

# Model Of Public Space In Urban Roads For A Better Quality Of Life Of Users In The Residential Area Of San Borja, Lima-Peru.

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## Abstract

The present research aims to propose a model of public space in urban roads to improve the user's quality of life in a residential area of the San Borja district. In the analysis of public spaces on streets and, especially at intersections, there are comfort problems for users and the lack of road safety, signage, landscaping, furniture, and equipment for people with physical disabilities. The study was systematically approached from a survey of information of the place, making use of technological tools such as 3D software, AutoCAD, and a bibliographic review; as a result of the research, a proposal of public space is proposed at the intersections of roads that minimize the existing problems to achieve comfort and urban sustainability, in the residential area to users.

**Keywords:** Public Spaces, Landscaping, Furniture, Quality of Life. Urban Sustainability

## 1. Introduction

Human beings have an intrinsic nature to socialize in different public spaces of the city, districts, neighborhoods, and active and passive activities. Considering that public spaces perform many essential functions and are a vital component of the urban fabric [1]. Urbanism is gaining momentum for the resurgence of the street, as public space is the urban resource available to alleviate the feeling of overcrowding in high-density urban areas [2]. Since public space is indispensable to its urban environment, the patterns of urban public space should be studied, identifying the specific needs of users [3]. Streets facilitate pedestrian movement within the urban fabric and are an essential component of urban morphology. Evaluating the quality of streets is critical for managing public resources and investing in improving the city's roads [4]. The model intersections are located on two secondary residential roads called Jirón Boccioni and Jirón Fray Luis de León in the district of San Borja. The streets do not have sufficient landscaping treatment to achieve harmony with the environment and well-being for residents; they give priority to parking lots and, at the intersections of the roads, it is necessary to improve the implementation of the means required for comfortable and safe travel for pedestrians and even for people with mobility

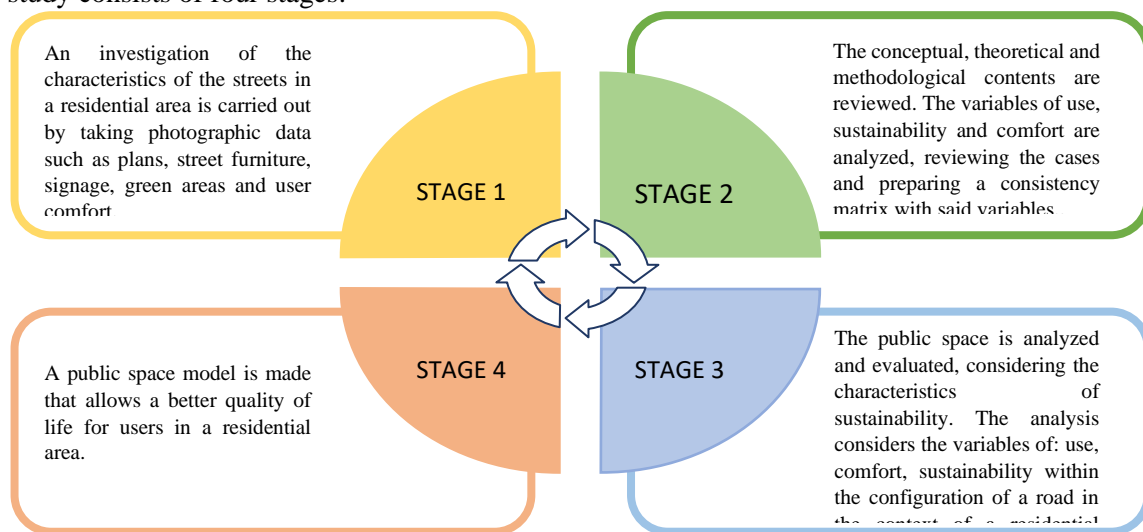
difficulties [5]. The district of San Borja has a large floating population due to work and tourism centers, which is why it demands a more significant logistical effort in terms of improving public spaces for adequate comfort, safety, and the use of renewable energy. An essential factor to consider in some roads is the lack of trees in the urban landscape of the district to preserve the quality of life of users [6], generating psychological, physical, and social benefits related to human health that come from contact with nature [7]. Special consideration should be taken in the road aspect and its intersections because they are prone to traffic accidents [8]. Access to crosswalks must be easily identifiable, safe, and comfortable; considering as complementary parts; the best implementation of road infrastructures such as traffic lights, speed reduction elements, dock breakers, signage, bollards, and pavement treatment with tactile surfaces. [9]. Research on public space is essential to ensure sustainability and safety in cities, taking into account the geographical, environmental [10] sanitary conditions, with the new social behaviors and forms of use of public space to protect people's health in a COVID-19 context [11] where the streets are essential elements of urban life in terms of walking [12]. Applying this model of public space in urban roads, we will understand the importance of use, comfort, sustainability,

