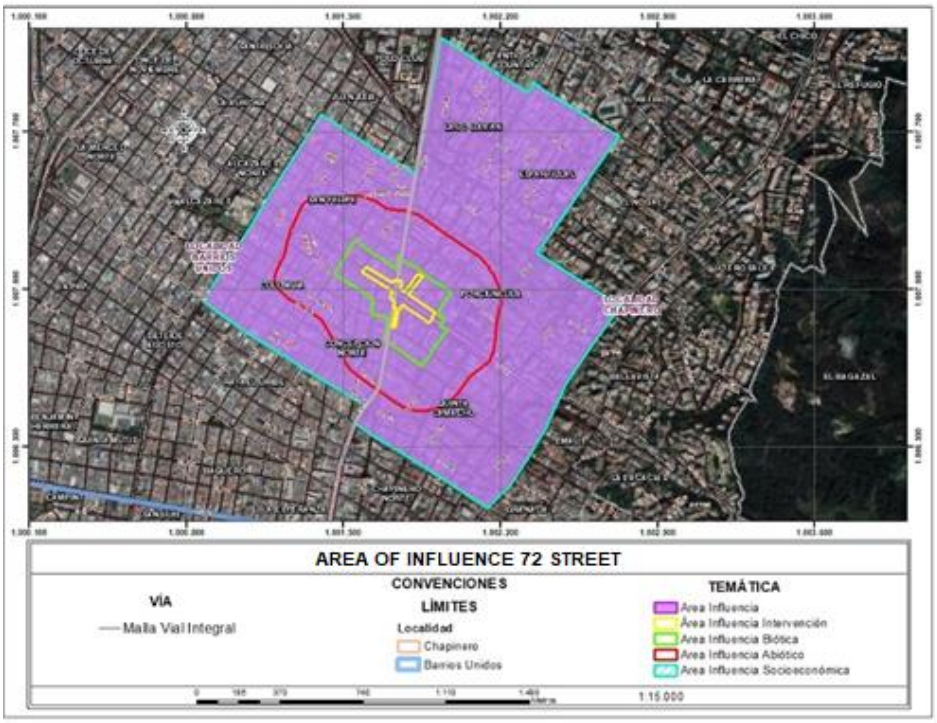

Figure 10 Map of the area of indirect abiotic, biotic and socioeconomic influence of 72nd Street

Source: Metro Línea 1 S.A.S., 2021

5.4 CHARACTERIZATION

The abiotic characterization was taken into account as follows:

- Geospheric Component (Geology, Sediments Related to Watershed Environments, Structural Geology, Geomorphology, Geomorphological Units, Landscape and Soils).
- Hydrospheric Component (Hydrology, Water Quality, Hydrogeology, Hydrogeologic Units, Potential Recharge, Direction of Flow)
- Atmospheric Component (Meteorology, Identification of sources of emissions, Air quality, Noise, Vibrations from machinery)
- Characterization of the Biotic Environment (Strategic Ecosystems, Sensitive and/or Protected Areas, Main Ecological Structure, Terrestrial Ecosystems, Land Cover, Vegetation and Landscape Area of Indirect Influence, Vegetation and Landscape Area of Direct Influence, Epiphytes, Fauna, Migratory Species, Avifauna identified by the Community, Nest Inventory, Mammalian fauna, Herpetofauna).

5.5 DEMAND, USE, EXPLOITATION AND/OR IMPACT OF NATURAL RESOURCES

Regarding the demand for resources, the use and exploitation of natural resources will be required; such as water, air, construction materials and forest resources among others such as surface and groundwater, human consumption of water for activities, industrial water consumption, use of rainwater, dumping, construction materials and solid waste (domestic, hazardous and management and disposal of leftover material from excavation and demolition).

Also taken into account were the resources affected by atmospheric emissions, emissions from energy generation, forestry use, silvicultural treatment, distribution by site, green areas, gardening and tree planting.

5.5.1 Frequency of monitoring

The frequency of information gathering will be daily, during the execution of activities in which each program applies, and the results of the follow-up will be recorded in the Follow-up and Monitoring format.

5.6 METHODOLOGY FOR IMPACT ASSESSMENT (VICENTE CONESA)

The Conesa (2000) methodology also allows to establish the importance of each of the project activities as impact generators, the level of significance of the impacts caused and their magnitude. For this purpose, the following criteria will be assessed and evaluated: clasification, nature, intensity, extent, duration, persistence, reversibility, recoverability, synergy, accumulation, effect, and periodicity to define the range of environmental importance of each impact, as proposed by the Conesa Fernández-Vítora Methodology.

This methodology includes a rating system for each criteria, according to the qualitative characteristics determined for each of the impacts to be evaluated, as shown in the following table:

Table 1 Criteria for impact assessment, Conesa Fernandez Methodology

Criteria		Definition	Label	Value
CA	Classification	The classification of an impact is positive (+) when the result of the action on the environmental factor considered produces an improvement in its environmental quality. The impact is considered negative (-) when the result of an action produces a decrease in the environmental quality of the considered factor.	Positive	(+)
			Negative	(-)
IN	Intensity	Refers to the degree of impact of the activity or action on a given factor in the specific area in which it acts.	Low or minimum	1
			Medium	2
			High	4
			Very High	8
			Total	12

Criteria		Definition	Label	Value
EX	Extent	The extent is the attribute that reflects the fraction of the environment affected by the action of the Project. - Punctual: localized effect. -Partial: does not admit a precise location within the projected environment. -Broad or extensive: intermediate situations that are evaluated according to their degradation. -Total: does not admit a precise location within the projected environment, having a generalized influence on all of it. -Critical: when the impact occurs in a crucial or important place.	Punctual	1
			Partial	2
			Broad or extensive	4
			Total	8
			Critical	(+4)
MO	Duration	The impact manifestation period refers to the time that elapses between the appearance and onset of the effect on the environmental factor under consideration.	Long term	1
			Medium term	2
			Short term	3
			Immediate	4
			Critical	(+4)
PE	Persistence	It refers to the time that the effect remains since its appearance, and after which the affected factor would return to the initial conditions prior to the action.	Fleeting or ephemeral	1
			Momentaneous	1
			Temporal or transitory	2
			Persistent	3
			Permanent and constant	4
RV	Reversibility	This refers to the reconstruction of the factor affected by the project, i.e., the possibility of returning to the initial conditions prior to the action, by natural means, once the action on the environment has ceased.	Short term	1
			Medium term	2
			Long term	3
			Irreversible	4

Criteria		Definition	Label	Value
RP	Recoverability	This refers to the possibility of total or partial reconstruction of the affected factor as a result of the Project, that is, the possibility of returning to the initial conditions prior to the action, by means of human intervention, that is, through the application of corrective measures or management measures.	In immediate manner	1
			On short term	2
			On medium term	3
			On long term	4
			Mitigable, replaceable and compensable	4
			Irrecuperable	8
SI	Synergy	There is synergy if two effects are manifested together, and this is greater than their isolated manifestations.	Without synergies (simple)	1
			With synergies	4
AC	Accumulation	The accumulation gives an idea of the progressive increase or not of the manifestation of the alteration on the evaluated variable(s), considering the continuous and repeated action that generates it in the area.	Simple	1
			Accumulative	4
EF	Effect	It refers to the cause-effect relationship, i.e. the manifestation of the effect on a socio-environmental variable as a consequence of an activity.	Indirect	1
			Direct	4
PR	Periodicity	Refers to the regularity of manifestation of the effect, whether cyclical or recurrent, unpredictable over time, or constant over time.	Irregular and discontinuous	1
			Periodical	2
			Continuous	4

Source: Conesa Fernández Vítora, (2000

Considering the values given for each criteria and the following formula, the importance rating for each impact is obtained, where the lowest possible value is 13 and the highest value is 100.

I = (3IN + 2EX +MO+ PE+RV+ RP + SI + AC +EF+ PR)

Table 2 shows the scale of valuation and grading of the importance of negative (-) or detrimental and positive (+) or beneficial impacts.

This scale considers as significant impacts those whose absolute value of importance is greater than or equal to 25, evaluated as moderate, severe and critical impacts, i.e., requiring the implementation of specific management measures and/or strategies to minimize the importance of the impact during the execution of the different phases of the Project. On the other hand, non-significant impacts are those whose absolute value of importance is less than 25, evaluated as irrelevant or compatible with the environment, since these present a greater assimilation of the environment after the cessation of activities and do not require corrective measures, or the measures implemented for moderate impacts can absorb such impacts.

Table 2 Environmental significance rating ranges and assessment of environmental significance

Rating scale	Negative Classification importance	Description of the importance	Rating scale	Importance for positive impacts	Description of the importance
0 a -25	Irrelevant/Slight	Has little or no importance for the environment (negative rating).	0 a 25	Irrelevant	This result of importance that which has little or no importance for the environment (positive rating).
-25 a -50	Moderate	This result of importance corresponds to the activity whose recovery does not require intensive preventive or corrective measures and in which the achievement of the initial environmental conditions requires some time. (Negative rating)	25 a 50	Moderate	This result of importance corresponds to the activity whose recovery does not require intensive preventive or corrective measures and in which the achievement of the initial environmental conditions requires some time. (Positive rating)
51 a - 75	Severe	This result of importance corresponds to the activity in which the recovery of environmental conditions requires preventive or corrective measures and in which, even with these	51 a 75	Severe	This significant result corresponds to the activity in which the recovery of environmental conditions requires preventive or corrective measures and in which, even with these measures,

Rating scale	Negative Classification importance	Description of the importance	Rating scale	Importance for positive impacts	Description of the importance
		measures, recovery requires a prolonged period of time (Negative Rating).			recovery requires a prolonged period of time (Positive Rating).
-76 a -100	Critical	This result of significance corresponds to the activity whose magnitude is greater than the acceptable threshold, since it produces a permanent loss of the quality of environmental conditions, with no possible recovery even if protective or corrective measures are adopted. (Negative Rating	76 a -100	Critical	This result of significance corresponds to the activity whose magnitude is greater than the acceptable threshold, since it produces a permanent loss of the quality of environmental conditions, with no possible recovery even if protective or corrective measures are adopted. (Positive rating

Source: Conesa Fernández Vítora, (2000)

5.6.1 Adaptation of the Conesa Methodology

The "Conesa" Ad-Hoc methodology adapted to the project was used, since it was not necessary for the evaluation team to follow the step-by-step for each of the criteria proposed in the original methodology. This modification will be implemented for the activities "Without Project" and "With Project" in the development of the Preliminary Phase corresponding to 72nd Street.

This adaptation of the methodology is based on the field verification of the intervention zones, due to the fact that the city of Bogota is an area that has already been intervened and has a composition mainly of infrastructure and constructions of the city. For this purpose, the following criteria were defined (these have been adjusted according to the needs of the project) for the evaluation of each of the impacts to be generated in the "Without Project" and "With Project" activities:

Table 3 Criteria for impact assessment, Conesa Fernandez Methodology (adapted)

Criteria		Definition	Rating	Vale
CA	Classification		Positive	(+)

Criteria		Definition	Rating	Vale
		The classification of an impact is positive (+) when the result of the action on the environmental factor considered produces an improvement in its environmental quality. The impact is considered negative (-) when the result of an action produces a decrease in the environmental quality of the considered factor.	Negative	(-)
P	Probability	Low: The probability is low when the activity is performed under safe conditions, and the impact occurs only in unusual cases. Medium: The probability is medium when, when performing the task, circumstances such as: lack of training, training, experience or absence of specific written procedures for the performance of the activity, etc., are present. High: The probability is high when under normal conditions and given the characteristics of the activity and/or process, the impact is certain to occur.	Low	4
			Medium	8
			High	16
D	Duration	Brief: The duration is brief when the impact lasts for a very short period of time (does not remain in time) and there is no potential for risk to the environment. Temporary: The duration is temporary when the impact lasts for a moderate period of time and has a medium risk potential, producing limited changes to the environment. Permanent: Duration is permanent when the impact causes indefinite and significant alterations over time on the environment. Interested parties express objections and demands.	Brief	4
			Temporary	8
			Permanent	16
M	Magnitude	Low: The magnitude is low when the impact causes minimal alteration to the environment. Medium: The magnitude is medium when the impact causes a moderate alteration to the environment. High: The magnitude is high when the impact is associated with destruction of the environment or its characteristics, bringing important future consequences.	Low	4
			Medium	8
			High	16
C	Reach		Punctual	4

Criteria		Definition	Rating	Vale
		Punctual: The area of influence is punctual when the impact is manifested only in the area where the activities of the process are carried out. Local: The area of influence is local when the impact is manifested in the local environment (affects a surface or subway watercourse, the atmosphere, the soil, generates a special waste, etc.). Regional: The area of influence is regional when the impact has regional consequences.	Local	8
			Regional	16
R	Recoverability	Mitigable: Recoverability is mitigable when the impact can be eliminated through activities that allow the affected resources to be recovered. Recoverable: Recoverable is when the impact can be reduced by implementing control measures in the activities (recovery, reuse in the process) up to a certain standard. Irrecoverable: Irrecoverable when the affected natural resources cannot be returned to their original conditions.	Mitigable	4
			Recoverable	8
			Irrecoverable	16
IN	Intensity	Low: Intensity is low when it is possible to manage the environmental aspect by implementing operational controls in the activities. Medium: Intensity is medium when it is possible to adapt measures to comply and manage the environmental aspect. High: Intensity is high when high capital investments are required to manage the environmental aspect.	Low	4
			Medium	8
			High	16

Source: Metro Línea 1 – 2021

Considering the values given for each criteria and the following formula, the importance rating for each impact is obtained, where the lowest possible value is 24 and the highest value is 100.

I = (P+D+M+C+R+IN)

Table 4 shows the scale of valuation and qualification of the importance of negative (-) or detrimental and positive (+) or beneficial impacts.

This scale considers as significant impacts those whose absolute value of importance is greater than or equal to 25, evaluated as moderate, severe and critical impacts, i.e., requiring the implementation of

specific management measures and/or strategies to minimize the importance of the impact during the execution of the different phases of the Project. While non-significant impacts are those whose absolute value of importance is less than 25 and are thus evaluated as irrelevant or compatible with the environment, since these present a greater assimilation of the environment after the cessation of activities and do not require corrective measures or the measures implemented for moderate impacts can absorb such impacts.

The adapted methodology complies with the most relevant criteria according to the need for project evaluation and its importance calculation is elaborated through the mathematical formula of the Conesa methodology, which was adapted to be able to have the weighting of each of the criteria and obtain the results as follows:

Table 4 Rating ranges and environmental significance rating

Rating scale	Negative Classification importance	Description of the importance	Rating scale	Importance for positive impacts	Description of the importance
0 a -25	Irrelevant/Slight	Has little or no importance for the environment (negative rating).	0 a 25	Irrelevant	This result of importance that which has little or no importance for the environment (positive rating).
-25 a -50	Moderate	This result of importance corresponds to the activity whose recovery does not require intensive preventive or corrective measures and in which the achievement of the initial environmental conditions requires some time. (Negative rating)	25 a 50	Moderate	This result of importance corresponds to the activity whose recovery does not require intensive preventive or corrective measures and in which the achievement of the initial environmental conditions requires some time. (Positive rating)
51 a - 75	Severe	This result of importance corresponds to the activity in which the recovery of environmental conditions requires preventive or	51 a 75	Severe	This significant result corresponds to the activity in which the recovery of environmental conditions requires preventive or corrective

Rating scale	Negative Classification importance	Description of the importance	Rating scale	Importance for positive impacts	Description of the importance
		corrective measures and in which, even with these measures, recovery requires a prolonged period of time (Negative Rating).			measures and in which, even with these measures, recovery requires a prolonged period of time (Positive Rating).
-76 a -100	Critical	This result of significance corresponds to the activity whose magnitude is greater than the acceptable threshold, since it produces a permanent loss of the quality of environmental conditions, with no possible recovery even if protective or corrective measures are adopted. (Negative Rating	76 a -100	Critical	This result of significance corresponds to the activity whose magnitude is greater than the acceptable threshold, since it produces a permanent loss of the quality of environmental conditions, with no possible recovery even if protective or corrective measures are adopted. (Positive rating

Source: Conesa Fernández Vítora, (2000)

5.6.1.1 Identification of activities that generate environmental impacts (WITHOUT PROJECT)

Consists of the identification and description of activities that influence the environment by varying or altering the degree of quality of the environmental components.

