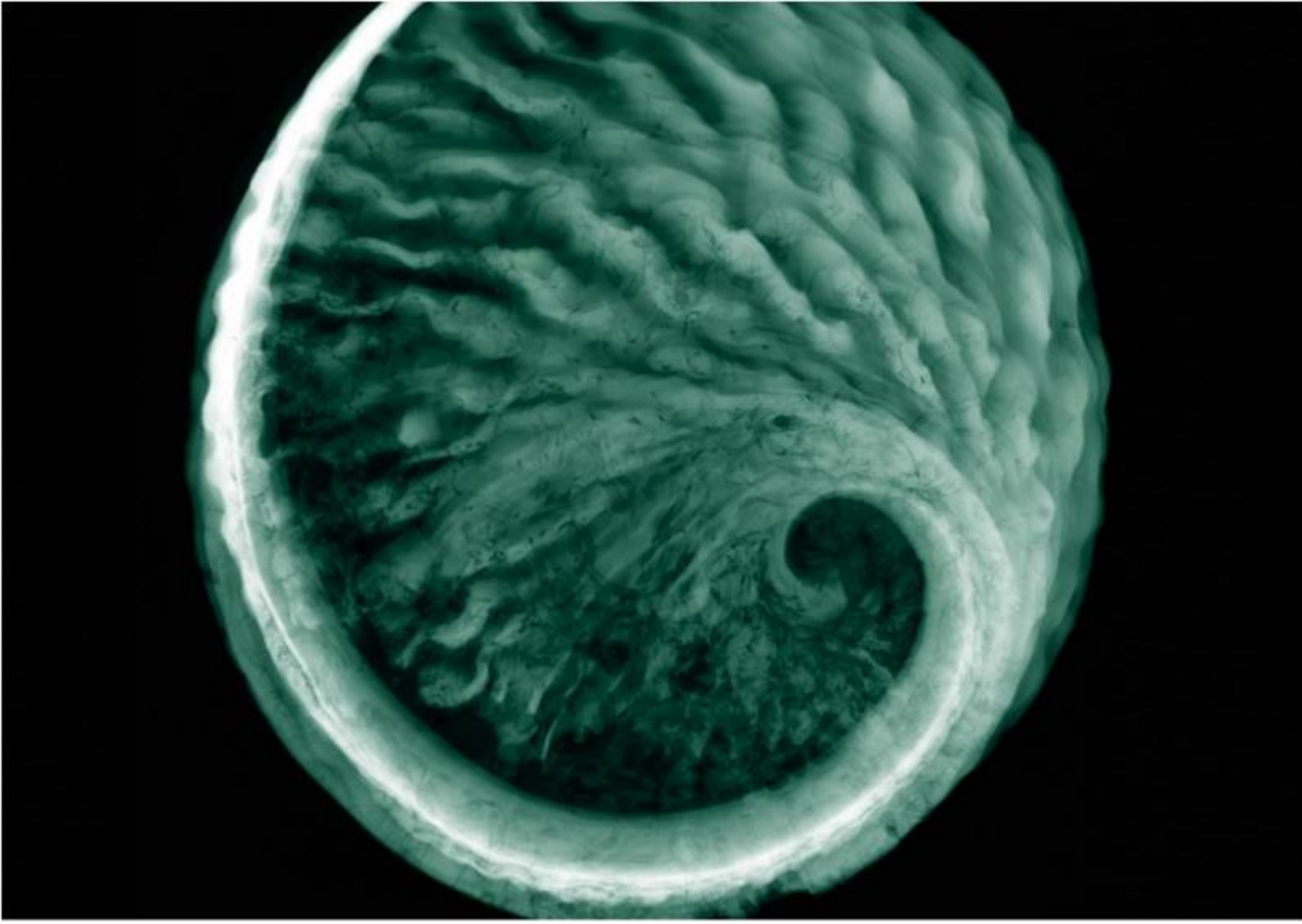

Environmental and Social Impact Assessment – ESIA

Jaguaré 360º Project

29 June 2021

Project No.: 0565997

The business of sustainability

ERM

Signature Page

29 June 2021

Environmental and Social Impact Assessment – ESIA

Jaguaré 360º Project

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1. INTRODUCTION

Peninsula Investments Group (PEN) hired ERM BRASIL LTDA (ERM) to conduct an Environmental and Social Impact Assessment (ESIA) for the real estate project Jaguaré 360º, to be located in west São Paulo (SP), in the Jaguaré district.

The ESIA supports the development of an Environmental and Social Management Plan (ESMP) to manage the project's impacts.

The Jaguaré 360º project will be located at 1485 Jaguaré Avenue, São Paulo (SP). The project comprises 2,903 residential units distributed in 27 ten-story buildings, in a site of 56,578 m².

The ESIA and the ESAP aim at providing a socio-environmental framework for the project management both in the construction and in the occupancy phases, as well as compliance with Brazilian legal requirements for real estate projects related to environmental permitting and controls, occupational health and safety aspects and some urban planning and development.

This report presents the following contents:

- Section 1 – Introduction: presents the objectives, methods and limitations of the ESIA;
- Section 2 – Methods: presents the methods used in each of the ESIA steps;
- Section 3 – Project Description: presents the project's construction and occupancy expected aspects, related to the characteristics of the lots, condominiums and units, the schedule and activities of the construction phase, as well as technologies and workforce to be implemented in the construction phase;
- Section 4 – Legal Requirements: presents a high level review of the Brazilian and the city of São Paulo's legal requirements for real estate and construction projects related to environmental management, occupational health and safety and urban planning and development;
- Section 5 – Relevant Environmental and Social Aspects: presents the project's area of influence, as well as relevant data on the environmental and social aspects of this area that is the baseline for the ESIA;
- Section 6 – Stakeholder Identification and Consultation: presents the results of the stakeholder consultation performed as a step of the ESIA;
- Section 7 – Environmental and Social Impact Assessment (ESIA): presents a combined assessment of the project's features in relation to the environmental and social aspects of the project's area of influence for the identification and assessment of environmental and social impacts;
- Section 8 – Environmental and Social Management Plan (ESMP): presents the project ESMP for the impacts identified in the ESIA, as well as general recommendations for the management of construction projects based on the International Finance Corporation (IFC) Environmental and Social Management System Implementation Handbook. The Jaguaré 360º project ESMP comprises the following management plans:
  - Environmental Management Plan;
    - Waste Management Plan;
    - Hazardous Materials Management Plan;
  - Health and Safety Management Plan;
  - Emergency Prevention and Response Management;
  - Human Resources Management Plan;
  - Social and Community Management Plan (Stakeholder Engagement); and

- Occupancy and Safety Building Plan.

- Section 9 – Conclusion and Recommendations: presents a summary of the environmental and social aspects of the project's area of influence, in correlation with the expected impacts and the environmental and social management measures provided for in the ESMP, and establishes a prognosis for the project installation.

1.1 Use of This Report

The client acknowledges that this report was intended for its exclusive use and that of its authorized representatives, and agrees not to use or reproduce ERM reports or correspondence, in whole or in part, for promotional purposes, or for the preparation of any brochure or other marketing material, without the ERM's prior consent.

In addition, the client must agree that its advertising or marketing materials, which contain information presented in this report, do not mention or imply the name of ERM without ERM's prior consent.

1.2 Limitations

This report is based on the application of scientific principles and professional judgment of certain facts as a result of technical and subjective interpretations. The professional judgments expressed in this document are based on the scenario identified in a given time and space (portrait) based on the facts currently available within the limits and availability of the data, scope of work, budget and proposed schedule, as presented in the technical proposal.

The conclusions reported in this document should be considered as guidelines, and not necessarily as actions to be taken, except when explicitly specified as such. ERM makes no warranties, express or implied, without limitation, as to usefulness or convenience for particular purposes other than those expressed in the technical proposal. In addition, the information provided in this report should not be interpreted as legal advice. In addition, the following limitations should be considered:

- The project's description is based solely on documents and information provided by PEN. Thus, ERM is not responsible for any changes to the executive project that may alter the impact assessment presented in this report;
- The environmental and social characterization of the project's area of influence is entirely based on secondary data;
- The stakeholder consultation process that was carried out as a step of the ESIA is based on a preliminary exercise of stakeholder identification applicable to the development phase of the project.; and
- The stakeholder consultation process that supports the ESIA is not exhaustive and aims to establish an overview of the expectations of stakeholders in the current phase of the project.

2. METHODS

The following documents referenced the development of the ESIA and the ESMP:

- International Finance Corporation – Performance Standards (2012);
- International Finance Corporation - Environmental and Social Management System Implementation Handbook – Construction (2014); and
- Environmental Resources Management (ERM) – The ERM Impact Assessment Standard v1.1 (2012).

The methods used in the development of the ESIA and the ESMP are presented as follows.

- Project Description: tThe project description was based on documents and information provided by PEN, referring to:
  - Site dimensions and lots where the buildings will be installed;
  - Number and layout of the housing units;
  - Expected occupancy density;
  - Parking lots;
  - Expected workforce to be employed in the construction phase;
  - Schedule of the construction phase; and
  - Expected activities and technologies to be employed in the construction phase.
- Legal Requirements
  - Survey of official and public data sources on the main laws and regulations applicable to projects, in the following areas: environmental permitting and controls, occupational health and safety, urban planning and development.
- Project Area of Influence
  - A description of the project's area of influence defined as a 500m radius around the site, based on secondary data by official public sources and government agencies, according to the following environmental and social aspects:
    - Environmental aspects (hydrography and water supply, geology, green areas);
    - Road system;
    - Occupation history;
    - Land use and relevant urban aspects;
    - Infrastructure;
    - Demography;
    - Economic activities;
- Stakeholder Identification and Consultation
  - A description of the project's stakeholders' profile and prioritization as well as the results of the interviews with selected key stakeholders to assess their perceptions on the project's area of influence from an environmental and social point of view and their prospects regarding the project's installation;
- Environmental and Social Impact Assessment;

- The environmental and social impacts of the project are identified and assessed according to the ERM Impact Assessment Standard (2012) in a simplified version applicable to small-scale projects, which describes the impacts according to the following attributes:
  - **Nature**: *Positive* (impacts that positively alter one or more environmental or social aspect within the project's area of influence) or *Adverse* (impacts that adversely alter one or more environmental or social aspect within the project's area of influence);
  - **Scale:** The estimated size of the impact (e.g., the size of the area damaged or impacted, the fraction of a resource that is lost or affected), assessed as *Minimum*, *Low*, *Medium* or *High*;
  - **Frequency:** A measure of the constancy or periodicity of the impact, assessed as *Remote*, *Rare*, *Occasional*, *Frequent* or *Constant*; and
  - **Significance:** Describes the degree of change that the impact is likely to impart upon the resource/receptor. The Significance is determined as the product of the interaction of Scale and Frequency, as presented in **Table 2.1**:

Table 2.1 - Impact Significance determination

Scale	Frequency	Significance
Minimum	Rare	Negligible
Minimum	Occasional	Minor
Minimum	Frequent	Minor
Low	Rare	Minor
Low	Occasional	Minor
Medium	Rare	Minor
Minimum	Constant	Moderate
Low	Frequent	Moderate
Medium	Occasional	Moderate
High	Rare	Moderate
Low	Constant	Major
Medium	Frequent	Major
High	Occasional	Major
Medium	Constant	Major
High	Frequent	Major
High	Constant	Catastrophic

  - The definitions of the impacts Significance are as follows:
    - *Negligible:* The resource/receptor will essentially not be affected in any perceptible way or is indistinguishable from natural background variations;
    - *Minor:* The resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation);
    - *Moderate:* The impact is within applicable standards (law and/or regulation), but falls somewhere in the range of a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit;
    - *Major:* A major level impact relates to one of the two situations: either it promotes changes in environmental aspects above standards established by law, or it

changes a socioeconomic aspect on a scale not observed in the current situation in the project's area of influence (for which there are no legal standards);

- *Catastrophic:* The impact significantly exceeds an accepted limit or standard and presents material risk to the lives of the stakeholders (neighbors, workers, etc.);
- According to the ERM's Impact Assessment Standard, positive impacts **should not** have their Significance assessed. It is sufficient to indicate that the project will result in a positive impact, without characterizing the exact degree of positive change likely to occur; and

- After the assessment, the impacts were plotted in a matrix (**Section 5**) and ordered according to the significance criterion, which allows the prioritization of actions that must be undertaken to manage the impacts identified in the construction and occupancy phases. **Figure 2.1 presents the standard impact assessment matrix.**

Figure 2.1 - Impact Assessment Matrix

SCALE	RARE	OCCASIONAL	FREQUENT	CONSTANT
HIGH	MODERATE	MAJOR	MAJOR	CATASTROPHIC
MEDIUM	MINOR	MODERATE	MAJOR	MAJOR
LOW	MINOR	MINOR	MODERATE	MAJOR
MINIMUM	NEGLIGIBLE	MINOR	MINOR	MODERATE

FREQUENCY

- Environmental and Social Management Plan, which includes the Social and Community Management Plan (Stakeholder Engagement).

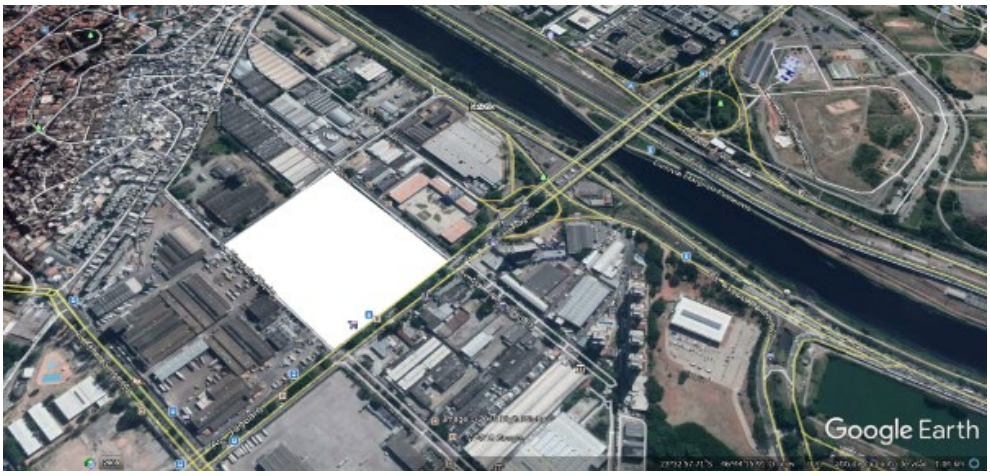
Following the identification and assessment of the impacts in terms of their magnitude and in light of the project's characteristics and its reflexes on the socioeconomic and environmental dynamics of the area of influence, management measures were designed in order to reduce the project's negative effects and potentiate the positive ones.

3. PROJECT DESCRIPTION

The project characterization was prepared based on information provided by the client, thus highlighting the construction and occupation activities with the greatest potential to generate impacts in the project's area of influence.

The Jaguaré 360º Project is located on the Jaguaré Avenue, an important avenue in west São Paulo's road system, 5 km from the Faria Lima region (the main central business district of São Paulo) and within a 1 km radius of both the city's largest university campus (University of São Paulo - USP) and the second largest park (Villa Lobos Park). **Figure 3.1** presents the site location.

Figure 3.1 - Site location



Source: PEN. 2020.

The project will consist of seven condominiums built on a 56,578.00 m² site. When finished, the project will have 27 buildings with 10 floors each, 2,903 residential units, with an average unit size of 39.00 m² and 1,742 parking spaces.

Leisure facilities includes, for each condominium a multipurpose court, plaza, gym, lounge, playground, bicycle parking, and space for events.

Figure 3.2 presents a conceptual image of the project and **Figure 3.3** presents a blueprint overview of the project.

Figure 3.2 - Conceptual image of the project

Source: PEN. 2020.

Figure 3.3 - Blueprint overview

Source: PEN. 2020.

The project's site is surrounded by the polygon formed by the limits of the Jaguaré Ave., the Onófrio Milano Ave., the General Vidal Ave. and the Torres de Oliveira Ave., as shown in **Figure 3.3**.

Table 3.1 presents the total number of units according to their distribution by condominium and sizes.

Table 3.1 - Units by condominiums and sizes

Condominium	Unit sizes (sqm)					Total			Buildings	Parking spaces
	37.77	*39.91*	*40.7*	*41.6*	*42.29*	*Units*	*Sqm*	*% of Total*		
1	100	68	18	48	19	253	10,024	9	3	150
2	200	90	54	54	18	416	16,351	14	4	250
3	200	90	54	54	18	416	16,351	14	4	250
4	200	90	54	54	18	416	16,351	14	4	250
5	200	90	54	54	18	416	16,351	14	4	250
6	200	90	54	54	18	416	16,351	14	4	250
7	200	198	58	94	18	570	22,573	20	4	340
Total	**1,300**	**716**	**346**	**412**	**20**	**2,903**	**114,353**	**100**	**27**	**1,742**

Source: PEN. 2020.

3.1 Global sales value and units prices

The project's estimated global sales values is BRL 667,690,000 (USD 121,398,181)[1]. The Jaguaré 360º average unit sales price is estimated at BRL 230,000 (USD 41,818), lower than the price cap of the *Minha Casa Minha Vida* Program (PMCMV) of BRL 240,000.

The PMCMV, by *Caixa Econômica Federal* (Brazil's Federal Saving and Loan Bank) subsidizes the acquisition of housing for families with monthly income of up to BRL 1,800.00 (USD 327.00) and facilitates the conditions of access to housing for families with income of up to BRL 9,000.00 (USD 1,636.00).

Subsidies can reach up to 90% of the property value for families with income of up to BRL 1,800.00 (USD 327.00), and up to BRL 29,000 for families with income of up to BRL 4,000.00 (USD 727.00).

However, for all income groups up to BRL 9,000.00 (USD 1,636.00), the program offers lower mortgage rates than those observed in the market.

3.2 Fixed and Circulating Population

The project is expected to present a fixed population of 5,806 people, and 270 of circulating population (maintenance and security professionals, among others).

3.3 Water Heating and Air Conditioning

The project will have hot water supply using gas heating to generate thermal energy. In the residential units, a thermal transfer kit will be installed, equipment responsible for generating hot water for consumption. The water heating system will serve the autonomous units at the showers. The installation of the gas heaters in the residential units will be optional and at the customer's expense. Only the distribution infrastructure will be provided in the project's construction. The water heating system will be supplied by natural gas, provided by Comgás, the local gas provider.

There is no central air conditioning nor heating system provided in the project. In the residential units, a split air conditioning system can be installed at the customer's expense.

3.4 Water Supply

The water for all uses will be supplied by the public utilities provider of the city of São Paulo, the São Paulo State Basic Sanitation Company (*Companhia de Saneamento Básico do Estado de São* Paulo – Sabesp)[2]. Sabesp controls the quality of water throughout the supply system, through systematic sampling and laboratory testing, in compliance with Brazilian regulations of water quality. No additional water quality testing will be required by the project, nor are they necessary.

3.5 Sewage Disposal

The wastewater and sewage produced during the construction and operation of the project will be collected and treated by Sabesp[3]. All wastewater will be collect by the PI01 sewage system of Sabesp. The treatment will occur in the wastewater treatment plant "ETE Barueri". Sabesp has already approved the connection to the sewage system and the capacity of treatment of the volume produced, according to documents reviewed.

1 According to currency exchange of August 28th 2020.

2 SABESP. Processes no. 126/2017, No. 127/2017, No. 128/2017, No. 129/2017, No. 130/2017 and No. 131/2017. June 15th 2017. Documents provided by Peninsula Investments.

3 Ibidem.

3.6 Energy Conservation

The Project foresees the use photovoltaic energy, LED lights, and presence sensors for all common areas. Electrical energy will be provided by the local provider, ENEL.

3.7 Greenhouse Gases (GHG)

As no central air heating system will be installed in the project, the emissions of Greenhouse Gases was considered nonexistent from this type of source in the operation phase[4].

As of the water heating system, in terms of GHG emissions, the system would be responsible for around 40 tons of CO^2eq monthly (in a scenario in which all units have the water heating system installed). This estimative was developed considering the project specificities, such as total number of residential units and average unit size, in conjunction with science-based assumptions on gas consumption per capita and well-recognized methodologies[5].

3.8 Elevators

The project will be provided with 4 elevators per building.

3.9 Pesticides

The Jaguaré 360º's landscaping project does not foresee the use of pesticides in its installation or maintenance.

3.10 Construction

3.10.1 Earthworks

According to information provided by PEN, there will be limited earthworks for the foundations of the buildings as all floors are above grade with no below grade parking.

3.10.2 Structure

The construction method that will be used for the project is still to be defined.

3.10.3 Construction Schedule

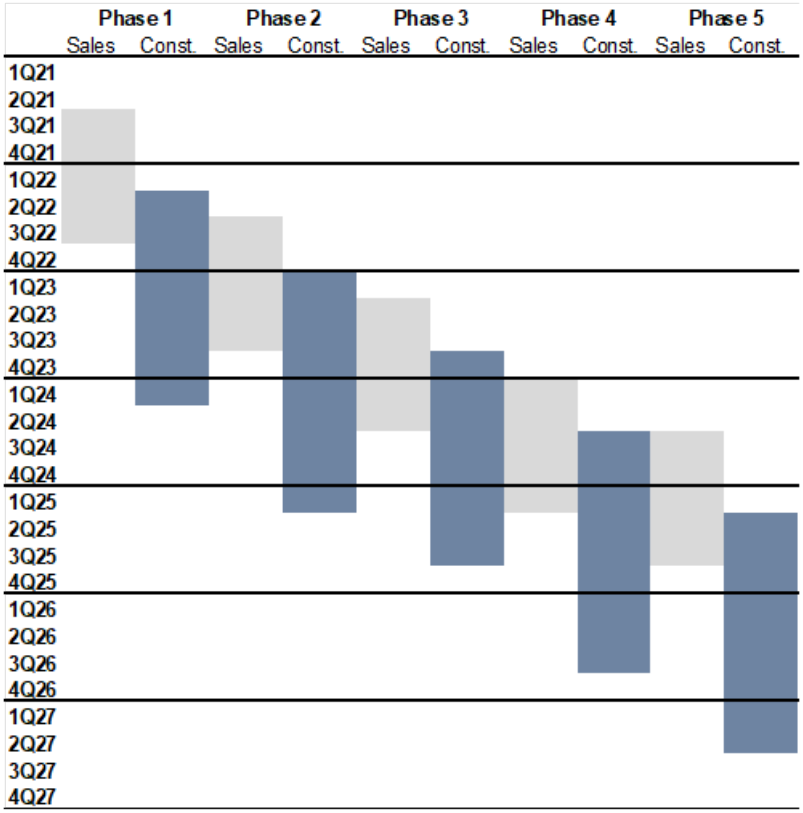
The Project is scheduled in five different phases, as seen in **Figure 3.4**.

Phase 1 is expected to launch in the third quarter of 2021 and the last phase ends in the third quarter of 2027. Each phase will have a pre-sales phase of six months before starting construction.

4 Residential real estate projects in Brazil rarely present central heating and air conditioning systems. These systems are often common in large commercial real estate projects, such as shopping malls, hotels and corporate buildings. In residential developments, air conditioning and heating systems are usually installed at the expense of the unit owners, individually, and yet are not frequent due to their impact on the cost of electricity or gas.

5 Based on the Brazilian GHG Protocols, estimating a monthly consumption of $7m^3$ per month/unit. The total estimate is based on the maximum emission scenario if all units had the system installed. Programa Brasileiro GHG Protocols. Available at: http://ferramenta.ghgprotocolbrasil.com.br/index.php?r=site/ferramenta.

Figure 3.4 - Construction schedule



Source: PEN. 2020.

3.10.4 Workforce

It is estimated that 600 temporary workers will be hired for the construction phase. This workforce will be 100% local, and will be hired by demand, via subcontractors, with estimated period of employment of 1 to 2 years, according to the different phases of construction, as presented on the construction schedule. All Brazilians labor regulation laws will be observed throughout the construction phases. Compliance of the subcontractors with Brazilian labor law will be assessed by PEN throughout the construction phase[6].

6 Specific measures to mitigate work related risks are provided in the Health and Safety Management Plan (Section 8.2) and in the Human Resources Management Plan (Section 8.4).

4. LEGAL REQUIREMENTS

This section presents the main legal requirements applicable to real estate and construction projects in Brazil and in the city of São Paulo.

The legal framework presented in this section is not exhaustive and aims at highlighting the environmental, occupational health and safety and urban planning and development mechanisms most relevant for the project ESMP, for both construction and occupancy phases.

Table 4.1 presents the main legal requirements for environmental permitting and controls, occupational health and safety and urban planning and development applicable to the project.