and inclusion that these spaces must have to interact and achieve a landscape development that benefits them. Public Spaces, It is the stage on which the drama of community life unfolds; they shape the ebb and flow of human exchange. They are an essential contribution to daily life because they are channels of movement and communication to relax the users. [13]. Residential Zone, Residential streets provide primarily residential services and other complementary (mixed) land uses, such as small-scale retail, cafes, restaurants,

offices, etc. make part of the functional diversity of residential neighborhoods and support healthier lifestyles and active living. [14]. Quality of Life, The concept of quality of life includes different components such as health, personal development, physical environment, natural resources, safety, comfort, and satisfaction. Quality of life in cities, of course, depends on the presence and distribution of spaces, services, and activities. [15].

### 3. Methodology

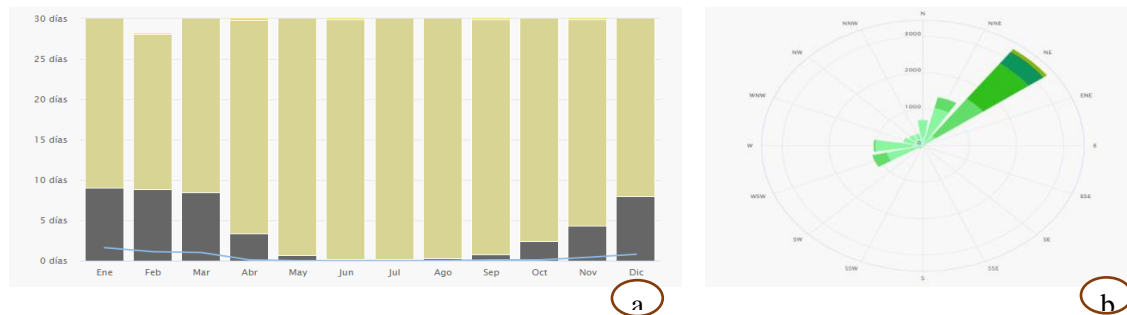
The study consists of four stages:



**Figure 1: Methodological Sequence**  
**Figure 2: Location Peru, Lima, San Borja**

Figure 2 shows that the district of San Borja is located in south-central Lima, province of Lima, and Department. It is located between the geographic coordinates 12° 04' 58" South Latitude and 76° 57' 47" West Longitude, with The district of San Borja has a complex and varied road network, as different types of roads cross it, such as local, collector, arterial, and express roads; it is also divided into functional axes.

an altitude of 170 m.a.s.l. Its location: 150130 and has a territorial surface of 9,9613.06 Km<sup>2</sup> [6]. It borders the following districts: La Victoria, San Luis, Ate, Surco, Surquillo, and San Isidro.



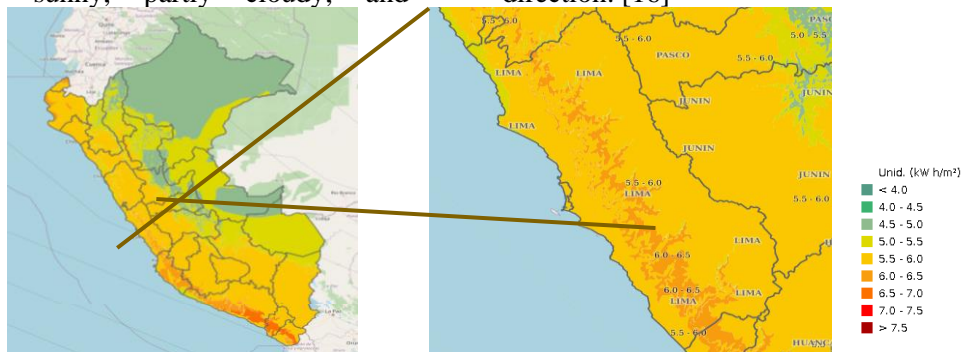
● Sun ● Partly cloudy ● Cloudy  
 >19 >28 >38 >50

