Master of Science in Territorial, Urban Environmental, and Landscape Planning

Curriculum: Planning for the Global Urban Agenda

Master of Science Thesis

JUST STREETS in Practice: The role of School Streets in fostering Mobility Justice in Braga

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Abstract

Urban mobility justice has been a growing concern worldwide due to the car-dominant planning process of urban areas, which has excluded certain groups, especially vulnerable ones, from safe and accessible urban streets. One of the most marginalized groups among these is children, whose limited autonomy and physical fragility make them highly susceptible to mobility-related risks. In this regard, designing streets that prioritize children's needs inherently benefits other vulnerable users, including people with reduced mobility, the elderly, and caregivers with strollers, by ensuring safe, accessible, and inclusive infrastructure for all. In this context, promoting active mobility is crucial for equitable urban development, which benefits everyone.

One of the emerging strategies is the implementation of the school street initiatives to restrict car dominance around schools, which has the potential not only to address environmental and safety concerns but also to advance mobility justice. When aligned with the mobility justice framework, school streets can enhance redistribution of urban space, foster inclusive participation, and recognize the specific needs and voices of vulnerable users. In this regard, Horizon Europe JUST STREETS Project is actively working in eight pilot and four follower cities in Europe and beyond. Contributing to its research, this thesis investigates the relationship between school street initiatives and mobility justice to promote safer, more inclusive, and accessible urban areas for vulnerable groups while encouraging active mobility.

This thesis focuses on the Portuguese city of Braga, which, despite the Municipality efforts to promote active and inclusive mobility, faces challenges rooted in a car-centric culture, especially in school environments. The city of Braga is among the eight pilot cities of the JUST STREETS Project, focusing its intervention on the area surrounding the Basic School 2/3 André Soares. This thesis employed a mixed-method approach, including qualitative, quantitative, and geospatial GIS-based mapping, as well as policy document analysis. The findings revealed that while Braga's policy documents and municipal planning increasingly emphasize active and inclusive mobility and improve its infrastructure, real-world implementation is hindered by car-dominance, insufficient participatory practices due to

low engagement from certain community groups, which leads to insufficient recognition of the lived experiences of vulnerable users. The study concluded by proposing context-sensitive design measures inspired by the lived experiences of local users gathered through interviews. This thesis demonstrated that school streets, when framed within a comprehensive mobility justice perspective, can become powerful tools for transforming car-centric streets into people-centered public spaces that uphold accessibility, safety, and inclusion.

Keywords: Mobility Justice, School Streets, Active Mobility, JUST STREETS, Braga

Acknowledgments

"If everything we did in our cities were great for an 8-year-old and an 80-year-old, then it would be great for everyone."

—Gil Penalosa

Throughout this journey, I have come to truly understand that planning for mobility is not just about designing spaces; it is about centering people, especially the most vulnerable ones, in our vision of the city. This thesis has deepened my belief in the importance of justice, empathy, and inclusivity in shaping urban environments, particularly around schools where the future of our cities begins each morning.

First and foremost, I am sincerely thankful to my supervisor, Professor Elisabetta Vitale-Brovarone, for her invaluable guidance, encouragement, and generosity with time throughout this process. Her expertise and thoughtful feedback were instrumental in shaping this work and continuously inspired me to grow, both academically and personally. I would also like to warmly thank my co-supervisors at the Mobility Department of the Municipality of Braga, Dr. Filipa Corais and Dr. Sandra Brito, for their kind support, insights, and dedicated collaboration, which greatly enriched this research.

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This thesis is a reflection of many voices, and I hope it adds to the ongoing dialogue for more just and inclusive urban futures.

Table of Contents

Figures:

Graphs:

Tables:

Maps:

Chapter 1
Introduction

This chapter provides an overview of the thesis, including research question and objectives, along with a brief outline of the methodology, the overall thesis structure, and the thesis timeline.

1-1 Background

Urban areas today are facing multiple interrelated crises, including air pollution, traffic congestion, the climate crisis of global warming and decarbonization, and urban fragmentation. Facing these challenges alongside a growing awareness of social inequalities, and environmental degradation, have prompted a reevaluation of how cities are designed and experienced, particularly in terms of everyday urban mobility (Sheller, 2018), which is a form of mobility that takes place within urban environments, whether for an entire trip or for segments of a journey that unfold within the city (Semanjski, 2023). Nevertheless, urban mobility is not only about technical issues like transportation networks or the efficiency of movement, but it also fundamentally shapes how people access opportunities, participate in social life, and exercise their rights as urban users (Sheller, 2020).