Table 4.1 - Project's Main Applicable Legal Requirements

Reference	Date	Administrative Instance	Summary	Description	Requirements applicable to the Project
ENVIRONMENTAL PERMITTING AND CONTROLS					
Conama Resolution 412/2009	May 14th 2009	■ Federal	■ Establishes criteria and guidelines for the environmental licensing of new projects for the construction of Social Interest housing.	■ Defines environmental performance standards for social housing projects.	■ In the simplified environmental licensing for social interest housing projects, at least the following documents must be presented: - Application for an environmental permit; - Favourable opinion for the removal of vegetation; - Municipal declaration of conformity of the project; - Technical report containing the location, description, the basic project and the schedule; - Technical responsibility note (ART); - Simplified Environmental Report (RAS); and - Report on Environmental Programs.
Law Nº 12.305/2010	February 8th 2010	■ Federal	■ Establishes the National Solid Waste Policy.	■ The following are subject to the elaboration of a solid waste management plan: - Civil construction companies, under the terms of the regulation or norms established by the bodies of Sisnama.	■ The construction company must develop a solid waste management plan and use the Waste Transport Manifest (Manifesto de Transporte de Resíduos – MTR).
Conama Resolution Nº 307/2002	July 17th 2002	■ Federal	■ Establishes guidelines, criteria and procedures for the management of construction waste.	■ Civil construction waste are classified as: - IV - Class D - are hazardous wastes from the construction process, such as paints, solvents, oils and others or those contaminated or harmful to health from demolitions, renovations and repairs to radiological clinics, industrial facilities and others, as well as tiles and other objects and materials containing asbestos or other products harmful to health. - § 2 The packaging of paints used in civil construction will be submitted to a reverse logistics system, according to the requirements of Law No. 12,305 / 2010, which contemplates the environmentally appropriate destination of the paint residues present in the packaging.	■ The construction company must develop a solid waste management plan and use the Waste Transport Manifest (Manifesto de Transporte de Resíduos – MTR).
CONAMA Resolution 450/2012	March 6th 2012	■ Federal	■ Establishes guidelines for collection and disposal of used or contaminated lubricating oil.	■ All used or contaminated lubricating oil must be collected and disposed so that it does not negatively affect the environment and provides maximum recovery of the constituents.	■ The processes used for the recycling of lubricating oil must be duly licensed by the competent environmental agency.
Law Nº 12.300/2006	March 16th 2006	■ State	■ Establishes the National Solid Waste Policy, sets forth the principles, objectives and instruments, guidelines, goals, and actions aiming for integrated solid waste management (including hazardous).	■ Sets the responsibilities of generators and public authorities and the relevant economic instruments. It is the main regulation for other federal, state and municipal regulations.	■ The Waste Handling Certificate (CADRI – Certificado de Movimentação de Resíduos) is the permit that approves the destination and disposal of hazardous waste (Class 1) for reprocessing, storage, treatment or final disposal, licensed or authorized by CETESB (São Paulo State Environmental Agency); ■ The construction company must develop a solid waste management plan and use the Waste Transport Manifest (Manifesto de Transporte de Resíduos – MTR); ■ When there is movement of hazardous waste out of the generating unit, generators, transporters and the receiving units of hazardous waste must use the Waste Transport Manifest (Manifesto de Transporte de Resíduos – MTR); ■ The movement of waste must be monitored by means of traceable records, in accordance with the project previously approved by governmental agencies; and ■ The management of industrial wastes, especially hazardous wastes, from generation to final disposal, will be done in order to meet the requirements of environmental protection and public health, based on the Solid Waste Management Plan referred to in this law.

Reference	Date	Administrative Instance	Summary	Description	Requirements applicable to the Project
Law Nº 16.402/2016	March 22th 2016	■ Municipal	■ Establishes land parceling, use and occupation in the City of São Paulo, according to Law No. 16.050, of July 31, 2014 - Strategic Master Plan.	■ Residential and non-residential uses must meet the discomfort parameters related to noise; associated vibration; radiation; odors; gases, vapors and particulate matter.	■ The parameters may vary according to the day and night time zone and schedule, according to Table 4B of this law.
Decree Nº 58.701/2019	April 4th 2019	■ Municipal	■ Regulates articles 123, 140, 141 and 142 of Law 13.478, of December 30, 2002, which provides for the organization of the Urban Cleaning System of the City of São Paulo, establishes powers aimed at the inspection of municipal attitudes and the application of the respective penalties provided for in that law.	■ Institutional, service, commercial and industrial establishments, among others, that generate inert solid waste generators, such as rubble, earth and construction materials, with a mass greater than 50 (fifty) kilograms daily, considered the monthly average of generation, are subject to obtaining a permit for approval and / or execution of building, renovation or demolition.	■ Large generators of solid waste must be registered with the Municipal Authority for Urban Cleaning – AMLURB.
OCCUPATIONAL HEALTH AND SAFETY					
General Requirements for H&S – NR-01	July 30th 2019	■ Federal	■ Establishes the general requirements for occupational H&S in Brazil.	■ SEPRT (Social Security and Labor Secretary) can audit the compliance with the practices states by the Brazilian Safety Standards (NRs).	■ The construction company must comply with all safety regulations, in order to prevent a risk of a magnitude that may cause the embargo of the site.
Embargo and Interdiction – NR-03	September 23rd 2019	■ Federal	■ Establishes the situations in which a building site may suffer an embargo or interdiction from governmental H&S agencies.	■ SEPRT (Social Security and Labor Secretary) can audit the compliance with the practices states by the Brazilian Safety Standards (NRs).	■ The construction company must comply with all safety regulations, in order to prevent a risk of a magnitude that may cause the embargo of the site.
H&S specialized services (SESMT) – NR-04	April 29th 2016	■ Federal	■ Establishes the guidelines for the mandatory minimum specialized H&S workforce.	■ The minimum specialized H&S workforce is established in accordance with the degree of risk involved in the economic activity of the facility and the number of employees.	■ The construction company must comply with the minimum specialized H&S workforce in order to commence the works.
Accident Prevention Comission (CIPA) – NR-05	July 30th 2019	■ Federal	■ Establishes the guidelines for the mandatory Accident Prevention Commission (CIPA).	■ The construction company shall ensure that an election for CIPA (Internal Committee for Accidents Prevention) members occurs annually.	■ CIPA new members shall be trained prior to be effective in the position.
Personal Protective Equipment (PPE) – NR-06	October 24th 2018	■ Federal	■ Establishes the guidelines for the usage of PPE in Brazil.	■ The construction company must ensure the distribution and usage of PPE to workers, free of any charge.	■ The construction company must guide employees on the use of PPE whenever needed, recommended or enforced; types of PPE, correct use and conservation; raise their awareness on the importance of such equipment as a way to protect their health and physical integrity.
Occupational Health Control Program (PCMSO) – NR-07	June 12th 2018	■ Federal	■ Establishes the guidelines for mandatory health exams of workers.	■ The construction company must ensure that all workers are up-to-date with mandatory health exams.	■ All workers must have completed the mandatory health exams prior to entrance in the site.
Electrical Safety – NR-10	July 30th 2019	■ Federal	■ Establishes the guidelines for electrical work safety.	■ All electrical equipment and installations must comply with NR-10 regulations.	■ Maintenance Operator, Electrical Technician, Instrument & Electrical Supervisor shall participate on Electrical Installation and Services Safety training. ■ The Installation must have an Electrical Installation List.
Machinery Safety – NR-12	July 30th 2019	■ Federal	■ Establishes the guidelines for machinery work safety.	■ All machines must comply with NR-12 regulations.	■ The organization of equipment must be done in such a way that the flow of operations does not present intersections and conflicts; ■ Starting and stopping devices must be designed, selected and installed so that they can be started or shut down in an emergency by someone other than the operator; ■ Safety signs: includes the use of colors, symbols, inscriptions, luminous or audible signs and must be adopted in all phases of use and useful life of machines and equipment, in a location clearly visible on the construction site; ■ Maintenance, inspection, preparation, adjustments and repairs: machinery and equipment must be subjected to preventive and corrective maintenance, in the form and

Reference	Date	Administrative Instance	Summary	Description	Requirements applicable to the Project
					periodicity determined by the manufacturer, in accordance with the national official technical standards in force; and ■ Training and information: the construction team must receive training provided by the manager and compatible with their functions, which addresses the risks to which they are exposed and the existing and necessary protective measures for the prevention of accidents and diseases.
Hazardous Activities – NR-15	September 12th 2019	■ Federal	■ Establishes the classification of hazardous activities regarding exposure to chemical, physical and biological agents.	■ The following are considered hazardous activities or operations: continuous and intermittent noise; impact noise; heat; chemicals; vibrations; and ■ The work in hazardous conditions ensures the worker additional payment, incident on the minimum wage of the region, equivalent to 40%, 20% or 10%, depending on the type of exposure.	■ The construction company must be aware of risks in the workplace, and especially regarding elimination and reduction of risks; and ■ When not possible to reduce the intensity of the risk, the company must provide PPE for workers who are exposed.
Dangerous Activities – NR-16	September 12th 2019	■ Federal	■ Establishes the classification of dangerous activities regarding exposure to flammables, explosives and electricity.	■ Hazardous activities and operations are those listed in the Annexes to NR-16. (Explosives, flammables, electrical energy.	■ The construction company must be aware of risks in the workplace, especially regarding flammable substances and electrical installations; and ■ The work in hazardous conditions ensures the worker an additional 30%, on the salary.
Ergonomics – NR-17	October 24th 2018	■ Federal	■ Establishes occupational ergonomics standards.	■ In order to assess the adaptation of working conditions to the psychophysiological characteristics of workers, it is up to the employer to carry out an ergonomic analysis of work (AET), which must address the working conditions, as established in NR-17.	■ Annual work stations ergonomic evaluation to prevent repetitive stress injuries.
Environmental and Safety Standards for the Construction Industry – NR-18	February 10th 2020	■ Federal	■ Establishes extensive guidelines for health, safety and environmental aspects for the construction industry. NR-18 is undergoing a full review - the new text is already available and will be valid after 10/02/2021.	■ NR-18 is the main Brazilian regulation on civil construction works. It regulates all actives in a construction site, ranging from safety plans, risk analysis, construction and demolition, cranes, electrical installations, machinery, confined spaces, working on heights, steel cables, scaffolds, training and others.	■ The construction company must comply with all of the NR-18, with special attention on the safety plans, training, and supervision.
Health and safety at work with flammables and fuels - NR-20	December 9th 2019	■ Federal	■ Establishes the minimum requirements to guarantee the safety and health of workers against the risks inherent to activities with flammable and combustible liquids.	■ Each installation project can be class I, II or III, and need to present the following topics, at least.	■ Each installation project can be class I, II or III, and need to present the following topics, at least. - description of the facilities and their respective processes through the operations manual; - general plant rental plan; - safety, health and environmental characteristics and information related to flammables and combustible liquids, contained in SDS of raw materials, consumables and finished products; - technical specification of equipment, machinery and accessories that are critical in terms of safety and occupational health established according to the project; - plans, drawings and technical specifications of the installation's security systems; and - Identification of the classified areas of the installation, for the purpose of specifying the equipment and electrical installations.
Occupational Comfort and Sanitary Conditions – NR-24	September 23th 2019	■ Federal	■ Establishes the minimum requirements for comfort and sanitary conditions in the workplace.	■ SEPRT (Social Security and Labor Secretary) can audit the compliance with the practices states by the Brazilian Safety Standards (NRs).	■ The construction company must comply with the minimum comfort and sanitary conditions defined in NR-24.
Safety Signs and Signals – NR-26	May 28th 2015	■ Federal	■ Establishes guidelines for the usage of signs, colors, and hazardous material labeling in the workplace.	■ Hazardous material must comply with Globally Harmonized System of Classification and Labelling of Chemicals (GHS).	■ Hazardous products, such as Diesel and batteries, must have: - Safety Data Sheet (SDS) according ABNT NBR 14725; and - Label according ABNT NBR 14725
Working at heights – NR-35	July 30th 2019	■ Federal	■ Regulates occupational the work at heights of over 2 m.	■ All work at height must be preceded by a Risk Analysis; and ■ Work at height permission must be recorded in the worker's occupational health certificate.	■ Workers shall participate on NR 35 - Work at Heights training.

Reference	Date	Administrative Instance	Summary	Description	Requirements applicable to the Project
Law Nº 1.257/2015	June 1st 2015	■ State	■ Establishes the Fire Code and Emergencies Protection protocol in the State of São Paulo.	■ Buildings must have, according to their respective risks and occupations, the following general fire and emergency safety measures: restriction to the appearance of fire; detection and alarm; emergency exit; access and facilities for rescue operations; structural protection in fire situations; fire safety administration; extinction and fire control.	■ To achieve compliance with the fire safety measures required for the building, the company must have: - Fire Department Inspection Report - AVCB; - Adequacy Authorization Term of the Fire Department - TAACB; - Fire Department Permit – CLCB.
Decree Nº 63.911/2018	October 12th 2018	■ State	■ Establishes the Fire Safety Regulation of buildings and risk areas in the State of São Paulo.	■ Regulates Law 1.257/2015.	To achieve compliance with the fire safety measures required for the building, the company must have: a) Fire Department Inspection Report - AVCB; b) Adequacy Authorization Term of the Fire Department - TAACB; c) Fire Department Permit – CLCB.
Law Nº 16.900/2018	June 4th 2018	■ Municipal	■ Establishes the requirements to be adopted by new developments in the City of São Paulo in relation to the safety area and fire prevention	■ The installation of public fire hydrants will be mandatory for the implantation of new projects that have potential for risk of accidents.	■ The enterprises and situations that require the installation of public hydrants are: - new subdivisions or residential condominiums, horizontal or vertical, with more than 40 (forty) units; - industrial or commercial subdivisions or condominiums, with any number of units; - Buildings with a built area equal to or greater than 4,000 m² (four thousand square meters), except those for single-family residential use. ■ Buildings that are located within a radius of 300 (three hundred) meters of hydrant already installed must install a new hydrant or perform the maintenance of a pre-existing hydrant in a location to be defined by the concessionaire of the water supply and sewage service.
URBAN PLANNING AND DEVELOPMENT					
Urban Policy – Article 182 of the Brazilian Federal Constitution (1988)	October 5th 1988	■ Federal / Municipal	■ Establishes guidelines for the development and implementation of urban development policies for Brazilian municipalities.	■ Urban policy must be conducted by the municipal government; ■ The basic instrument of urban development and expansion policy is the Master Plan, mandatory for cities with more than twenty thousand inhabitants and proclaimed by the City Council; ■ Establishes the social function of the urban property (that is, compliance with fundamental city ordination requirements expressed in the Master Plan); and ■ Determines the use of urban property, under penalty of: division of land, progressive tax over time or expropriation.	■ Contractors and investors must abide the local urban planning and development policies in place.
City Statute – Federal Law Nº 10.257	July 10th 2001	■ Federal / Municipal	■ Regulates the chapter "Urban policy" (Art. 182 of the Brazilian Constitution), with the basic principles of participatory planning and the social function of the property.	■ Establishes the instrument of urban planning and development (Master Plan), and its associated requirements: - Provides for the compulsory use of non-built, underutilized or unused urban land, under penalties of the law; - The progressive tax on urban property (Imposto Predial e Territorial Urbano); - The right to build; - The onerous grant of the right to build; - The instrument of Syndicated Urban Operations in Public Private Partnerships - PPP (specific urbanistic regulation and related incentives aiming to the implementation of improvements in a predetermined perimeter as urban development) and the instrument of Certificates of Additional Construction Potential, a publicly traded securities which grants the right to build and expand buildings in the Urban Operations specific perimeters; - The alienation of the right to build; - Standards for Environmental Impact Assessment (EIA) for projects within the urban territory, providing measures for the following aspects whenever applicable: demography, urban and community infrastructure, land use and occupation, real estate valuation, traffic generation and demand for public transport, ventilation and lighting, natural and cultural heritage;	■ Contractors and investors must abide the local urban planning and development policies in place.

Reference	Date	Administrative Instance	Summary	Description	Requirements applicable to the Project
				- Minimum requirements for the Master Plan; ■ Social consultation and participation in urban development policies.	
City of São Paulo Strategic Master Plan – Municipal Law Nº 16.050	July 31st 2014	■ Municipal	■ Establishes the guidelines and local policies for urban planning and development in the city of São Paulo.	■ Establishes guidelines for the planning and development of the city until 2030; ■ Establishes the City of São Paulo Strategic Master Plan, defining: - The macro-zoning, macro-areas and urban zoning within the city's perimeter (standards for land use and occupation); - Standards for the provision of public services of housing, sanitation, transport, protected areas (natural and cultural heritage and urban landscape), education, health and other institutional services; - The Zones of Special Social Interest (ZSSI), areas intended primarily for social interest housing projects and affordable housing; - Standards for housing projects in ZSSI, aimed at the development and provision of Social Interest Housing (low income families, on housing projects with up to a single toilet and one single parking space) and Affordable Housing (medium income families, on projects with up to two toilets and one parking space); - The Axles of Urban Transformation (areas of the urban territory located around the medium and high capacity public transport systems, suitable for constructive and demographic densification. These areas may enjoy incentives to urban development projects, such as the Syndicated Urban Operations); - The minimum, basic and maximum utilization coefficient (Coeficiente de Aproveitamento - CA) for urban development projects; - Mechanisms for Syndicated Urban Operations and PPP. ■ Environmental Permitting and Management for urban developments, with the following basic requirements: - Environmental Impact Assessment (large projects, with potential for large-scale impacts); - Neighbourhood Impact Assessment (medium and small projects, with potential for localized or neighbourhood impacts); - Environmental Feasibility Study (projects with less potential for impacts).	■ The following aspects of the municipal law are most relevant for the project: - Land use and occupation in accordance to the zoning provided by the Master Plan; - Develop and present environmental impact assessment proportional to the project's impacts, in order to guarantee the environmental and accessory permits; - Once the project provides for affordable housing, it has to comply with reasonable marketing prices in order to provide access to housing for socioeconomic disadvantaged families according to the following thresholds[7]: ▪ **Social Interest Housing Type 1 & 2:** aimed at families that enjoy total monthly household income from up to BRL 6270 (up to USD 1250 ▪ **Affordable Market Housing:** aimed at families that enjoy total monthly household income up to BRL 10,400 (up to USD 2080) - Housing projects of Social Interest or Affordable Market are permitted in any of the non-protected zones provided by the Master Plan, and may be carried out both by public or private initiatives; - The project has to comply with the applicable utilization coefficient (Coeficiente de Aproveitamento - CA), according to its insertion on the zoning provided by the City of São Paulo Strategic Master Plan.

7 According to currency exchange of August 28th 2020.

The legal requirements referenced in **Table 4.1** are correlated with the impact mitigation measures described in the ESMP whenever applicable.

5. PROJECT AREA OF INFLUENCE

The project's area of influence corresponds to a 500m radius around the project's site (1485 Jaguaré Avenue). The area of influence was defined by ERM, according to the Municipal Council of the Environment and Sustainable Development (*Conselho Municipal do Meio Ambiente e Desenvolvimento* – CADES) Resolution Nº 107/2005 that establishes the guidelines for neighborhood impact assessment[8].

The project site is located in west São Paulo (SP), in the Jaguaré district, that has a total area of 6.6 km². The project's area of influence is located in the floodplain of the Pinheiros River, on its right bank. The approximate distance between the site and the river bank is 430 m.

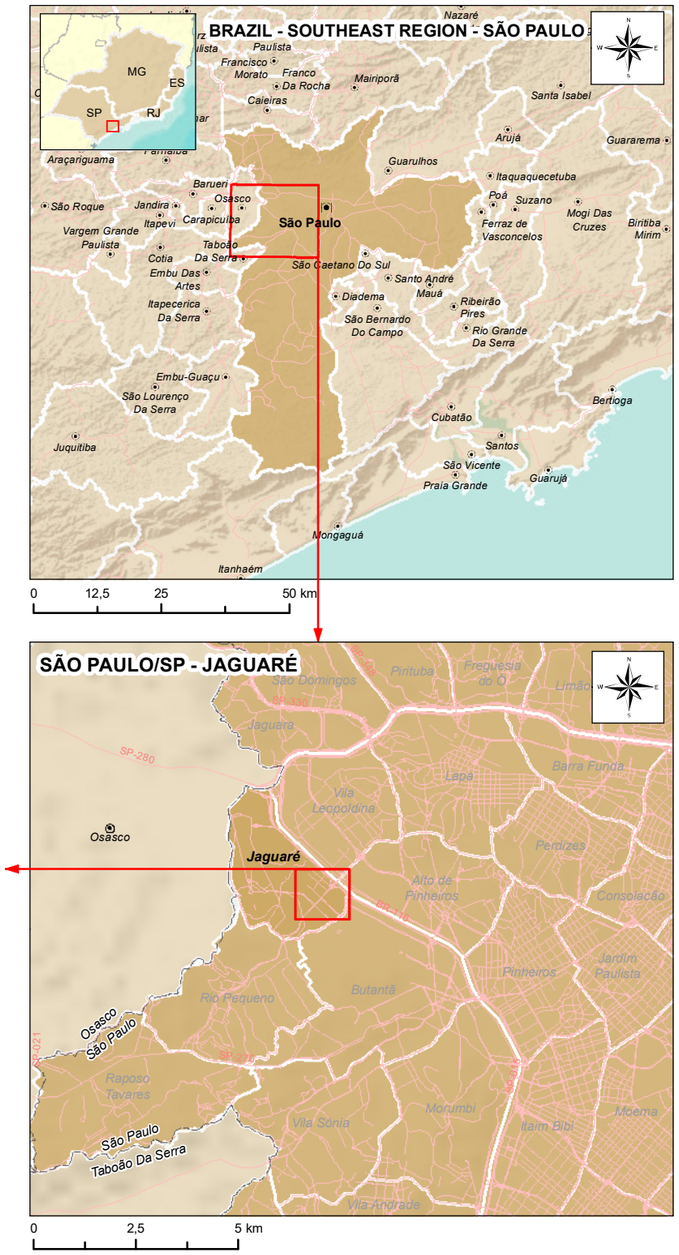
The immediate areas on the banks of the Pinheiros River are important roads in the city of São Paulo, forming the system of express avenues of the Marginal Pinheiros (officially SP-015), connecting the south and west São Paulo in a total extension of 22.5 km (13.5 mi), from Interlagos to the Marginal Tietê, another city's structural road system.

The area of influence comprises urbanized blocks, delimited by the Jaguaré Ave., the Kenkiti Simomoto Ave., the Torres de Oliveira Ave., the Onófrio Milano Ave., the Marechal Mario Guedes Ave. and the Engenheiro Billings Ave., which is part of the Marginal Pinheiros system.

8 CADES. Resolution Nº 107/2005. Available at:
https://www.prefeitura.sp.gov.br/cidade/secretarias/meio_ambiente/cades/resolucoes/index.php?p=10652

Figure 5.1
Presents the site location and the project's area of influence.

LOCATION MAPS



LEGEND

- Site location
- Project site
- Area of influence - 500 m buffer from site location
- Jaguaré district

UTM - SIRGAS 2000 - 23 South

SOURCE:
Database managed by ERM Brasil, 09/2020;
Hidrography; access roads; states and municipal boundaries: IBGE, scale 1: 250,000;
Imagery from 2019 available at Google Earth Pro, access on September/2020.

SIZE A3 297 x 420 mm

CLIENT: **Peninsula Investments Group**	DESCRIPTION: Area of Influence		PROJECT NUMBER: **0565997**
PROJECT: Environmental and Social Impact Assessment (ESIA) - Jaguaré, São Paulo/SP	EDIT CONTROL: 09/03/2020 EDITION / 09/10/2020 REVIEW	THIS DOCUMENT IS PROPERTY OF ERM BRASIL LTDA. AND CANNOT BE COPIED, REPRODUCED OR TRANSMITTED BY ANY OTHER MEANS, OR USED FOR DIFFERENT PURPOSES FROM THOSE WHICH IT WAS DONE.	FIGURE / ANNEX: FIGURE 5.1 PREPARED BY: RENATA OLIVEIRA TECHNICAL RESPONSIBLE: ELIZABETH PENHALBER

0565997-1-IG001 CRS

ERM

The project's area of influence is described according to the following aspects.

5.1 Environmental aspects

ERM reviewed the most recent Surface Water Quality Report for the State of São Paulo (2018), prepared by the State Environmental Agency (*Companhia Ambiental do Estado de São Paulo* – CETESB). According to the report, the closest monitoring point from the project's site is located at Rio Pinheiros, in a point located approximately 3 km and down gradient of the site.

The water quality of the Rio Pinheiros of the monitored point (Reference: PINH 04900) is considered "very bad" quality ($25 > WQI \geqslant 0$), with a water quality index (WQI) lower than 20.

According to the Flood Vulnerability Map issued by the National Water Agency (*Agência Nacional de Águas* – ANA) the Rio Pinheiros watercourse is indicated with high vulnerability to flooding. However, no information about historical flooding within the project's area of influence was identified. Also, no records of the occurrence of flooding in the project's site were identified[9].