For the "Without Project - 72nd Street" scenario, the activities that generate impacts and are developed in the area of influence are identified, at the time the Environmental Impact assessment methodology is developed, which are:

- Presence of urban settlements (Housing).
- Operation of commercial, recreational, health and institutional infrastructure.
- Maintenance of public service networks (electrical, sanitary, aqueduct and sewage networks).
- Vehicular traffic

- Pedestrian traffic

5.6.1.2 Identification of environmental and social components

For the activities to be developed in the 72nd Street Underpass, the environmental and social components that will be evaluated with the Ad-Hoc methodology were identified.

5.6.1.3 Identification of activities that generate environmental impacts (WITH PROJECT)

Consists of the identification and description of activities that influence the environment by varying or altering the degree of quality of the environmental components.

For the "With Project - 72nd Street" scenario, the activities that generate impacts during the pre-operational stage of the 72nd Street Underpass are identified.

- Implementation of Transit Management Plan
- Construction site enclosure and signage
- Topography and stakeout
- Relocation of aerial networks
- Demolition and removal of existing structures
- Construction of diaphragm walls: Excavations, trenches and demolition; Guide beams; Diaphragm wall excavation and concrete pouring
- Construction of header beams, top strut beams and overhead plate
- Mechanized excavation
- Construction of beams and bottom slabs
- Construction of cleanout walls
- Public space
- Pavement structure
- MR
- Asphalt

5.6.1.4 Identification of impacts

Based on the characterization of the Area of Influence, the components for the abiotic, biotic and socioeconomic environments were identified, and the impacts that are considered susceptible to alteration during the development of the "With Project" activities for 72nd Street, Description of the susceptible impacts of 72nd Street - Evaluation of "With Project" impacts.

In order to perform the corresponding interactions, the modified CONESA methodology is applied for the conditions and activities of the project in the 72nd Street Underpass.

Then the rating of environmental impacts is performed, which can be seen in the evaluation matrix where the color level represents the Critical, Severe, Moderate and Irrelevant impacts. As part of the qualification, an additional box is included describing the impact presented for each of the project activities, then its mitigation actions and finally the management program to be implemented.

5.6.1.5 Analysis of "With Project" results

According to the impact identification matrix, 229 impacts are expected to be generated during the Previous Phase. Once the environmental and social impacts were rated, the consolidation was carried out according to the results of the importance value.

As a result, there are 6 severe negative impacts on the 72nd Street Underpass for the abiotic component, taking into account the construction activities to be developed.

There are 117 Moderate negative impacts on the 72nd Street Underpass for the abiotic component, taking into account the construction activities to be carried out; of these, there are 4 positive impacts (1. Construction of diaphragm walls <Excavation of diaphragm walls - pouring of concrete> - Instability of the terrain), (3. Construction of diaphragm walls <Excavation of diaphragm walls - pouring of concrete> - Exploitation of natural resources), (4.)

There are 152 Irrelevant negative impacts on the 72nd Street Underpass for the abiotic component taking into account the construction activities to be carried out.

After carrying out the entire exercise, the management programs to be implemented for each impact evaluated can be seen.

After performing the analysis, 5 severe negative impacts and 2 severe positive impacts were recorded from the biotic component for the areas of influence of the 72nd Street Underpass.

As a result, there are 9 moderate negative impacts and 3 moderate positive impacts for the biotic component.

After carrying out the entire exercise, the management programs to be implemented for each impact evaluated can be seen.

As a result, 116 Irrelevant negative impacts are presented in 72nd Street for the biotic component taking into account the construction activities to be developed.

5.7 ENVIRONMENTAL MANAGEMENT PROGRAMS

The objective of the environmental and social component programs during the execution of the activities in the 72nd Street Underpass is to define the management processes and preventive, corrective and mitigation measures for the impacts and risks identified in each activity of the project.

For the implementation of the Environmental and Social Management Plan for the activities of the Previous Phase of the 72nd Street Underpass, there is a team of professionals in compliance with the requirements of Technical Appendix 15.

Through the analysis of the impacts identified for the execution of the activities of the Previous Phase of the First Line of the Bogotá Subway, the following Environmental and Social Management Programs were determined:

Table 5 Programs of Environmental and Social Management Plan

Environment	Environmental Management Program	Sheet	Assigned Budget (COP)
ABIOTIC	Excavation waste material management and disposal program	PM_AB_01	524.430.000
	Materials management program	PM_AB_02	225.110.000,00
	Conventional solid waste management program.	PM_AB_03	213.741.553,00
	Integrated hazardous waste management plan	PM_AB_04	31.475.000
	Program for managing liquid fuel spills or leaks.	PM_AB_05	
	Used oil management program	PM_AB_06	
	Discharge management program	PM_AB_07	115.517.000
	Environmental Liabilities Management Program: Contaminated Soils	PM_AB_08	1.614.000.000
	Atmospheric emissions source management program: air quality	PM_AB_09	455.604.100
	Greenhouse gas management program.	PM_AB_10	
	Noise management program	PM_AB_11	103.721.000
	Vibration and structural noise management program	PM_AB_12	540.000.000
	Program for the management of water protection zones, drainage systems and surface water bodies	PM_AB_13	85.350.000
	Temporary facilities management program	PM_AB_14	4.277.550.000

Environment	Environmental Management Program	Sheet	Assigned Budget (COP)
	Efficient water uses and management	PM_AB_15	
	Main Ecological Structure management program	PM_AB_16	422.250.000
BIOTIC	Urban fauna management program	PM_B_01	1.350.000
	Vegetative cover management and removal program	PM_B_02	1.350.000
	Forestry management program	PM_B_03	39.760.000
	Compensation management program for the biotic environment due to landscape visual quality impact.	PM_B_04	486.350.000
	Compensation management program for the biotic environment due to landscape impact.	PM_B_05	

Source: Metro Línea 1 S.A.S., 2021

5.8 ENVIRONMENTAL TRACKING AND MONITORING PLAN

The environmental follow-up and monitoring plans are specific for each of the main impacts and risks identified, they will allow for appropriate follow-up, indicators and verifiers. The controls defined in the programs are listed in checklists created for each of the abiotic (15) and biotic (5) component programs, which will make it possible to collect information on a daily basis and under the responsibility of ML1´s on-site environmental personnel.

Table 6 Abiotic and Biotic Environment Monitoring and Tracking Programs

Environment	Environmental Management Plan	Monitoring and Follow-up Plan
ABIOTIC	PM_AB_01. Excavation waste material management and disposal program	PM_AB_01. Follow-up Plan Excavation waste material management and disposal program
	PM_AB_02. Materials management program	PM_AB_02. Follow-up Plan Materials management program

Environment	Environmental Management Plan	Monitoring and Follow-up Plan
	PM_AB_03. Conventional solid waste management program.	PM_AB_03. Follow-up Plan Conventional solid waste management program.
	PM_AB_04 Integrated hazardous waste management plan	PM_AB_04 Follow-up Plan Integrated hazardous waste management plan
	PM_AB_05. Program for managing liquid fuel spills or leaks.	PM_AB_05. Follow-up Plan Program for managing liquid fuel spills or leaks.
	PM_AB_06. Used oil management program	PM_AB_06 Follow-up Plan. Used oil management program
	PM_AB_07. Discharge management program	PM_AB_07 Follow-up Plan. Discharge management program
	PM_AB_08. Environmental Liabilities Management Program: Contaminated Soils	PM_AB_08. Follow-up Plan Environmental Liabilities Management Program: Contaminated Soils
	PM_AB_09. Atmospheric emissions source management program: air quality	PM_AB_09. Follow-up Plan Atmospheric emissions source management program: air quality
	PM_AB_10. Greenhouse gas management program.	PM_AB_10. Follow-up Plan Greenhouse gas management program.
	PM_AB_11. Noise management program	PM_AB_11 Follow-up Plan. Noise management program
	PM_AB_12. Vibration and structural noise management program	PM_AB_12 Follow-up Plan. Vibration and structural noise management program

Environment	Environmental Management Plan	Monitoring and Follow-up Plan
	PM_AB_13. Program for the management of water protection zones, drainage systems and surface water bodies	PM_AB_13 Follow-up Plan. Program for the management of water protection zones, drainage systems and surface water bodies
	PM_AB_14. Temporary facilities management program	PM_AB_14 Follow-up Plan. Temporary facilities management program
	PM_AB_15. Efficient water uses and management	PM_AB_15. Efficient water uses and management
	PM_AB_16. Main Ecological Structure management program	PM_AB_16. Follow-up Plan Main Ecological Structure management program
BIOTIC	PM_B_01. Urban fauna management program	PM_B_01 Follow-up Plan. Urban fauna management program
	PM_B_02. Vegetative cover management and removal program	PM_B_02. Follow-up Plan Vegetative cover management and removal program
	PM_B_03. Forestry management program	PM_B_03. Follow-up Plan Forestry management program
	PM_B_04. Compensation management program for the biotic environment due to landscape visual quality impact.	PM_B_04. Follow-up Plan Compensation management program for the biotic environment due to landscape visual quality impact.
	PM_B_05. Compensation management program for the biotic environment due to landscape impact.	PM_B_05. Follow-up Plan Compensation management program for the biotic environment due to landscape impact.

Source: Metro Línea 1 –2021

Checklists will be developed for the collection of information in the follow-up and monitoring format for each of the abiotic and biotic component programs. Follow-up and Monitoring Plan Formats.

5.8.1 Personnel responsible for monitoring

For monitoring and follow-up of the abiotic component, the personnel responsible for follow-up will be the approved environmental residents and HSE inspectors assigned to the different work fronts.

For the monitoring and follow-up of the biotic component, the personnel responsible for follow-up will be the approved forestry residents and biologists assigned to the different work fronts.

5.8.2 Action Plan

When a non-compliance occurs that generates a deviation of the norms, practices, procedures, regulations, policies, guidelines of the PMAS, etc., that could be a direct or indirect cause of environmental damage, an action plan will be implemented that will allow, through various activities, compliance with the objectives proposed by the PMAS.

Figure 11 shows the flowchart to be taken into account when there is repeated non-compliance that deviates from the objectives established in the PMAS.

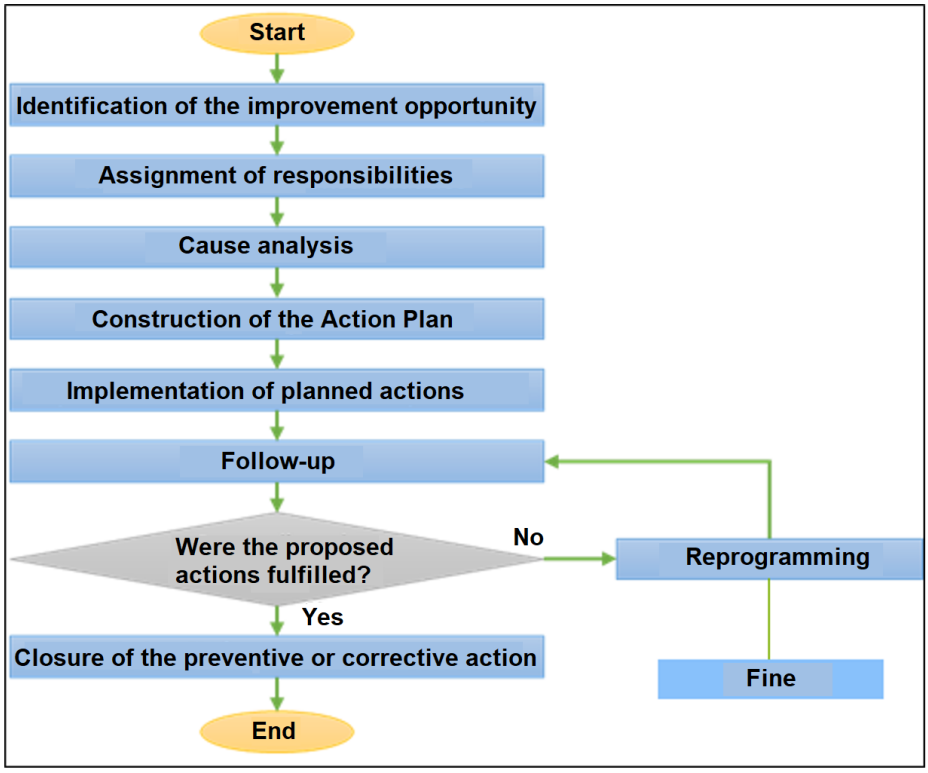

Figure 11 Action Plan Procedure Flowchart

Source: Metro Línea 1 S.A.S., 2021

5.9 OCCUPATIONAL SAFETY AND HEALTH MANAGEMENT SYSTEM (SG-SST FOR ITS SPANISH ACRONYM)

As part of the obligations for the start of early activities for the construction of the Calle 72 Underpass, the provisions of Technical Appendix No. 15 are complied with.

The company METRO LINEA 1, in compliance with the provisions of Law 1562 of 2012, Decree 1072 of 2015 and Resolution 0312 of 2019 and other applicable regulations in force regarding occupational safety and health; Metro Line 1 (ML1), has structured the OCCUPATIONAL SAFETY AND HEALTH MANAGEMENT SYSTEM (SG-SST), ensuring safe and healthy working conditions in the development of the different activities and whose main objective is to control the hazards and risks present in the project, promote continuous improvement and prevent hazardous conditions that may affect the welfare of workers and productivity, with the commitment and responsibility of the top management of the company METRO LINEA 1, extending the application and compliance to contractors, subcontractors, suppliers, visitors and third parties.

The operation of the SG-SST is proposed through a method defined by stages whose principles are based on the PDCA cycle (Plan, Do, Check and Act) and which includes the following elements; policies, organization, planning, implementation, evaluation, audit and improvement actions, the development of these elements will allow to comply with the purposes of the SG-SST requirements.

SG-SST contemplates different stages which are described in the Occupational Safety and Health System Manual ML1-SST-MN-2020-0001 (VGG Version).

In each of the stages (PLAN, DO, VERIFY AND ACT) defined in the SG-SST, the components established in the regulations are defined, according to the identification of risks, the different plans, policies, procedures, and standards necessary to carry out an adequate OSH management are established, guaranteeing the fulfillment of the objectives, indicators and goals established by the organization in terms of Occupational Safety and Health.

5.9.1 Objectives of the occupational safety and health system:

- To promote the integral wellbeing of workers.
- Determine strategies to eliminate hazards and reduce risks in the development of activities.
- Comply with legal and other requirements.

5.9.2 Annual work plan for occupational health and safety

In compliance with Colombian legislation on occupational safety and health, the organization establishes an annual work plan that takes into account the fulfillment of objectives, established goals and the control of priority risks.

The annual plan establishes goals, responsibilities, resources, and a schedule of activities, in accordance with the minimum standards of the mandatory quality assurance system of the General Occupational Hazards System. The annual plan is aligned with the Occupational Safety and Health policy and the matrix identifying hazards and risks and it accounts for the respective measurement of compliance, coverage, and effectiveness indicators.

A monthly report will be made with the necessary supports on compliance of the annual work plan, verifying compliance with the indicators and goals, generating action and improvement plans in case of deviations or gaps in compliance with the plan.

The Monitoring and Follow-up Plan seeks to evaluate the effectiveness of the management measures planned to address the abiotic, biotic, and social impacts of the activities of the Previous Phase of the project and to have the basic tools to determine in a timely manner the adjustments required for the planned management, in accordance with the results obtained.

5.10 DISASTER RISK MANAGEMENT PLAN

The Disaster Risk Management Plan is based on the written structuring of preventive actions, administrative, functional and operational preparation, before, during and after an emergency or contingency, which allows the construction project of the First Line of the Bogotá Metro - PLMB (Pre-operational Stage Previous Phase - Vial Interchange 72nd Street) to adapt to the conditions in which they work, acquire the knowledge and organizational attitudes necessary to act correctly in the prevention and control of emergencies.

The plan includes the specific risk analysis that considers possible effects of natural, socio-natural, technological, bio-sanitary and unintentional-human-originated on the exposed infrastructure and those arising from damage to it in its area of influence of possible affectation by the project.