**Figure 3(a,b):** Cloudy sky, sunshine and precipitation days -Wind rose Source: meteoblue

Figure 3(a) presents the following climatological characteristics, most of the months remain partly cloudy as the monthly number of sunny, partly cloudy, and

Days of precipitation ● 0 ● >1 ● >5 ● >12

precipitation days are shown. Days with less than 20% cloud cover are considered sunny days, with 20-80% cloud cover as partly cloudy and more than 80% overcast. Also, (b) the Wind Rose for San Borja shows the number of hours per year that the wind blows in the SW to NE direction. [16]



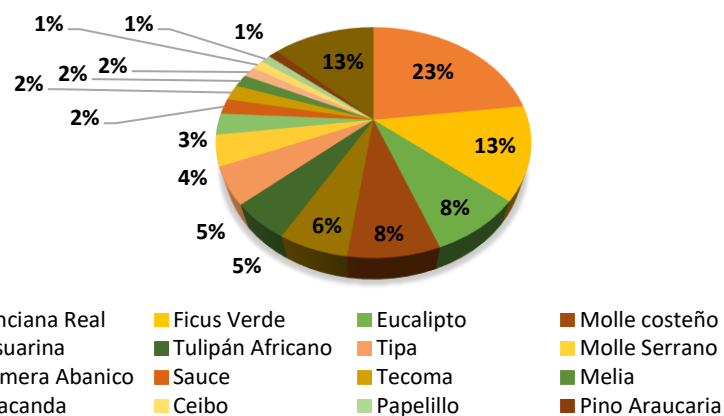
**Figure 4:** Annual Solar Radiation Map - Peru, Lima.

Figure 4 shows that Peru has high annual solar radiation due to its proximity to the equator. On the coast, it is 5.0 to 6.0 kWh/m<sup>2</sup>; in the highlands, 5.5 to 6.5 kWh/m<sup>2</sup> and in the jungle 4.5 to 5.0 kWh/m<sup>2</sup> on average. These figures

show Peru's high photovoltaic performance, which is why it should be exploited in the production of clean and renewable energies. [17].

### 3.1 Flora

The term urban trees are used to highlight the use of trees in the city. In general, we interpret their applications as ornamental



**Figure 5:** Tree distribution



Figure 5 shows the forest inventory for the district of San Borja, with the highest percentage of tree species: Ponciana Real, Ficus Verde, Eucalyptus, Molle costeno, and casuarina.

Also, due to their location in cities, trees provide social and environmental benefits,

which are extremely important, such as pollution reduction, thermal regulation, health improvement, and increased quality of life. Despite this, in recent years, several falling trees or parts have affected public property and third parties within the district; fortunately, they have not caused human losses. [18-19].

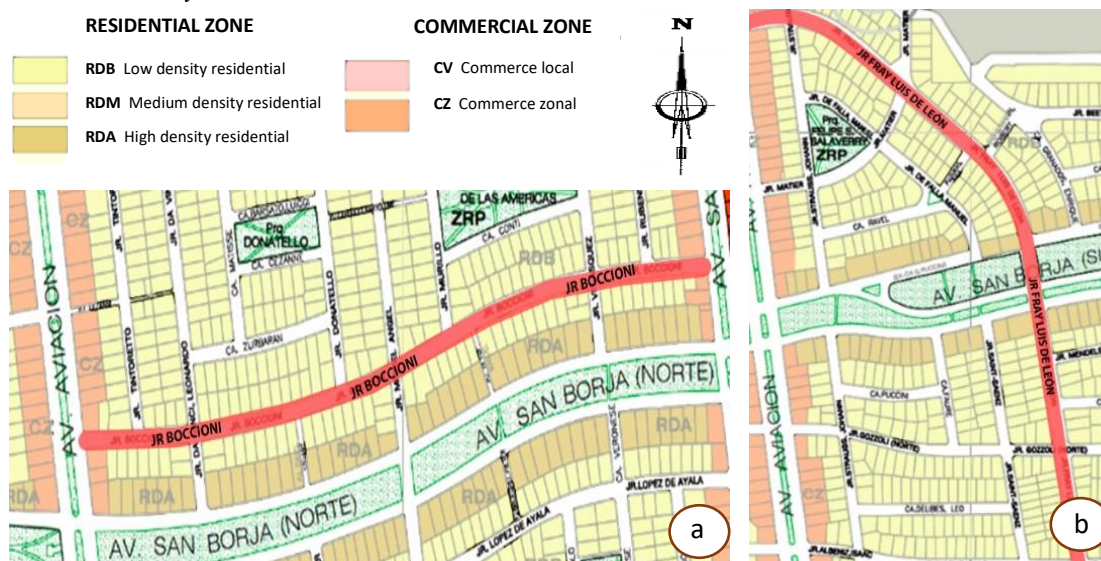


**Figure 6:** Sectors of green areas Source: Municipality San Borja

Figure 6 shows the number of green areas in each sector of the district. Sectors four, seven, and twelve have the highest percentage of trees because they are bordered by the large central berms of San Borja Sur Avenue, San Borja Norte Avenue, and Boulevard de Surco Avenue. Conversely, the areas with the least amount of trees are sectors one, three, and ten, mainly residential.