Groundwater flow direction has not been determined for the area, however based on the topographic gradient, shallow groundwater is considered likely to flow in a northwestern direction, towards the Pinheiros River. It is important to note that groundwater flow direction can be influenced locally and regionally by the presence of local wetland features, surface topography, recharge and discharge areas, horizontal and vertical inconsistencies in the types and location of subsurface soils, and proximity to water pumping wells.

It was made available for review the Technical Opinion #45101872, issued 24/10/2018 by the State Environmental Agency, CETESB (Companhia Ambiental do Estado de São Paulo). According to this report, in the site area there is no record of contaminated areas.

The Technical Opinion #45101872 also states that soil and underground water samples were collected in 20 investigatory wells, analyzed for relevant pollutants and the results compared with the CETESB's reference. All the parameters were within the legal thresholds. The Technical Opinion #45101872 considers that the activities developed in the area had low potential for contamination and that the analytical results for soil and groundwater samples did not indicated concentrations above the intervention compared to the standards adopted, and concludes that there is no contamination in the soil and groundwater in the area.

5.2 Road System

The road system within the project's area of influence is described according to the Master Plan's (2014) classification. The Master Plan classifies the city of São Paulo structural road system according to the following levels:

- **Level 1** – Those used as a link between the Capital and other municipalities in the State of São Paulo and the other states of the Federation;
- **Level 2** – Those, not included in the previous level, used as a link with the municipalities in the Metropolitan Region and with the 1st level roads; and
- **Level 3** – Those, not included in the previous levels, used as internal links within the city's territory, connecting different urban regions; and
- **Non-structural (Local)** – Serves strictly located traffic, between areas within the same district or neighborhood.

Table 5.2.1 presents the classification of the road system within the project's area of influence.

9 According to the Centro de Emergências Climáticas - CGE (Center for Climate Emergencies) and the GeoSampa (Georeferenced data platform) of the municipal government. CGE available at: https://www.cgesp.org/v3/alagamentos.jsp; GeoSampa available at: http://geosampa.prefeitura.sp.gov.br/PaginasPublicas/_SBC.aspx Thus, no specific mitigation measure is recommended.

Table 5.2.1 - Road system

Road	Class
Jaguaré Avenue	*Structural Level 2*
Kenkiti Simomoto Avenue	*Structural Level 3*
Torres de Oliveira Avenue	*Non-structural (Local)*
Onófrio Milano Avenue	*Non-structural (Local)*
Marechal Vidal Avenue	*Non-structural (Local)*
Marechal Mario Guedes Avenue	*Non-structural (Local)*
Engenheiro Billings Avenue	*Structural Level 1*

Source: SÃO PAULO. Municipal Law Nº 16.050. 2014.

The main access to the project's site is the Jaguaré Avenue, which is classified as a structural road level 2, which is structural for the metropolitan region. The non-structural roads within the project's area of influence are used for traffic distribution within the neighborhood and immediate areas.

5.3 Occupation History

Once a rural area of São Paulo, formed by small and medium-sized farms, the Jaguaré district was designed and built by engineer Henrique Dumont Villares in 1935. Owner of the Jaguaré Real Estate Company, Villares divided the region into residential, commercial and industrial areas, and encouraged its occupation, consolidated after the construction of the Jaguaré bridge[10], over the Pinheiros River[11].

In the following decades, the district attracted hundreds of factories in the chemical, food processing and textile sectors, making it one of the most industrialized districts in São Paulo. However, the slow economic growth recorded in the 1980s profoundly affected the district, which lost a large part of its industrial facilities[12].

Although industrial activities have declined significantly today, it is still possible to identify the presence of industrial facilities in the district in the sectors of logistics, mechanical equipment, industrial public services (solid waste management) and distribution.

In recent years, investments have been made in the real estate sector, which are beginning to encourage the verticalization of residential areas, still predominantly composed of single-storey houses and townhouses[13].

The site's occupation history is related to the *Cooperativa Agrícola de Cotia* (CAC) from 1947 to 1994. During this period, CAC performed processing and commercialization activities of potato, onion and egg using the site. CAC's facilities comprised 3 main warehouses.

From 1996 to 2015, the site was occupied by *Editora Globo*, where *Grupo Globo's* commercial departments, publishing houses, and distribution of printed publications took place.

The demolition of the old warehouses and other facilities used by CAC and *Grupo Globo* was completed in the first quarter of 2019.

10 In 1938.

11 This structure was expanded in 1971 and reopened in 1974. It is still operational to the present day.

12 PONCIANO, Levino (2001). Bairros paulistanos de A Z. São Paulo: SENAC. pp. 107–108.

13 However, this type of housing is not frequent in the project's area of influence.

5.4 Demography

This section presents demographic data on the Jaguaré District and the project's area of influence. Due to changes in the census methodology over the years, it is not possible to estimate the specific population of the area of influence in the historical series. Thus, for the project's area of influence, the data presented are from 2010.

Table 5.4.1 - Population

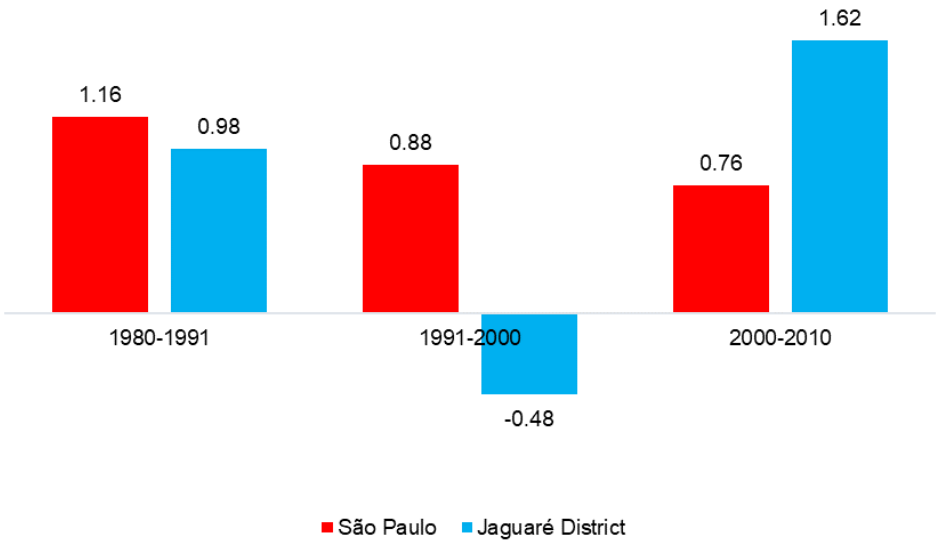
Territory	Population			
	1980	1991	2000	2010
São Paulo	8,493,226	9,646,185	10,434,252	11,253,503
Jaguaré District	39,867	44,361	42,479	49,863
Project's area of influence	*	*	*	4,202

Source: IBGE. 1980, 1991, 2000 and 2010 Census.

Between 1981 and 1990, the Jaguaré district presented a population growth rate below that observed for the city of São Paulo as a whole, decreasing by 0.48% (per year) between 1991 and 2000 and growing above that observed in the city between 2000 and 2010, which may indicate that the district is consolidating itself as an area of urban expansion. In 2010, the project's area of influence population reached 4,402 people, or 8.8% of the population of the Jaguaré District.

Figure 5.4.1 presents the population growth rates for the city of São Paulo and the Jaguaré District, from 1980 to 2010.

Figure 5.4.1 - Population growth rates (per year)



Source: IBGE. 1980, 1991, 2000 and 2010 Census.

Table 5.4.2 presents data on the demographic density of São Paulo and the Jaguaré District.

Table 5.4.2 - Demographic density

Territory	Area (hectares)	Demographic density (pop./ha)			
		1980	1991	2000	2010
São Paulo	150,900	56.2	63.9	69.1	74.5
Jaguaré District	660	60.4	67.2	64.3	75.5

Source: IBGE. 1980, 1991, 2000 and 2010 Census.

Over the years the Jaguaré district presented a similar demographic density, but slightly higher, to that observed in the city of São Paulo as a whole. The trend is growing both in the municipality and in the district, which indicates the consolidation of constructive and population densification in these areas.

Table 5.4.3 presents population estimates for the city of São Paulo and the Jaguaré District.

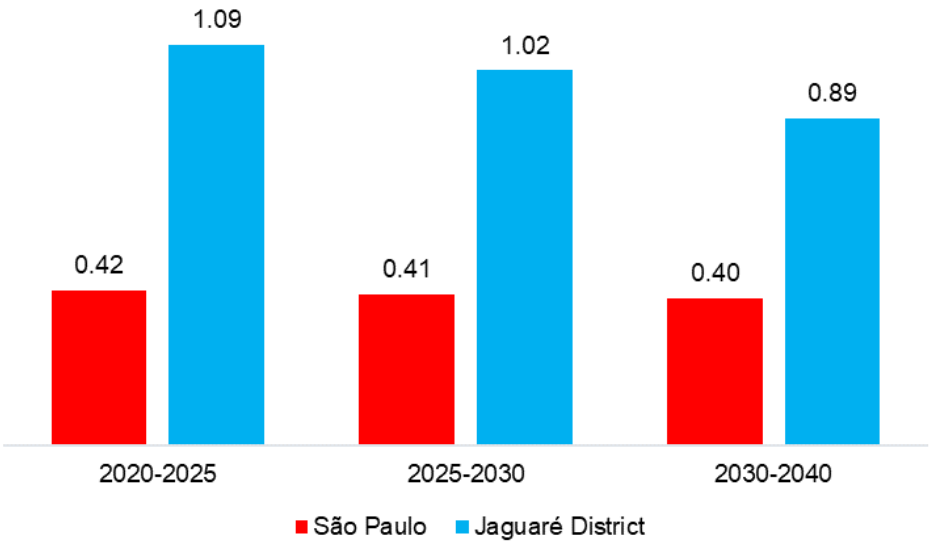
Table 5.4.3 - Population estimates

Territory	2020	2025	2030	2040
São Paulo	11,754,736	12,005,353	12,255,969	12,757,203
Jaguaré District	56,147	59,286	62,369	68,146

Source: IBGE, 2020.

Figure 5.4.2 presents the estimated population growth rates based on the estimated population.

Figure 5.4.2 - Estimated population growth rates (per year)



Source: IBGE. Population estimates. 2020.

The estimates indicate that the Jaguaré district may present a population growth rate higher than that estimated for the city of São Paulo during the analyzed period. The data presented in this section also shows that the population of the Jaguaré District may present about 36.6% growth in its population from 2010 to 2040.

The project is expected to add about 5,806 people to the project's area of influence population by 2027.

5.5 Land use and Urban Aspects

This section analyzes the current and expected land use and occupation profiles in the Jaguaré District and in the project's area of influence.

Table 5.5.1 presents the most frequent land uses in the Jaguaré district, according to the absolute numbers and percentages of the types of lots located in the district.

Table 5.5.1 - Current land use – Jaguaré District

Type	Lots	
	N.	%
Residential – Vertical	7,250	48.0
Residential – Horizontal	4,560	30.2
Residential – Inadequate housing	1,263	8.3
Commerce and Services	956	6.2
Vacant	795	5.2
Industrial	117	0.8
Warehouses	70	0.5
Education	23	0.2
Leisure and Religious	27	0.2
Special Use (Hospitals, Cemeteries, Shelters)	16	0.1
Parking Lots and Garages	6	0.1
Other	27	0.2
Total	**15,110**	**100**

Source: SÃO PAULO. Secretaria Municipal da Fazenda - Cadastro de Contribuinte Imobiliário/IPTUEG. 2015.

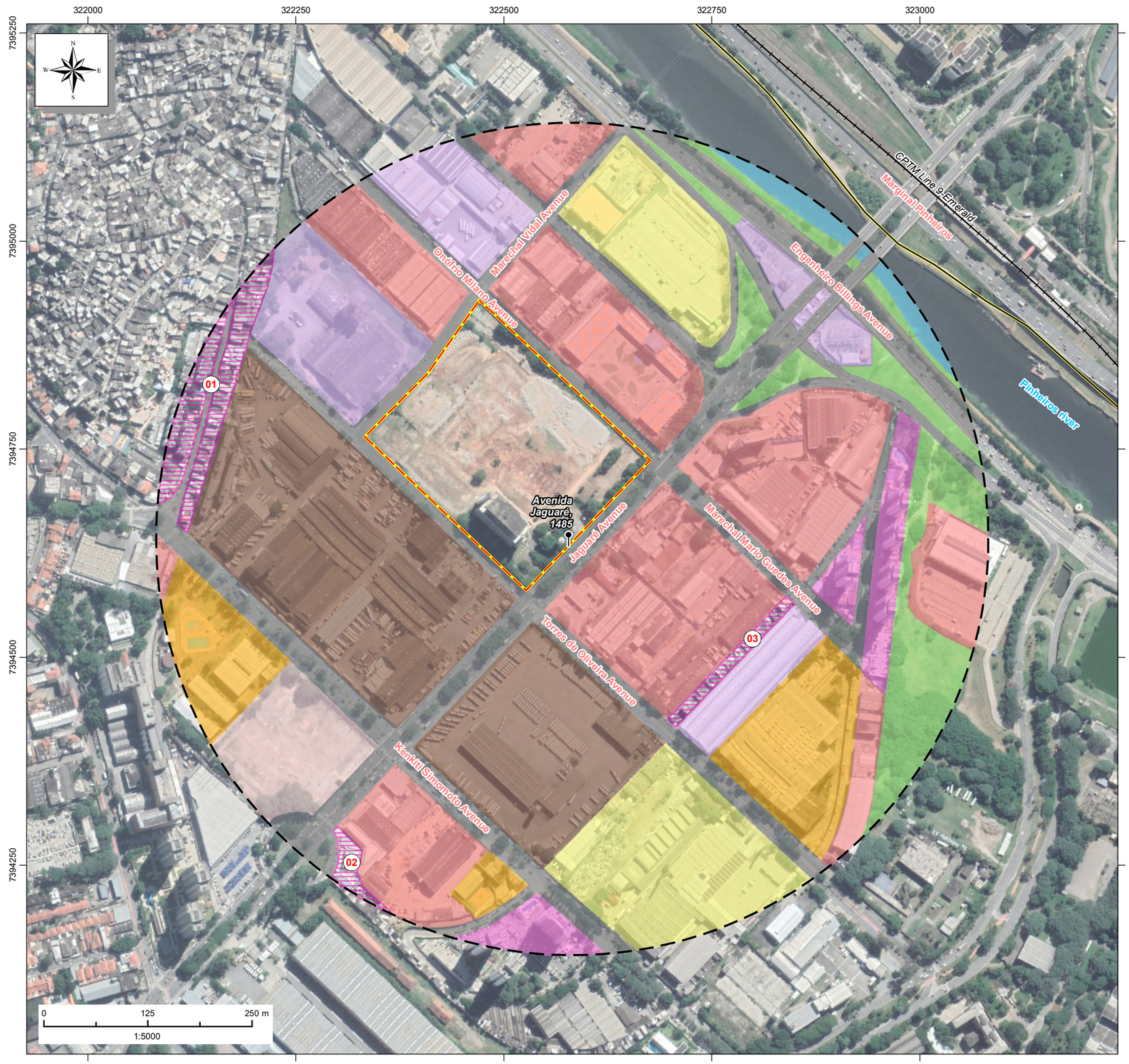
The main uses identified in the Jaguaré District as a whole are residential, horizontal and vertical, followed by areas of inadequate housing (slums and other vulnerable areas) and commerce and services. There is 5.2% of vacant lots, while industrial use corresponds to 0.8% of the current observed use.

Regarding the project's area of influence, the current uses identified relate mainly to industrial, commercial (large-scale) and institutional facilities and buildings.

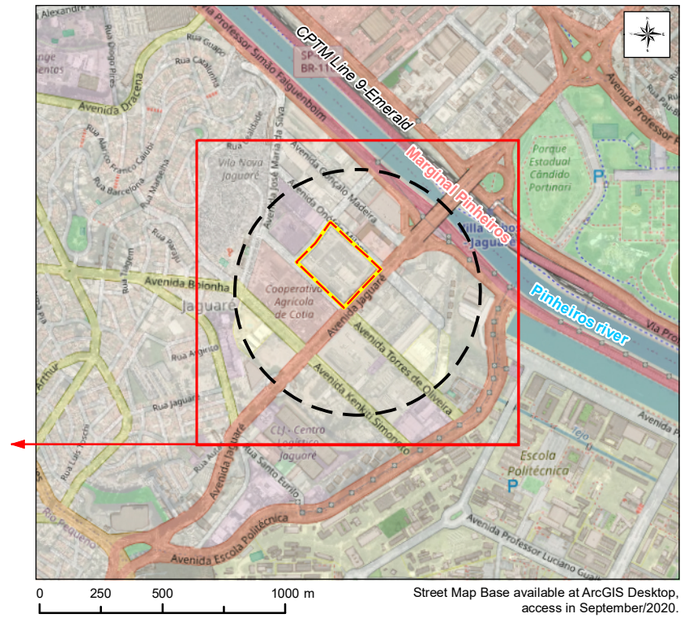
The current residential use is residual and limited to recent housing developments in residential buildings located in the east and southeast limits of the project's area of influence. Small-scale public housing projects are also observed in the west limit of the project's area of influence.

In the Jaguaré Avenue, which is the main access to the project's site, the predominant uses are industry and large-scale commerce.

Figure 5.5.1 presents the current land use profiles in the project's area of influence and subsequent figures (**5.5.2** to **5.5.8**) show pictures of land use examples within the project's area of influence.



REFERENCE MAP



Street Map Base available at ArcGIS Desktop, access in September/2020.

LEGEND

- Site location
- Railway
- Marginal Pinheiros bycicle path
- Project site
- Area of influence - 500 m buffer from site location

Land use

- Residential area
- Irregular residential area
- Industrial area
- Institutional area
- Commercial and service
- Logistic
- Mixed use
- Green area
- Street
- Vacant
- Water body

Irregular residential areas

- 01 Nova Jaguaré
- 02 Beira da Linha
- 03 Torres de Oliveira

UTM - SIRGAS 2000 - 23 South

SOURCE:
Database managed by ERM Brasil, 09/2020;
Imagery from 2019 available at Google Earth Pro, access on September/2020.

SIZE A3 297 x 420 mm

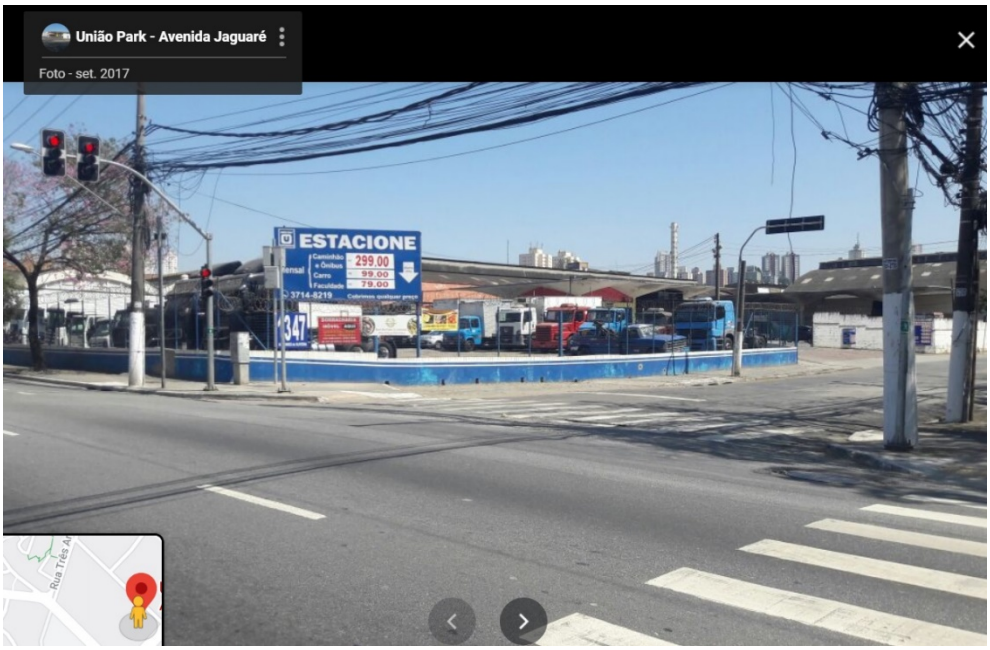
CLIENT: **Peninsula Investments Group**	DESCRIPTION: Land Use	PROJECT NUMBER: **0565997**	0565997-1-IG002
PROJECT: Environmental and Social Impact Assessment (ESIA) - Jaguaré, São Paulo/SP	EDIT CONTROL: 09/03/2020 EDITION / 09/10/2020 REVIEW	FIGURE / ANNEX: FIGURE 5.5.1	
		PREPARED BY: RENATA OLIVEIRA	
		TECHNICAL RESPONSIBLE: ELIZABETH PENHALBER	

ERM

Figure 5.5.2 - Sight from the 1485 Jaguaré Avenue

Source: Google. 2020.

Figure 5.5.3 - Logistical use immediate to project's site – truck parking lot



Source: Google. 2020.

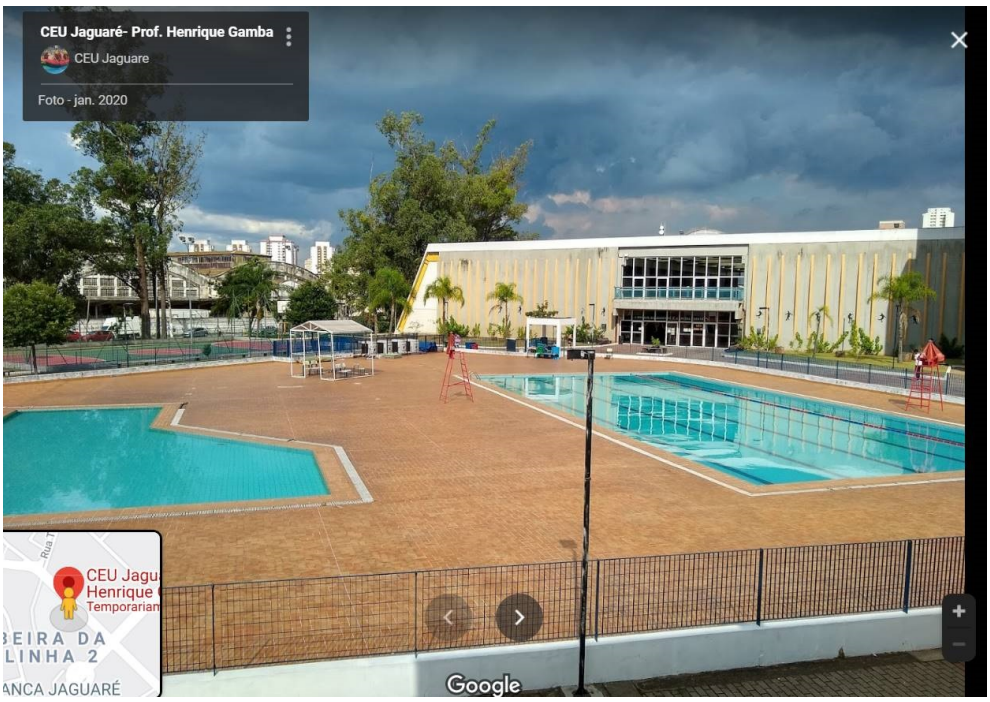
Figure 5.5.4 - Industrial use in the Jaguaré Avenue – *Franguex Gêneros Alimentícios*

Source: Google. 2020.

Figure 5.5.5 - Commercial use (lodging) in the Jaguaré Avenue – Go Inn Hotel

Source: Google. 2020.

Figure 5.5.6 - Institutional use (education) in the Kenkiti Simomoto Avenue – CEU Prof. Henrique Gamba



Source: Google. 2020

Figure 5.5.7 - Residential use in the Mal. Mario Guedes Avenue – Quartier Residences

Source: Google. 2020.

Figure 5.5.8 - Industrial public services use (waste management) in the Mal. Mario Guedes Avenue – Loga

Source: Google. 2020

Regarding the expected uses for the area, according to the São Paulo's Master Plan (2014), the project's area of influence is under the following zoning rules:

Table 5.5.2 Zoning – Area of Influence

Level	Name	Definition	Main objectives
Macro-zone	■ Urban Qualification and Structuring Macrozone	Presents a great diversity of patterns of land use and occupation, socio-spatial inequality, differentiated patterns of urbanization and is the area of the municipality most conducive to urban uses and activities.	■ Reduce the socio-spatial inequality; ■ Decentralization of housing, employment and income projects; ■ Maintenance, protection and qualification of residential areas.
Macro-area	■ Metropolitan Structuring Macro Area	It covers the areas of the fluvial plains of the Tietê, Pinheiros and Tamanduateí rivers, characterized by the existence of structural roads, a railroad system and highways that articulate different municipalities and employment poles in the São Paulo Metropolitan Area, where processes of economic transformation and patterns of land use and occupation, with the need to balance the relationship between employment and housing.	■ Increase construction and demographic densities; ■ Redefinition of current land use and occupation patterns; ■ Production of Social Interest and Affordable Housing; ■ Maintenance and incentive to employment.
Zone (Sector)	■ Railway and Riverfront Sector	Areas covered by the floodplains of the Pinheiros and Tietê rivers with density of high capacity road and rail transport systems.	