5.11 BIOSAFETY PROTOCOL

In compliance with the provisions of current legal regulations, the general biosafety protocol is adopted to mitigate, control and carry out the proper management of the COVID-19 coronavirus pandemic to reduce the risk of exposure and contagion by acute respiratory infection caused by SARS 2 CoV-2 (COVID-19). The aims is to protect the Concessionaire's workers and their families in the different scenarios in which there is a greater risk of contagion by interpersonal contact such as: Mobility, entrance to the office, work fronts, work spaces where several people concur, dining areas, sanitary units, elevators and other areas and/or activities where proximity between people is required and apply the guidelines established therein.

The above is done in order to reactivate the activities of the Previous Phase during the sanitary emergency, promoting measures and actions to ensure the safety and integrity of all concessionaire personnel, contractors, subcontractors, suppliers and visitors.

6 SOCIOECONOMIC ENVIRONMENT

6.1 AREAS OF INFLUENCE

The following table shows that for the early works on 72nd Street, the area of indirect influence in the districts of Chapinero and Barrios Unidos is defined as Zonal Planning Units - UPZ 97 and 98, called Chico Lago and Los Alcázares, this includes the neighborhoods near the worksite. The direct area of influence corresponds to the cadastral blocks where the works of the 72nd Street underpass are located.

Table 7- Area of Influence for the 72nd Street previous phase works (district, UPZ and neighborhood)

WORK	SECTION	DISTRICT	UPZ	NEIGHBORHOODS
Intercambiador vial Calle 72 por Av. Caracas	Section 6 (partial)	Chapinero	UPZ 97	Lago Gaitán, Espartillal, Porciúncula, Quinta Camacho
		Barrios Unidos	UPZ 98	Juan XXII, Colombia, San Felipe, Concepción Norte

Source: Metro Línea S.A.S., 2021

The following image shows the indirect area of influence in relation to the zoning units and neighborhoods near the intervention area.

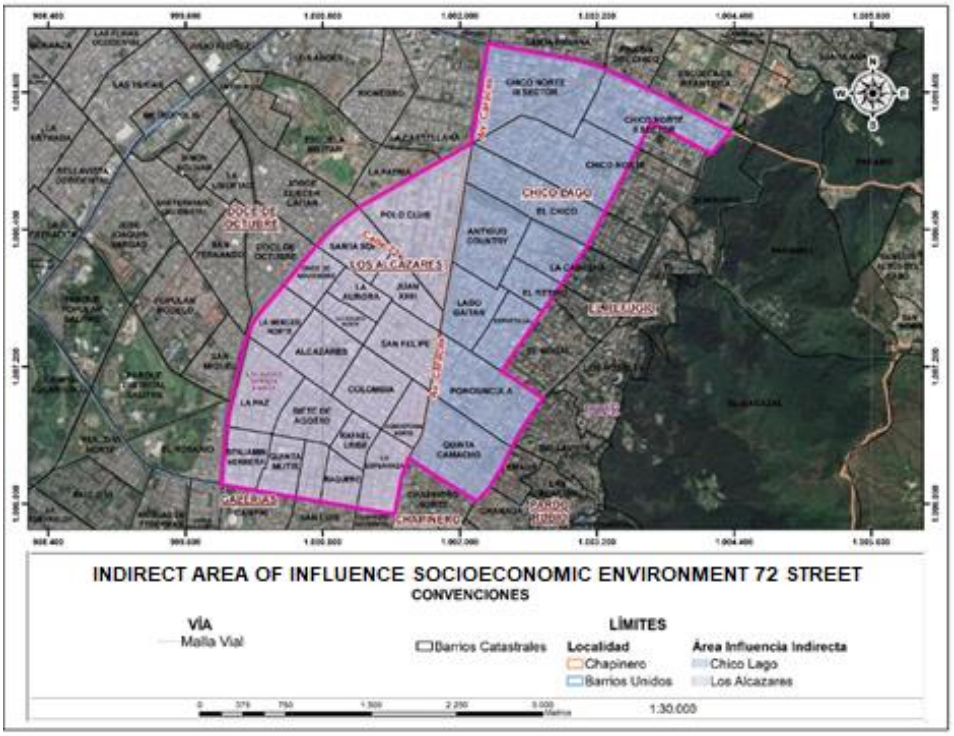

Figure 12 AID. SECTION 6. UPZ Los Alcázares and Chico Largo, District of Chapinero and Barrios Unidos

Regarding the direct area of influence that was determined by the blocks bordering the intervention area, the greatest effects of the works will be received by the population that uses or resides in the bordering properties on 72nd Street. In this sense, the AID defines this area as the most vulnerable to impacts in the pre-operational stage, in which the construction of the 72nd Street and Caracas Avenue underpass will begin.

The figure below shows the area of direct influence, made up of the cadastral blocks in the vicinity of the construction site. The red strip indicates the properties that will be directly impacted by the construction activities. The area marked in yellow is also part of the direct area of influence in which the intensity of the effects is less critical because access to the properties is not interrupted and their daily activities will not be significantly altered in this regard.

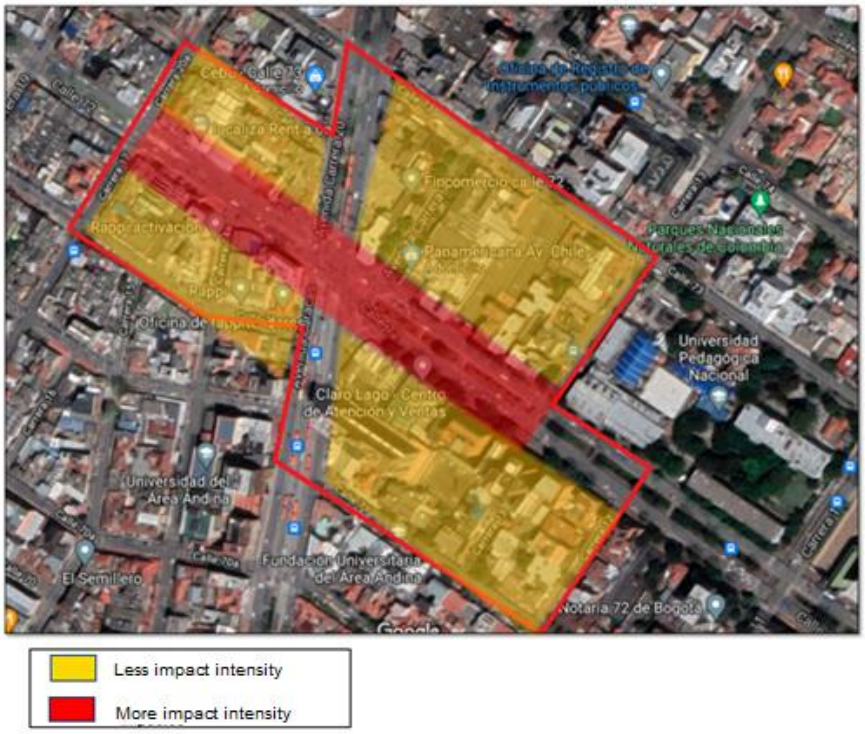

Figure 13 AID- Area with the highest intensity of impacts in the direct area of influence - AID

6.2 CHARACTERIZATION

The description and characterization of the direct and indirect area of influence is based on the results of the studies conducted for the project's structuring stag. Although it was proposed for the entire viaduct, it has similar criteria in the formulation as it seeks to describe the social, economic and cultural interactions that take place in the territory where the works will be carried out.

This document is formulated according to Annex 1 of technical appendix 15, of concession contract number 163 of 2019, which indicates the approach to the social component from the following dimensions: demographic, spatial, cultural, political-administrative, and economic. Their analysis allows

for the identification of the impacts or effects that may be generated on the population during the construction stage of the underpass. From there, it will be the basis for the formulation of measures for the management and mitigation of these effects on the inhabitants of the sector, the permanent economic activities, and in general, the social dynamics that occur in the defined areas.

The update of the socioeconomic environment for the 72nd Sreet with Avenida Caracas underpass was approached from four consultation exercises, as follows:

- Consulta documental referente a la PLMB – etapa de estructuración
- Secondary information consultation, such as the survey results of the Departamento Nacional de Estadísticas (DANE), the household survey, the 2017 multipurpose survey and the 2018 population census and other city official sources, such as: (i) the economic development observatory, (ii) the city's health observatory, (iii) statistical reports from the secretariat of social integration and city planning, (iv) the Bogotá urban laboratory, (v) the document repositories of the local mayor's offices of Chapinero and Barrios Unidos, (vi) information from the Bogotá Chamber of Commerce, among others.
- Application of qualitative research techniques.
- The qualitative research techniques that were implemented to obtain primary information are presented as follows:

The qualitative research techniques that were implemented to obtain primary information are presented as follows:

- Participant observation exercises

4 identification tours were done with specific objectives as follows:

Table 8 Identification tours performed

No.	OBJECTIVE	DATE	TIME
1	Identification of local stationary, formal and informal commerce (baseline update).	09/07/2021	10:00 am – 2:00 pm
2	A photographic record of the neighboring blocks made it possible to document the participant observation exercise.	16/07/2021	4:00 pm – 6:00 pm
3	Identification of social behavior patterns; characterization of the floating and transient population. Dynamics of displacement and occupation of public space. Identification of other relevant urban elements such as the presence of institutions, commercial zones, areas of greater vehicular and pedestrian mobility, public safety	28/07/2021	8:00 am – 10:00 am 12:00 m – 3:00 pm 5:00 pm – 7:00 pm

	conditions, identification of meeting places, and in general, the functional logic of the territory.		
4	Identification of the use of garages and public parking lots on 72nd Street and adjacent blocks to measure impacts on motorized mobility.	12/08/2021	2:00 pm – 4:00 pm

- Application of tools to obtain primary information

There are three sources of primary information documented from the social actors present in the territory. On the one hand, the information obtained in the home visits for neighborhood acts, on the other hand, the information collected through a survey applied to the 71 merchants located on 72nd Street between Carrera 13 and Carrera 17, and finally, the information obtained through the monitoring of the presence of informal vendors and occupants of public space.

Table 9 Data collection exercises

No.	DATA COLLECTION EXERCISE	RESULTS
1	Preparation of neighborhood acts	354 acts were done
2	Application of survey to merchants	71 surveys done
3	Monitoring the presence of informal vendors and occupants of public space	2 monitorings performed
4	Socialization of PMT on special properties	6 properties on the east side of the intersection

- Data triangulation to analyze information obtained from the cited sources

The obtained information was analyzed considering the following dimensions: social, demographic, economic, environmental, political-administrative, spatial, and cultural. Then, they were compared with categories such as territoriality, social structure, interactions with the environment, the notion of space and time, urban structure, social imaginary, and sustainability conditions associated with the economic structure.

6.2.1 Criteria for the definition of the areas of incluence

The criteria considered to define the socioeconomic direct and indirect areas of influence are based on the identification of the following conditions:

- Closer proximity to the physical area of the construction works
- Vehicular, pedestrian and bicycle user mobility dynamics.
- Traffic Management Plan outline - PMT -

- Presence of social, health or educational institutions or entities in areas near the project.
- Conditions and characteristics of commercial activity in the territory.

These social criteria were analyzed in relation to environmental criteria that define the impacts from the abiotic and biotic components, in addition to the mobility factors, as follows:

- **Abiotic**: Air, particulate matter, and noise generation; soil, vibrations, and landscape (considering the permanent visual change that the PLMB will generate in all its stages).
- **Biotic:** Fauna, flora, and social and economic processes.
- **Movilidad**: Another factor of the project that will modify daily practices is the change in mobility, generated by the detours necessary for the 72nd Street intervention.

6.2.2 Indirect Area of Influence – AII

The indirect area of influence for the construction of the 72nd Street and Caracas Avenue underpass is located in two districts: Barrios Unidos and Chapinero.

Chapinero is district No. 2 of the city of Bogota and has an area of 3,899 hectares. It is located in the northeastern part of the city and starts on 39th Street and ends on 100th Street and from Caracas Avenue to the eastern mountains. It borders the districts of Santa Fe, to the south; Teusaquillo and Barrios Unidos, to the west; Usaquén, to the north, and the municipalities of Choachí and La Calera, to the east. To the north, it is bordered by Calle 100 and the road to La Calera, which separate it from the district of Usaquén. To the west, the Autopista Norte-Avenida Caracas highway separates it from the districts of Barrios Unidos and Teusaquillo. To the east, the foothills of the Cruz Verde páramo, the "Piedra de la Ballena", and the Pan de Azúcar and La Moya hills mark the boundary between the district and the municipalities of La Calera and Choachí. The Arzobispo River defines the southern border with the district of Santa Fe[1].

The Chicó Lago UPZ is classified as commercial and has an area of 422.39 hectares, representing 34.21% of the district's total area. This UPZ is bordered to the north by Avenida Carlos Lleras Restrepo (100th Street); to the east by Carrera 7.ª, 97 A Street, Avenida Germán Arciniegas (Carrera 11) and 76th Street; to the south by 67th Street; and to the west by Avenida Caracas (Carrera 14) and Autopista Norte.

On the other hand, Barrios Unidos is the 12th district in the city and has a total area of 1,189.52 hectares, all of them in the urban area. It has a population of 254,162 inhabitants and is located in the northwest part of the city. It is bordered on the west by Carrera 68 Avenue, which separates it from the district of Engativá; on the south by 63rd Street, which separates it from the district of Teusaquillo; on the north by 100th Street, which separates it from the district of Suba; and on the east by Caracas Avenue, which separates it from the district of Chapinero. The district is crossed by the El Salitre river and the Río Negro canal, with a relatively flat terrain that forms part of the Bogotá savannah. It is made up of the UPZ Los

[1] https://enchapinero.com/noticias/historia-de-chapinero/

Andes, Doce de Octubre, Alcázares and Parque el Salitre, which group the 44 neighborhoods of this district[2].

The Los Alcázares UPZ is located southeast of the district of Barrios Unidos and was regulated by Decree 262 of 2010. It is characterized by being a heterogeneous area in terms of activities and urban dynamics, functionally linked to the regional and urban context through the urban integration road corridors of Paseo de los Libertadores, Medellín (Calle 80), Ciudad de Quito (Carrera 30) and José Celestino Mutis (Calle 63) avenues.

It is made up of the following neighborhoods: 11 de noviembre, Alcázares Norte, Baquero, Benjamín Herrera, Chapinero Noroccidental, Colombia, Concepción Norte, Juan XXIII, La Aurora, La Esperanza, La Merced Norte, La Paz, Los Alcázares, Muequetá, Polo Club, Quinta Mutis, Rafael Uribe, San Felipe, Santa Sofía and Siete De Agosto. Thus, most of UPZ 98 is an urban renewal zone in which not only housing, but also commercial and service uses have the possibility of expanding. The neighborhoods in the district of Chapinero that are close to the project are: Lago Gaitán, Espartillal, Porciúncula, Quinta Camacho, because of the historical process that consolidated the district.

6.2.2.1 Demographic dimension

- Population structure

The results of the Multipurpose Survey for Bogota show that 3.3% of the population of Bogota is concentrated in the district of Barrios Unidos and 1.5% in the district of Chapinero.

In Chapinero it is evident that the largest number of people are located in the range between 35 and 39 years of age, in both men and women. The narrowest level is at the extremes, between the lower age ranges (0 - 4 and 5 - 9) and higher age (75 - 79), the same trend is evident in Barrios Unidos.

It is likely that the urban renewal processes that are taking place, especially in the district of Barrios Unidos, will lead the trend in the opposite direction, by encouraging the construction of new multi-family housing.

- Unsatisfied Basic Needs Level - NBI

The NBI is calculated by DANE and measures the population with deficiencies in one or more indicators related to the characteristics of housing, its inhabitants, and their quality of life. The percentage of people with NBI is 1.81% for the district of Barrios Unidos and 1% for the district of Chapinero. This represents low NBI indexes.

[2] Secretaria de cultura, recreación y deporte [sitio web]. Bogotá D.C.; [Consultado: 28 de abril de 2021]. Disponible en https://www.culturarecreacionydeporte.gov.co/es/localidades/barrios-unidos.