### 3.2 Streets analyzed

Two secondary roads have been selected in residential areas of the district of San Borja, the first of them is Jiron Boccioni which limits from Av. Aviación to Av. San Luis; the second road is Jiron Fray Luis de León between Av. Aviación and Jiron Albéniz



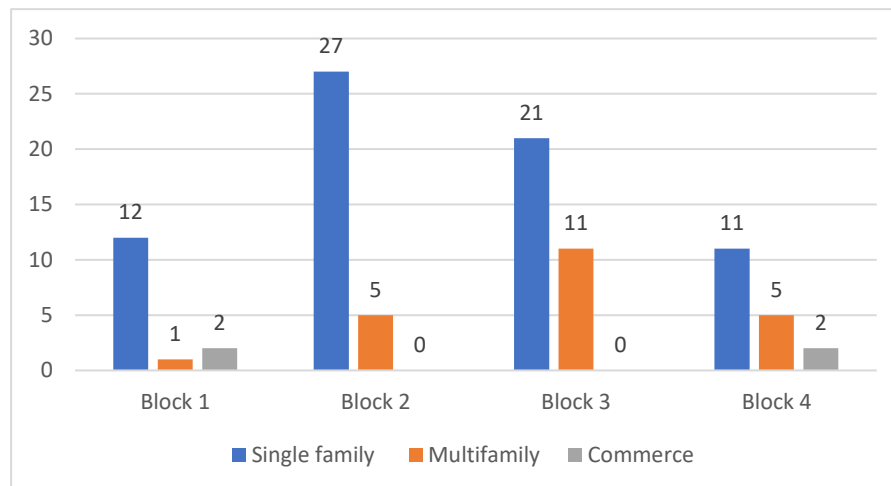
**Figure 7 (a,b):** San Borja Zoning Plan - Jirón Boccioni and Jirón Fray Luis de León Source: San Borja Municipality

Figure 7(a) shows that Jiron Boccioni Street has 97 lots, of which 93 are residential, and four are commercial located in a low-density residential zone. Also, (b) shows that Fray Luis de Leon Street has 95 lots, of which 90 are residential, and five are commercial located in a low-density residential zone.

## 4. Results

### 4.1. Land uses

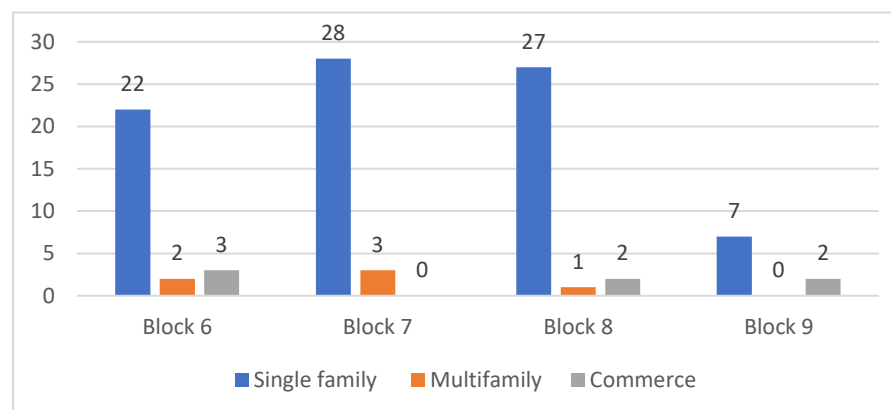
The study analyzed the different land uses along the roads, identifying three types. This study is critical because it allows us to understand the current distribution and zoning.



**Figure 8:** Types and number of lots per block jirón Boccioni

Figure 8 shows that the jirón Boccioni road has 71 single-family homes, 22 multi-family homes, and four commercial premises, the latter

being located at the beginning and end of the road.