Level	Name	Definition	Main objectives
Subsector	■ Arco Pinheiros	The Arco Pinheiros is one of the priority areas for urban development and qualification foreseen in the Master Plan, which aims at the installation of high-density construction and population projects, and projects for economic transformation and environmental qualification.	

Source: SÃO PAULO. Municipal Law Nº 16.050. 2014.

With regard to land use and occupation profiles, it is possible to observe that the project's area of influence is undergoing a transformation process, with growth in commercial and residential use, and decline of industrial use, which is encouraged by the Master Plan.

Additionally, as part of the Arco Pinheiros subsector the project's area of influence is subject to inclusion of urban qualification projects provided for in the Arco Pinheiros Project of Urban Intervention (*Projeto de Intervenção Urbana* – PIU), which includes urban mobility projects, requalification of precarious housing areas, installation of parks and green areas, and creative economy and research projects[14].

The project's area of influence also comprises irregular residential occupation areas. Data on these areas are presented in **Table 5.5.3**.

Table 5.5.3 - Irregular occupation areas within the project's area of influence

Area	Estimated number of households	Estimated population	Location in relation to project's area of influence[15]
Torres de Oliveira	63	185	Completely inserted
Beira da Linha	266	867	Partially inserted (less than 5%)
Nova Jaguaré	2,412	8,653	Partially inserted (less than 5%).

Source: IBGE. 2010.

The irregular residential occupations are shown in **Figure 5.5.1 Land Use**.

Only the Torres de Oliveira area is completely inserted within the limits of the project's area of influence, while the Beira da Linha occupation is at least 5% inserted in the area.

The Nova Jaguaré is considered the largest slum in São Paulo in continuous area, and is located west of the project's area of influence. The overlapping percentages between these areas and the project's area of influence were estimated through the analysis of satellite images and spatial data from IBGE.

It is important to highlight that areas that concentrate irregular residential occupation are considered priorities for the construction of social interest housing and affordable housing projects according to the Master Plan.

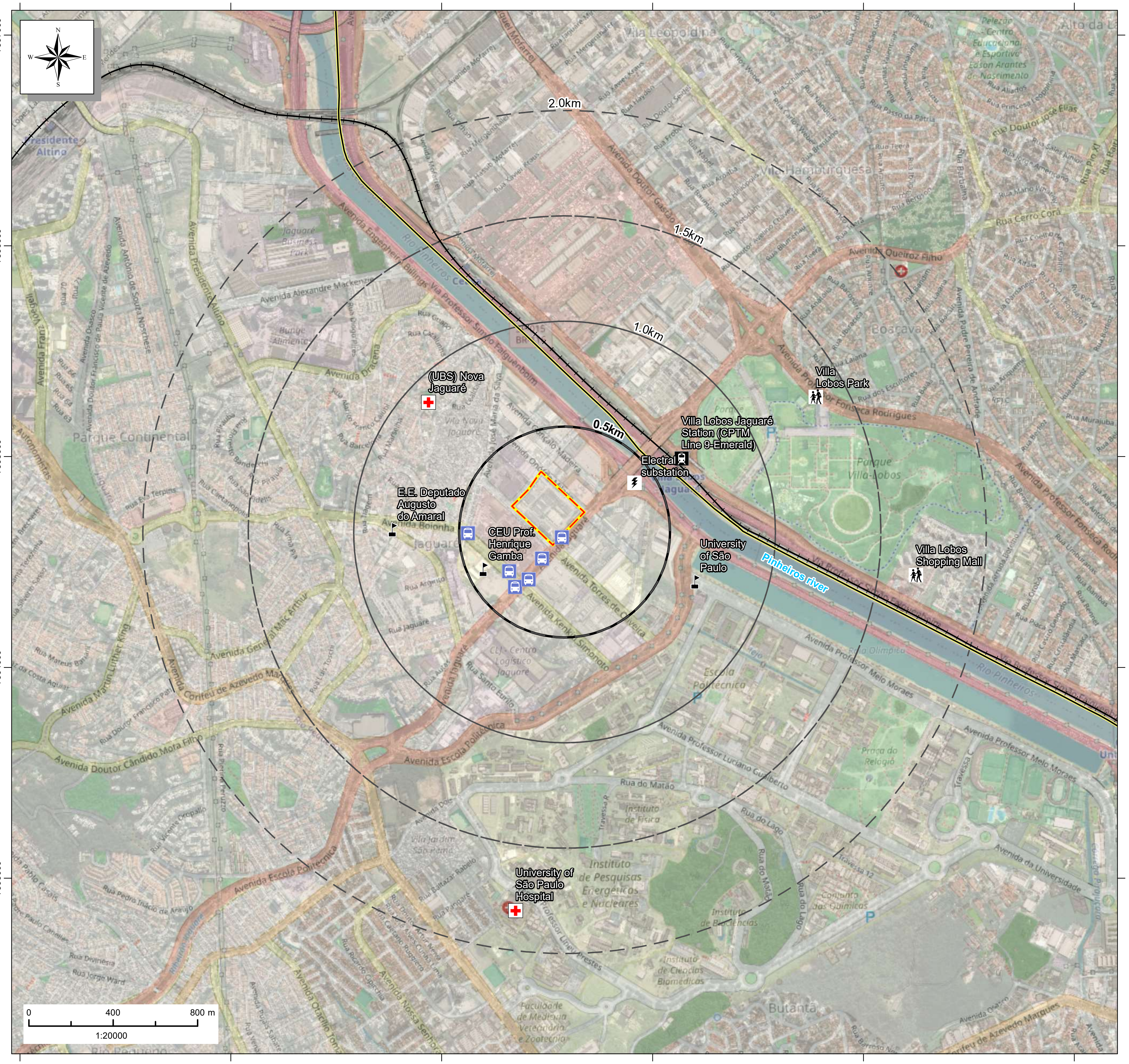
14 Official public information on the Arco Pinheiros Project of Urban Intervention is available at: https://gestaourbana.prefeitura.sp.gov.br/piu-arco-pinheiros/

15 Estimative based on satellite image analysis.

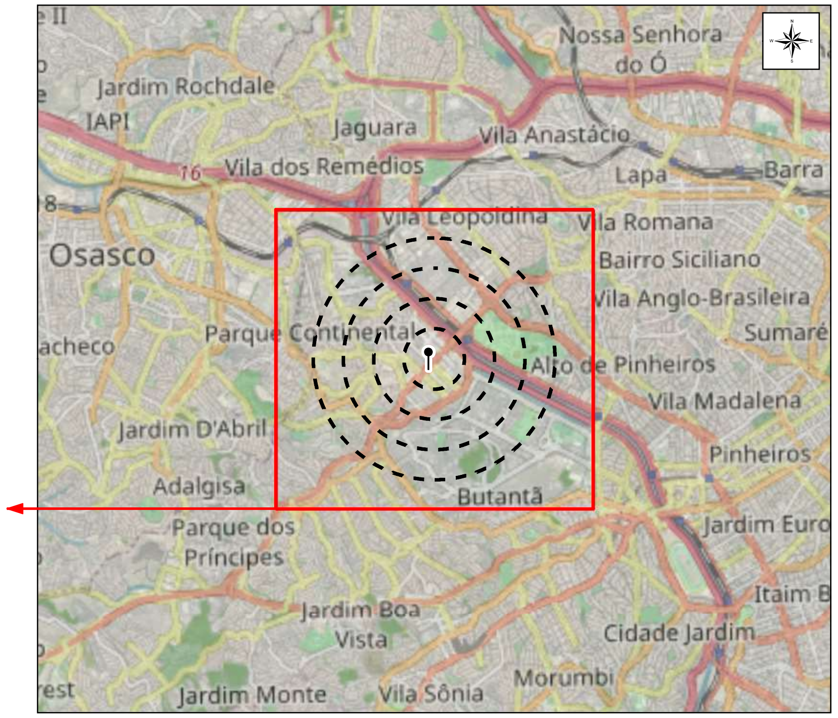
5.6 Infrastructure

This section present data on housing, transport, health, education, leisure and culture infrastructure within the project's area of influence. The data gathered in this section is secondary and collected in official public sources.

The infrastructure identified within the project's area of influence and its surroundings is presented on **Figure 5.6.1** and described in the following subsections.



REFERENCE MAP



Street Map Base available at ArcGIS Desktop, access in September/2020.

LEGEND

- Education
- Energy
- Leisure and culture
- Health
- Railway station
- Bus stop
- Buffers from site location
- Railway
- Marginal Pinheiros bycicle path
- Project site

UTM - SIRGAS 2000 - 23 South

SOURCE:
Database managed by ERM Brasil, 09/2020;
Street Map Base available at ArcGIS Desktop, access in September/2020.

SIZE A3 297 x 420 mm

CLIENT **Peninsula Investments Group**	DESCRIPTION Infrastructure	PROJECT NUMBER **0565997** FIGURE / ANNEX FIGURE 5.6.1
PROJECT Environmental and Social Impact Assessment (ESIA) - Jaguaré, São Paulo/SP	EDIT CONTROL 09/03/2020 EDITION / 09/10/2020 REVIEW THIS DOCUMENT IS PROPERTY OF ERM BRASIL LTDA. AND CANNOT BE COPIED, REPRODUCED OR TRANSMITTED BY ANY OTHER MEANS, OR USED FOR DIFFERENT PURPOSES FROM THOSE WHICH IT WAS DONE.	PREPARED BY RENATA OLIVEIRA TECHNICAL RESPONSIBLE ELIZABETH PENHALBER

0565997-1-IG003
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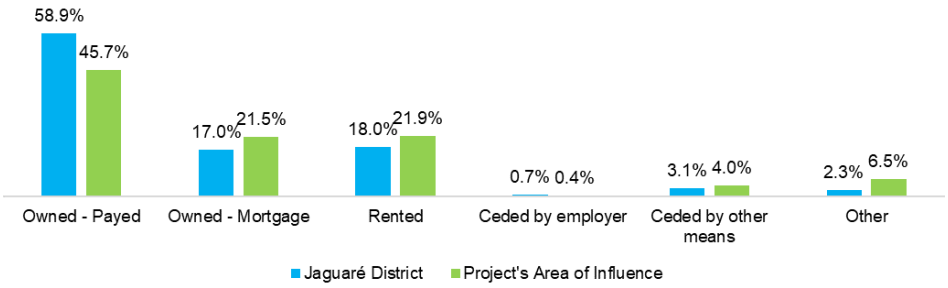
5.6.1 Housing

The characterization of the existing housing infrastructure is based on data from the 2010 Census[16]. According to the 2010 Census, the Jaguaré District had a total of 16,257 households in 2010, out of which circa 1,270 were located within the limits of the project's area of influence (7.7%)[17].

Figure 5.6.1-1 presents data on these households according to ownership status.

Figure 5.6.1-1 - Households ownership status

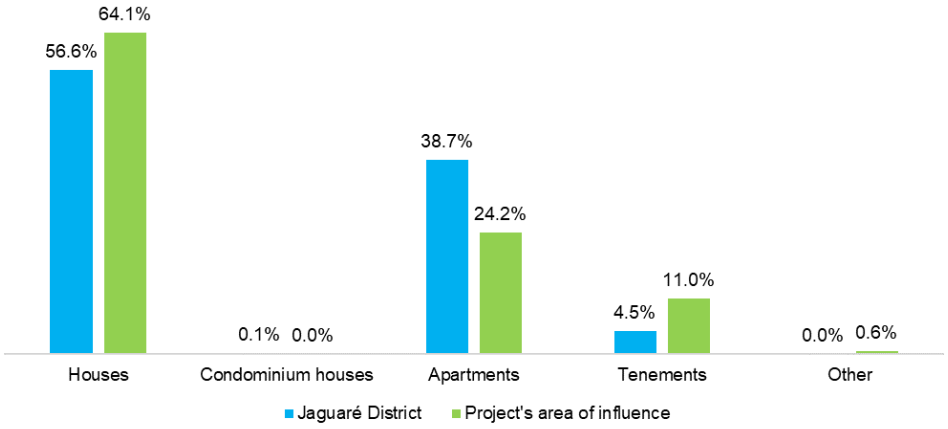


Source: IBGE. 2010.

The data show a tendency for property consolidation in the Jaguaré District as a whole, however, in the project's area of influence there is a higher frequency of rented and ceded households, in comparison to the broader Jaguaré District.

Figure 5.6.1-2 presents data on the households according to typology.

Figure 5.6.1-2 - Households typology



Source: IBGE. 2010.

The data show significant differences on household typology in the analyzed areas: the project's area of influence presents higher frequency of houses, and consequently a lower frequency of apartments, in comparison to the Jaguaré District as a whole. The tenements are also more frequent in the project's area of influence. The differences in typology in the two areas may relate to the presence of

16 Instituto Brasileiro de Geografia e Estatística. 2010.

17 Estimative based on census sectors inserted or partially inserted within the project's area of influence.

irregular residential occupation areas within the project's area of influence, as described in the **5.5 Section – Land use and urban aspects**.

5.6.2 Transport

The project's area of influence has a high coverage of multimodal and integrated transport services. With regard to road transport, 6 bus stops are identified in the area of influence, 4 of them on Jaguaré Ave., and 2 on the Kenkiti Simomoto Ave. The bus lines serving the area of influence connect the west zone to the center of São Paulo, in both directions.

In addition, the Master Plan provides for the installation of a bus corridor on the Jaguaré Ave. as of 2025. The installation of a bus corridor will increase the capacity and speed of bus transport in the project's area of influence, which is in line with the strategic objective of increasing the construction and population density in this area.

The site is also located 900m[18] away from the CPTM's Line 9-Emerald Villa Lobos Jaguaré station.

Line 9-Esmeralda connects the district of Grajaú, in the extreme south of São Paulo, to the municipality of Osasco, in the Metropolitan Region, crossing important regions of São Paulo, such as Santo Amaro, Itaim Bibi, Vila Olímpia and Pinheiros, regions that concentrate high demand for jobs and offers important services of education, health and leisure.

Line 9 also offers connection with Line 4 - Yellow of the subway, which connects the west zone to the center of São Paulo. In the Pinheiros station of subway Line 4-Yellow users also have access to a bus terminal that operates with bus lines connecting the four regions of the city.

Additionally, there is the Marginal Pinheiros bicycle path, bordering Line 9-Emerald, on a 21.5 km (13.3 mi) route. The bicycle path has 6 accesses and connects important infrastructures to Line 9-Emerald, such as the *Cidade Universitária* of the University of São Paulo (USP) and the Villa Lobos Park.

The transport infrastructure located within and around the immediate project's area of influence is presented on **Figure 5.6.1**.

5.6.3 Health

The following health care facilities are located within a radius of up to 3 km from the project's site:

Table 5.6.3-1 - Health care facilities

Type	Name	Location	Distance from project site
Basic Health Care Unit	UBS Nova Jaguaré	Salatiel de Campos St., 222	1.3 km (0.8 mi)
Hospital	University of São Paulo Hospital	Prof. Lineu Prestes Ave., 2.565 (Cidade Universitária)	2.8 km (1.7 mi)

Both units provide public and free care through the Brazilian Unified Health System (SUS). Neighborhoods adjacent to the area of influence, such as Lapa and Pinheiros, also present important public and private health services and infrastructure.

5.6.4 Education

The project's area of influence comprises an elementary school, in addition, 1 km away is located the Deputado Augusto do Amaral State School (high school). The project's site is also located 1.6 km (1 mi) from of the University of São Paulo's *Cidade Universitária* Campus (Gate 2).

18 A 13 minutes' walk, average.

Table 5.6.4-1 - Education facilities

Type	Name	Location	Distance from project site
Elementary education	CEU Prof. Henrique Gamba	Kenkiti Simomoto Ave., 80	500m
High school	E.E. Deputado Augusto do Amaral	Francisco Pedro do Amaral St., 447	1.2 km (0.7 mi)
University education	University of São Paulo	Gate 2 – Av. Prof. Mello Moraes.	1.6 km (1 mi)

The educational services and facilities identified are public and free of charge, covering elementary through university education.

5.6.5 Leisure and Culture

The following leisure facilities are located within 5 km of the site:

Table 5.6.5-1 - Leisure and culture facilities

Type	Name	Location	Distance from project site
Shopping mall	Villa Lobos	Nações Unidas Ave., 4777	3.5 km (2.2 mi)
Public park	Villa Lobos	Professor Fonseca Rodrigues Ave., 2001	3.7 km (2.3 mi)

The Villa Lobos shopping mall concentrates shops, restaurants, theater and cinema.

Founded in 1989, the Villa-Lobos Park covers an area of 732,000 m², and has a bike path, sports courts, soccer fields, playgrounds and a forest with species of Atlantic Forest. The leisure area includes exercise equipment, jogging, roller and skate rinks, street basketball tables, an open amphitheater with 750 seats and an open area for shows, adapted toilets and a cafeteria.

5.7 Economic Activities

This section presents data on the number of businesses, jobs and income in the Jaguaré District. **Table 5.7.1** presents the number of businesses according to the different sectors of the economy:

Table 5.7.1 - Businesses per sector – Jaguaré District

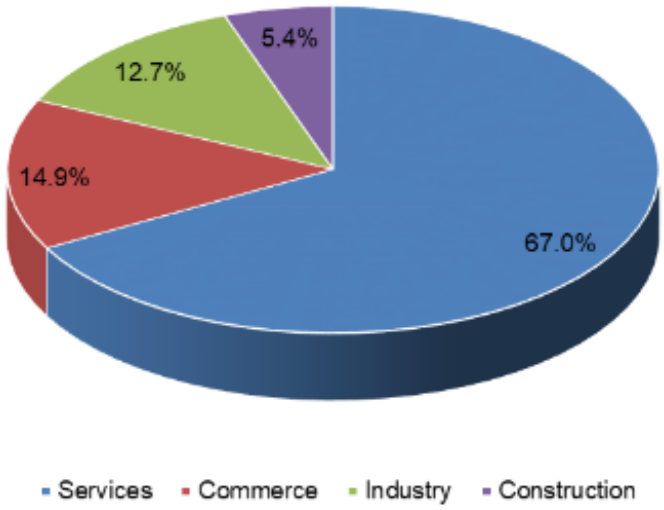
Services	Commerce	Industry	Construction	Total
557	463	94	36	1,150

Source: Ministério da Economia. Relação Anual de Informações Sociais – Rais. 2018.

The services sector corresponds to 48.4% of the businesses located in the Jaguaré District, followed by commerce (40.2%), industry (8.1%) and construction (3.13%).

The four sectors generated a total 46,167 jobs in 2018. **Figure 5.7.1** presents the distribution of the total jobs generated across the economy sectors.

Figure 5.7.1 - Jobs across economy sectors – Jaguaré District

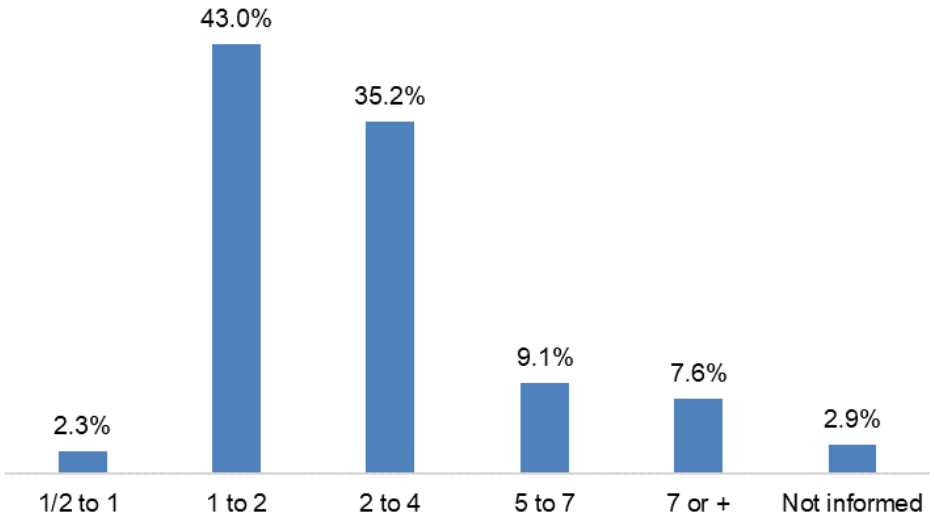


Source: Ministério da Economia. Relação Anual de Informações Sociais – Rais. 2018.

The services sector also corresponds to the majority of jobs (67%), followed by commerce (14.9%), industry (12.7%) and construction (5.4%).

The distribution of jobs according to salary ranges is presented in **Figure 5.7.2**.

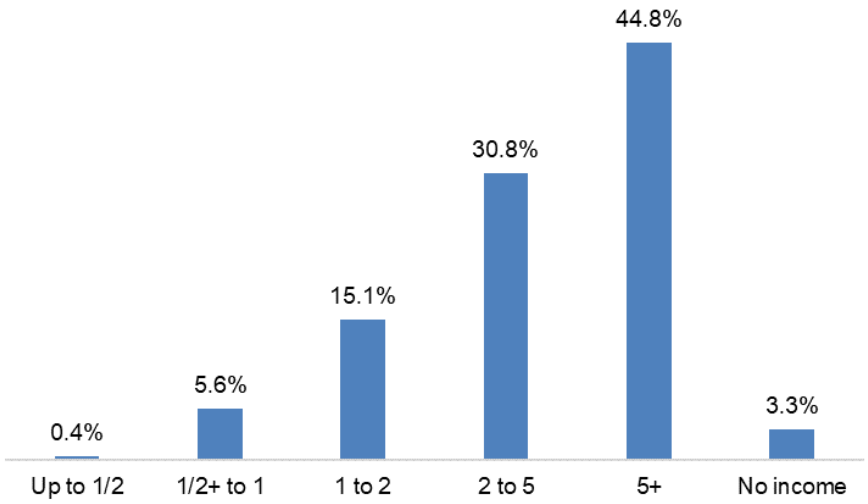
Figure 5.7.2 - Distribution of jobs according to salary ranges (number of minimum wages) – Jaguaré District



Source: Ministério da Economia. Relação Anual de Informações Sociais – Rais. 2018.

The presented data refers to the Brazilian 2018 minimum wage (BRL 954, 00 / USD 246, 50[19]). The distribution of households according to monthly average income is presented on **Figure 5.7.3**.

Figure 5.7.3 - Distribution of households according to monthly income (number of minimum wages) – Jaguaré District



Source: IBGE. 2010.

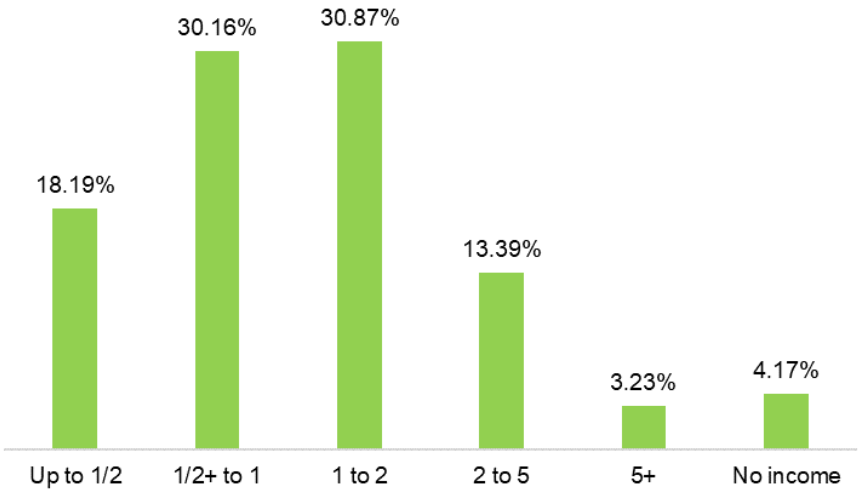
The main category of household income in the Jaguaré District according to the 2010 Census is that exceeding 5 minimum wages/month (44.8%). The households with 2 to 5 minimum wage monthly

19 According to the 2018 currency exchange.

income (which are one the target audiences of social interest housing programs) corresponded to 30.8% of the households in the Jaguaré District in 2010.

Figure 5.7.4 presents data on monthly income for the households located in the project's area of influence.

Figure 5.7.4 - Distribution of households according to monthly income (number of minimum wages) – Project's area of influence



Source: IBGE. 2010.

In the project's area of influence, the average household monthly income is lower than that observed in the Jaguaré District. This area presents a higher concentration of households and families with income within the criteria of social housing projects in comparison to the Jaguaré District as a whole.

5.8 Real Estate Market

This section presents data on the real estate market launches in São Paulo and in the Jaguaré District. **Table 5.8.1** presents the number of vertical residential launches from 2014 to 2018.

Table 5.8.1 - Vertical residential launches

Territory	2014	2015	2016	2017	2018	Total
São Paulo	258	156	136	188	228	966
Jaguaré District	2	*	*	*	1	3

Source: Empresa Brasileira de Estudos de Patrimônio (EMBRAESP). 2018.