This situation happens because occupation processes of the territory are not recent, contrary to other districts. However, according to City studies[3], the phenomenon of hidden poverty has been identified in the districts that are the subject of this study. In these households, income is insufficient to cover obligations such as housing maintenance. In terms of access to health care, this type of population does not have the income to join the contributive system, but their entry

6.2.2.2 Spatial dimension

- Quality and coverage of public and social services

In Bogota, since 2011, access to public utilities is almost universal. Specifically, in the districts of Chapinero and Barrios Unidos, they have full energy, water, sewage, and garbage collection service coverage. Natural gas service shows a decrease in access mainly in the district of Chapinero. Regarding access to fixed telephone and internet, for Chapinero the coverage in 2017 was 87.1% while in Barrios Unidos the access was of 79.2%.

- Affiliation to the General Social Health Security System

In the district of Chapinero, as of March 2021, 89.06% of the inhabitants are in the contributive regime, 7.64% of the population is part of the subsidized regime, 3.28% is in the exceptional regime and only 0.03% of the population in this district is not affiliated to any regimen. Meanwhile, the district of Barrios Unidos presents a greater number of people linked to the General System of Social Security (SGSS) in the contributory regime. On March 2021, 91.33% of the people registered in the SISBEN survey, belonged to this regime. In the subsidized regime, it reports 5.14% of the total population, and in the exceptional regime, it reports 3.47%. In the "without affiliation" category, only 0.03% of the total population is registered[4].

- Social services, educational and health infrastructure.

The districts of Barrios Unidos and Chapinero are part of the North Integrated Health Services Sub-Network (Subred Integrada de Servicios de Salud Norte). The only public hospital in the area is Hospital de Chapinero ESE, which has three facilites in the district of Barrios Unidos.

According to metadata extracted from the "Directorio Único de Establecimientos Educativos para Bogotá[5]", the educational infrastructure in the districts of Chapinero and Barrios Unidos accounts for the existence of 86 educational institutions, both public and private. In the works' area of influence for the 72-street underpass, in the districts of Chapinero (UPZ Chico Lago) and Barrios Unidos (UPZ Alcázares),

[3] Secretaria de Integración Social. [sitio web]; [Consultado: 25 de abril de 2021]. Disponible en: https://www.integracionsocial.gov.co/index.php/noticias/116-otros/3372-la-pobreza-oculta-fenomeno-por-descubrir-en-bogota-2

[4] https://saludata.saludcapital.gov.co/osb/index.php/datos-de-salud/ofertas-de-servicios-de-salud/afiliacion-regimen/

[5] Secretaria Distrital de Educación de Bogotá. Disponible en: https://dueb.educacionbogota.edu.co/Dueb/

10 educational facilities were identified, including schools, non-formal education institutions and higher education establishments.

It is observed that, for the district of Barrios Unidos and even though the trend is increasing, the percentage is low especially among the primary school age population (5 to 11 years) and secondary school age population (12 to 15 and 16 to 17). In the 12 to 15 age range, there is a decrease in attendance of 3% while in the other ranges the trend continues to increase. The data for the district of Chapinero show a slightly greater increase with respect to the data for the district of Barrios Unidos; only in the 12 to 15 age range is there a percentage decrease of 2%.

In terms of recreational and sports facilities, Barrios Unidos has 120, which are classified as follows:

Table 10 Recreational and sports areas

Type of parks	
Sports Venues	2
Pocket Park	36
Metropolitan Park	10
Neihborhood Park	68
Zonal Park	4

Source: IDRD 2021

- Recreational and sports infrastructure.

Regarding the area of influence near the intervention sector, the distribution of these facilities establishes that in the Alcázares UPZ there are 12 facilities that should be considered in the socialization processes of the PMT and all the activities of the Social Management Plan so that they become meeting points with the community.

The revision of facilities in the project's area of influence helped identify 120 scenarios, which are located outside the direct area of influence of the works.

- Housing types and possession

According to data from the economic development observatory of the Secretaría de Desarrollo Económico de Bogotá[6], Chapinero concentrates 70.7% of its households in strata 4, 5 and 6, while 17.1% of the homes are classified as strata 2. This reflects the social contrast in the district due to the presence of a high commercial and business activity in the area. The district of Chapinero is

[6] Secretaria de Desarrollo Económico [sitio web] visitado el 30/04/2021. Disponible en http://observatorio.desarrolloeconomico.gov.co/dinamica-economica

predominantly residential where 95.3% of the properties are exclusively for residential use (55,647 households) and 4.7% are for commercial use (2,753 households) in the forms of mixed use, industry, commerce, or services. According to the type of housing, 85.6% of the district's residents live in apartments (50,019), 14.3% in houses (8,323) and 0.1% in rented rooms.

For the district of Barrios Unidos, the results of the 2017 Bogota Multipurpose Survey showed that the district has a population of 267,103 inhabitants, of which 50.5% are women and 49.5% are men. The predominant stratum for the households is stratum 3, with 63.2%, followed by stratum 4 with 36.3%, stratum 5 with 0.5% and stratum 2 with 0.03%. It was also identified that 51.3% of the homes in the district are owned by their inhabitants, 42.4% are rented or leased, 3.8% in usufruct and 2.5% in other modalities of possession.

The district is primarily residential, 90.9% of the properties are used exclusively for housing (88,021 households) and 9.1% are for commercial use (8,819 households). It should be noted that 62.6% of the district's residents (60,595 households) live in apartments, 35.1% in houses (33,989 households), and the remaining 2.3% live in rooms (2,255 households).

- Road infrastructure, its condition and transportation services

Regarding the road infrastructure, the indicator system associated with SIIPVIALES[7] shows that the district of Chapinero occupies 496.98 km of the city's total of 13,967.5 km. Regarding its condition, 56.5 km of existing lane (km/c) were in good condition at the time of measurement (first half of 2019). The remaining km, present deterioration. The main roads in the district of Chapinero are Avenida 39, Streets 45, 53, 57, 60, 63, 72, 76, 85, 88, 92, 94 and 100, Carreras Séptima, 11, 13 and 15, Avenida de los Cerros, Avenida Chile (72 Street) and Avenida Caracas. In all of them, there are multiple urban bus routes to all sectors and neighborhoods of the city. Also, on 72 Street with Carrera 13 there is a bus stop for intermunicipal buses to La Calera and neighboring municipalities.

The TransMilenio system is located on two lines, line A (Troncal Caracas), with stations at Avenida 39, 45 Street, Marly, 57 Street, 63 Street, Flores, 72 Street, 76 Street, and line B (Autopista Norte), with stations at Héroes, 85 Street, Virrey and 100 STreet, all on the western edge of the district. Chapinero has a network of bicycle routes on Carrera 13 and a Sunday bicycle lane on Carrera Séptima.

Bogotá's train service (Tren de Cercanías de Bogotá) enters the district at Autopista Norte and 92 Street, where it takes Transversal 23 to 100 Street and continues its way to Usaquén. It operates as tourist transportation on weekends and holidays, and cargo transportation on weekdays.

In Barrios Unidos, there are 581.11 km of the city's road infrastructure, and most of the roads are accessible. Of these, 100.5 km correspond to arterial roads, mainly part of Carrera 30, 68 Street and 80 Street. 23.49 km are in fair condition, mostly in secondary neighborhood roads; and only 3.8 km are in poor condition, according to the information reported by SIIPVIALES. The main roads in the district are

[7] IDU. Sistema de Indicadores Actualización a Julio 2019. [Disponible en https://www.idu.gov.co/page/contexto-indicadores

80 Street, 68 Street, Avenida 68 and 100 Street, Avenida La Esmeralda, Avenida Ciudad de Quito or Carrera 30, Carrera 50, and Carrera 24.

The Transmilenio system provides services to the population of Barrios Unidos. On the one hand, 80 Street is covered by the D line and has the Polo, Escuela Militar, Carrera 47 and Carrera 53 stations. Avenida NQS is covered by line E and has the following stations: La Castellana, NQS 75 Street, Avenida Chile and Simón Bolívar. On Autopista Norte, the district is covered by line B, with stations at 100 Street, Virrey, 85 Street and Héroes. A section of Avenida Caracas, which is covered by line A, has the stations 76 Street, 72 Street and Flores. A section of Avenida Suba is covered by line C, with stations San Martín, Rionegro and Suba 95 Street.

Thanks to their geographic location in the city, the districts of Chapinero and Barrios Unidos benefit from all transportation services, a network of bicycle routes and a well-maintained road network. This facilitates the population's mobility by all modes of transportation.

6.2.2.3 Cultural dimension

- **Chapinero District**
  - Intangible cultural heritage: social practices and aesthetic traditions.

The district's cultural offer is focused on building a community through free access to events in different artistic areas that promote the relationship of its inhabitants with the territory. In the last decade, there have been several cultural events with a city-wide scope developed through the entities that form part of the Culture, Recreation and Sports sector, such as[8]:

- Feria del Libro
- Bogotá International Film Festival (BIFF)
- Festival de Cine Independiente de Bogotá (IndieBo)
- Festival de Teatro de Bogotá y la Feria Internacional de Arte de Bogotá (ARTBO)

  - Movable and immovable property declared to be of cultural interest.

The following table shows the cultural interest properties by category for the Chapinero district according to the corporate geographic database of the city planning entity, Secretaría Distrital de Planeación, in 2017.

Table 11 BIC classification in Chapinero

CATEGORY	AMOUNT
Integral conservation	255

[8] Localidad #2 Chapinero. Secretaria de Cultura, Recreación y Deporte. Bogotá: 2018.

CATEGORY	AMOUNT
Monument conservation	7
Typological conservation	737
Partial restitution	17
Total restitution	1
No classification	1
TOTAL	1.018

Source: Ficha Local de Chapinero. 2016.

- Cultural significance sites, areas of cultural use for recreation and leisure, and other areas of cultural significance

Chapinero is home to several points of cultural interest for its inhabitants and for the rest of the city: the Zona Rosa and Parque de la 93. It also contains the bohemian area in Chapinero Central that goes from Carrera Séptima to Avenida Caracas and from 45 Street to 63 Street, where there are bars, restaurants, supermarkets, shopping malls, green areas, private clubs, etc. Caracas Avenue between 54th and 56th Streets is called "La Playa" or Mariachi Street in Bogota.

The Chapinero neighborhood has been declared as an area of Cultural Interest of the city. Of note are the Museo del Chicó, the Plaza-Parque and the Church of Nuestra Señora de Lourdes, the center of the district, and the Church of La Porciúncula. Most of Bogotá's upscale neighborhoods are in this district, such as Los Rosales, La Cabrera, El Retiro, El Nogal and El Chicó[9].

Chapinero is home to 183 artists, mainly in the fields of music 49.7%, audiovisuals 14.2% and drama 10.9%. It also has a total of 652 cultural, recreational and sports organizations. Of these, 29% are involved in music, 30% in art and drama, and 18% in dance. Finally, organization, participation and democratic culture correspond to 9% each[10].

The most important travel sites in the AID correspond to the most used roads and the cultural, commercial, and educational facilities located on them. 72nd Street, 63rd Street, 53rd Street, Carrera 13 and Carrera 11 are some of them[11].

[9] Alcaldía local de Chapinero. Alcaldía Mayor de Bogotá: 2019.

[10] Bogotá: Base de Datos SCRD. ASEGURARTE, 2019.

[11] Sistema de información del sector cultura, recreación y deporte. Secretaría de cultura, recreación y deporte. Bogotá, 2014.

- Presence of ethnic communities

There is no reported presence of ethnic communities in the direct area of influence according to Certification 0894 dated August 29, 2017, issued by the Ministry of Interior.

- Barrios Unidos district

Currently, the district stands out for its strong commercial and service dynamics and the concentration of small and medium-scale industrial activities such as wood processing and transformation, footwear, lithographs, and the sale of automotive spare and repair parts[12].

In the district of Barrios Unidos, the festivities of August 7, October 12 and November 11 are celebrated. Likewise, Christmas celebrations occupy a large part of the festive calendar where transformations of places and environments take place. In these celebrations, imaginaries of violence have been constructed, as well as processes of dialogue on memory and knowledge about the territories. Likewise, the novenas de aguinaldos and the feast of the holy kings are the characteristic events of the sector.

Among the cultural and traditional activities of the district are the marketplaces of Siete de Agosto with its traditional festival of el Sagrado Corazón, the Doce de Octubre square is known for Doña Segunda's fritanga, a place with more than 50 years of existence and the celebration of the Virgen del Carmen. Finally, the Plaza de Artesanos is an itinerant marketplace and a farmers' markets. The 7 de Agosto and Alcaceres neighborhoods area a large commercial sector where leather, bicycles, clothing, and various items are sold[13].

The district of Barrios Unidos is characterized by having important theaters such as: Teatro Quimera, Sala de la Ventana Producciones organization, Sala Cultural Marcel which is part of the organization la Casa del Silencio y Teatro Físico and the Taller teatro Vreve. All these organizations have won resources and scholarships for their associates from the Ministry of Culture and the District Secretariat of Culture, Recreation and Sports[14].

6.2.2.4 Political-organizational dimension

- Participation instances and mechanisms

Chapinero's participation dynamics take place in its local affairs through formally established participation organizations, including 20 Community Action Boards, which represent the interests of the same number of neighborhoods, and the Local Planning Council (Consejo de Planeación Local - CPL), made up of citizen representatives. There are also other non-institutional participation bodies, represented by citizens for the promotion of various cultural, sports, and economic issues, among others.

[12] Monografía de localidades #12 Barrios Unidos. Alcaldía Mayor de Bogotá, 2018.

[13] Ficha Local Barrios Unidos. Secretaría de Cultura, Recreación y Deporte –SCRD. Bogotá: 2019.

[14] Ficha Local Barrios Unidos. Secretaría de Cultura, Recreación y Deporte –SCRD. Bogotá: 2019.

According to information gathered in the Comprehensive Diagnosis of Citizen Participation for the district of Barrios Unidos [15], there are currently 26 active Community Action Boards, 44 Community Organizations, 15 Youth Organizations, 19 active participation bodies and 16 representatives for each sector in the Local Planning Council.

6.2.2.5 Economic dimension

- Local market characteristics

Regarding information per district, the Economic Development Observatory presents labor market information for the year 2019. For the district of Chapinero, it shows that of the economically active population (amounting to 70,944 people), only 61% are employed, and 40,725 are inactive. It can also be found that 90.1% of the population is of working age and only 61% is employed. For its part, the economic development observatory, based on data from DANE, indicates that in terms of employment, Chapinero has the highest employment rate of the 19 urban districts of Bogota. Private employment predominates, with 55.7% of the employed; 29.8% are independent professionals or self-employed; and 6.9% are linked to the government.

According to gender distribution, the district of Chapinero has led the ranking of women's employment in the 19 districts of the city, corresponding to 53.9%. In 2017, it registered 30,552 employed women, of which 62.9% are salaried and 37.1% are non-salaried and largely located in private jobs (17,185 women). For men, the employment rate was 68.3%, corresponding to 37,517 of employed persons, 3,380 less than three years ago. As can be seen, the gender employment gap is 14.4 percentage points[16].

In terms of employment by age range, the district of Chapinero is the leader in the 29 to 45 years old and 46 years old and over, with an employment rate of 89.9% and 55.4%, respectively.

In the district of Barrios Unidos, of the 89.1% of the working age population, only 57.2% is employed. The working age population amounts to 238,091 people, of which 136,220 say they are working and 93,711 say they are inactive. This number that can be justified by the percentage of elderly people that are dependent on relatives or are retired, due to the age of some neighborhoods, which date back more than 50 years.

The Economic Development Observatory, based on DANE[17] data, indicates that 50.5% of the Barrios Unidos' inhabitants are women and 49.5% are men, making up 96,840 households. The employment rate of the district is 57.2% and the number of employed is 136,220 people.

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[15] Instituto Distrital de la Participación Social. Diagnostico Integral de Participación Social de Barrios Unidos. [sitio web]. Bogotá D.C; [Consultado: marzo 2021]. Disponible en: https://www.participacionbogota.gov.co/

[16] Ibid

[17] http://observatorio.desarrolloeconomico.gov.co/dinamica-economica/ Informe del DANE sobre empleados particulares, trabajadores cuenta propia, patrones o empleadores que laboran en empresas de hasta 5 personas, trabajadores familiares sin remuneración en empresas u otros hogares y empleados domésticos.