**Figure 9:** Types and number of lots per block jirón Fray Luis de León

Figure 9 shows that the Fray Luis de León road has 84 single-family homes, six multi-family homes, and seven commercial premises; the

retail sector is located at the intersections with Av. Aviación and Av. San Borja Sur.

**Table 1:** Land use characteristics

STREET	CHARACTERISTICS
Jirón Boccioni	<ul style="list-style-type: none"> <li>The predominance of single-family homes, with an average of two stories.</li> </ul>
	<ul style="list-style-type: none"> <li>Multi-family buildings with an average of five stories.</li> </ul>
	<ul style="list-style-type: none"> <li>Commercial buildings at the beginning and end of the road with an average of two stories.</li> </ul>

	<ul style="list-style-type: none"> <li>• Passive roadway (walks and hikes).</li> <li>• Sidewalks and berms measure 1.50m and 2.0m, respectively.</li> <li>• Sidewalks and pedestrian ramps in normal condition.</li> </ul>
Jirón Fray Luis de León	<ul style="list-style-type: none"> <li>• Predominance of single-family homes, with an average of two stories.</li> <li>• Multi-family buildings with an average of four stories.</li> <li>• Commercial buildings at the intersection with avenues with an average of two stories.</li> <li>• Passive roadway (walking and strolling).</li> <li>• Sidewalk and berm measurements are 1.50m and 5.0m, respectively.</li> <li>• Sidewalks and pedestrian ramps in fair condition.</li> </ul>

#### 4.2. Contamination

The environmental management of a road plays a significant role because it allows adequate and integral control of the environment to

contribute to sustainable development. In the streets analyzed, polluting factors contribute to such management, such as noise, air, and waste pollution [20].

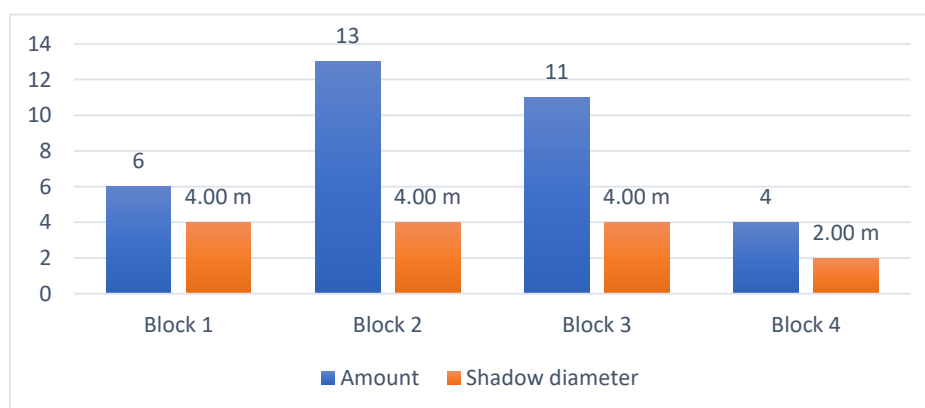
**Table 2:** Contamination type characteristics

STREET	CHARACTERISTICS
Jirón Boccioni	<ul style="list-style-type: none"> <li>• Noise and air pollution due to commerce and vehicular flow at the intersection with Aviación and San Luis Avenues.</li> <li>• There is no proper waste management.</li> <li>• There are only trash cans in block two.</li> </ul>
Jirón Fray Luis de León	<ul style="list-style-type: none"> <li>• Noise and air pollution due to commerce and vehicular flow at the intersection with Avenidas San Borja Sur and Aviación.</li> <li>• There is no proper waste management.</li> <li>• There is only one subway collection site in block six.</li> </ul>