The city of São Paulo registered a total of 966 new vertical residential projects in the period, only 3 of them located in the Jaguaré District, which shows that it has not been feasible to develop residential projects in the area.

Table 5.8.2 presents the number of vertical residential units (apartments) launched in the same period.

Table 5.8.2 - Vertical residential units

Territory	2014	2015	2016	2017	2018	Total
São Paulo	32,830	20,218	18,839	36,169	34,743	142,799
Jaguaré District	411	-	-	-	99	510

Source: Empresa Brasileira de Estudos de Patrimônio (EMBRAESP). 2018.

The data on real estate launches show that the Jaguaré District has significant potential for investments in the real estate market.

The average price for vertical residential launces in the Jaguaré District is BRL 6,856.00/m² (USD 1,286.00/m²), while the estimated average price for the Jaguaré 360º project is BRL 5,839.00/m²[20] (USD 1,061.00/m²).

20 Information provided by PEN's real estate market survey. 2020.

6. STAKEHOLDER IDENTIFICATION AND CONSULTATION

In order to prepare a stakeholder consultation plan for the project, ERM performed a stakeholder identification and analysis, based on secondary data available on public sources (such as newspapers, scientific articles, etc.).

A total of 56 relevant stakeholders were identified for the project and its area of influence. The project's stakeholder matrix is presented in **Appendix B**.

After the initial stakeholder identification, the project's stakeholders were classified according to the following attributes:

- **Category –** indicates the sectors / social extracts in which the stakeholders operate; and
- **Relevance –** indicates the relevance of the stakeholders to the project and the Social and Community Management Plan (Section 8.5) based on their potential exposition to the project's impacts[21] and/or their potential influence over the project's premises.

Table 6.1 presents the categories of the identified stakeholders.

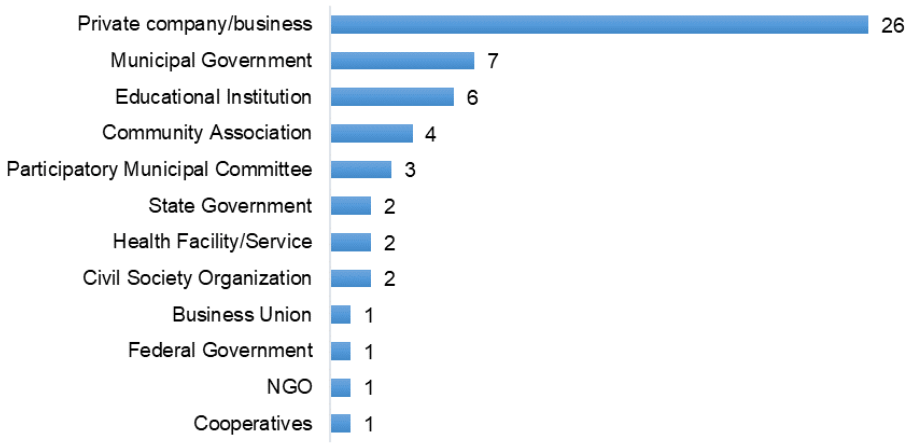
Table 6.1 - Stakeholders Categories

Category	Description
Business Union	Business unions associated with specific economic sectors, such as the Transport Companies Union, present in the project's area of influence.
Civil Society Organization	General civil society organizations, such as associations of interests and club, for example the Parque Continental Rotary Club.
Community Association	Organizations that represent local communities and their residents.
Cooperatives	Cooperatives associated with specific economic sectors, such as the Agricultural Cooperative Água Azul Norte, present in the project's area of influence.
Educational Institution	Schools, universities and research institutes, both public and private.
Federal Government	Federal government agencies, entities and their representatives.
Health Facility / Service	Hospitals, Basic Care Unities (UBS) and other health care facilities.
Municipal Government	Municipal government agencies, entities and their representatives.
Non-Government Organization	Nonprofit organizations that operate independently of any government, typically one whose purpose is to address a social, political or environmental issue.
Participatory Municipal Committee	Participatory forums that debate public policies in the environmental and social areas.
Private company/business	Companies, commerce and other businesses.
State Government	State government agencies, entities and their representatives.

Figure 6.1 presents the stakeholders breakdown according to these categories.

21 Especially geographic proximity (stakeholders located within the project's area of influence).

Figure 6.1 - Stakeholders category breakdown



The general profile of the stakeholders is in line with the project's area of influence main characteristics and land use, due to the major presence of industries and commercial establishments in the area.

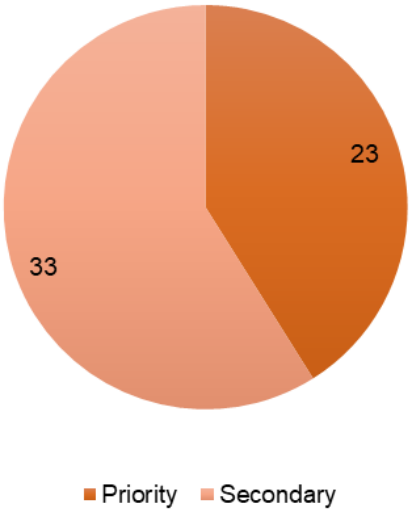
The second stakeholder analysis attribute is relevance, and indicates whether a specific stakeholder should be prioritized in communication and engagement actions.

Table 6.2 - Stakeholders Relevance

Level	Description
Priority	Stakeholders located within the project's area of influence and thus subjects to the project's direct impacts, and/or stakeholders that have potential influence over the project's premises, such as government agencies of any jurisdiction.
Secondary	Stakeholders not located in the project's area of influence and with no potential influence over the project's premises, but relevant in the social dynamics of the Jaguaré district as a whole.

Figure 6.2 presents the distribution of the project's stakeholders according to relevance.

Figure 6.2 - Stakeholders relevance breakdown



About 40% of the project's stakeholders were identified as priorities due to their insertion within the project's area of influence and/or their potential influence over the project's premises. Out of these, a sample of 10 stakeholders were selected to take part in consultations regarding their perception on the environmental and social aspects in the project's area of influence and on the project installation (positive and negative impacts, suggestion of mitigation measures, communication and engagement methods).

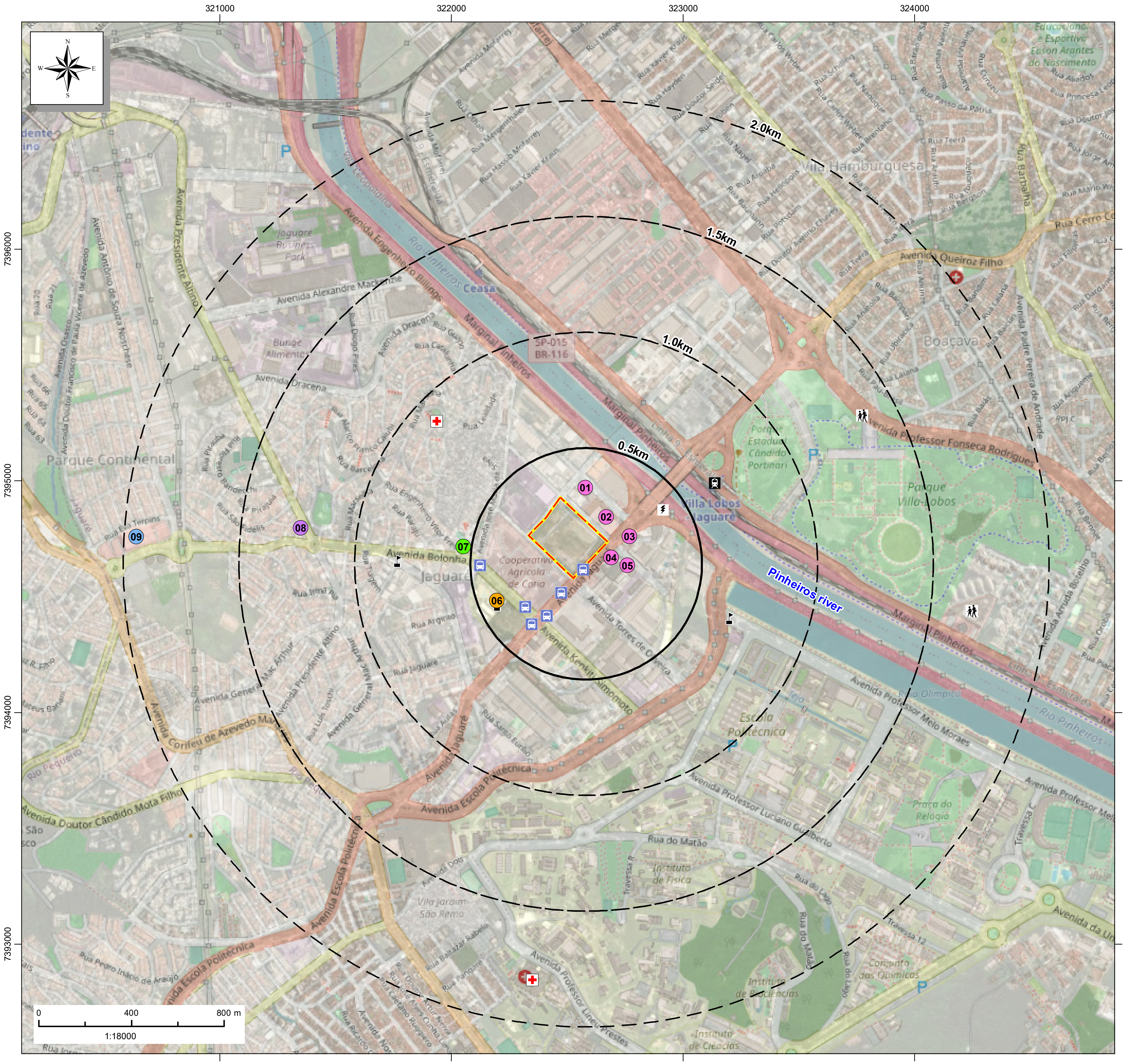
The stakeholder consultation was carried out by ERM from June 14th to June 21st with the application of structured interview scripts. Due to the COVID-19 health and safety measures, the interviews were conducted by phone. The interview script is presented in **Appendix C**.

Table 6.3 presents the list of consulted stakeholders.

Table 6.3 - Consulted stakeholders

Stakeholder	Category	Relevance
Buffet Espaço Villa Lobos	Private company/business	Priority
CEU Jaguaré	Educational Institution	
Go Inn Hotel	Private company/business	
Helipad Helicidade Jaguaré	Private company/business	
Associação Aquarela (Social Assistance)	Community Association[22]	
Municipal Sub-prefectures Secretary	Municipal Government	

[22] The Associação Aquarela is a community association and philanthropic organization that operates in the Nova Jaguaré community (one of the irregular residential occupation areas described in **Section 5.5**). As part of the development of the stakeholder consultation plan that supports the ESIA, ERM also did try to contact representatives of the União dos Moradores da Vila Nova Jaguaré, but the contacts of association's representatives were not identified in public sources through the desktop review. It is important to highlight that both the Associação Aquarela and the União dos Moradores da Vila Nova Jaguaré are classified as priority stakeholders to the project, as presented in **Appendix B** – Stakeholders Matrix (rows 3 – Associação Aquarela and 52 – União dos Moradores da Vila Nova Jaguaré), and should be considered as key stakeholders in future communication actions, as presented in the Social and Community Management Plan (**Section 8.5**).

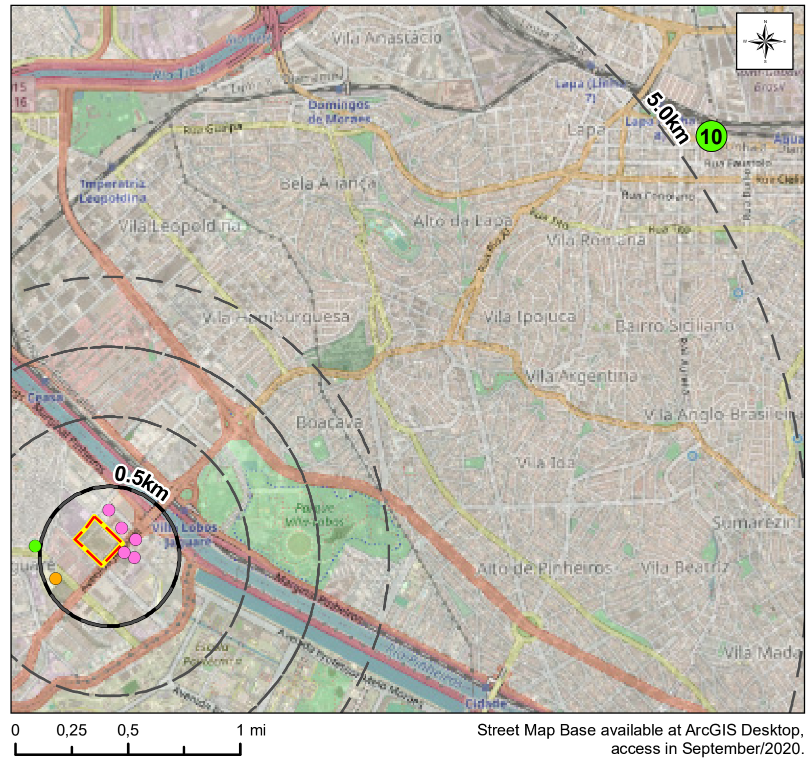


UTM - SIRGAS 2000 - 23 South

SOURCE:
Database managed by ERM Brasil, 06/2021;
Street Map Base available at ArcGIS Desktop, access in 06/2021.

SIZE A3 297 x 420 mm

REFERENCE MAP



Street Map Base available at ArcGIS Desktop, access in September/2020.

LEGEND

- 01 Buffet Espaço Villa Lobos
- 02 Helipad Helicidade Jaguaré
- 03 Go Inn Hotel
- 04 Ponteio Steak House
- 05 Vibe Society - Society Football Courts
- 06 CEU Jaguaré
- 07 Lapa Subprefecture (Social Assistance)
- 08 Reciclar Institute
- 09 Rotary Club São Paulo - Parque Continental
- 10 Municipal Sub-prefectures Secretary

- Education
- Energy
- Leisure and culture
- Health
- Railway station
- Bus stop
- Project site
- Buffers from site location

Stakeholder category:

- Private company/business
- Educational Institution
- Municipal Government
- NGO
- Civil Society Organization

CLIENT **Peninsula Investments Group**	DESCRIPTION Stakeholders		PROJECT NUMBER **0565997** FIGURE / ANNEX FIGURE 6.3
PROJECT Environmental and Social Impact Assessment (ESIA) - Jaguaré, São Paulo/SP	EDIT CONTROL 06/23/2021 EDITION / 06/23/2021 REVIEW	THIS DOCUMENT IS PROPERTY OF ERM BRASIL LTDA. AND CANNOT BE COPIED, REPRODUCED OR TRANSMITTED BY ANY OTHER MEANS, OR USED FOR DIFFERENT PURPOSES FROM THOSE WHICH IT WAS DONE.	PREPARED BY LAURA ANDRADE TECHNICAL RESPONSIBLE ELIZABETH PENHALBER

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Ponteio Steak House	Private company/business	
Reciclar Institute[23]	NGO	
Rotary Club São Paulo - Parque Continental	Civil Society Organization	
Vibe Society - Society Football Courts	Private company/business	

Figure 6.3 presents the consulted stakeholders location in relation to the project's area of influence.

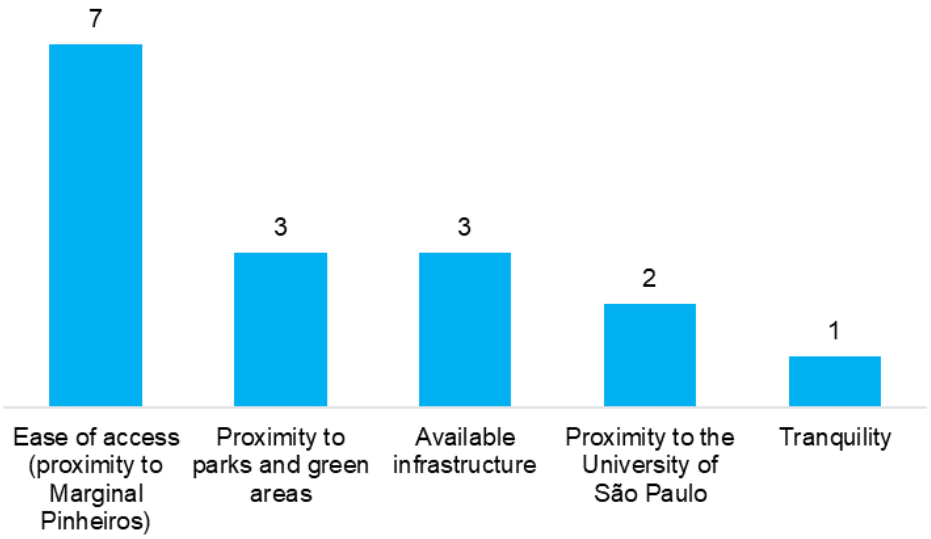
After identification and prioritization, the selected stakeholders were interviewed in order to assess their perception of the environmental and social aspects of the project's area of influence, of potential negative and positive impacts and their preferred communication and engagement strategies.

The results of these consultations are presented as follows. Since the script questions were open-ended, the answers could be multiple. Therefore, the total number of responses is not always equivalent to the number of stakeholders interviewed.

Regarding the stakeholders interviewed profile, 7 were male and 3 female, and 8 of them are present in the neighborhood for more than 10 years (8).

Regarding their perceptions of the neighborhood and the project's area of influence, the selected stakeholders were asked about the main positive and negative aspects of the area, both environmental and social, as well as their perception of the available infrastructure and public services. The results are as follows:

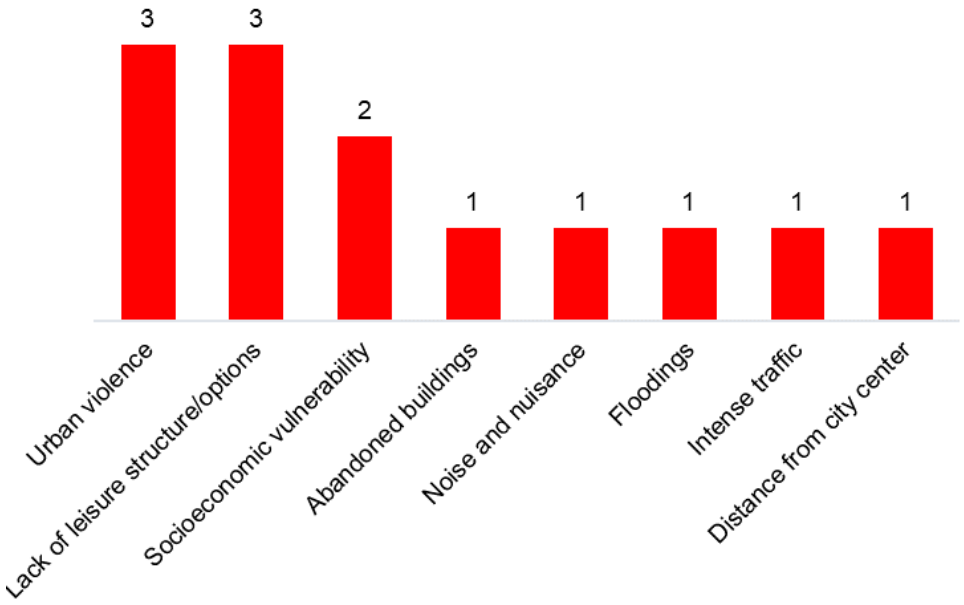
Figure 6.4 - Main positive aspects of the area



The main positive aspect of the area according to the stakeholders is the proximity to the Marginal Pinheiros, which grants the neighborhood with ease access from and to different destinations in the city territory. Other positive aspects mentioned are the proximity to parks and green areas, especially the Villa Lobos Park, the available infrastructure of education and health, and the proximity to the University of São Paulo. One of the consulted stakeholders considers the area to be safe and calm, in spite of the presence of industry establishments and other large scale facilities.

[23] The NGO develops social and environmental projects aimed at the vulnerable communities in the Jaguaré District, including the irregular residential occupation areas within the project's area of influence.

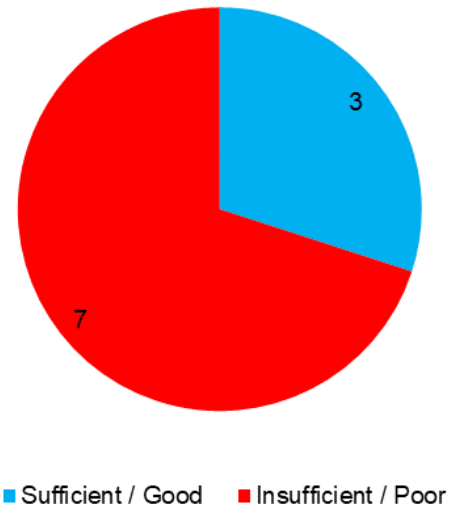
Figure 6.5 - Main negative aspects of the area



The main negative aspects of the area according to the consulted stakeholders are the urban violence, due to the occasional occurrence of robberies, the lack of leisure structure and options, such as clubs and cultural facilities (cinemas, theaters, and libraries) and the occurrence of socioeconomic vulnerability expressed in the presence of slums, the main one being the Vila Nova Jaguaré. Other negative aspects, mentioned once each, are the noise and nuisance from the traffic of vehicles and night time illegal events (such as funk parties), the occurrence of flooding in the rain season (summer), intense traffic and the neighborhood's distance to the city center.

The consulted stakeholders were also asked about their perception of the available infrastructure and public services in the neighborhood. Figure 6.6 presents these results.

Figure 6.6 - Assessment of available infrastructure



The main infrastructure needs reported by stakeholders who assessed the available infrastructure as poor or insufficient were:

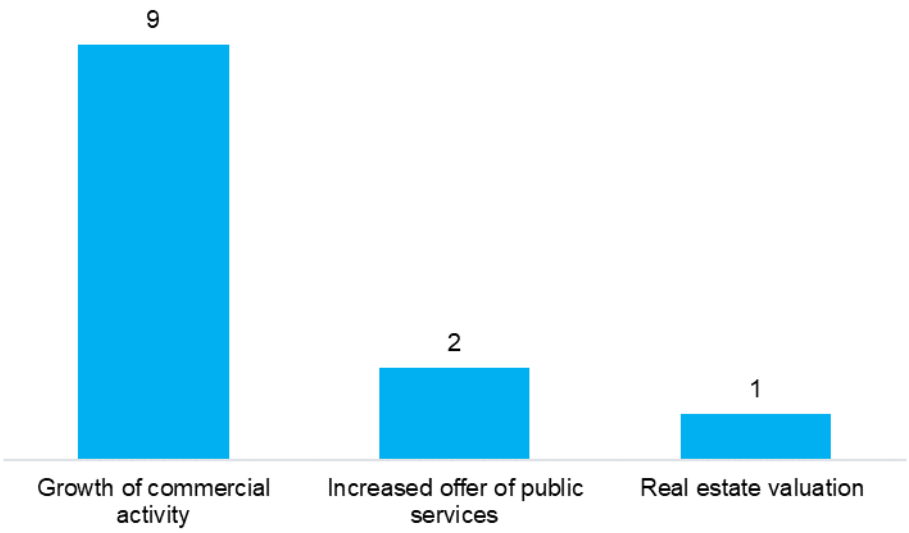
- Insufficient health facilities and services – 4 mentions;
- Lack of education, culture and leisure facilities – 2 mentions;
- Insufficient traffic infrastructure – 1 mention;
- Insufficient infrastructure to contain floods – 1 mention; and
- Subway line unavailability – 1 mention.

The stakeholders were also asked whether these needs affects the neighborhood as a whole or specific areas and vulnerable groups. According to the stakeholders, the main affected are the residents of vulnerable communities, such as the Vila Nova Jaguaré community, which is adjacent to the project's area of influence.

The stakeholders that assessed the available infrastructure as sufficient / good highlighted the presence of high-capacity public transport, such as bus corridors and CPTM Train Line 9 – Emerald and the presence of public and private schools and universities.

Regarding their prospects of a residential real estate development in the area, the stakeholders were asked about potential positive (expectations) and negative impacts and risks (concerns). The results are as follows:

Figure 6.7 - Potential positive impacts



The stakeholders' main positive expectation is the growth of commercial activity in the area due to the attraction of new residents and population growth, which can boost the local demand of goods and services. Increased offer of public services is also expected as an effect of the project's installation due to the potential requalification of the area, which will assume a more residential aspect, in contrast with the current industrial and commercial use. One of the stakeholders mentioned the real estate valuation that may occur as a side effect of the conversion in land use, which would benefit estate owners in the future.

Regarding the project's potential negative impacts and risks, the only impact identified by the consulted stakeholders was increased traffic, mentioned in 5 interviews[24]. The other 5 consulted stakeholders did not identify any project's negative impacts or risks.