- Productive and technological processes

The analysis of productive and technological processes presented by the Bogota Chamber of Commerce in 2020's Economic and Business Profile of Bogota's districts indicates that, when comparing the districts according to the distribution of companies, the following characteristics stand out:

- Seven (7) districts in the north and west part of the city account for 62% of Bogotá's companies (Suba, Usaquén, Kennedy, Chapinero, Engativá, Fontibón and Barrios Unidos).

This business distribution is the result of urban development and the concentration of productive activities in the north and west of the city, where there is a greater supply of provisioning, personal, business and logistics services. This makes the location attractive for a greater number of companies in the service, commerce and industry sectors. The south and center of the city have a lower supply of provisioning and logistics services for the location of companies and as a result there is a low business density in these areas of Bogota.

The districts of Chapinero and Barrios Unidos, which are the subject of this study, rank among those with the highest number of small companies in terms of company size: Chapinero (8,929) and Barrios Unidos (3,136 companies). Small companies are characterized by generating employment for a range 11 to 50 employees[18].

As for medium-sized companies, which have up to 250 employees, the largest number in the districts of Chapinero (3,408 companies); Usaquén (2,031 companies); Suba (842 companies); Fontibón (787 companies) and Barrios Unidos (731 companies)[19].

In the district of Chapinero, which is known as the business center of Bogota due to its cultural and financial services, 40% of large companies (1,457 companies) are located.

The ranking by district in the services sector shows that 50% of the companies are concentrated in the districts of Suba (29,399 companies), Chapinero (28,848 companies), Usaquén (27,540 companies) and Engativá (18,801 companies). The service activities with the highest number of companies in these districts are accommodation and food services (8.1% of the total number of companies); professional, scientific, and technical activities (11.7% of the total number of companies) and administrative and support service activities (4.7% of the total number of companies).[20]

[18]Registro Mercantil de la CCB, 2019. Cálculos: Dirección de Gestión y Transformación de Conocimiento de la CCB.

[19] Ibid

[20] CÁMARA DE COMERCIO DE BOGOTÁ. Perfil de las localidades de Bogotá 2020.

- Development poles of the districts.

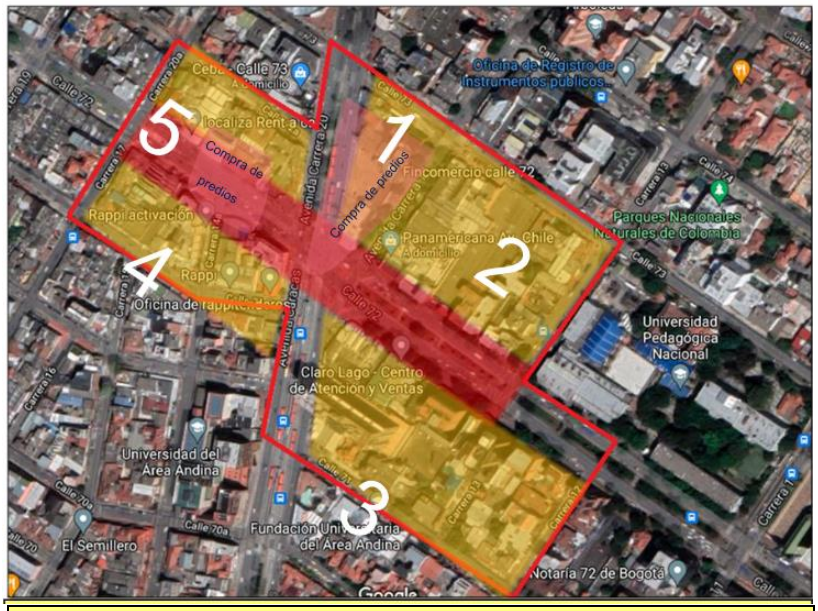
Although all districts have companies from all sectors, it is possible to identify the economic focus of Bogotá by district according to the business structure and the diversity of productive activities:

- Service activities: Suba, **Chapinero**, Usaquén, Engativá, Kennedy, Fontibón, Teusaquillo, **Barrios Unidos**, Santa Fe and Puente Aranda.
- Commercial activities: Kennedy, Suba, Engativá, Usaquén, Los Mártires, Puente Aranda, Bosa, **Barrios Unidos**, Fontibón, **Chapinero** and Santa Fe.
- Industry activities: Kennedy, Engativá, Suba, Puente Aranda, Los Mártires, Usaquén, **Barrios Unidos**, Fontibón, Bosa and Rafael Uribe Uribe.
- Construction activities: Suba, Usaquén, Engativá, **Chapinero**, Kennedy, **Barrios Unidos**, Bosa, Ciudad Bolívar and Fontibón.
- Agricultural activities: **Chapinero**, Usaquén, Suba, Kennedy, Engativá and Fontibón.
- Mining and quarrying activities: Usaquén, **Chapinero**, Suba, Fontibón, Engativá, Kennedy, Candelaria, Teusaquillo, **Barrios Unidos** and Santa Fe.

Note that the studied districts appear in all sectors by economic vocation, which demonstrates the commercial and service activities present in the territory. This is due to the geographical location of Chapinero and Barrios Unidos, together with the date of its conformation, which allows the existence of properties with the characteristics of size and location conducive to the installation of business and commercial headquarters.

6.2.3 Direct Area of Influence – AID

The direct area of influence for the 72nd Street and Caracas Avenue underpass is determined by the cadastral blocks located in the vicinity of the project. Given the differences in the blocks' conformation in relation to the properties' forms of occupation, the structure of the public space, the destination or use of the properties and the general characteristics of the sector, the description and analysis is carried out by dividing the territory (which also obeys the work intervention schedule) as follows:



The numbers correspond to the classification of the blocks into which the socioeconomic environment analvsis was divided.

Figure 14 Direct Area of Influence

Block 1 and 2: Sector between 72nd Street and 73rd Street between Carrera 13 and Carrera 15 and Caracas Avenue and Carrera 15, north side. District of Chapinero, El Lago and Porciúncula neighborhoods, being this the polygon where work began on September 17, 2021, for an estimated period of 15 months.

This northeastern side of the intersection is characterized by the multiplicity of uses of the 24 identified properties, where residences are combined with commercial and institutional premises, in horizontal property, and public and private parking lots. It was found that a significant percentage (close to 40% of the properties) are unused. Stores, apartments, and offices are identified with rental or sale notices.

In terms of infrastructure, activities for educational purposes were identified. Among them, a language center called Centro de Idiomas Internacional House that provides non-formal education, as well as the Instituto Colegio Kuepa that provides formal education for validation of basic primary and secondary education. There is also a property that formerly served as the administrative headquarters of the Universidad UDCA and is currently being remodeled.

Further to the west, on the same north side, Block 1 is made up of approximately 29 properties. These include commercial premises, horizontal properties, educational buildings, and public parking lots. Most of them are 4-story buildings on average, with a smaller number of single-family houses.

Regarding their use, 14 of the properties are uninhabited and have already been handed over as a result of the property acquisition process being carried out by Empresa Metro de Bogotá -EMB. The following are the commercial units that are still in operation: retail sale of food products, beverages and liquor,

which is combined with a billiard game establishment and a Panamericana stationery store with a public parking lot.

Block 3: located between 72nd Street and 71st Street between Carrera 13 and Caracas Avenue, south side. Chapinero district, Quinta Camacho neighborhood, which corresponds to the second road closure and construction works that begin in November 2021 and last for 15 months. It is made up of properties where multiple commercial activities operate on the first floor, combining small stores with chain stores and franchises of recognized brands such as FACOL, Almacenes Olímpica, Operador Móvil Claro Comunicaciones, DollarCity, and Cruz Verde drugstores. In the public space there are about 30 stationary vendors and street vendors who take advantage of the high pedestrian flow to carry out their activities.

On the second floors there are apartments and offices in horizontal property. Likewise, there are also non-residential buildings such as the former National Television Agency, some public and private parking lots, and a financial headquarters of the Banco de Bogotá. On Caracas Avenue, there is a shopping center called "La Esquina del Celular".

This block's profile shows that there are properties that correspond to multipurpose buildings with several uses. Unlike the north side, some buildings have heights of up to 19 floors. With respect to their use, the commercial development is predominant, and the second level is for institutional non-residential use. It should be noted that the building Propiedad Horizontal Edificio Life 72 is located in this block. This is a recently constructed building that is currently in the process of being commercialized and consists of 18 floors. Of these, 13 floors are for housing, 4 are parking levels, the fourth floor and the roof are for common areas and the fifth floor has 18 offices

Four (4) properties of cultural interest were identified in this area which include buildings where offices for commercial companies operate. These buildings are located on 71st Street and correspond to the nomenclatures 13-28, 13-14, 13-42 and 13-66. The José Enrique Rodó bust, which is a sculpture of cultural interest, is also located on the separator of 72nd Street and 13th Street, in front of the Universidad Pedagógica.

Blocks 4 and 5: located between 72nd Street and 71st Street between Caracas Avenue and Carrera 20A on the north and south sides. District of Barrios Unidos, San Felipe, Alcázares and Colombia neighborhoods. This area corresponds to the construction works to be carried out starting on November 2022.

This polygon contains housing, warehouses, commercial establishments and, to a lesser extent, apartment, and single-family homes. Buildings do not exceed 4 and 5 stories.

With respect to the use of each building, there is a predominance of commercial use. Among the most representative is the liquor distributor on 71st Street, 2 companies of public transport cab operators, 1 vehicle rental company and 5 small-scale businesses dedicated to the sale of food, restaurants, hardware stores, drugstores, and veterinary products, among others. In this area there is a building of cultural interest of typological conservation.

On the southwestern side of this polygon, which is part of the district of Barrios Unidos, specifically in the Colombia neighborhood, horizontal properties were identified that combine residential and commercial uses, with residential activity predominating from the second floor upwards.

Regarding the use of each building, it was identified that the commercial use predominates. This area is where the so-called hidden kitchens that provide services for major food chains in Bogota operate, as well as two car dealerships, 17 establishments dedicated to food marketing, drugstores and shops that sell lithography supplies.

Regarding the area of influence near the project, it has been identified that the properties have multiple uses that associate residential activity with commerce, offices, service provision, small industries, among other. This is especially present on the eastern side of Avenida Caracas with 72 Street where there are different uses apart from housing. Likewise, on the southeastern side of the intersection, it shares area with the Quinta Camacho Sector of Cultural Interest (SIC).

6.2.3.1 Population characteristics

The urban conditions of the sector where the construction works will be carried out generates a high movement of people from outside the sector, who travel to and from arterial roads such as Caracas Avenue, 72nd Street and other high traffic roads such as Carrera 9 to the east or Carrera 20 A and Carrera 17, to the west of Caracas Avenue.

Likewise, for the use of the properties there is a predominance of offices, commerce and services, which generates a permanent flow of employees and workers, especially during daylight hours. Residential activity also contributes to the socioeconomic dynamics of the sector, especially on the western side of the Caracas, where apartments and houses are found.

The population pyramid for this sector shows a higher percentage of pedestrians and bicycle users, which can amount to 500 people per hour on a working day. The proximity to the TransMilenio system is the factor that generates most of the displacements.

The following figure shows data resulting from field research and data obtained from secondary sources for the population's characteristics:

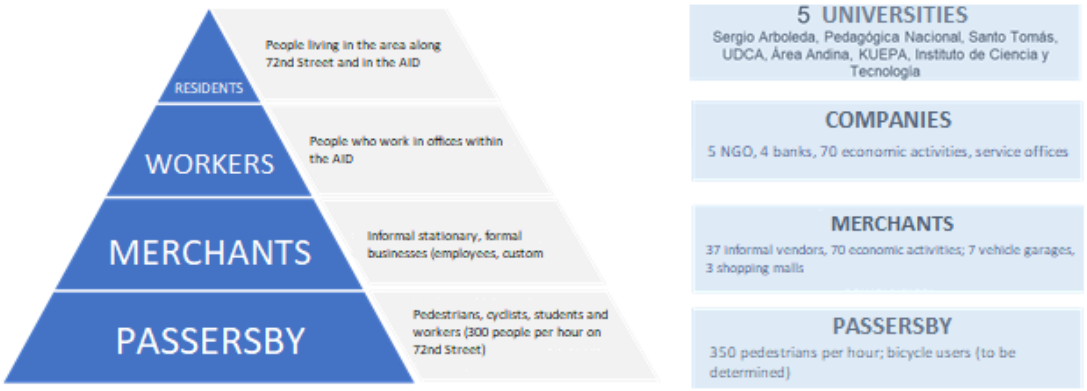


Figure 15 Population characteristics

6.2.3.2 Spatial dimension

- Health infrastructure

In the direct area of influence for the construction works of the 72nd Street with Avenida Caracas underpass, there were no health facilites identified. The Chapinero Hospital, in the district of Barrios Unidos, is the closest to the project and is located at KR 22 #75 08, in the indirect area of influence.

- Educational infrastructure

The closest of this type of infrastructure is the Universidad Pedagógica Nacional, which, as of the date of the update of this component, has been closed for more than a year due to the sanitary emergency, in addition to the pause of academic activities due to social mobilizations and events derived from the National Strike.

This university has an average of 2000 students, who in normal conditions (without pandemic), commute by bicycle and by walking along 72nd Street. They also move by means of the SITP and Transmilenio mass transportation systems, according to information collected during dialogue processes with the institution. 10 educational infrastructures were identified in the direct area of influence on the districts of Chapinero (UPZ Chico Lago) and Barrios Unidos (UPZ Alcázares). These include schools and non-formal education and higher education institutions.

6.2.3.3 Cultural dimension

- Cultural interest assets (Bienes de interés cultural)

SIC Quinta Camacho Located between 67th and 72nd Streets and 7th Street and Caracas Avenue. Currently, the SIC Quinta Camacho provides to the area various commercial and institutional activities and the premises are home to offices belonging to private organizations, educational institutions and the third sector.

The church of Santa María de los Ángeles de La Porciúncula was created in 1935 as a parochial vicariat and was elevated to the category of parish by decree No. 16 of March 12, 1942, which was signed by the Servant of God Ismael Perdomo, with Fray José María Pérez as its first pastor.

In the district of Chapinero, the movable property of José Enrique Rodó, Uruguayan writer and politician, is in the area on the separator of 72nd Street near the Universidad Pedagógica. It is a property of cultural interest of the city in the public space.

In this system of signifiers, the inhabitants of the AID of the project are an integral and active part as they are the ones who give meaning, from their daily life to the material cultural heritage of their districts. This is because the cultural heritage, more than a sum of objects, is configured as a social fact based on the relationships and links that unite the inhabitants with these referents, understood as condensers and triggers of collective memory and identity[21]

- Preventive archaeology studies

The entire project has an Archaeological Management Plan approved under authorization No. 6819, which corresponds to the location polygon from the Depot and the interconnection viaduct located between the Gibraltar property and the Depot. The report delivered and approved by ICANH, indicates:

> *" Section 1 of the PLMB is 19.1 km long between the Portal de las Américas and Calle 78 stations, including the maneuvering tail to Calle 76 and a technical branch to the Depot, which will be located on the eastern side of the Bogotá River, in the area known as El Corzo. The system will have 15 stations (Plan 1.1). It should be remembered that this document only presents the results of the PT-PLMB survey and the connecting viaduct between the Gibraltar property and theDepot, since the rest of the section, from the Gibraltar property to 78th Street, will be part of another authorization and for this sector an Archaeological Diagnosis was made (delivered to ICANH through Radicado 4086 and with response in Rad, 4652 and 4817)."*

6.2.3.4 Political-Administrative dimension

- Social organizations present in the area of influence.

During the social organization identification and recognition process for the 72nd Street underpass area of influence (Barrios Unidos and Chapinero districts), the following private organizations, associations, cooperatives, JAC and JAL are listed, whose data are extracted from primary sources and feedback from district databases as follows:

[21] Peñalba 2005 - Peñalba, J. L. (2005). Evolución del concepto y de la significación social del patrimonio cultural. Arte, individuo y sociedad, 17, 177-206.