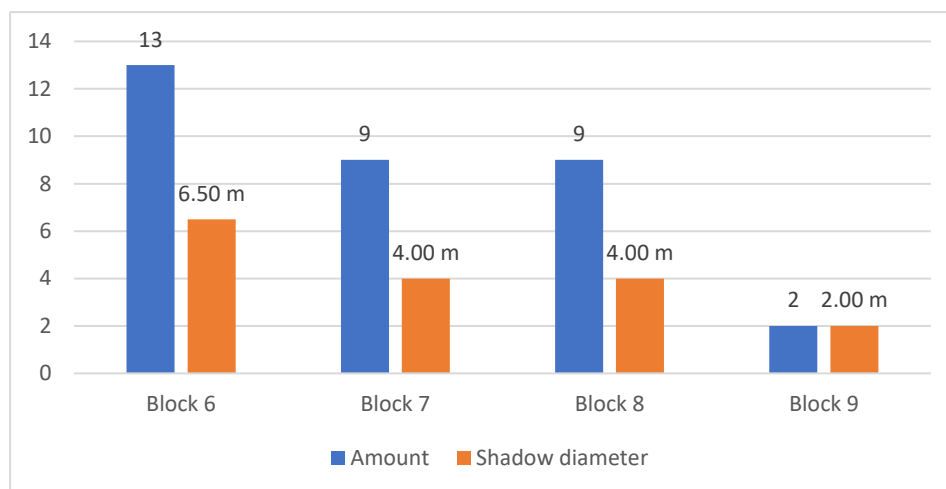
#### 4.3. Landscaping and Green Area

On both roads, the landscaping is not well planned since there are various trees, and sometimes there is a lack of vegetation. This is

essential to achieve comfort and beautify the roads with green areas, thus improving the quality of life in this residential area.



**Figure 10:** Shade quantity-diameter Trees jirón Boccioni



**Figure 11:** Number-Diameter of shade Trees jirón Fray Luis de León

#### 4.4. Jirón Boccioni

According to the research, Jiron Boccioni has a passive activity character; there is no recreational furniture; it is purely residential. It is characterized as a street where generally single-family houses are located; there are

commercial premises at the beginning and end of the street. Although it is a slightly narrow street, it has two-way traffic. There are few traffic signs on the street, so the road does not provide security; there are no garbage cans, there is not much green area along the road, and few trees offer shade and protection.