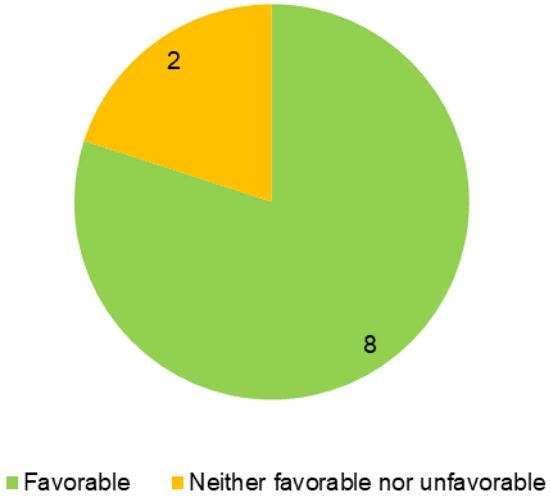
As the main concern of the stakeholders with the project's installation is the potential increased traffic, the main suggestions for mitigation measures are related to this theme, and contemplate the following:

24 However, it is important to highlight that only 60% of the units will have parking spaces.

- Expansion of the Jaguaré Avenue;
- Informative campaigns and traffic signalling; and
- Engagement with the municipal government to discuss effective measures for traffic.

After the appreciation of potential positive and negative impacts, the stakeholders were asked to balance the pros and cons of the project, according to their experience and knowledge of the area, and assess their inclination towards the project installation.

Figure 6.9 - Position towards project installation



The majority of the consulted stakeholders declared themselves to be in favour of the project's installation, mainly because of the potential for the requalification of the area, with residential conversion of the land use, and due to the expectation of commercial activity increase, as a result of population growth and its impact on demand for consumer goods and services. Two of the consulted stakeholders declared to be neutral.

Finally, the stakeholders were asked to provide their opinion on the most suitable communication channels and strategies, the following were prioritized:

- Phone and social media (*WhatsApp*);
- E-mail; and
- Printed communication materials (handouts, brochures, etc.).

According to the stakeholders, the communication and engagement should focus on the release of informative materials on the project's impact mitigation measures, especially in the construction phase, with consideration to the following themes: traffic control and signalling, risk management, noise and nuisance.

Further information dissemination and communication measures that applies to the project's installation are provided in the Social and Community Management Plan (**Section 8.5**).

7. ENVIRONMENTAL AND SOCIAL IMPACT ASSESSEMENT

The project's environmental and social impacts were identified through the correlation between the project's characteristics and their possible effects on environmental and social quality aspects in the area of influence.

This section identifies the activities of the project's construction and occupation phases that may have environmental and social impacts on the project's area of influence.

The identified activities that can generate impacts are:

- Circulation of heavy vehicles (trucks) and cars on the access roads to the project's site due to the transportation of materials, equipment and workers;
- Temporary circulation of workers who will use the public transport services;
- Noise generation and emissions due to construction works and the movement of vehicles and equipment;
- Generation and emission of particulate material (dust) as a result of construction works;
- Generation of solid waste resulting from earthworks and construction activities and operation of the administrative and support sector at the construction site;
- Temporary interruption of traffic on the surrounding roads to carry out activities associated with the construction works;
- Acquisition of local inputs and services; and
- Occupation and operation of the project.

Figures 7.1 and 7.2 present the impact matrix of the construction and occupancy phases[25].

Table 7.1 presents the detailed environmental and social impacts identified and assessed in the construction and occupancy phases, as well as the impact mitigation measures proposed by the Environmental and Social Management Plan (ESMP) presented in **Section 7**. Some of the measures are not part of any specific plan, but recommended according to the international good practices.

25 The positive impacts are not plotted on the matrices since no significance is assigned to positive impacts according to the methodology.

Figure 7.1 - Impact Matrix – Construction Phase

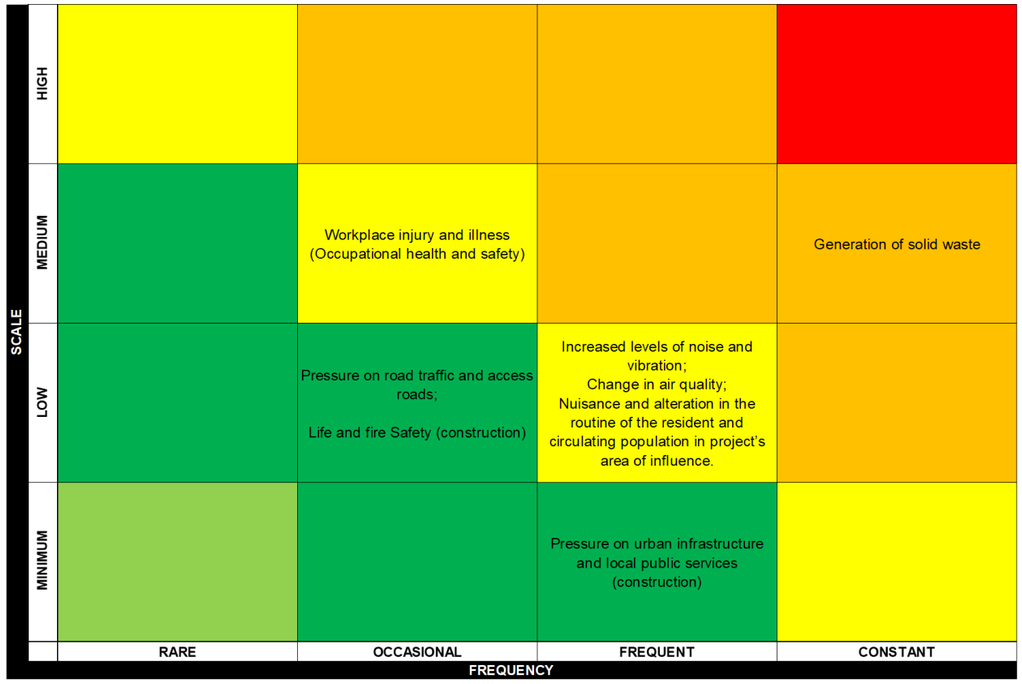


Figure 7.2 - Impact Matrix – Occupancy Phase

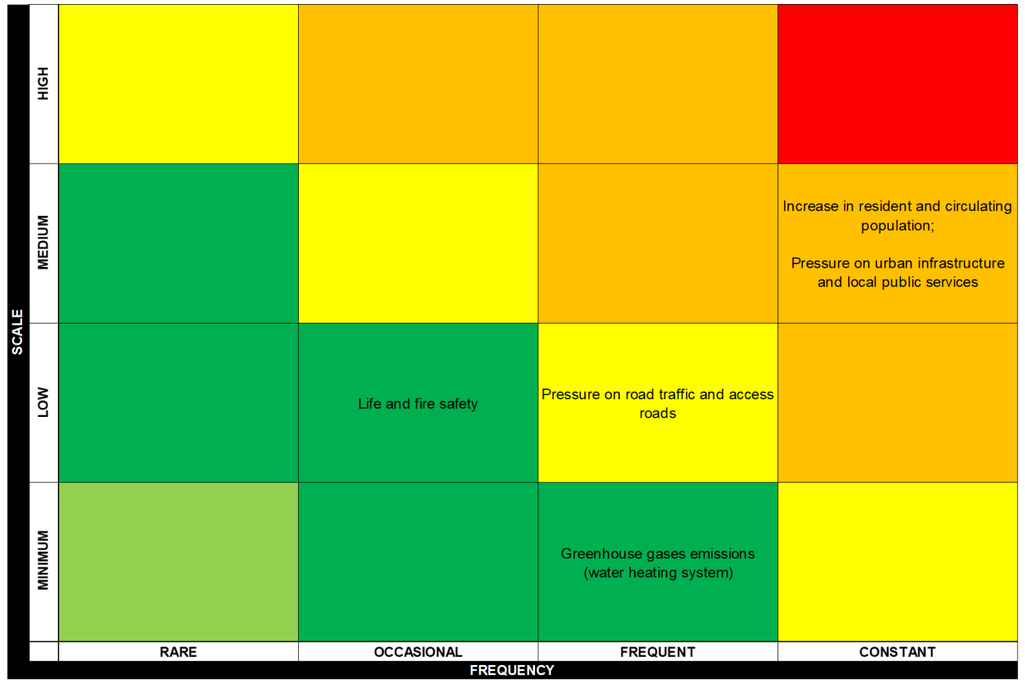


Table 7.1 - Environmental and social impact assessment

Impact	Description	Nature	Scale	Frequency	Significance	Related ESMP and Impact Mitigation Measures
CONSTRUCTION PHASE						
Generation of solid waste	During the construction phase, solid waste will be generated, such as construction waste, wood, metal scraps, tow contaminated with oils and greases, plastic packaging, organic and sanitary waste, paper, etc. ■ **Scale:** The scale is assessed as medium, considering the phases of works that will have the potential to generate the largest volume of waste (such as earthworks and excavation). ■ **Frequency:** The frequency is assessed as constant, since solid waste will be generated throughout the construction phase. Despite this, it is emphasized that there are no legal limits for maximum generation of waste, provided that it is properly disposed.	Adverse	Medium	Constant	Major	■ Environmental Management Plan. - Waste management plan: ▪ Implement and continuously monitor the effectiveness of the measures provided for by the Waste management plan, such as: ▪ Classification of waste; ▪ Waste generation reduction whenever possible; ▪ Recycling; ▪ Correct disposal of waste.
Workplace injury and illness (occupational health and safety)	During the construction phase, there is the occasional risk of work-related accidents that may cause injuries or illness to the employees. ■ **Scale:** The scale is assessed as medium, considering that even though serious injuries can occur in the workplace, a close oversight by the HSE team and obedience to workplace regulations can highly decrease the occurrence of these events. ■ **Frequency:** The frequency is assessed as occasional, since accidents can occur with no estimable frequency.	Adverse	Medium	Occasional	Moderate	■ Health and Safety Management Plan. - Implement and continuously monitor the risks identified in the workplace; - Properly train the workforce in the use of PPE and inform about the risks of the construction environment; - Provide specific training on high risk activities and make use of work permits during high risk activities; - Enforce the correct use of PPE.
Increased levels of noise and vibration	Civil engineering works and the movement of heavy vehicles will generate noise and vibration that may cause discomfort to the resident, circulating and working population, compromising the quality of life of these individuals. ■ **Scale:** The scale is assessed as low, since the impact should be limited to the immediate project's area of influence; ■ **Frequency:** The frequency is assessed as frequent, since noise and vibration may occur throughout different phases of the construction works.	Adverse	Low	Frequent	Moderate	■ Environmental management plan. - Implement and continuously monitor the effectiveness of the measures for managing the impacts of increased levels of noise and vibration. ■ Social and community management plan. - Monitor the stakeholders' grievances related to the theme, through the grievances mechanism, and implement specific measures to manage impacts to reduce the number of manifestations.
Change in air quality	During the construction phase, the level of particulate material (dust) may increase due to the movement of vehicles, earthworks and construction works, especially in the excavation stage. Emissions will also occur as a result of the increased movement of light and heavy vehicles in the area. ■ **Scale:** The scale is assessed as low, since the impact should be limited to the immediate project's area of influence ■ **Frequency:** The frequency is assessed as frequent, since the activities that will cause an increase of the levels of particulate material will occur in a frequent basis in different phases of the construction works, as described in **Section 3 Project Description**.	Adverse	Low	Frequent	Moderate	■ Environmental management plan. - Implement measures to monitor the dispersion of particulate matter (dust) and greenhouse gases (vehicles and equipment, such as power generators); - Use alternatives for the reduction of particulate material (dust), such as humidification of bare soil and use of fencing; - Prioritize the use of fuels with lower greenhouse gas emissions, such as alcohol and biodiesel whenever possible.
Nuisance and alteration in the routine of the resident and circulating population in project's area of influence	The circulation of heavy vehicles on the access roads to the project's site during the construction phase, the emission of particulate material, noise generation, temporary interruption of the surrounding roads and the circulation of workers in the project's area of influence may interfere with the daily lives of the resident and circulating population. However, as described in **Section 5**, the immediate project's area of influence is not characterized by residential use, which reduces the scale of this impact due to a smaller number of potential receptors. ■ **Scale:** The scale is assessed as low due to the diminished number of potential receptors in the project's area of influence. ■ **Frequency:** The frequency is assessed as frequent as a result of the interactions between the impacts on traffic, increased levels of noise and vibration and change in air quality.	Adverse	Low	Frequent	Moderate	■ Environmental Management Plan. - Implement and continuously monitor the effectiveness of the measures for managing the impacts of increased level of noise and vibration, changes in air quality and pressure on traffic (described in the correspondent plans), ensuring the minimization of potential discomfort to the neighbors of the site during the construction phase. ■ Social and Community Management Plan. - Implement actions to proactively communicate changes and annoyances to the neighbors of the site during the construction phase through the Social and community management plan; - Monitor the stakeholders' grievances related to the theme, through the grievances mechanism, and implement specific measures to manage impacts to reduce the number of manifestations.
Life and fire Safety (construction)	The life and fire hazard will occur as risk of the project during the construction phase due to the use of flammable material and electric equipment in the construction works, consequently, increasing the risk of life and fire safety.	Adverse	Low	Occasional	Minor	■ Emergency Prevention and Response Management - Indicate the measures or organization in case of fire; include communication measures with the trained emergency response team. In case of a minor fire, define the corresponding actions to extinguish it, such as the use of a fire extinguisher.

Impact	Description	Nature	Scale	Frequency	Significance	Related ESMP and Impact Mitigation Measures
	■ **Scale**: The scale was assessed as low, because of the required legal safety procedures that greatly diminishes the possibility of a large event. ■ **Frequency:** The frequency is assessed as occasional, since a number of prevention procedures can be implemented to avoid the starting of a fire, and, if it occurs, to ensure a safe building evacuation.					- Remove any unnecessary stored items and maintain general housekeeping - Provide proper signaling of escape routes and emergency lighting. ■ Ensure the means of escape: walkways and stair cases should be always clear, and fire doors must never be locked.
Pressure on road traffic and access roads	The circulation of vehicles should happen throughout the construction phase of the project, and relates to the activities of transporting materials, equipment and workers. The construction works will be concentrated during the day, until 17 pm. The flow of heavy vehicles necessary for the transport of construction materials, equipment and, mainly, for the concrete transport, of excavation materials and waste to the final destination places (dump and landfill), will be concentrated on the road system of the project's surrounding area of influence. ■ **Scale:** The scale is assessed as low, since the impact should be concentrated within the project's area of influence; ■ **Frequency:** The frequency is assessed as occasional, since the activities that will cause a greater flow of vehicles (earthworks and transportation of concrete and other materials) will occur in specific phases of the construction works, as described in **Section 3 Project Description**.	Adverse	Low	Occasional	Minor	■ Environmental Management Plan. - Avoid the circulation of heavy vehicles, as well as the interruption of local roads, during peak hours (Monday to Friday from 7:00 am to 9:00 am, from 11:30 am to 1:30 pm and from 5:00 pm to 7:00 pm); - Implement a routine to check the condition of the roads used for moving heavy vehicles. Once damage is found, establish contact with the government to define responsibilities, and thus carry out the necessary repair; - The staff dedicated to transport (materials, equipment) must be trained in defensive driving. ■ Social and Community Management Plan. - Communicate with stakeholders on eventual traffic interruptions and provide for alternatives; - Monitor the stakeholders' grievances related to the theme, through the grievances mechanism, and implement measures to manage impacts to reduce the number of manifestations.
Pressure on urban infrastructure and local public services (construction)	The pressure on urban infrastructure and local public services is a byproduct of the project's impact on the increase of circulation of workers during the construction phase, especially for transport services, that are profuse in the project's area of influence and surrounding areas, as described in **Section 5**. ■ **Scale:** The scale was assessed as minimum as the workforce for the construction phase will be 100% local; ■ **Frequency:** The frequency of the impact was assessed as frequent during the construction phase.	Adverse	Minimum	Frequent	Minor	■ This impact can be mitigated with the adoption of staggered times for workers shifts.
Generation of jobs	The construction phase will generate jobs for workers in the civil construction sector. A total of 600 workers are expected to be hired for the construction phase over the period of 5 years.	Positive	*	*	*	■ Social and Community Management Plan. - Communicate job opportunities that can be filled by residents of local communities, especially the most vulnerable, promoting local development and increased income.
Improvement in demand for local commerce and services	The growth in demand for local products and services will occur as a positive impact of the construction phase due to the acquisition of products and services in the project's immediate area of influence.	Positive	*	*	*	■ Social and Community Management Plan - It is recommended that PEN suppliers prioritize local commerce whenever possible in the purchase of products and services, enhancing the positive impact.
OCCUPANCY PHASE						
Increase in resident and circulating population	The increase in the resident and circulating population will progressively take place in the occupancy phase according to the selling and occupation of the residential units. The project is expected to add 5,806 residents to the project's area of influence population by 2027, when all the lots and buildings are expected to be concluded. The population in the project's area of influence according to the 2010 Census was of 4,202 people. Despite this, it is highlighted that the data may be out of date in view of the current situation, since new real estate projects were installed in the area after 2010. In addition, the project is inserted in a preferential area for constructive and demographic densification, according to the Master Plan (2014). Finally, the project may present an estimated circulating population of 270 people, such as workers in the maintenance and security of the buildings. It is important to highlight that this impact is expected by the municipal government as the project is located in an area destined to constructive and demographic densification and urban qualification according to the Master Plan (2014). ■ **Scale:** The scale was assessed as medium in terms of the combined analysis of the estimated population for the project, and the support capacity of the area	Adverse	Medium	Constant	Major	■ It is important to highlight that this impact is expected by the municipal government as the project is located in an area destined to constructive and demographic densification and urban qualification according to the Master Plan. Thus, no impact mitigation measure is recommended for the occupancy phase.

Impact	Description	Nature	Scale	Frequency	Significance	Related ESMP and Impact Mitigation Measures
	provided for in the Master Plan (which aims at constructive and demographic densification). ■ **Frequency:** The frequency of the impact was assessed as constant due to the nature of the project (residential use).					
Pressure on urban infrastructure and local public services	The pressure on urban infrastructure and local public services is a byproduct of the project's impact on the increase of resident and circulating population in the occupancy phase. The pressure on infrastructure may occur due to the increase in the demand for education, health and transport services that are profuse in the project's area of influence and surrounding areas, as described in **Section 5**. ■ **Scale:** The scale was assessed as medium in accordance to the estimated increase of resident and circulating population in the occupancy phase, and considering the Master Plan's zoning for the project's area of influence that sets the objective of increased constructive and demographic densification in this area; ■ **Frequency:** The frequency of the impact was assessed as constant due to the nature of the project (residential use).	Adverse	Medium	Constant	Major	■ As part of the closure of the ESMP after the construction phase, identify along with the government and other stakeholders opportunities for private social investment (PSI)[26] aimed at improving or expanding the existing local infrastructure, especially in the areas of education, health and leisure. However, it is important to highlight that this impact is expected by the municipal government as the project is located in an area destined to constructive and demographic densification, and also due to its insertion in the perimeter of Arco Pinheiros, which already provides mechanisms for public investment and private partnerships in infrastructure projects for the region.
Pressure on road traffic and access roads	The pressure on the traffic of the project's area of influence will remain in the occupancy phase of the project due to the vehicles that must be added by the residents of the project. The project has 1,742 parking spaces, as described in **Section 3**. However, it is important to highlight that the road system of the project's area of influence is mainly formed by structural roads, according to the Master Plan classification, that present high capacity for road transport and traffic. The project's area of influence surroundings is also well served by high capacity transport systems, such as bus lines and CPTM's Line 9-Emerald, which offers non-private transportation alternatives to project residents. ■ **Scale**: The scale was assessed as low, because of the limited number of parking spaces provided by the project (only 60% of the units will include parking spaces) and the road conditions in the project influence area. ■ **Frequency**: The frequency was assessed as frequent due to the high availability of non-private transport alternatives in the project's area of influence, which will give residents the choice not to use their own vehicles whenever possible.	Adverse	Low	Frequent	Moderate	■ As part of the closure of the ESMP after the construction phase, identify opportunities for improvement and adaptation of the local road system, such as the implementation of alternative access to the project, in accordance with the traffic authority (CET). To deal with this impact, the stakeholders suggested the installation of proper traffic signaling in the adjacencies of the site and engagement with public authorities to discuss alternatives to reduce traffic in the area.
Life and fire Safety	The life and fire hazard will occur as risk of the project during the occupation phase due to the increase of flammable material in the apartments, consequently, increasing the risk of life and fire safety. ■ **Scale**: The scale was assessed as low, because of the required legal safety procedures that greatly diminishes the possibility of a large event. ■ **Frequency:** The frequency is assessed as occasional, since a number of prevention procedures can be implemented to avoid the starting of a fire, and, if it occurs, to ensure a safe building evacuation.	Adverse	Low	Occasional	Minor	■ Emergency Prevention and Response Management - Indicate the measures or organization in case of fire; include communication measures with the trained emergency response team. In case of a minor fire, define the corresponding actions to extinguish it, such as the use of a fire extinguisher. - Remove any unnecessary stored items and maintain general housekeeping - Consider smoke detection for common areas. - Provide proper signaling of escape routes and emergency lighting. - Ensure the means of escape: walkways and stair cases should be always clear, and fire doors must never be locked.
Greenhouse gases emissions (water heating system)	This impact relates to the generation of GHG emissions from the use of the water heating systems that will be of optional installation in the project's residential units. As presented in Section 3.7, the water heating system would be expected to generate 40 tons of CO^2/monthly in its maximum capacity (e.g.: all units with the system installed), a scenario that is not likely to occur[27]. ■ **Scale:** The scale was assessed as minimum, as it is not likely that the system will operate in its full capacity; ■ **Frequency:** The frequency is assessed as frequent, as the system will supply the units on a daily basis (showers).	Adverse	Minimum	Frequent	Minor	■ No mitigation measure recommended for occupancy phase. However, the future management of the condominiums may consider replacing the water heating system with other alternative sources (solar) if emissions reach an undesirable level.

26 Defined as the voluntary and systematic allocation of private resources in a planned and monitored way, to social projects with public interests. INSTITUTO PARA O DESENVOLVIMENTO DO INVESTIMENTO SOCIAL. Private social investment trends in Latin America. 2011.

27 Despite their higher cost, electric showers are still more frequent in Brazilian homes.

Impact	Description	Nature	Scale	Frequency	Significance	Related ESMP and Impact Mitigation Measures
Improvement in demand for local services and commerce	The growth in demand for local products and services will occur as a positive impact of the project due to the increase in the local population, which will increase the global income in the area of influence and, consequently, the demand for products and services in local commerce, boosting the economy.	Positive	*	*	*	■ This impact is a natural consequence of the project's development. Thus, no enhancement measure is recommended.
Increased supply of affordable housing	The impact on the supply of affordable housing will happen as a result of the project's premises, since 100% of the residential units will be destined to low-income families with government subsidized credits.	Positive	*	*	*	■ This impact is a natural consequence of the project's development. Thus, no enhancement measure is recommended.

All impacts identified for the construction and occupancy phases have management measures provided for in the project's Social and Environmental Management Plan, presented in **Section 8**.

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The project's Environmental and Social Management Plan (ESMP) was designed in a conceptual manner according to the project's early premises, described in **Section 3**. Thus, the ESMP present general guidelines and standards that have to be in place for the effective socio-environmental impact management, especially in the construction phase, when the project's impacts will be more perceptible.

The project's ESMP was designed with consideration to the guidelines of the Environmental and Social Management System Implementation Handbook (Construction sector), by the International Finance Corporation (2014).

The IFC Performance Standards triggered by the project are:

- PS 1 – Assessment and management of environmental and social risks and impacts;
- PS 2 – Labor and working conditions;
- PS 3 – Resource efficiency and pollution prevention; and
- PS 4 – Community health, safety and security.

The project does not trigger other IFC performance standards as no impacts on land acquisition and resettlement (PS 5), biodiversity (PS 6), indigenous people (PS 7) and cultural heritage (PS 8) were identified.

The IFC Performance Standards applicable to the project's ESMP are highlighted accordingly in the following plans.

The definition of responsible professionals, goals and budget for the ESMP plans is a prerogative of PEN, as these premises are not included in the conceptual design of the plans.

8.1 Environmental Management Plan

In the construction phase all contractors and visitors to the site will be made aware of the ESMP and its procedures and controls applicable to their presence and activities on site. The Project Manager will be responsible for monitoring communications between all relevant parties to the project ensuring that all environmental matters to the project are discussed and managed.

Specific plans were designed to mitigate the main environmental impacts for the construction phase. These plans are presented in the following subsections.