- Associations: Ministry of Commerce, Industry and Tourism[22].
- Cooperativa business: Fondo de Garantías de Entidades Cooperativas – FOGACOOP-[23]
- JAC: Departamento Administrativo de la Defensoría del Espacio Público [24]

The districts that are under study are home to the headquarters of multiple social organizations whose radius of action goes beyond the local and even city level, some of which have been in existence for more than 50 years. Others, although at the local level, such as the Community Action Boards, are long-standing community institutions whose representation in the districts constitutes an articulating element of social participation and the management of local and neighborhood projects.

6.2.3.5 Economic dimension

The sector's business and commercial development presents the conditions to be linked to the strategies proposed by the Bogota Chamber of Commerce, especially because one of the business and productive activity corridors of the district of Chapinero, which is shared with Barrios Unidos, is precisely 72nd street.

As for urban development in the sector, there is evidence of the construction of new urban projects, driven by the positive valuation of the land adjacent to the viaduct, so that there is already evidence of new construction in the sector of Avenida Caracas and 71st Street, through emerging urban renewal processes that develop construction projects for housing, commerce, and offices.

- Formal commerce

On 72nd Street there are commercial and service companies, entertainment centers, restaurants, a wide network of financial institutions and shopping malls, as can be seen in the following photographs.

[22]MINISTERIO DE COMERCIO, INDUSTRIA Y TURISMO. Bogotá D.C; [Consultado: marzo 2021]. Disponible en: https://www.mincit.gov.co/servicio-ciudadano/enlaces-de-interes/directorio-de-agremiaciones-y-asociaciones

[23] FOGACOOP. Bogotá D.C; [Consultado: marzo 2021]. Disponible en: https://www.fogacoop.gov.co/seguro-para-su-ahorro/cooperativas-inscritas

[24] DADEP. Bogotá D.C; [Consultado: marzo 2021]. Disponible en: https://www.dadep.gov.co/transparencia/planeacion/estrategia-participacion-ciudadana-y-control-social/directorio-juntas

Figure 16 Vehicle dealership companies and bookstore companies.
(72nd Street in Barrios Unidos, San Felipe and Concepción Colombia).

72nd Street, due to its historical, commercial and financial importance, is a place where employees, merchants, entrepreneurs, students, among others, play a fundamental role in sustaining the economic activities and services provided in the sector.

On the north sidewalk of 72nd Street and between Caracas Avenue and 20th Street (district of Barrios Unidos), there are establishments with vehicular access and/or parking bays for customers, specifically two automotive service shops, as well as grocery and liquor stores, and educational services.

On the south sidewalk in the same location, there are dealership stores, as well as small businesses such as fast-food restaurants and hardware and accessory sales. In some properties, there is a public space corresponding to the sidewalk and a front yard area, which are used for their commercial purpose.

The south side of 72nd Street between Avenida Caracas and Carrera 13 (Chapinero district), is a reception point for travelers coming from the TransMilenio public transportation system, as well as people coming from the neighboring municipalities of La Calera, Guasca and Sopó. On this roadway there are establishments of different branches and economic activities, such as large surface markets (3), financial institutions (2) and small businesses (9), with direct attention to the public.

In relation to the commercial activity of 72nd Street and in the process of collecting information in the territory, 71 commercial establishments in the direct area of influence were approached, located on the corridor of 72nd Street, between Carrera 13 and Carrera 20A, and between 71st Street and 73rd Street, corresponding to the districts of Chapinero to the east, and Barrios Unidos to the west of Avenida Caracas.

Of the establishments (71), 46 of them are located in UPZ 97 Chico Lago (64.8%) and 25 of the economic activities are part of UPZ 98 Los Alcázares (35.2%). There was a higher density of commercial establishments in the eastern section of Avenida Caracas because it is the corridor that leads to the financial sector located towards Carrera 7.

Most of the surveyed establishments operate from leased premises (62 of the 71 merchants interviewed), equivalent to 87.3% of the total, while 9.9% (7) own their premises. This figure is relevant, given that, according to those interviewed, one factor that puts pressure on sales is covering the lease as part of their cost structure.

57.8% of the establishments (41) have been operating at this site for more than five years. This figure allows inferring that merchants consider the segment of Caracas Avenue and 72nd Street as an efficient commercial sector, due to its traditional characteristics, pedestrian flow and mobility and security conditions. Given the design structure of the metro station to be implemented at this site, it is inferred that, in the long term, this figure will be enhanced, so the challenge is to generate sustainability conditions during the construction process.

The record of the 71 surveyed establishments shows that of the 574 employees in the area, 55.2% are women while 44.8% are men. The implementation of the labor linkage and influx, communications and Metro Culture programs will be designed to have a relevant approach that addresses the processes designed for inclusion, with a gender focus, during and from the construction stage of the work.

The following table shows the distribution by economic activity of the surveyed establishments. Given the characteristics of the offered products and services, it is inferred that the main activity (restaurants, commercial premises, service establishments) are carried out in the establishment; therefore, it is relevant the adequate implementation of the Traffic Management Plan and the permanent contact with the merchants, for the adaptation of the accesses to the premises.

Table 12 Economic activities by sector

Sector	# of establishments
Agriculture	1
Commercial	19
Construction	1
Education	5
Industrial	0
Transport	4
Restaurants	13
Health	2
Hotels and lodging	0
Services	19

Financial services	7
Total	71

Source: Metro Línea/ GSK. 2021

- Informal commerce and public space occupants

In the AID sector of the Caracas Avenue and 72nd Street underpass, there is evidence of intense informal commerce in public spaces. This condition present in the territory is expected to worsen with the beginning of the works due to the permanence of workers and related personnel. Likewise, phenomena such as the displacement of the informal commercial node may occur, as the flow of pedestrians changes, but could also focus on the attention of construction personnel.

Even though this is an income alternative for communities that are clearly disadvantaged due to the lack of job opportunities, it is carried out by women and foreigners, in proportions that tend to increase, according to what was evidenced in the field work.

In the information gathering process, informal vendors located in the area where 72nd Street and Avenida Caracas underpass will be executed were approached. This zone also converges with a sector of economic relevance in the city, as it has been characterized for being a structuring polygon of the commercial, financial, and productive dynamics of the north of the city. For technical purposes, a direct identification of the informal commerce businesses located in the corridor of 72nd Street, between Carreras 11th and 20th was carried out. This area is in the districts of Chapinero, to the east, and Barrios Unidos, to the west; thus, recognizing the characteristics of the economic environment of the direct area of influence.

Sixty-nine informal sales stalls that were distributed in the area of interest were approached, both in the district of Chapinero and Barrios Unidos. Of the 69 surveyed businesses, 64 of them or 93% are in the district of Chapinero, while 5, or 7% of the establishments corresponded to the district of Barrios Unidos.

The observation area covers a segment of 3 neighborhoods in the districts of Chapinero and Barrios Unidos. 65% of the informal economic activities are located in the Quinta Camacho neighborhood (45 businesses), 28% (19 businesses) in the Porciúncula neighborhood and 7% in sectors of the Concepción Norte neighborhood (5 businesses).

The results show that with respect to the relationship with the business, 81% (56 traders) of the people surveyed are stall owners, 13% (9 people) are helpers or collaborators and 6% (4 respondents) are renters of the street vending stalls.

In terms of age groups, 62% of those surveyed were between 27 and 59 years of age. Twenty-three percent are over 60 years of age and 13% are between 18 and 26 years of age. Sixty-five percent of those surveyed identified themselves as male and 35% as female.

From this result it can be concluded that most informal merchants have not initiated registration and validation procedures with the City and its competent entities. In this case, the entities are IPES (entity

attached to the Secretaría Distrital de Desarrollo Económico) who performs the characterization of the merchant and the Local Mayor's Office who validates the registration, since the street vendor is registered as an occupant of public space in a given district. Subsequently, once the registration is complete, the merchant can access the different commercial alternatives offered by IPES in the district, in addition to the training offer.

Regarding the characteristics of the commercial activities carried out by informal traders, the following table shows the distribution by category:

Table 13 Economic activities

Category	Merchants
Artisan	1
Shoeshiner	1
Vendors of products and/or services in general	60
Stationary kiosk vendor	4
Watchman and/or guard	2

Within the type of goods and/or services marketed by informal vendors, it was found that 32% sell packaged foods and packaged beverages. In second place, 29% sell meals that are prepared and served on site. Next are those in the "Others" category, which includes sellers of costume jewelry, bicycle repair services, and kitchen accessories, among others. Finally, there are informal economic activities that sell technological accessories, clothing and accessories as well as cell phone minutes, all three categories with 4%.

6.2.3.6 Property Acquisition and Resettlement

Empresa Metro de Bogotá (EMB) is the entity in charge of advancing the acquisiton process of the necessary land for the execution of the First Line of the Bogotá MEtro Project -PLMB, announced by District Decrees 318 of 2017 and 634 of 2017. Similarly, these processes of land acquisition and resettlement have been carried out with a General Resettlement Plan for the First Line of the Bogotá Metro, which has the no objection of the multilateral bank and adopted as Resettlement and Social Management Policy for the PLMB Project through Resolution 190 of 2021 posted on the website of Empresa Metro de Bogotá.

Likewise, it should be specified that of the one thousand four hundred twenty-one (1,421) properties required for the development of the PLMB project, the EMB is managing the acquisition of one thousand sixteen properties (1,016) and IDU within the framework of Integral Property Management Agreement No. 1021 of 2017 is managing the acquisition of four hundred five properties (405). The Comprehensive

Property Management Agreement No. 1021 of 2017 has as its object: "*Join technical, administrative and financial efforts to execute the Integral Media Management project required to acquire the necessary for the infrastructure of the First Line of the Bogotá MEtro (PLMB) in the following components: essential roads, yards, workshops and stations*".

6.2.3.7 Development trends

According to the results of the diagnosis presented above, it is evident that there are two areas on which social management should focus given the transformations that will occur during the construction of the underpass. These refer to the economic and commercial activity present in the sector and the implications of the traffic management plan during the development of the works, both of which are related and complementary.

In particular, the economic activity will be impacted by changes in the routes taken by pedestrians who are potential customers of the businesses. This is because most customers walk to the businesses, and this may negatively modify the sector's productivity during the construction stage, but which during the operation stage becomes a development opportunity due to the urban renewal processes that will attract investment opportunities and the placement of new businesses. For its part, the implementation of the traffic management plan generates changes in vehicular and pedestrian mobility that will temporarily modify vehicular access to the properties and pedestrian routes.

The following is a list of plans, programs and projects in the development stage, which are closely related to the First Line of the Bogotá Metro.

- 2020-2024 City Development Plan (Plan de Desarrollo Distrital)

The 2020-2024 City Development Plan "A new social and environmental contract for the Bogotá of the 21st century" is the road map developed by the Mayor's Office of Bogotá to fulfill all the goals established for the city over the next four years. This plan is composed of 17 strategic programs and 57 general programs[25].

The following is a list of the programs of the development plan, articulated with the project of the First Line of the Bogotá Metro.

- Programs related to the World Bank's safeguards "Gender Equality in Development".

Program 4. Prevention of exclusion for ethnic, religious, social, political and sexual orientation reasons.

Program 5. Promotion of equality, capacity building and recognition of women.

- Program related to the World Bank's safeguard "Environmental and Social Framework"

Program 28. Bogota, protector of its natural resources.

- Program related to the European Investment Bank Safeguard and Activated Standards

[25] Plan de Desarrollo Distrital 2020-2024. [sitio web]. Bogotá D.C; [Consultado: marzo 2021]. Disponible en: https://bogota.gov.co/sites/default/files/acuerdo-761-de-2020-pdd.pdf

"Rights and Interests of Vulnerable Groups".

Program 31. Protection and valuation of tangible and intangible heritage in Bogota and the region.

- Programs related to the construction, operation, and maintenance of the First Line of the Bogotá Metro. (PLMB).

Program 32. Urban revitalization for competitiveness.

Program 33. More trees and more and better public space.

Program 36. Management and sanitation of water bodies.

Program 42. Citizen awareness and culture for security, coexistence, and trust building.

Program 44. Self-awareness, respect, and care in public spaces.

Program 45. Safer and collectively built public space.

Program 49. Safe, sustainable, and accessible mobility. Its objective is to improve the travel experience of people in the city, to improve the quality of life, considering the components of cost, time, and quality. To achieve this, priority is given to road safety, sustainability, and accessibility for all citizens, as well as improving the conditions and quality of urban-regional public transportation.

This program is directly related to the contractual object of the PLMB, in its construction and operation phases.

Program 50. Subway Network. This program refers directly to the PLMB project. It establishes it as the structuring axis of passenger transportation in the city.

- Identification of the second level partial plans according to the Land Management Plan (POT) that are part of the Project's area of influence, as well as the nodes that are related to the PLMB.

In this specific case, the partial plans related to the work on the 72nd Street underpass that will occur in the Chapinero district (Chicó-Lago UPZ) and the Barrios Unidos district (Alcázares UPZ) are listed.

- Plan Parcial Plaza Chicó
- Plan Parcial Proscenio

In accordance with the above, the trend towards urban renewal promoted by the current Land Use Plan is evident, which considers the urban redevelopment of sectors that have deteriorated due to the physical conditions of the properties, the change of use and the age of the buildings. This, together with the recovery of the city in central sectors that have urban infrastructure, public and social services that can be used for the generation of high-rise housing combined with other uses associated with commerce, industry, education and health.

6.3 IDENTIFICATION, ANALYSIS AND EVALUATION OF SOCIAL IMPACTS

6.3.1 Identification of construction activities that generate social impacts

The work corresponds to the construction of an underpass along 72nd Street under Caracas Avenue, the purpose of which is to relieve congestion in this sector of the city prior to the start of the viaduct works. The length of the 72nd Street underpass will be 296 meters, the maximum depth will be 8 meters and the standard width will be 15 meters. The side of the smallest length of the box culvert will be approximately 100 meters long, 8 meters wide, and the space between the sides of the box culvert will be approximately 8 meters.

The excavation of the foundation pit will be carried out once the diaphragm walls and the different structures defined in the engineering studies are built. An excavator will be used to make symmetrical cuts in sections, partitions and layers. On the western side, it starts as a single structure that forks into two structures towards the eastern side.

The diagnosis was the basis for the impact identification and analysis exercise, for which the results of the characterization were classified according to the dimension to which they refer, producing a positive, negative or neutral evaluation for each characteristic, thus acquiring the condition of impact.

The systematization of the impact identification exercise made it possible to identify the changes in the territory that the project could generate in the short, medium and long term, information that was useful for determining the final impact matrix.

The following table presents the impact qualification criteria that will allow the ponderation of each of them, to produce by summation, the final evaluation. The information contained in this table is the result of the analysis of environmental impact methodologies, particularly the "Methodological Guide for the evaluation of environmental impact", proposed by Vicente Conesa Fernández (1993), from which the qualification criteria that are useful for evaluating impacts on the socioeconomic environment are taken.

Unlike the evaluation of the environmental component, which establishes a direct relationship between the detailed construction activities and the environmental impacts where the identification of negative impacts takes precedence, for the social component, the cause-effect relationship must be approached from factors that impact the lifestyles of the population in the vicinity of the works. These do not always correspond to the construction activities identified for the environmental component, and the mitigation perspective does not imply a modification in the construction activity, but rather in the generation of mechanisms of another order, even external ones. An example of this is the impact derived from air pollution with particulate matter or the generation of noise in the surroundings of the works, which in themselves are environmental impacts and their mitigation measures are found in the works themselves. For the socioeconomic component however, it implies the modification of lifestyles, the generation of information mechanisms and the establishment of agreements with the people who receive the impact. Because of this, the valuation of the attributes must be approached from a different perspective associated with social practices and their relationship with the development of the construction process.

From another perspective, the impacts generated by the work can also be positive for the involved community, therefore, it is necessary to identify and evaluate these positive impacts to generate favorable enhancement measures for them and for the success of the project.

The results of this evaluation are the basis for the adoption of mitigation, compensation, and management measures, which constitute the objectives of the Social Management Plan. In this sense, the identified impacts are translated into a dialectal correlation, in which on one side are the potentials and fragilities of the involved population and, on the other, the Social Management Plan. As a result of this process, it is expected that there will be a positive change in the ways of dealing with the situation that generates the potential impact on the population.