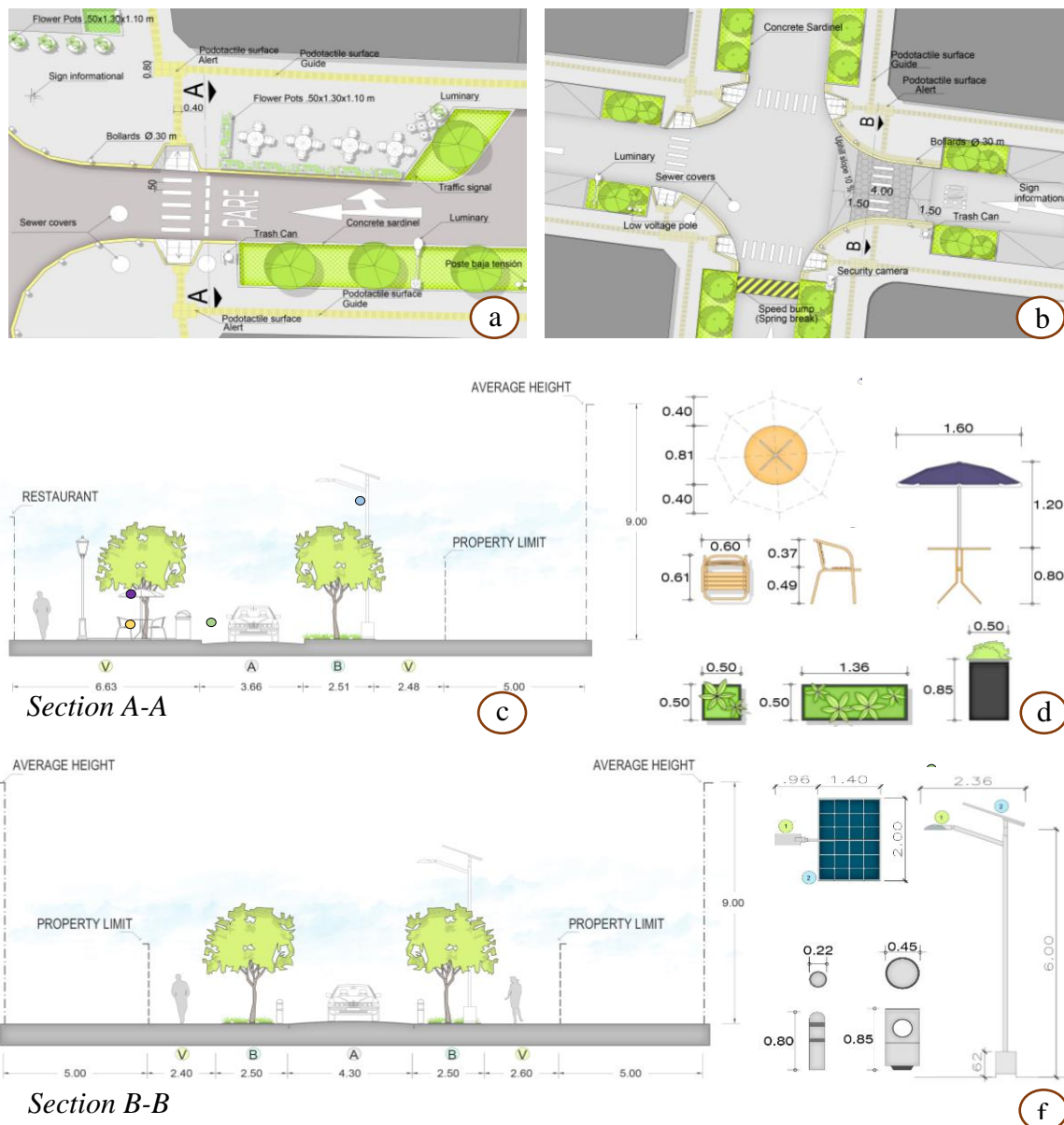


**Figure 12 (a,b,c):** Vía jirón Boccioni, current status

Figure 12 (a,b) shows a restaurant at the intersection of Jiron Boccioni and Av. Aviación; all of the buildings in the initial section are houses with vehicular access, and there is not much green area and few trees that do not provide much shade. The average height of the buildings is six meters, with an average of two stories. The road is two-way, and the flow of vehicles tends to head towards Av. Aviación.

Also, in (c), there is no speed reducers at the intersections, and there are no crosswalk signs. The roadway is six meters wide, with berms and sidewalks of approximately two meters each. There are no pedestrian-accessible surfaces for people with reduced mobility or trash cans along the entire street.

#### 4.5. Jirón Boccioni Approach



**Figure 13 (a,b,c,d,e,f): Boccioni shred cuttings and details**

Figure 13 (a,b,c,e) shows the extension of the sidewalk next to the restaurant to have a public space for pedestrians; according to (d,f), the following furniture was implemented: four tables, sixteen chairs, four umbrellas, and twelve planters; complying with the social distancing norms given by the government to reduce the contagion of COVID-19. A speed reducer was also installed to provide greater security.

#### 4.6. Jirón Fray Luis de León

The jirón Fray Luis de León road has a passive recreational character, according to the

analysis, as there is no active recreational furniture along the entire route of the road. It is mainly residential; there are no commercial establishments except for San Borja South Avenue and Aviación Avenue intersections. The lateral berm is divided into landscaping and parking in a balanced way. The road has signage in a stable state of preservation and lacks implementation; on the other hand, there are no garbage cans on the street, which can cause an environmental problem.



#### 4.7. General floor plan of Fray Luis de León Street



**Figure 14:** Vía jirón Fray Luis de León, current location

Figure 14 shows that at the intersection with Avenida San Borja Sur, the "Molinari" school has approximately 500 students. There is also an oriental food store. In addition, there are single-family homes, most of them 2-story with their parking. It can be visualized that for this vital intersection, there is a need to implement some furniture for people with disabilities such

as blindness and color blindness; we are talking about tactile floors and intelligent traffic lights. Also, the flow of people caused by having a school on the corner mentioned above has not been considered. There is also a lack of ramps and signage for pedestrians and their easy access.