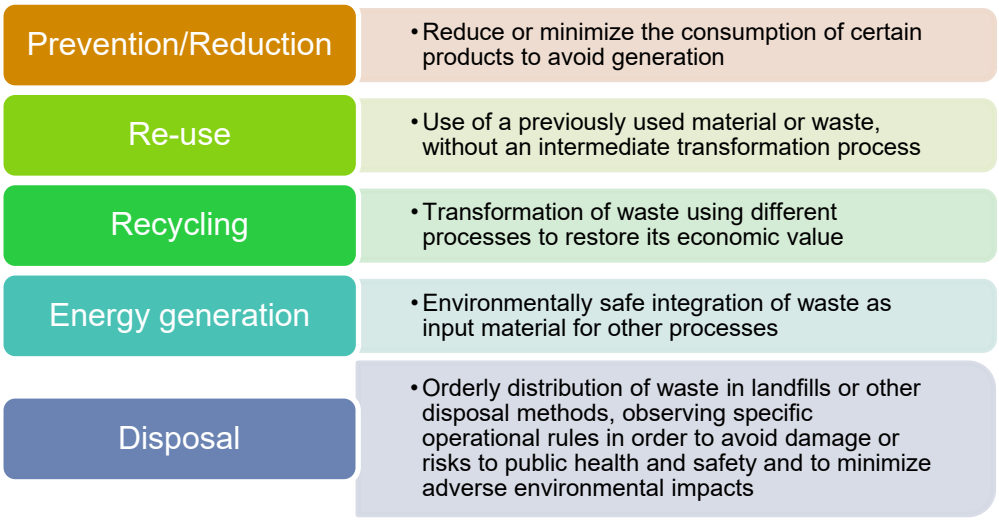
8.1.1 Waste Management Plan

8.1.1.1 Objective

The objective of the Waste Management Plan is to identify, separate and dispose all solid waste generated by the project, considering the appropriate methods of management, storage, transport and final disposal, based on the characteristics of the waste and the hierarchy of controls. In addition, comply with municipal, state and national environmental regulations related to waste management, as presented in **Section 4** (Table 4.1).

8.1.1.2 Guidelines and activities

The Environmental Health and Safety (EHS) Supervisor is responsible for the development and implementation of management measures to promote the reduction of waste generation. The central theme of this procedure will have the concept of the solid waste management hierarchy, where minimization will be achieved by applying the following principles:



Waste materials that may be generated during demolition and construction include concrete, steel, aluminum, plasterboard, bricks and tiles, plastic and glass. Effective construction planning can minimize the production of waste, and appropriate storage of wastes – particularly suitable source separation of waste materials – can greatly improve recycling rates and potentially lower disposal fees. The waste management hierarchy provides a framework to maximize the useful life of materials when waste cannot be avoided.

Training

Each of the contractor's activities will consider waste reduction, use, segregation and recycling. For this, all construction staff, including subcontractors, will be trained in general awareness and procedures related to waste. Training will be provided by the EHS Supervisor, or by his team, regarding the tasks involved in implementing this procedure.

Generation, Classification and Storage

The EHS Supervisor, and his team, are responsible for classifying the generated solid waste and obtaining the applicable permissions and authorizations regarding the project's solid waste management and describing the parameters to be met by the Contractors and Subcontractors.

Depending on their characteristics and properties, waste can be classified as hazardous or non-hazardous, as described below:

- Hazardous waste - Class I[28];
- Non-inert non-hazardous waste - Class IIA[29];
- Non-hazardous and inert waste - Class IIB.[30]
- Civil Construction Waste (RCC): must be classified according to CONAMA Resolution 307/2002, aiming at its correct reuse / recycling / final destination; and
- Lubricating Oil: CONAMA Resolution 450/2012, which provides for the collection, collection and disposal of used or contaminated lubricating oil.

Those responsible for the generation and handling of solid waste must follow the actions described below:

28 Waste that have at least one of the following characteristics: flammability, corrosivity, reactivity, toxicity and pathogenicity.

29 Waste that do not fit the class I - Hazardous or class IIB - Inert

30 Waste that, when subjected to dynamic and static contact with distilled or deionized water at room temperature have none of their constituents solubilized at concentrations superior to potable water standards, except for appearance, color, turbidity, hardness and flavor.

- Ensure that the waste storage locations are in good condition and compatible with the types of waste stored, following the guidelines of the aforementioned standards;
- Ensure that the storage locations are of an appropriate size for the amount of solid waste generated, considering local regulations;
- Ensure that solid waste is stored in places with safety devices that prevent the contact of solid waste with the environment;
- Check if the solid waste storage locations are adequate to avoid spills caused by contact with rainwater; and
- Inspect the areas daily to ensure cleanliness, pest control, excess storage, spills, leaks, among others, during the project's implementation phase.

All solid waste generation points must be identified and mapped.

Inventory of Solid Waste

The EHS Supervisor, and his team, are responsible for preparing and filling the Solid Waste Inventory for the project. Accordingly, the "Solid Waste Inventory" includes the following elements, but is not limited to:

- Type of waste: specification of all waste generated in each process or activity (for example, paper, cardboard, plastic, pruning waste, wood, organic waste, among others);
- Classification: classify the waste as dangerous (Class I), non-dangerous non-inert (Class IIA) and non-dangerous inert (Class IIB) and provide the appropriate identification labeling;
- Generation points: specify the generating process or activity for each type of waste;
- Temporary storage area: specify the location or area where the waste will be stored until it is ready for final disposal;
- Type of storage: specify the type of storage of the waste, depending on its type, classification or quantity (for example, metallic container, big bag, etc.);
- Quantity generated: quantity generated of each related solid waste;
- Amount destined: quantity of each waste generated and that was sent for treatment / final disposal;
- Treatment / Final destination: specify the treatment or final disposal that will be given to each type of waste generated (for example, recycling, reuse, incineration, composting, energy generation, landfill);
- Transport company: Specify the company that will be responsible for the removal of waste; and
- Receiving company: Specify the company that will be responsible for the final treatment / disposal of waste.

In addition, and to complement the Inventory, it is necessary to make a Generation Waste Map. The EHS Supervisor is responsible for developing and updating the Map. It can be a map, a drawing of the site layout or a flow diagram identifying the points of generation and the waste storage areas.

The handling and transportation of waste from the site must be kept to a minimum, with special care for hazardous and bulk liquid waste and in accordance with applicable local regulations.

Waste removal, transportation and registration

The contractor must obtain and keep records of the following information before removing any waste generated in the project phases:

- Permits necessary for the transport of solid waste from transporters; and

- Environmental operating permit for companies receiving waste, responsible for the treatment / final destination.

The Environmental Manager will keep a record of this information from waste transporters and receiving companies. Any waste that is removed must be accompanied by the Waste Transport Manifest (Manifesto de Transporte de Resíduos (MTR) and the Waste Handling Certificate (CADRI – Certificado de Movimentação de Resíduos) for hazardous waste, which makes it possible to know and control the form of disposal given by the generator, transporter and waste receiver.

8.1.1.3 Key Performance Indicators

The KPIs shown below will be useful to determine if this plan's implementation has been effective. In addition with the level of compliance of this indicators, it can be identified if changes are necessary and can be considered improvement measures.

- % Waste reduction (all types);
- % Recycled waste (whenever applicable);
- % Reused waste (whenever applicable);
- 100% Compliance with waste storage areas inspections;
- 100% Compliance with local applicable permits and authorizations; and
- 100% of the employees assigned to handle waste must have the appropriate training.

8.1.2 Hazardous Materials Management Plan

8.1.2.1 Objective

The objective of the Hazardous Materials Management Plan is to identify, storage and manage adequately the hazardous materials avoiding any kind of risk for the employees, facilities and environment, complying with the applicable local regulation regarding the hazardous materials management.

8.1.2.2 Guidelines and activities

Training

All construction personnel will be trained in the general awareness and procedures concerning hazardous materials. Personnel involved with the planning, storage, transportation, and final disposal of hazardous materials will receive additional training including refresher and updates to the training. Training will be provided by the EHS Supervisor or his staff regarding the duties involved in implementing this procedure.

Hazard assessment

The hazard's level should be determined according to the following information:

- The type and amount of hazardous materials used in each activity;
- Evaluation of the potential spill's circumstances according to the available statistics of the industry, if applicable;
- Evaluation of potential non-controlled reactions, such as explosions and fires; and
- Evaluation of the potential consequences in relation to the physical and geographical characteristics of the activity, including related aspects with populated regions, hydric resources and environmental sensitive zones.

The hazard assessment should be carried out by specialized professionals who apply internationally accepted methodologies such as risks identification studies (HAZID).

The identified impacts should be assessed and updated by the EHS Supervisor during the Project's activities to include each potential new hazardous materials impacts. In addition, the assessment must take into consideration potential risks to surrounding communities during hazardous materials handling, storage and disposal.

Hazardous materials identification

For the hazardous materials identification, it is necessary to make an inventory of all substances, in which it must be included the substance name, formula, activity or area in which it is used, maximum amount for storage, storage type and type of personal protective equipment according to local regulation.

The inventory or register of all hazardous substances must be held on the premises and will evaluate any harmful substances in an effort to replace them with less harmful substances. Any substance that has been banned by legislation or replaced by a less harmful substance shall become listed as a prohibited substance. The register will be reviewed at regular periods as necessary but never longer than twelve months intervals.

Holding a register will be helpful to recognize if the substances are under a local specific list. If it is not in any list, it must be considered the Material Safety Data Sheet (MSDS), in which is specified the danger of the substance or material. These must be checked against publications or local regulations in order to find out if exposure control limits are in force.

A MSDS must be provided, no matter how the substance is supplied - in bulk or in packages, no later than at the time of delivery. There is no requirement for the provisions of a MSDS with repeat orders but suppliers have a duty to ensure that recipients are in possession of the latest version. Obligatory headings for MSDS, are as follows:

Identification of the substance/preparation and company.

- Composition/information on ingredients;
- Hazards identification;
- First-aid measures;
- Fire-fighting measures;
- Accidental release measures;
- Handling and storage;
- Exposure controls/personal protection;
- Physical and chemical properties;
- Stability and reactivity; and
- Toxicological information.

Hazardous materials labelling

The hazardous materials must be labelled according with the following specifications, additionally of the local regulations:

- Warning word: Indicated the level of danger. It is the heading of a safety signal for the chemicals. "Danger" is used for the most severe cases, and "Warning" is less severe;
- Product name of identifiers: Simply identify the name of the product or chemical. Additional identifiers can be noted to the right of the manufacturer's information;
- Manufacturer information: This identifies the name, address and telephone number of the manufacturer;

- Hazard statements: These are phrases that describe the nature of the dangerous products and their degree of danger. Hazard statements must be found on the MSDS of the chemical;
- Precautionary statements/First aid measures: These are phrases that are linked to each indication of risk; describe general precautions for prevention, response, storage or disposal. These indications will be found on the MSDS of the chemical; and
- GHS symbols (hazard pictograms): These are used to identify hazardous products and are usually grouped by chemical/physical risk, health risk and environmental risk.

Preventive measures for storage

Additionally of the storage and considering the applicable local regulation, it is necessary to have a procedure for protection against spillage of containers and deposits, since spills are caused mainly by the mishandling of these materials, among the recommended measures, but not limited to, to perform an anti-spill protection are:

- Use of anti-drip hose connections for tank vehicles and fixed connections with storage tanks;
- Installation of filling systems with automatic shut-off valve in the storage tanks to avoid overflow;
- Use of casket around the filling tube to collect spills;
- Use of pipe connections with automatic overflow protection (float valve);
- Pump less volume of the available capacity in the tank or container asking for less material than its available capacity;
- Prepare written procedures for carrying out transport operations, which includes the preparation of a checklist of the measures to be followed during filling operations and the use of filling operators duly trained in these procedures;
- Installation of vents that prevent overpressure or overfilling and allow controlled emission to a capture point;
- Installation of control gauges in the tanks to measure the volume of the interior; and
- Regarding the prevention of explosions, fires and reactions, reactive, flammable and explosive materials should also be handled to avoid uncontrolled reactions or situations that may result in fires or explosions.

Hazardous materials disposal

While handling hazardous materials it can be generated some hazardous wastes coming from the following situations:

- Hazardous materials spills;
- Hazardous materials containers;
- Any material which had had contact with hazardous materials;
- Deciduous hazardous materials; and
- Hazardous materials that are not used anymore or will not be used.

The hazardous waste generated from the hazardous materials must be handled as this category according to the Waste Management Plan and with the supervision of the EHS Supervisor.

The transportation of hazardous waste must follow the established by ANTT Resolution No. 5,232/2016, which approves the complementary instructions to the Terrestrial Regulation for the Transport of Hazardous Products.

8.1.2.3 Key Performance Indicators

The KPIs shown below will be useful to determine if this plan's implementation has been effective. In addition with the level of compliance of this indicators, it can be identified if changes are necessary and can be considered improvement measures.

- 100% of the hazardous materials with MSDS; and
- 100% of the employees assigned to handle hazardous materials with the appropriate training.

8.1.3 Other Environmental Mitigation Measures

For environmental and road safety, and to comply with Brazilian regulations, all materials containers leaving and arriving at the site will be appropriately covered to avoid soiling of the roads and highway.

The following measures are part of the Environmental Management Plan but do not constitute specific plans:

- Change in air quality (due to emission of particulate matter and greenhouse gases):
  - Implement measures to monitor the dispersion of particulate matter (dust) and greenhouse gases (vehicles and equipment, such as power generators);
  - Use alternatives for the reduction of particulate material (dust), such as humidification of bare soil and use of fencing; and
  - Prioritize the use of fuels with lower greenhouse gas emissions, such as alcohol and biodiesel whenever possible.
- Increased noise and vibration levels:
  - Implement and continuously monitor the effectiveness of the measures for managing the impacts of increased levels of noise and vibration; and
  - Communicate to neighbors and respect the schedules for carrying out the works during the construction phase.

8.2 Health and Safety Management Plan

8.2.1.1 Objectives

The objective of the Occupational Health and Safety Management Plan is to establish the health and safety conditions for the project's construction phase, with the aim of preventing occupational risks for contractors and subcontractors. This plan is justified to guarantee the health and safety of the workers during the construction phase.

8.2.1.2 Guidelines and activities

Risk identification and analysis

HSE Manager must assure that the construction site has a description for the risk identification. After the risks identification, the evaluation is carried out. This evaluation allows risk sorting according to severity and probability levels, with specific controls being defined for those risks that are considered significant in order to reduce them to an acceptable level. In this way, the highest risks with the greatest severity rating and the greatest probability of occurring are managed first, and lower risks with lower probability of occurrence and lower severity rating are handled in descending order of importance.

The contractor shall implement preventive measures in accordance with the following hierarchy:

- Elimination of risk;
- Minimization and control of risk, with the adoption of collective protective measures;

- Minimization and control of risk factors, with the adoption of administrative measures or work organization; and
- Adoption of individual protection measures, Personal Protective Equipment (PPE).

High risks activities and work permits

High risk activities are the ones with that are more likely to result in failure, harm or injury, so, to ensure that these types of activities are carried out in a correct way it is necessary to develop a work permit process.

Some examples of high risk activities are:

- Working at heights;
- Working on confined spaces;
- Hot works;
- Electrical work; and
- Lifting activities.

A work permit assures that the worker and its supervisor are aware of the risks of the activity, and will assure that all the measures to minimize the risk are applied.

The work permit must contain at least:

- The name of the authorized worker;
- The type of work to be carried out and the area or place where the activity will be carried out;
- The date and time of the start of the activities, and the estimated time of completion;
- The security measures applied in accordance with the results of the risk analysis for each activity, and
- The name and signature of the employer or the person designated to grant authorization.

The work permit must be developed by the personnel carrying out the activity and reviewed by their direct supervisors, to ensure that they know the activity risks, PPE required, required emergency procedures and emergency equipment.

Safe work permits are issued for a specific work and a defined period of time for specific workers.

Permits must be signed by the EHS Supervisor, job supervisor and workers carrying out the activity.

Personal protective equipment (PPE)

The PPE for each activity must be selected according to the hazards and risks identified in the risk analysis and work permit.

The PPE must be selected to protect the body part exposed to the risks identified, next is a list of the most common PPE used for the activities:

- Head – helmet (against impact, dielectric, hood);
- Eyes and face - protective glasses, goggles, face screen, welding helmet, welding glasses;
- Ears – earplugs, earshells;
- Respiratory system – respirators (against particles, gases or vapors), disposable mask, autonomous respiratory equipment;
- Superior extremities – gloves (against chemical substances, dielectric, against extreme temperatures), sleeves;

- Trunk (chest, back) – apron (against extreme temperatures, against chemical substances) overall, coat, clothing against chemical substances;
- Inferior extremities – occupational footwear, footwear against impacts, conductive footwear, dielectric footwear, spats, waterproof boots;
- Protection against falls equipment; and
- Firefighting equipment.

H&S training

All the staff will go through the induction training of NR-18. Additional specific training for individuals involved in particular tasks or with particular responsibilities such as working at heights and cargo handling. The EHS Supervisor must assure that the personnel on-site has the necessary training to carry out its activities, this includes contractors and subcontractors personnel.

Personnel health

The EHS Supervisor must ensure the health care of personnel, by making sure that the project provides at least with basic documents and facilities such as:

- Environmental Risk Prevention Plan (*Plano de Prevenção de Riscos Ambientais* – PPRA);
- Construction Industry Work Conditions and Environment Program (*Programa de Condições e meio Ambiente de Trabalho na Indústria de Construção* – PCMAT);
- Medical and Occupational Health Control Plan (*Plano de Controle Médico e Saúde Ocupacional* - PCMSO);
- Occupational Health Certificate (*Atestado de Saúde Ocupacional* - ASO);
- Toilet facilities;
- Clean and potable water supply;
- Appropriate working hours;
- Medical Service (medical stations, first aid kits, nurse/doctor); and
- Continuous medical check-up.

Safety instructions for access to the work

The following instructions will be given to all visitors and workers who access the site for the first time. Each person who receives these instructions must sign a receipt, which will be guarded by the EHS Supervisor. Safety instructions for access to the work:

- It is mandatory for visitors and workers who access this workplace to comply at all times with the instructions of the HSE Personnel;
- Use the adequate PPE. If you do not have them, request them to the HSE Personnel;
- Pay attention when walking through the site, avoid going through areas with obstacles or mud and stepping on sharp objects;
- Always look both ways before crossing roads, traffic lanes, or open areas. Do not approach, or interfere with, construction machinery or vehicles;
- Avoid getting close to slab edges, decking edges, etc. unless they are fully protected; and
- In an emergency, remain calm and follow the orders of those responsible for the work at all times. Go to the designated meeting point and remain there until the end of the emergency.

8.2.1.3 Key Performance Indicators

The KPIs shown below will be useful to determine if this plan's implementation has been effective. In addition with the level of compliance of this indicators, it can be identified if changes are necessary and can be considered improvement measures.

- Number of Reported Accidents & Incidents;
- Lost Time Injury Frequency Rate; and
- % of Workers Trained in Health & Safety.

8.3 Emergency Prevention and Response Management

8.3.1 Objective

The objective of the Emergency Preparedness and Response Management Plan is to establish preventive and response measures to respond efficiently and in a timely manner to emergencies that may take place during the execution of the Project, and to prevent that the consequences of a major event result in negative effects to human lives, the environment or to property.

8.3.2 Guidelines and activities

Risk and hazards identification

Identification and analysis of occupational, environmental and social risks are part of the planning process prior each activity that is carried out during the construction phase the project.

Communications

The project must establish appropriate arrangements for contacting medical assistance when necessary as well as the fire department and the emergency response team. The Social and Community Management Plan must include communication measures with communities of the Area of Influence; some of the stakeholder that might be considered are community leaders, local authorities and local first responders (i.e., fire department, police).

Responsibilities

Establish the team that will be trained in emergency response as described below.

- Workers that can potentially raise the alarm;
- EHS Supervisor;
- Emergency Response Team (i.e., emergency brigade);
- Site´s medical staff, if applicable;
- Site Manager;
- Subcontractors; and
- All the staff.

Evacuation arrangements

The Project must define the arrangements in case of evacuation:

- Responsibilities;
- Meeting points;
- Installation of an alarm;
- An Evacuation Notice to be included in the bulletin boards of the site; and
- Drill exercises to be performed regularly.

Containment

Spill kits shall be inspected weekly to ensure that the inventory of the kit is as it should be and to ensure that the location of the spill kit is appropriate to the site activities such as storage, offloading and use of materials.

Emergencies

Establish the corresponding actions for any of the following emergencies:

- Medical: Indicate the medical assistance contact;
- Fire: Indicate the measures or organization in case of fire; include communication measures with the trained emergency response team. In case of a minor fire, define the corresponding actions to extinguish it, such as the use of a fire extinguisher;
- Environmental: Define preventive and mitigation measures in case of a spill of hydrocarbons or chemical substances;
- Natural disasters: In this section, all applicable natural disasters, considering the location of the site, must be included in special, a study regarding possibility of floodings must be performed; and
- Malicious Acts: In this section, prevention and mitigation measures when dealing with violence, theft, robbery, vandalism etc. should be included.

It is also noteworthy that, since 1964 the Brazilian law (Federal Law No. 4.591) requires all vertical or horizontal condominiums of any type to have at least the basic insurance policy against fire, lightning and explosions of any kind. The obligation was ratified by Federal Law No. 73/66 and by the New Civil Code of 2002.

Resources for emergency response

At a minimum the resources for emergency response are:

- Fire extinguisher(s) and first aid kit(s) according to the type of activity and the degree of medical treatment that may be needed before transfer to the hospital;
- Personnel trained for the provision of first aid and emergency response;
- Control and monitor the costs associated with resources for emergencies; and
- Contact of emergency assistance services (e.g. local authorities, rescue, hospitals, and civil protection, among others).

Training

The EHS Supervisor will establish the training and requirements regarding emergency response, according to the following topics:

- Identification of the main occupation, environmental and social risks and its corresponding preventive or mitigation measures;
- Types of emergency in the work area;
- Common types of fire and how to use firefighting equipment, fire extinguishers and / or fire systems;
- Organization and management of emergency situation (emphasizing the channels of communication in site and relevant contact numbers);
- Evacuation and rescue (disconnection of the energy source and rescue at heights); and
- First aid.

Preparations prior to the emergency

The following actions must be done in preparation for potential emergencies at the site:

- Apply operational controls (e.g. hazard identification, control and risk assessment, use of PPE, signaling);
- Have the basic information such as emergency telephone directories, emergency organization chart, planning and evaluation of drills, fire extinguisher inspections, first aid certificates;
- All personnel must know and identify the security zones established in the internal and external Site (e.g. meeting points, evacuation routes) as well as the location of the fire control equipment (i.e. fire extinguishers);
- All personnel involved in the activity must know the possible emergency scenarios to which they will be exposed, within the development of their activities, as well as the actions to be taken in the event of an emergency; and
- All personnel involved must participate in emergency drills that will be scheduled and follow an established program, responsible parties will use the drill record format to record drill information such as the drill plan and results.

Actions after an emergency

At the end of the emergency, cleaning and decontamination activities of the goods and equipment should be carried out, so that construction can resume as soon as possible. Then the following actions will be performed:

- Prepare the report of damages of the incident; and
- Evaluate the response measures and use for feedback and improvements.

Keep a logbook for the registration of accidents and incidents during the different stages of the project's construction phase.

8.3.3 Key Performance Indicators

The KPIs shown below will be useful to determine if this plan's implementation has been effective. In addition with the level of compliance of this indicators, it can be identified if changes are necessary and can be considered improvement measures.

- Number of drilling exercises performed x planned; and
- % of the emergency team trained.

8.4 Human Resources Management Plan

8.4.1 Objectives

- Ensure adherence and strict compliance with Brazilian labor legislation (Federal Law Nº 5.452/1943);
- Ensure the observation of the rights of direct and indirect workers;
- Establish, maintain and improve worker-manager relationship;
- Promote fair treatment, non-discrimination and equal opportunity for workers, and compliance with healthy and safe (H&S) working conditions; and
- Protect workers' wellbeing.

8.4.2 Guidelines and activities

PEN acknowledges the importance of basic rights of workers and the value of a solid worker-manager relationship, which should be achieved through a fair treat to direct and indirect workers and the provision of health and safety (H&S) working conditions.

Commitments

The project will commit not to engage directly or indirectly with business partners and subcontractors convicted for using child or forced labor. These commitments will come into force through a framework of supply chain risk assessment with the observance of human and labor rights aspects and the provision for the exclusion of suppliers involved in illegal practices prior or during the start of construction works.

The project will commit to the provision of fair and favorable conditions of work in compliance with Brazilian labor legislation, the United Nations Guiding Principles on Business and Human Rights (2011), the Equator Principles (2013; 2020) and the International Labor Organization (ILO) conventions ratified by Brazil[31], relating to the following working conditions:

- Human resources recruitment and selection;
- Salary and benefits;
- Paid rest (weekend and vacations);
- Workloads;
- Overtime;
- Performance evaluation and feedback;
- Non-discrimination and equal opportunities;
- Right to association (unions); and
- Internal grievances mechanism.