6.3.2 Identified impacts

The effects on the socioeconomic environment generated by the project were combined in the following analysis matrix, which includes all the observations and conclusions of the characterization exercise, from which the identification of impacts is derived.

It should be noted that in this exercise, positive alterations were identified that made it possible to evaluate the expected positive impacts in the short, medium and long term, which are shown in blue letters for greater understanding. Likewise, some conditions cited in the interactions are neutral or foreseen without it being possible to identify their rating prior to the project.

Table 14 Identified impacts

POTENTIAL IMPACTS ON THE ENVIRONMENT						
CATEGORIES	DIMENSIONS					
	SOCIAL / DEMOGRAPHIC	ECONOMIC	ENVIRONMENTAL	POLITICAL ADMINISTRATIVE	SPATIAL	CULTURAL
TERRITORIALITY	- Impact on social support and solidarity networks due to changes in the environment. - Alteration of family and social relationships. Generation of dynamics of socio-cultural exclusion and socio-spatial segregation.	- Alteration of survival mechanisms for grocery stores and small businesses. - Modification of the sector's employability dynamics (supply or loss of jobs). - Purchase of land for construction sites. - Private participation in the purchase of land due to urban renewal expectations.	- Transformation of environmental elements. - Reduction of the recycling trade and its related activities. - Modification of citizen security patterns. - Risk of generating respiratory and psychological diseases.	Loss of community references, meeting points, social landmarks. - Modification of leadership styles and community processes. - Generation of scenarios for citizen participation and dialogue.	Changes in the physiognomy and uses of the sector. - Establishment of new services and commercial activities during construction and operation.	- Transformation of places with historical traditions representative of the cultural identity of the neighborhoods. (Quinta Camacho) - Loss of cultural and patrimonial references of the city. - Transformation of traditional cultural references. Generation of new scenarios and socio-cultural references.
SOCIAL STRUCTURE	- Disarticulation of social and community organizations. - Modification of social programs for street vendors.	- Alterations in the economic dynamics of the sector. - Risk of job loss due to a decrease in sales. - Potential generation of employment and jobs at construction sites.	Creation of social and environmental organizations for the protection of trees.	- Strengthening of community management. - Modification of current power structures. - Changes in local governance.	- Loss of family patrimony due to alteration of tenancy and purchase of land. - Family conflicts arising from property acquisition.	- Loss of the historical memory of the place, neighborhoods and traditional activities. - Changes in the ways of living associated with changes in urban infrastructure.
INTERACTIONS WITH THE ENVIRONMENT	- Decrease in walkable public space. - Urban integration around the Metro concept for Bogotá.	Employment generation possibilities at the construction site Disappearance of others in the informal sector (commerce, recycling)	- Transformaciones en el ambiente urbano.	- Generation of interest in urban environmental issues (trees, birds, air quality, noise, etc.). - Emergence or strengthening of environmental social organizations	- Reorganization of the territory in terms of uses and exploitation of public space. - Changes in mobility and accessibility schemes	- Loss of the historical memory of the trade center, and the involved neighborhoods.

POTENTIAL IMPACTS ON THE ENVIRONMENT						
CATEGORIES	DIMENSIONS					
	SOCIAL / DEMOGRAPHIC	ECONOMIC	ENVIRONMENTAL	POLITICAL ADMINISTRATIVE	SPATIAL	CULTURAL
SPACE TIME	- Generational conflict due to the perception of changes in the ways of living. - Transformation of private space and habitable public space. - Modification of citizen behavior patterns.	- Economic reactivation of the sector. - Change in the economic vocation of some traditional sectors. - Emergence of investment opportunities and sources of employment.	- Interest in the urban renewal of the environment. - Greater environmental supply for the city.	- Urban development expectations associated with the construction of the PLMB.	-Improvement of urban facilities. - Determination of new land uses. - Valuation of the AID properties.	- Modification of cultural and historical references. Emergence of a new identity model for the sector. - Alteration of traditional cultural patterns.
URBAN STRUCTURE	- Articulation of existing urban elements and implementation of new ones and the consequent transformation of daily dynamics for residents and pedestrians. - Changes in mobility along main arterial roads and secondary neighborhood roads.	- Valuation of the sector due to the assumption of public and private investment in the area. - Speculation in land prices. - Revitalization of the commercial and productive sector.	- Transformación en el paisaje por cambio en los refrentes geográficos – Aparición de vectores de contaminación ambiental durante las obras.	-Generation of scenarios for participation and dialogue with surrounding communities and social organizations. - Emergence and strengthening of social organizations. - Generation of social control actions.	- Emergence of integrating elements of the sector's identity. - Consolidation of scenarios for cultural, recreational and sports activities.	- Resignification of heritage properties and places with historical significance for the city.
SOCIAL IMAGINARY	- Modification of traditional cultural and geographic references. - Alteration of the spectrum of beliefs, myths, truths and other imaginaries surrounding the meaning of the Bogotá Metro and integrated mobility.	- Perception of violation of people's property rights. - Speculation regarding land acquisition and its effects on the population. - Fear of impoverishment due to the possibility of land purchase caused by the construction of the PLMB.	- Hope for improvement in the security conditions of the sector. - Expectation of an increase in recycling activities and landowner activities in the area of influence. Expectation of inconvenience in the use of Transmilenio and intermunicipal transportation during construction.	- Conflicts of perception and interests between the communities, their leaders and district entities. - Perceived threat to landowners' patrimony. - Emergence of unconventional leadership. - Fear and insecurity regarding the effect of the changes, in relation to the idea of people's wellbeing.	- Alteration of traditional geographic references. - Loss or transformation of urban signifiers.	- Loss of historical references due to generational mutation. - Loss of the historical memory of the neighborhoods and the city's commercial center.

POTENTIAL IMPACTS ON THE ENVIRONMENT						
CATEGORIES	DIMENSIONS					
	SOCIAL / DEMOGRAPHIC	ECONOMIC	ENVIRONMENTAL	POLITICAL ADMINISTRATIVE	SPATIAL	CULTURAL
SUSTAINABILITY (ECONOMIC DYNAMICS)	- Modification of residents' survival strategies. - Dynamization of social processes that change people's daily lives. - Generation of employment and jobs at the construction site. - Alteration of income and income sources. - Disarticulation of social and family support networks. - Loss of institutional benefits and services for the vulnerable population (informal vendors).	- loss of recent investments in the properties subject to purchase or with commercial premises - Labor demand and generation of vacancies at all levels. - Attraction of private investment that will activate local commerce. - Revitalization of formal and informal trade flows. - Possibilities of insertion of current residents into the economic dynamics generated by the PLMB.	- Alteration of the perception of physical security, which will result in a lower flow of visitors and customers for businesses established prior to the project.	- Insertion of political-administrative elements useful for strengthening governance. - Opportunity to generate comprehensive strategies to control the influx of workers and gender segregation (labor influx).	- Generation of areas for the development of profitable economic activities. - Change of focused commercial zones (automotive industry). - Change in the vocation of land use, from residential to commercial (western side).	Impact on cultural activities associated with the BIC and SIC present in the territory and in the AID.

POSITIVE EFFECTS

NEGATIVE EFFECTS

The table below shows the impacts identified for the socioeconomic and cultural environment.

	COMPONENT	ASPECT	IMPACT
1	Environmental	Interaction with the surrounding environment and public health.	Illnesses generated by environmental impacts (noise and air)
2	Demographic	Interaction with the surrounding environment and public health.	Disease transmission by the generation of conditions that facilitate the transmission of Covid 19 and other infectious diseases.
3	Spatial	Territoriality	Disturbance of tranquility and safety due to changes in traffic. (Increase of vehicles, decrease of routes)
4	Spatial	Territoriality	Alteration of daily life, customs, and lifestyles.
5	Political	Social structure	Opposition of company's trade union movements or associated with public transportation or cargo vehicles.
6	Cultural	Social structure	Discrimination based on gender and gender identity, political affiliation, sex, ethnic origin, cultural, age, social status, religion, nationality.
7	Cultural	Social imaginary	Perception of the alteration in citizen security.
8	Economic	Sustainability	Generation of employment in the project
9	Spatial	Territoriality	Accidents involving workers, bystanders, and residents, and those resulting from structural accidents or vehicle overturns.
10	Spatial	Interaction with public services	Alteration in the provision of public utilities.
11	Spatial	Territoriality	Impact on vehicular and pedestrian mobility, which can lead to accidents, changes in travel times, and increased transportation costs.
12	Economic	Sustainability (economic dynamics)	Cambio en el nivel de ingresos en el área de influencia derivados de la modificación en las dinámicas del empleo.
13	Political	Social imaginary	Generación de expectativas respecto a las oportunidades e incidencias del proyecto.

	COMPONENT	ASPECT	IMPACT
14	Political	Social structure	ngthening of community participation scenar
15	Political	Intervention in the political-organizational structure	Changes in management and organizational capacity, social control mechanisms.
16	Political	Social imaginary	Generation of expectations regarding the opportunities and impacts of the project.
17	Political	Territoriaity	Irregular occupation of land acquired for the construction of the PLMB.
18	Cultural	Territoriality Cultural	Cultural transformations in the area of influence related to use and spatial and geographic references.
19	Archaeological/ heritage	Territoriality Cultural	Alteration of the nation's cultural and archaeological heritage.
20	Spatial	Territoriality Property acquisition	Changes in land occupation and population displacement
21	Political	Territoriality	Generation of conflicts of interest

Source: Metro Línea 1 – 2021

6.3.3 Rating of impacts

According to the impact identification matrix, 21 impacts on the socioeconomic environment are expected to be generated during the previous phase. Once scored, the consolidation was carried out according to the results of the importance value. The results obtained from the rating, by medium impacted, are presented below:

Tabla 1 Rating of the identified impacts for the socioeconomic environment

IMPACTS IDENTIFICATION				IMPACT RATING
ENVIRONMENT	COMPONENT	ASPECT	IMPACT	
Socioeconomic and cultural	Environmental	Interaction with the surrounding environment and public health.	Illnesses generated by environmental impacts (noise and air)	**MODERATE**

IMPACTS IDENTIFICATION				IMPACT RATING
ENVIRONMENT	**COMPONENT**	**ASPECT**	**IMPACT**	
Socioeconomic and cultural	Demographic	Interaction with the surrounding environment and public health.	Disease transmission by generating conditions that facilitate the transmission of Covid 19 and other infectious diseases.	**MODERATE**
Socioeconomic and cultural	Spatial	Territoriality	Tranquility and safety disturbance due to changes in traffic. (Increase of vehicles, decrease of routes)	**MODERATE**
Socioeconomic and cultural	Spatial	Territoriality	Alteration of daily life, customs, and lifestyles.	**SEVERE**
Socioeconomic and cultural	Political	Social Structure	Opposition of companies' trade union movements or associated with public transportation or cargo vehicles.	**MODERATE**
Socioeconomic and cultural	Cultural	Social Structure	Opposition of companies' trade union movements or associated with public transportation or cargo vehicles.	**MODERATE**
Socioeconomic and cultural	Cultural	Social Imaginary	Perception of the alteration in citizen security.	**SEVERE**
Socioeconomic and cultural	Economic	Sustainability	Employment generation in the project	**POSITIVE**
Socioeconomic and cultural	Spatial	Territoriality	Accidents involving workers, bystanders, and residents, and those resulting from structural accidents or vehicle overturns.	**MODERATE**
Socioeconomic and cultural	Spatial	Interaction with public services	Alteration in the provision of public utilities.	**SEVERE**
Socioeconomic and cultural	Spatial	Territoriality	Impact on vehicular and pedestrian mobility, which can lead to	**SEVERE**

IMPACTS IDENTIFICATION				IMPACT RATING
ENVIRONMENT	**COMPONENT**	**ASPECT**	**IMPACT**	
			accidents, changes in travel times, and increased transportation costs.	
Socioeconomic and cultural	Economic	Sustainability (economic dynamics)	Change in the level of income in the area of influence derived from the modification in employment dynamics.	**MODERATE**
Socioeconomic and cultural	Economic	Sustainability (economic dynamics)	Changes in the productivity of commercial activities in the area and influence.	**MODERATE**
Socioeconomic and cultural	Political	Social structure	Strengthening of community participation scenarios, emergence of community leaders	**POSITIVE**
Socioeconomic and cultural	Political	Intervention in the political-organizational structure	Changes in management and organizational capacity, social control mechanisms.	**POSITIVE**
Socioeconomic and cultural	Political	Social Imaginary	Generation of expectations regarding the opportunities and impacts of the project.	**POSITIVE**
Socioecic and cultural	Political	Territoriality	Irregular occupation of land acquired for the construction of the PLMB.	**MODERATE**
Socioeconomic and cultural	Cultural	Intervention in patterns or infrastructure of cultural interest	Cultural transformations in the area of influence related to use and spatial and geographic references.	**MODERATE**
Socioeconomic and cultural	Archaeological/ heritage	Interaction with archaeological wealth / cultural heritage	Alteration of the nation's cultural and archaeological heritage.	**SEVERE**

IMPACTS IDENTIFICATION				IMPACT RATING
ENVIRONMENT	**COMPONENT**	**ASPECT**	**IMPACT**	
Socioeconomic and cultural	Spatial	Property acquisition	Changes in land occupation and land use, which generate population displacements	**CRITICAL**
Socioeconomic and cultural	Political	Territoriality	Generation of conflicts of interest	**SEVERE**

The classification of the impacts is presented in a consolidated form in the following table:

No.	CLASSIFICATION	AMOUNT
1	COMPATIBLE	0
2	MODERATE	10
3	CRITICAL	1
4	SEVERE	6
5	POSITIVE	4

6.3.4 Impacts analysis

The following is a summary table of the socioeconomic impacts for which the corresponding management measures will be implemented through Social Management Programs:

IMPACT GENERATORS	IDENTIFIED IMPACTS	POPULATION INVOLVED WITH VULNERABILITY	MANAGEMENT MEASURES	ASSOCIATED PROGRAMS
. Implementation of the transitional and definitive PMT . . Increase in the traffic of vehicles and construction machinery, emitters of gases and pollution and generators of noise and particles in the environment. . Increased traffic on detour roads with greater emphasis on 72 Street. . Movement of machinery for the formation of the platform. . Excavations	Illnesses generated by environmental impacts (noise and air)	. Population that uses or resides in the properties located on 72nd Street. . Passers-by (pedestrians, bicycle users, motorcyclists). Workers linked to the project who work at the construction site and occasional workers (371 people on average during the construction stage).	. Clear, accurate and timely information. . Articulation with the mobility, social integration and health and culture secretariats. . Socialization of the PMT. . Educational programs for safe mobility. . Timely and truthful attention to requests, complaints, and claims (PQRS) received regarding this impact.	Public information and communication program Metro escucha, Metro resuelve program Citizen participation program Inter-institutional articulation program for the construction of urban life of the PLMB
. Agglomeration of workers in the intervention area who are transmitters of diseases and in particular of Covid-19. . Contact of workers with people outside the worksite (family and community).	Risk of disease transmission due to the creation of conditions that facilitate the transmission of Covid and other infectious diseases.	. Workers linked to the project who work in the depot and occasional workers (371 people on average during the construction phase).	. Implementation of strict Covid-19 protection measures . Communication and disclosure of information regarding protection measures. . Generation of communication pieces to reinforce safe behaviors.	Public information and communication program Metro escucha, Metro resuelve program Citizen participation program Inter-institutional articulation program for the construction of urban life of the PLMB
. Implementación del PMT . Aumento de tráfico en el entorno. - Circulación de vehículos hacia y desde la obra. Riesgo de accidentalidad por reducción de áreas peatonales transitables	Generación de empleo en el proyecto	. Población desempleada y buscado trabajo transeúnte y residente del área de influencia, trabajadores del sector, vendedores estacionarios y ambulantes.	. Generación y divulgación de la política de vinculación laboral . Controlar y verificar el cumplimiento de la política por parte de los contratistas y del Concesionario. . Generar un único canal de recepción de solicitudes de empleo a través del programa de empleabilidad del Distrito	Programa de inclusión sociolaboral Programa de manejo para el influjo laboral Programa de información y comunicación pública Programa Metro escucha, Metro resuelve. Programa de influjo laboral
. Announcement of start of construction works	Alteration of daily life, customs and lifestyles.	. Residents of the properties adjacent to 72nd Street.	. Inform the community about the implementation of the PMT.	Public information and communication program