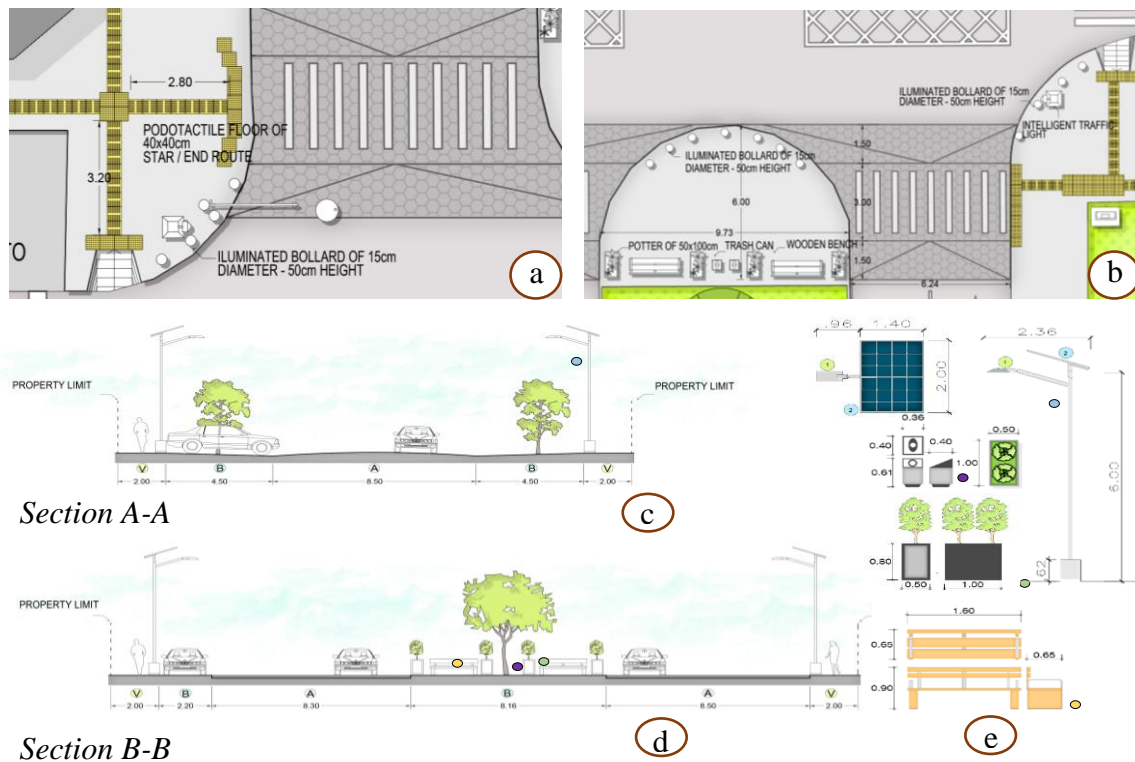


Figure 15 (a,b,c,d,e): Proposed Fray Luis de León shred model (cuts and details)

Figure 15 (a,b) shows the proposed furniture, two benches for pedestrian use in the center of the berm, four planters, two garbage cans to recover the public space complying with the social distancing norms given by the

government to reduce the contagion of COVID-19. Likewise, in (d,c,e), solar posts were implemented for public lighting, thus using renewable energies for greater sustainability.

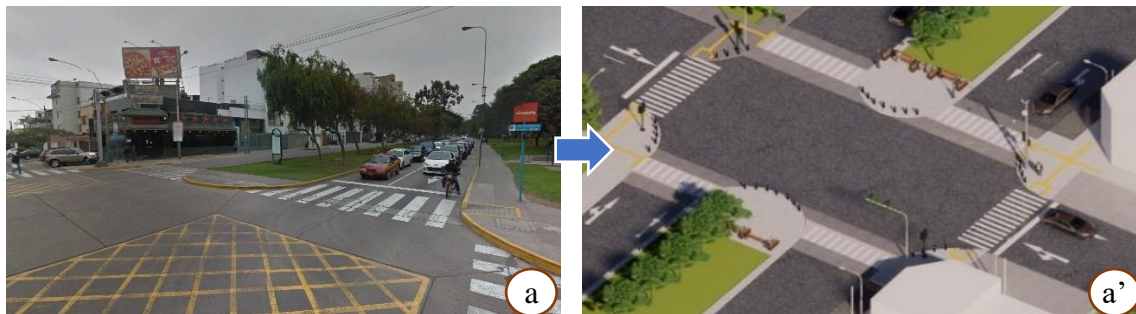


Figure 16 (a, a') shows the proposed public space with its respective furnishings and equipment and bollards to protect the user's safety.

## 5. Conclusions

- ✓ The design of public spaces on urban roads improves users' quality of life through good sustainable urban innovation.
- ✓ The design of areas with landscaping treatment allows adequate air conditioning of

the spaces, generating well-being and thermal comfort for users.

- ✓ Public spaces illuminated with solar panels and renewable energies allow for reducing environmental pollution, providing security, socialization, and integration of users.
- ✓ The proposal and implementation of road infrastructure, such as traffic lights, speed reducers, speed bumps, signage, bollards, pavement with tactile surfaces, garbage cans, surveillance cameras, provide safety, confidence, are comfortable, safer, efficient,

and less dangerous for the inclusion, accessibility, and mobilization of users.

✓ The sustainability of the eco-friendly areas of the spaces is reinforced with the use of clean technology, reducing the environmental pollution [21]

✓ The excellent design of public space can allow economic reactivation, promote mobility, and meet the government's standards of social distancing due to COVID-19.

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