Human resources management and practices

The contractor will be accountable for the following human resources management on site during the construction phase:

- All direct and indirect workers performing activities on the site must present formal labor contracts, whether temporary or permanent;
- The use of labor without formal contracts will not be permitted on the site;
- All direct and indirect workers performing activities on the site must have access to Personal Protective Equipment (PPE), as described in the Health and Safety Management Plan;
- All direct and indirect workers performing activities on the site will be trained at least once on discrimination prevention, especially targeted for minority groups (based on gender, race and ethnicity);
- All direct and indirect workers performing activities in any of the construction phase stages will have access to an internal grievances mechanism through which they will be able to communicate their concerns or report any ethical misconduct by its coworkers or managers; and
- The contractor and its subcontractors will ensure that eventual migrant workers are aware of the working conditions in their labor contracts, and have had access to reading and understanding the terms and clauses of the labor contracts in a language of their full understanding.

31 The list of ILO conventions ratified by Brazil is available at: https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:102571#:~:text=Out%20of%2098%20Conventions%20ratified,in%20the%20past%2012%20months.

Internal grievances mechanism

The project should design and deliver an internal grievances mechanism aimed at the workers of all constructions stages and activities, available to all direct and indirect workers, free of cost and with anonymized means of report.

The internal grievances mechanism will adopt adapted language, according to the socio-economic profile of the workforce, and disclosed throughout the different site's installations. Suggested channels for the internal grievances mechanism include, but are not limited to:

- Phone (free of charge);
- E-mail;
- Social media (WhatsApp); and
- Suggestion boxes.

If the contractor or its subcontractors chose to use suggestion boxes, they should not be located in facilities or rooms used by managers and supervisors, ensuring that workers have access to safe and private spaces to reporting grievances.

Occupation health and safety

The Human Resources Management Plan and the Health and Safety Management Plan are directly related, and human resources management will consider the objectives of this plan throughout the construction phase.

Retrenchment

If the project anticipates the termination of a significant number of jobs or a layoff of a significant number of workers that cannot be avoided, the Human Resources Manager will develop and implement a plan to mitigate the adverse issues, such as:

- The schedule of cutbacks;
- Retrenchment methods and procedures;
- Selection criteria (i.e. the selection criteria for those to be laid off should be objective, fair and transparent);
- Severance payments;
- Offers of alternative employment; and
- Assistance in retraining efforts and job replacement.

The project will also proactively consult with employees and their organizations in order to identify means to mitigating the impact of retrenchment.

8.4.3 Key Performance Indicators

- Up-to-date control of the number of workers by subcontractor;
- Up-to-date control of formal labor contracts; and
- % of suppliers' compliance with terms and conditions related to working conditions.

8.5 Social and Community Management Plan (Stakeholder Engagement)

8.5.1 Objectives

- Design and implement engagement and communication mechanisms and tools to communicate with external stakeholders relevant information related to the environmental, social, health and security measures related to the project' activities; and

- Implement a free of cost grievances mechanism available to the project's stakeholders, through which they can communicate their concerns and request information during the construction phase.

8.5.2 Guidelines and activities

The following guidelines and activities apply to the Social and Community Management Plan.

Stakeholder Identification and Mapping

The identification and mapping of stakeholders is set to be updated during the development phase of the project, with the aim of studying the environmental and social context in order to know and understand the current local situation regarding the communities, neighbors, and social organizations relevant to the project and those located in the project's area of influence. The initial mapping was performed by ERM as a step of the ESIA in June 2021. The initial project's stakeholder's matrix is presented in **Appendix B**. The stakeholders matrix should be updated prior to the initiation of the construction phase when a new consultation round should be performed.

The stakeholder identification and mapping allows the precise identification of the project's potential impact receptors, especially those related to traffic pressure and nuisance, as well as their expectations related to the impact management measures. A total of 56 stakeholders were identified by this method. Out this total, 23 stakeholders were identified as priority to the project, due to their proximity to the project site.

The project's stakeholders were analyzed according to the *IFC Stakeholder Engagement Good Practices Handbook for Emerging Markets* (2007). The results are presented in **Section 6**.

Stakeholder and community engagement

Stakeholder and community engagement will be triggered during the development and construction phases of the project. In order to promote a better understanding of the project and construct confidence among its stakeholders, the investor will ensure transparency in the communication of relevant information by:

- Disclosing information on time and at the proper moment;
- Disclosing relevant information by managing expectations adequately (e.g. employment opportunities) and avoiding downplaying the potential negative aspects (e.g. nuisance during the construction phase);
- Disclosing relevant information in a culturally appropriated manner to facilitate the participation of local population;
- Disclosing information in a way that supports the consultation process, allowing enough time to pass between the communication of information and the start of the consultations; and
- Disclosing the existence of the Grievance Mechanism and its communication channels.

The information that should be communicated regarding the project may include but is not limited to the following:

- Stages, activities and estimated schedule of the construction works;
- Expected impacts of the construction phase (nuisance, traffic pressure, change in air quality);
- Impact management measures; and
- Potential interruptions in traffic due to transport of materials and construction waste.

According to the stakeholder consultation process that was carried out as a step of the ESIA (Section 6), the main project's stakeholders' concerns is the intensification of traffic due to the increased circulation of vehicles both in the construction and operation phases. Thus, the main information and communication measures should concentrate on this theme.

Grievances mechanism

The management of grievances seeks to reinforce positive long-term relationships with interested parties and to detect problems from the beginning, mapping possible risks to the business. The implementation and operation of the system does not seek to replace the engagement actions or to obtain zero complaints; but rather, to create a line of communication in which the stakeholders feel comfortable on sharing information and dialoguing with the project representatives.

The contractor should design and deliver a free of cost grievances mechanism available to the project's stakeholders throughout the project's construction phase, by which the stakeholders can have access to transparent and continuous information regarding the project's impacts and management measures.

The grievances mechanism may include one or more communications channels (phone, e-mail, social media), as applicable to the project. The grievances mechanism must provide means for anonymized manifestations.

The mechanism should develop and make public the service premises, such as:

- Standard minimum deadline for responses;
- Procedure for investigating complaints; and
- Responsible for interacting with stakeholders.

The grievances mechanism should also provide a specific channel for emergency communication, related to the activities of the Emergency Prevention and Response Management Plan.

Suggested communication tools may include, but are not limited to the following.

- Website;
- Phone (free of cost);
- Memos;
- Letters;
- Email;
- Informative sessions/Meetings;
- Brochures; and
- Copies of documents placed in visible and strategic locations.

According to the stakeholder consultation process performed as a step of the ESIA (Section 6), the main preferred communication channels are phone and social media (WhatsApp), e-mail, and printed materials.

It is recommended that project develop and deliver a dedicated website where external stakeholders will be able to access information regarding the activities of the project in a constant, clear and transparent fashion.

Documentation and record

Evidence of meetings and interactions with stakeholders will be maintained through registry formats, minutes and photographs whenever possible.

8.5.3 Key Performance Indicators

Key performance indicators of the Social and Community Management Plan may include but are not limited to:

- Number of information materials eventually published;

- Number of meetings eventually held with stakeholders;
- Total number of manifestations on the grievances mechanism;
    - Number of solved manifestations on the grievances mechanism according in compliance with the established deadline for responses; and
- A measure of the stakeholders' satisfaction in relation to the grievances mechanism.

8.5.4 Building Occupancy and Safety Management Plan

8.5.4.1 Objectives

The objective of the Building Occupancy and Safety Management Plan is to avoid situations that provide unhealthy built environments. This plan should be an integral part of all phases of a building's life cycle, and should refer to:

- Prevent occupational injuries and illnesses to the staff and residents of the residential buildings and safe spaces and furniture in the common areas; and
- Perform proper building operations and maintenance.

8.5.4.2 Guidelines and activities

Prevention of occupational injuries and illnesses

- Consider work practices and employee physical requirements, when designing buildings and processes;
- Design for safe replacement and modifications of equipment to reduce the risk of injury to operations and maintenance staff;
- Comply with applicable regulatory requirements;
- Provide proper ventilation under all circumstances, and allow for natural lighting where possible; and
- Mitigate noise hazards from equipment and processes.

Prevent falls from heights

- Provide guardrails and barriers that will prevent falls from heights in both interior and exterior spaces;
- Provide fall protection for all maintenance personnel; and
- Provide certified tie-off points for fall arrest systems.

Prevent slips, trips, and falls

- Provide interior and exterior floor surfaces that do not pose slip or trip hazards; and
- Provide adequate illumination, both natural and artificial, for all interior and exterior areas.

Ensure electrical safety

- Provide adequate space for maintenance and repair in electrical rooms;
- Provide adequate drainage and/or containment from areas with energized electrical equipment;
- Label all electrical control panels and circuits; and
- Specify high-visibility colors for high voltage ducts and conduits.

Provide good indoor air quality and adequate ventilation

- Consider the indoor relative humidity in the design of the ventilation system; and

- Locate outside air intakes to minimize entrainment of exhaust fumes and other odors.

Provide ergonomic and furniture for common areas

- Design common areas that are safe and inclusive for all residents and employees, including people with special needs, such as the visually impaired and wheelchair users;
- Select furnishings, chairs, and equipment that are ergonomically designed;
- Consider providing break areas to allow the employees to temporarily leave the work place; and
- Minimize lighting glare on computer monitor screens.

Obtain all the approvals before building occupation

- Fire Department Inspection Certificate (Auto de Vistoria do Corpo de Bombeiros – AVCB);
- Authorization for residential occupation (Habite-se).

8.5.4.3 Key Performance Indicators

Key performance indicators of the Building Occupancy and Safety Management Plan may include but are not limited to:

- 100% of the approvals in place before occupation.

9. CONCLUSION

The Environmental and Social Impact Assessment (ESIA) of the Jaguaré 360º project considered the relevant characteristics of the project and the variables of environmental and social quality in its area of influence (500m radius) to identify and assess impacts of the construction and occupation phases.

The project's premises allowed the identification of impacts associated with the following activities:

- Circulation of heavy vehicles (trucks) and cars on the access roads to the project's site due to the transportation of materials, equipment and workers;
- Temporary circulation of workers who will use the public transport services;
- Noise generation and emissions due to construction works and the movement of vehicles and equipment;
- Generation and emission of particulate material (dust) as a result of construction works;
- Generation of solid waste resulting from earthworks and construction activities and operation of the administrative and support sector at the construction site;
- Temporary interruption of traffic on the surrounding roads to carry out activities associated with the construction works;
- Acquisition of local inputs and services; and
- Occupation and operation of the project.

A total of 10 impacts were identified for the construction phase, two of which were positive and the other adverse. For the occupation phase, 7 impacts were identified, two positive and the other adverse.

In the construction phase, all identified impacts have equivalent mitigation measures provided in the ESMP (**Section 8**). All adverse impacts of the construction phase are provided with equivalent management measures in the ESMP developed in a conceptual level with reference to the IFC's Environmental and Social Management System Implementation Handbook – Construction (2014). The mitigation measures proposed in the ESMP are equivalent to the significance of these impacts and have the potential to make the environmental and social changes tolerable for recipients during the construction phase.

In the occupancy phase, adverse impacts are acknowledged and expected by the municipal government, since the project's installation area is defined in the Master Plan (2014) as a priority for constructive and demographic densification. In this note, it is also important to highlight that the stakeholders consulted as a step of the ESIA (**Section 6**) are favorable to the project's installation, as the requalification of the area, with the conversion of land use to a residential profile is expected, and also because of the potential for increased offer of infrastructure of public services, as a result of population growth in the area.

Nonetheless, additional management measures based on good practices were indicated by ERM, as the identification of private social investment opportunities aimed at improving and expanding local infrastructure, especially in the education, health and leisure sectors.

The project will be located in a priority area for urban qualification and increased construction and demographic density, according to the definitions in the Master Plan (2014). This is also one of the expectations of the stakeholders consulted as part of the ESIA development, as presented in the consultations results (**Section 6**).

Thus, even though the current land use profile of the area of influence is characterized by industrial use, it is possible to verify a transformation process of this area that is consistent with the project's premises, once other vertical residential launches happened in the recent past.

In addition, it should be noted that the production of social interest and affordable housing aimed at vulnerable and low-income families is in line with the profile of the area and with the objectives of the Master Plan (2014).

In addition, the project is part of the Arco Pinheiros perimeter, an Urban Intervention Plan area where public and private investments are foreseen to install infrastructure. One of the examples of these investments is the installation of a bus corridor on the Jaguaré Ave. by 2025, which should expand the transportation offer in the project's area of influence.

In this sense, considering the weighting of negative and positive impacts, the premises of the project and the area of influence, the prognosis for the project installing is positive.

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APPENDIX B STAKEHOLDERS MATRIX

ID	STAKEHOLDER	CATEGORY	E-MAIL / SITE	PHONE	RELEVANCE
1	ARCO/SPM Sede Social e Esportiva	Comunity Association	–	(11) 3768-4181	Secondary
2	Assai Atacadista	Private company/business	http://www.assai.com.br/	(11)3714-4623	Secondary
3	Associação Aquarela	Comunity Association		(11) 4329-3171	Priority
4	Associação Brasileira de Cimento	Business Union	http://www.abcp.org.br/	(11)3760-5370	Secondary
5	Cavenaghi	Private company/business	http://www.cavenaghi.com.br/	(11)2380-3050	Secondary
6	Centro de Estudos e Pesquisas Dr João Amorim	Educational Institution		(11)5898-5801	Secondary
7	Centro Remoto de Educação - Unidade Butantã	Educational Institution	cre-butanta@centrorenovo.com.br	(11) 3768-6227	Secondary
8	CEU Jaguaré - Professor Henrique Gambá	Educational Institution	https://www.facebook.com/ceujaguare/	(11)3716-2150	Priority
9	Churrascaria Ponteio	Private company/business	www.churrascariaponteio.com.br	(11) 97190-1600	Priority
10	CJL - Centro Logístico Jaguaré	Private company/business	_	(11)2114-0000	Secondary
11	CL Santa Jaguaré	Private company/business	https://sancagalpoes.com.br/centro-logistico/aluguel-de-galpoes-na-av-jaguare-818-em-sao-paulo-sp/	(11)3768-5226	Secondary
12	Colgate Palmolive Indústria e Comércio	Private company/business	https://www.colgatepalmolive.com.br/	(11)3767-1400	Secondary
13	Comissão Municipal para Desenvolvimento Sustentável - Agenda 2031	Participatory Municipal Committee	https://www.prefeitura.sp.gov.br/cidade/secretarias/meio_ambiente/participacao_social/conselhos_e_orgaos_colegiados/index.php?p=237119	_	Secondary
14	Comitê de Mudança do Clima e Economia	Participatory Municipal Committee	https://www.prefeitura.sp.gov.br/cidade/secretarias/meio_ambiente/comite_do_clima/index.php?p=284394#	_	Secondary
15	Companhia Ambiental do Estado de São Paulo - CETESB	State Government	https://cetesb.sp.gov.br/licenciamentoambiental/	_	Secondary
16	Condomínio Prime Residence	Comunity Association	_	_	Priority
17	Conselho Municipal de Meio Ambiente e Desenvolvimento Sustentável	Participatory Municipal Committee	https://www.prefeitura.sp.gov.br/cidade/secretarias/meio_ambiente/cades/index.php?p=3250	_	Secondary
18	Cooperativa Agropecuária Industrial Água Azul Norte	Cooperatives	_	(11)3768-1991	Secondary
19	Correcta Indústria e Comércio	Private company/business	http://www.correcta.ind.br/	(11)3718-6400	Secondary
20	Departamento de Estradas de Rodagem - DER-SP	State Government	http://www.der.sp.gov.br/WebSite/Index.aspx	_	Secondary
21	Depósito do Fundo Social de São Paulo	Private company/business	fundosocial.sp.gov.br	(11) 3768-1977	Secondary
22	Enel Base Jaguaré	Private company/business	_	(11) 5818-8633	Secondary
23	Escola Estadual Deputado Augusto do Amaral	Educational Institution	http://www.educacao.sp.gov.br/cgrh/escolas/augusto-amaral-deputado/	(11) 3768-2342	Priority
24	Espaço Villa Lobos	Private company/business	http://www.espacovillalobos.com.br/	(11)2359-0562	Priority
25	Fox Reciclagem Jaguaré	Private company/business	http://www.foxreciclagem.com.br/	(11)2175-7272	Secondary
26	General Water	Private company/business	www.generalwalter.com.br	(11) 3763-6777	Secondary
27	Go Inn Hotel Avenida Jaguaré	Private company/business	https://www.atlanticahotels.com.br/hotel/go-inn-sao-paulo-jaguare	(11)3716-2656	Priority
28	Good Storage - Unidade Jaguaré	Private company/business	_	_	Secondary
29	Heliponto SIBH Helicidade - Helicentro Jaguaré	Private company/business	_	_	Priority
30	Hospital da Universidade de São Paulo	Health Facility / Service	http://www.hu.usp.br/	(11) 3091-9200	Secondary
31	Instituto Associação do Trabalho Educacional Esportivo Recreativo e Cultural	Civil Society Organization	_	(11) 2620-5134	Secondary
32	Instituto do Patrimônio Histórico e Artístico Nacional - IPHAN	Federal Government	http://portal.iphan.gov.br/sp	(11) 3826-0744	Secondary
33	Instituto Reciclar	NGO	thiago@reciclar.org.br	(11) 3768-3607	Priority
34	Jaguaré Park Estacionamentos	Private company/business	www.estacioneunipart.com.br	(11) 5062-9571	Priority
35	Kia Stern	Private company/business	http://sternkia.com.br/	(11)3714-4224	Secondary
36	Leroy Merlin Jaguaré	Private company/business	http://www.leroymerlin.com.br/loja/loja-jaguare	(11) 4020-5376	Secondary
37	L'Essence Motel	Private company/business	http://www.lessencemotel.com.br/	(11)3765-3160	Priority
38	Loga Jaguaré	Private company/business	http://www.loga.com.br/	(11)2165-3500	Priority
39	Moinho Primor S/A	Private company/business	https://racoesprimor.com.br/	(11)3768-7322	Secondary
40	Next Helicópteros - Táxi Aéreo	Private company/business		(11) 99610-2131	Priority
41	Orion Transportes	Private company/business	https://www.oriontransportes.com.br/	(11)5685-4049	Secondary
42	Posto Rede Papa	Private company/business	_	_	Secondary
43	Rotary Club São Paulo - Parque Continental	Civil Society Organization	http://www.rotaryparquecontinental.com.br/	(11) 97496-4926	Priority
44	Secretaria de Governo Municipal	Municipal Government	https://www.prefeitura.sp.gov.br/cidade/secretarias/governo/	(11) 3113-8000	Secondary
45	Secretaria Municipal da Fazenda	Municipal Government	https://www.prefeitura.sp.gov.br/cidade/secretarias/fazenda/	–	Priority
46	Secretaria Municipal das Subprefeituras - Lapa	Municipal Government	https://www.prefeitura.sp.gov.br/cidade/secretarias/subprefeituras/lapa/	(11) 3396 7500	Priority
47	Secretaria Municipal de Infraestrutura e Obras	Municipal Government	https://www.prefeitura.sp.gov.br/cidade/secretarias/obras/	3337-9900	Priority
48	Secretaria Municipal de Mobilidade e Transportes	Municipal Government	https://www.prefeitura.sp.gov.br/cidade/secretarias/transportes/	–	Priority
49	Secretaria Municipal de Urbanismo e Licenciamento	Municipal Government	https://www.prefeitura.sp.gov.br/cidade/secretarias/licenciamento/	3243-1252 | 3243-1027	Priority
50	Secretaria Municipal do Verde e do Meio Ambiente	Municipal Government	https://www.prefeitura.sp.gov.br/cidade/secretarias/meio_ambiente/	(11) 5187-0100 / 0101	Priority
51	Transppass	Private company/business	_	800110158	Secondary
52	União dos Moradores da Vila Nova Jaguaré	Comunity Association	_	_	Priority
53	Unidade Básica da Familia Nova Jaguaré	Health Facility / Service		(11) 3714-2461	Priority
54	UNIP - Cidade Universitária	Educational Institution	https://www.unip.br/universidade/campi/marginal.aspx	(11)3767-5800	Secondary
55	Universidade de São Paulo	Educational Institution	https://puspc.usp.br/	11 3091-3121	Secondary
56	Vibe Society - Quadras de Futebol Society / Juventus Academy Escola De Futebol	Private company/business	http://vibe-society.com/	(113719-3536	Priority

APPENDIX C INTERVIEW SCRIPT

Bom dia/Boa tarde

Antes de mais nada gostaria de agradecer a sua disponibilidade em nos atender. Meu nome é _____, sou colaborador (a) de uma consultoria em sustentabilidade chamada ERM Brasil Ltda. Fomos contratados para realizar um estudo de avaliação de impactos sociais e ambientais referente a possível implantação de um empreendimento imobiliário na região.

O empreendimento se for instalado, será no bairro do Jaguaré e será um condomínio residencial de grande porte, com cerca de 2.000 unidades residenciais.

Estamos realizando consultas em nome do empreendedor com o objetivo de entender melhor a percepção da população do bairro em relação a potencial chegada de um empreendimento como este na região. Os resultados desta consulta irão compor o nosso estudo de impacto ambiental.

Aplicaremos um breve questionário, que terá o anonimato nas respostas, e não está sendo gravado. Nós apenas gostaríamos de contar com o seu apoio para que o empreendimento possa melhor se planejar e causar o mínimo de alteração na rotina da região durante a sua instalação.

As informações levantadas com a aplicação do questionário serão utilizadas exclusivamente para o desenvolvimento do diagnóstico e definição medidas mitigadoras de impactos e de relacionamento com a comunidade, a serem implementadas pelo empreendimento, não podendo ser utilizadas para outros fins sem a devida autorização de ambas as partes. Caso não se sinta confortável para responder qualquer um dos questionamentos, estes não serão considerados. Você está de acordo? Podemos prosseguir?

English Version - Good Morning Good Afternoon

Firstly, I would like to thank you for your attention in talking to us. My name is _____, I'm an employee of a sustainability consultancy called ERM Brasil Ltda. We were hired to carry out a social and environmental impacts assessment in regarding the implementation of a real estate project in the region.

The installation will be on the Avenida Jaguaré block, on the corner of Avenida Onofrio Milano and Avenida Torres de Oliveira, and at the end of Avenida General Vidal. It is a project of approximately 60 thousand m², with seven residential condominiums, which includes 27 buildings and a leisure area.

In respect of the good relationship with institutions and the local neighborhood, the project is carrying out consultations with surrounding communities and other institutions of interest in order to better understand the impacts of the installation in the region and identify and characterize the local dynamics.

With the results of these consultations, the enterprise intends to plan its installation activities in the region. This is a short questionnaire, which will have anonymity in the responses, and is not being recorded. We would just like to have your support so that the project can better planned to cause the minimum of change in the region's routine during its installation.

The information collected with the questionnaire will be used exclusively for developing the diagnosis and definition of mitigating measures of impacts to be implemented by the enterprise, and cannot be used for other purposes without the proper authorization of both parties. If you are not comfortable answering any of the questions, these will not be considered. Are you in agreement? May we continue?

Bloco 1	Dados Gerais do entrevistado
1.1	Nome:
1.2	Idade:
1.3	Endereço:
1.4	Gênero:
1.5	Organização/Entidade que representa:

Bloco 2	Qualidade de vida e questões da comunidade
2.1	Há quantos anos a sua empresa/ instituição está instalada na região?
2.2	Qual a área de atuação/ forma de trabalho?
2.3	Qual a sua percepção sobre o bairro do Jaguaré?
2.4	Quais são os principais pontos positivos do bairro?
2.5	Quais são os principais pontos negativos ou preocupações sobre o bairro?
2.6	A região tem algum problema de infraestrutura ou serviços públicos?
2.7	Saberia indicar organizações atuantes na região? (ONGs, associações, etc.)
2.8	
2.9	
2.10	Saberia identificar áreas do bairro com população mais vulnerável? (carência de serviços públicos, sociais, infraestrutura, renda, etc.)

Bloco 3	Percepção sobre o empreendimento
3.1	
3.2	Você acha que a instalação de um empreendimento imobiliário mudaria a rotina do bairro? Se sim, o que mudaria?
3.3	Na sua opinião, um empreendimento imobiliário de grande porte traria alguma vantagem para o bairro?
3.4	E traria alguma preocupação/problema para o bairro?
3.5	Você tem alguma sugestão para o empreendimento lidar com as questões relatadas?
3.6	Fazendo um balanço entre os pontos positivos e negativos, como o Sr vê a chegada de um empreendimento imobiliário no bairro? (aqui queremos saber se ele é a favor ou contra, mas sem perguntar de forma direta)

Bloco 4	Canais de Comunicação
4.1	Caso o empreendedor decida implantar o empreendimento e abra um canal de comunicação, qual seria a forma preferência na sua opinião? (telefone, e-mail, WhatsApp, outros)
4.2	Qual seria o melhor canal de contato, caso o empreendimento precise entrar em contato com a Sr/Sra.?

Obrigada.
Data: _____

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