IMPACT GENERATORS	IDENTIFIED IMPACTS	POPULATION INVOLVED WITH VULNERABILITY	MANAGEMENT MEASURES	ASSOCIATED PROGRAMS
. Demand for unskilled labor for the construction works . . Demand for complementary services such as food and beverages in the vicinity of the construction site . . increase of environmental factors (noise, vibration, dust).		. Residents or occupants of offices and premises of the AOD with greater strength on 72nd Street.	. Generate communication pieces with preventive information to take control measures . Periodic meetings with key social actors such as merchants or by blocks with residents. . Socialize through announcements, the communication channels to raise PQRS, and the attention procedure.	Metro escucha, Metro resuleve program Traffic management plan Sustainable mobility culture program.
. Working conditions . . Notice of commencement of work . . Opening of bids for contracting of vehicles . . Compensation plan and benefits associated with the contracting process.	Opposition of companies' trade union or associated with public transport or cargo vehicles.	Concessionaire's workers Vehicle company workers Associated and unionized public transportation drivers	. Multilateral banking safeguards training and education . Code of Conduct Training and Implementation . Enforcement of traffic regulations . . Socialization of PMAS social programs	Sustainable mobility culture program Traffic management plan Public information and communication program Metro escucha, Metro resuelve program
Hiring of labor . Announcement of commencement of work. . Traditional sexist cultural practices. . Emergence of organizations for the defense of the LGTBI community. . Normative framework for the protection of the rights of the population with a differential approach .	Discrimination based on gender and gender identity, political affiliation, sex, ethnic origin, cultural, age, social status, religion, nationality.	. LGTBI community population . Conglomerates of foreigners residing in the AID. . Women . Vulnerable population . . Organized communities .	. Socialize the code of conduct and follow up on its strict compliance. . Develop employability protocols that consider the differential approach and the inclusion of people in vulnerable conditions. . Guarantee compliance with the 10% hiring of female personnel. . Guarantee compliance with the hiring of 20% of unskilled labor residing in the AID. . Generate spaces for dialogue with organized communities regarding differential conditions .	Public information and communication program Metro escucha, Metro resuelve program Sustainable mobility culture program Program for the construction of the urban fabric of PLMB Citizen empowerment program for the construction of urban life for PLMB

IMPACT GENERATORS	IDENTIFIED IMPACTS	POPULATION INVOLVED WITH VULNERABILITY	MANAGEMENT MEASURES	ASSOCIATED PROGRAMS
			. Reach integration and participation agreements with these social groups . . Negotiate with the corresponding entities to support the actions of the differential groups.	
. Increased traffic . . Installation of enclosures and signage . . Conformation of the working platform. . Increase of street and stationary vendors.	Perception of the alteration of citizen security	. Population that uses or resides in the properties adjacent to 72nd Street. . Passers-by (pedestrians, bicycle users, motorcyclists) who travel along the AID. . Workers linked to the project who work at the construction site and occasional workers (370 people on average during the construction phase).	. Generate security fronts with the help of the local police . . To duly inform about aspects of theft, harassment, or abuse prevention. . Generate preventive signage at the 72nd Street and Caracas Avenue underpass for pedestrians and bicycle users. Establish inter-institutional agreements with the local police, the secretary of government to implement the program of coexistence managers and constant patrols by the police.	Public information and communication program Metro escucha, Metro resuelve program Traffic management plan Sustainable mobility culture program

IMPACT GENERATORS	IDENTIFIED IMPACTS	POPULATION INVOLVED WITH VULNERABILITY	MANAGEMENT MEASURES	ASSOCIATED PROGRAMS
. Start of construction works . Machinery movement . Lack of control of passers-by in the vicinity of the construction site . . Machinery and cargo vehicle traffic . . Presence of street vendors and commercial premises. . Increased traffic . Implementation of the PMT	Accidents involving workers, bystanders and residents and those resulting from structural accidents or vehicle overturns.	. Population that uses or resides in the properties adjacent to 72nd Street. . Passers-by (pedestrians, bicycle users, motorcyclists). Workers linked to the project who work at the construction site and occasional workers (370 people on average during the construction stage).	. Implementation of safety protocols in the workplace . . Guarantee that workers are provided with the protective elements, tools and work equipment to carry out their work. . Generate pedagogical activities to reinforce behaviors for workers on site. . Appropriately signpost the construction site and its surroundings. . Develop educational activities for pedestrians and bicycle users to avoid accidents.	Traffic management plan Public information and communication program Metro escucha, Metro resuelve program Transit management plan Sustainable mobility culture program. Program for occupants of public space - informal merchants.
. .Movement of electric power networks . . Movement of dry and aqueduct networks. . Increased heavy traffic and detours that may disrupt or delay garbage collection services .	Alteración en la prestación de los servicios públicos domiciliarios	. Resident population in the vicinity of the construction site, Quinta Camacho, Espartillal, Porciúncula, Colombia, Santa Sofía neighborhoods.	. Revise the information and disclosure protocol for public utilities . . Review the garbage collection schedule to avoid generating traffic problems in the area that impede the provision of the service. . Implement communication activities in the AID to inform about modifications in the provision of public services, temporary suspension, or unforeseen damages. . Socialize through announcements, the communication channels to raise PQRS, and the attention procedure.	Public information and communication program Metro escucha, Metro resuelve program Traffic management plan Sustainable mobility culture program

IMPACT GENERATORS	IDENTIFIED IMPACTS	POPULATION INVOLVED WITH VULNERABILITY	MANAGEMENT MEASURES	ASSOCIATED PROGRAMS
. Implementation of the PMT . Increased traffic on 72 Street, Avenida Caracas, and surrounding secondary streets . . Vehicle circulation to and from the construction site .	Impact on vehicular and pedestrian mobility. Road accidents. Changes in travel times. Increase in transportation costs. Large and definitive PMT.	Property Owners (Residents and Tenants) Passers-by, Workers in the sector. Bicycle users,	. Inform the community about the implementation of the PMT. . Generate communication pieces with preventive information to take control measures . . Periodic meetings with key social actors such as merchants. . Socialize through announcements, the communication channels to raise PQRS, and the attention procedures.	Public information and communication program Metro escucha Metro resuelve program Traffic management plan Sustainable mobility culture program
. Implementation of the transitory and definitive PMT . . Transit of heavy vehicles that emit gases and pollution and generate noise and particles in the environment . . Increased traffic in the area surrounding the construction site and in the detour sectors foreseen in the TMP. . Movement of machinery . Excavations.	Changes in the productivity of commercial activities in the area of influence.	. 71 merchants located on 72nd Street. And 157 in the AID. 70 informal stationary merchants.	. Socialize the PMT with merchants . . Permanently inform about reactivation and protection measures for formal and informal commerce in the event of environmental impacts that may affect their commercial activity. . Participation in the implementation of the PMT.	Management program for the economic sustainability of commerce Traffic management plan Sustainable mobility culture program Infrastructure and third-party asset protection program "Met Buen Vecino". Public information and communication program Metro escucha, Metro resuelve program

IMPACT GENERATORS	IDENTIFIED IMPACTS	POPULATION INVOLVED WITH VULNERABILITY	MANAGEMENT MEASURES	ASSOCIATED PROGRAMS
. Announcement of commencement of construction. . Increased traffic in the sector due to PMT detours and closure of 72nd Street . . Implementation of the PMT. Impact on commercial activity.	Strengthening of community participation scenarios, emergence of community leaders	. Residents of the intervention sector Passers-by, motorized and vehicular citizens.	. Generate dialogue spaces and consultation with grassroots organizations with presence in the territory. . Form the Zonal Participation Committee . Identify local grassroots organizations. . Promote citizen participation . . Encourage the creation of citizen oversight organizations.	Program for the construction of the urban fabric of PLMB Public information and communication program Metro escucha Metro resuelve program Citizen empowerment program for the construction of urban life for PLMB
. Project announcement . . Disclosure of construction information . . Commencement of construction activities . . Knowledge of the project by interested organizations .	Changes in management and organizational capacity, resulting in the activation of social control mechanisms.	. Existing social organizations. . Homeowners and residents . Merchants . Educational institutions in the sector . . Cargo drivers	. Implementation of the communications plan . Regular meetings with key stakeholders . . Socialize through announce,emts, the communication channels to raise PQRS, and the attention procedure.	Public information and communication program Metro escucha, Metro resuleve program Program for the construction of the urban fabric of PLMB Citizen empowerment program for the construction of urban life for PLMB
. Announcement of commencement of work . Demand for unskilled labor for the construction of the 72nd Street and Caracas Avenue interchange. . Demand for complementary services . . Vehicle traffic to and from the construction site	Generation of expectations regarding the opportunities and impacts of the project.	. Social organizations of the environment. . Bystanders . Residents of the localities and UPZs involved.	. Implementation of the communications plan . Regular meetings with key stakeholders . . Socialize through announcements, the communication channels to raise PQRS, and the attention procedure.	Public information and communication program Metro escucha, Metro resuelve program Program for the construction of the urban fabric of PLMB Citizen empowerment program for the construction of urban life for PLMB
. Land acquisition . Resettlement program .	Irregular occupation of land acquired for the construction of the PLMB.	. Construction contractor . Concessionaire . . Bystanders .	Implementation of the communications plan	Public information and communication program

IMPACT GENERATORS	IDENTIFIED IMPACTS	POPULATION INVOLVED WITH VULNERABILITY	MANAGEMENT MEASURES	ASSOCIATED PROGRAMS
. Compensation payments and relocation . . Lack of monitoring and control of the delivered properties.		. Owners .	. Regular meetings with key stakeholders . . Socialize through announcements, the communication channels to raise PQRS, and the attention procedure. Generate control mechanisms for security in the area.	Metro escucha, Metro resuelve program Resettlement program
Enclosure and signaling of construction site . Formation of the work platform . Moving or felling trees Construction of camps	Cultural transformations in the area of influence related to use and spatial and geographic references.	Population residing in the surrounding neighborhoods. Population of workers who have their workplace in the AID. Civil society organizations Students	. Clear, truthful and timely information on the work to be carried out. . Generation of educational activities with specific population groups to generate ownership of the work.	Public information and communication program Metro escucha, Metro resuelve program Program for the construction of the urban fabric of PLMB. Citizen strengthening program for the construction of urban life for PLMB.
Start of construction . Excavations and removal of sidewalks and roadway . . Generation of air pollutant vectors. Vibrations	Alteration of the nation's cultural and archaeological heritage.	Civil society organizations Environmental institutions	Clear, truthful and timely information on the work to be carried out. . Generation of educational activities with specific population groups to generate ownership of the work.	Public information and communication program Metro escucha, Metro resuelve program. Program for the construction of the urban fabric of PLMB. Citizen strengthening program for the construction of urban life for PLMB. Protection of cultural heritage Program to protect the infrastructure and property of third parties "Metro Buen Vecino"

IMPACT GENERATORS	IDENTIFIED IMPACTS	POPULATION INVOLVED WITH VULNERABILITY	MANAGEMENT MEASURES	ASSOCIATED PROGRAMS
Property acquisition Population transfer processes Demolition of properties	Changes in land occupation and population displacement	Homeowners Residents	Implementation of compensatory measures, Accompaniment in land management. Resettlement support	Resettlement program Public information and communication program Metro escucha, Metro resuelve program
. Announcement of the start of construction . Demand for unskilled labor for the works. . Demand for complementary services . Vehicle traffic to and from the construction site . Implementation of the participation strategy . . Non-conformity of the surrounding community .	Increase in conflicts of interest	. Social organizations . Homeowners . . . Residents and occupants . . Workers in the sector .	. Implementation of the communications plan . . Periodic meetings with specific social actors. . Socialize through announcements, the communication channels to raise PQRS, and the attention procedure.	Public information and communication program Metro escucha, Metro resuelve program Infrastructure and property protection program for third parties "Metro buen vecino" (Metro as a good neighbor). Citizen empowerment program for the construction of urban life for the PLMB

6.4 SOCIAL MANAGEMENT PLAN PROGRAMS

The objective of the social programs during the execution of the activities in the depot is to define the management processes and preventive, corrective and mitigation measures for the impacts and risks identified in each activity of the project.

Through the analysis of the identified impactsfor the execution of the preliminary phase activities of the First Line of the Bogotá MEtro, the Social Management Programs were determined, which are listed below:

Table 15 Social Management Plan Programs

Environment	Social Management Plan	Code
SOCIOECONOMIC	Public information and communication program	PM_SE_01
	Metro escucha, Metro resuelve program	PM_SE_02
	Citizen participation program	PM_SE_03
	Citizen empowerment program for the construction of urban life of the first Metro line	PM_SE_04
	Inter-institutional articulation program for the construction of urban life of the First Metro Line of Bogotá	PM_SE_05
	Sustainable mobility culture program	PM_SE_06
	Program for the protection of infrastructure and third-party assets "Metro Buen Vecino"	PM_SE_07
	Social and labor inclusion program	PM_SE_08
	Program for the construction of the urban fabric of the First Line of the Bogotá Subway.	PM_SE_09
	Traffic management program	PM_SE_010
	Labor Influence Management Program	PM_SE_011
	Management program for the economic sustainability of formal commerce	PM_SE_012
	Management Program for the Protection of Cultural Heritage	PM_SE_013
	Management program for occupants of public space	PM_SE_014

Fuente: Metro Línea 1, 2021

6.5 MONITORING AND FOLLOW-UP PLAN

The monitoring and follow-up plan will evaluate the effectiveness of the management measures planned to address the social impacts generated by the work on the 72nd Street and Avenida Caracas underpass, in order to monitor the strategies adopted in each of the programs and determine in a timely manner the adjustments required for the planned management, in accordance with the obtained results

For each of the programs, specific follow-up indicators were established to measure management in each case, which are monitored with a unified system for measuring indicators, which are included in a follow-up and monitoring matrix where all programs and their activities are listed to facilitate periodic follow-up of each program.

INDEX	VARIABLES	INDICATOR	INDICATOR INTERPRETATION
COMPLIACE	AE = Executed activities AP = Planned activities	$\frac{AE}{AP}X100$	At the planned time With the expected people At the expected place With the budgeted resources
	TPP = Total participants TPC = Total persons summoned	$\frac{TPP}{TPC}X100$	
	FE = Execution dates FP = Scheduled date	$\frac{FE}{FP}X100$	
QUALITY	CE = Expected content SC = Satisfaction with content	$\frac{SC}{CE}X100$	Accuracy, clarity and relevance of the content. Impact of results (survey results).
	NCE= Number of sent communications MP= Published communications	$\frac{NCE}{MP}X100$	Evidence of whether the sent information was published by the stipulated means.
SATISFACTION	PS = Satisfied persons PP = Participating persons.	$\frac{PS}{PP}X100$	Based on perceived need Scope of functional objectives
COVERAGE	TOP = Total Participating Organizations TOI = Total Identified Organizations	$\frac{TOP}{TOI}X100$	Increased impact on target population
	TASPT = Total Social Actors Participating by Segment TASIT = Total Social Actors Identified by Segment	$\frac{TASPT}{TASIT}X100$	
	TPI= Total number of persons impacted (by readership or listeners) PAID= AID population	$\frac{TPI}{PAID}X100$	
	NIE= Number of Forms Delivered	$\frac{NIE}{NIP}X100$	

	NIP= Number of Planned Printouts		
	NI = Number of interactions NV= Number of Views	$\frac{NI}{NV}X100$	

The following mechanisms have been established to coordinate follow-up and monitoring activities:

- Weekly meetings to follow up on construction and consulting contracts to monitor the social component.
- Weekly comprehensive meetings with the participation of all social teams to review goals and adjust procedures.
- Meetings to address special topics.
- Management control and follow-up through weekly, monthly and semi-annual monitoring reports.
- Delegation of a specialized professional from the concessionaire to exercise control and follow-up of each component according to its specialty, in all contracts and work fronts.

The concessionaire submits monthly progress reports on the execution activities of this Social Management Plan, which is structured according to the developed activities that make up each of the programs. These periodic reports are submitted to the interventoría, who will forward them to Empresa Metro de Bogotá to be socialized with the Multilateral Bank, according to the agreements.