In fact, the new mobility paradigm considers movement as inherently political, shifting attention from technical infrastructure to the social, cultural, and political dynamics that shape and are shaped by the urban mobility (Everuss, 2019), which is called “Mobility Justice” that involves an analysis of how power, privilege, and exclusion operate through the infrastructures, policies, and cultures of movement in cities (Sheller, 2018). Although transportation infrastructure is central to mobility justice, as it can either expand individuals’ mobility capabilities and social engagement or entrench inequality and spatial marginalization, depending on how access to mobility systems is structured (Sheller, 2018), social and political processes are equally vital, because infrastructure alone cannot guarantee just outcomes without fair and inclusive decision-making in which whose voices are included in planning, as well as governance, and recognition of diverse needs in which whose needs are prioritized or ignored, so that justice must be pursued not only through material distribution but also through democratic and participatory processes (Verlinghieri & Schwanen, 2020). In this regard, procedural justice is essential since even equitable infrastructure can produce unjust outcomes if affected communities are excluded from planning (Nthoki Nyamai, 2023), or even if the power sector limit the community influence (Cook & Butz, 2015), this is why recognition justice underscores the importance of acknowledging the social identities, cultural backgrounds, and embodied experiences of

marginalized and vulnerable groups whose mobility needs differ from dominant assumptions (Haxhija, Duran-Rodas, Wulfhorst, & Teresa Baquero Larriva, 2024). Therefore, mobility justice is not only about the right to move but also about the right to shape the conditions of movement, which requires structural transformation in how cities distribute space, power, and voice (Sheller, 2020).

This research has been conducted under the JUST STREETS Europe Horizon Project, which prioritizes the (re)development of urban streets to support active mobility and promote sustainable, inclusive, equitable, and people-centered urban streets for all citizens, specifically vulnerable and marginalized groups, through the lens of the mobility justice framework (JUST STREETS, n.d.) which encourages critical analyses and identification of the root causes of inequities (Aretha Sacha, Honey-Rosésa, & Simón-i-Mas, 2025). In this regard, active mobility, primarily walking and cycling, in mainstreaming health concerns within transport and urban planning policies, plays a crucial role as a key pillar of sustainable and just urban development by reducing car dependency, mitigating air pollution, supporting healthier lifestyles, as well as promoting spatial accessibility (WHO, n.d.; WHO Team, 2025). In addition to these benefits, it also plays a crucial role in fostering social inclusion, especially for groups who are often excluded from car-based mobility systems, including children, the elderly, and people with reduced mobility (Vecchio, Tiznado-Aitken, & Hurtubia, 2020).

One emerging approach to address these inequalities on urban streets is the implementation of school street initiatives, which aim to advance both sustainable mobility and social equity. School street initiatives involve the temporary or permanent restriction of motor vehicle access on streets adjacent to school entrances, specifically during drop-off and pick-up hours (Capital Regional District & City of Victoria, 2019). These interventions not only enhance road safety and air quality but also actively reclaim street space for children, caregivers, people with reduced mobility, and the area users' community in general (Hopkinson, Goodman, Sloman, Aldred, & Thomas, 2021). However, public health and transportation researchers have studied children's school mobility, concentrating primarily on the environmental and health advantages of active mobility; a few have connected

school travel and mobility justice (Aretha Sacha, Honey-Rosésa, & Simón-i-Mas, 2025). Hence, the relationship between school streets and mobility justice is important, not only in terms of distributive justice, since they mostly address distributive injustice caused by infrastructural deficiencies that hinder active travel and reinforce vehicle dominance (Aretha Sacha, Honey-Rosésa, & Simón-i-Mas, 2025), but also in regards with procedural and recognition justice, since school streets are places where diverse voices of different users need to be heard, and their participation in the planning phase is essential, as they are the everyday users of the area who understand the local challenges (Vecchio, Tiznado-Aitken, & Hurtubia, 2020).

This research was inspired by witnessing real-life challenges of school streets in Zagreb during a summer course in Croatia, prior to the beginning of the current research. In accordance with this idea, this thesis tried to focus on the Basic School 2/3 André Soares, which is the case study of the JUST STREETS Project in Braga, Portugal. The city of Braga has shown its commitment to sustainable and inclusive mobility through the development of its Sustainable Urban Mobility Plan (SUMP), and participation in European projects such as JUST STREETS, REALLOCATE, STEP UP, SHARED GREEN DEAL, and other European Projects, as well as being awarded in European Mobility Week. However, in spite of these advances, the city still faces some challenges related to car dominance, limited participatory planning due to low engagement from some community groups, and uneven accessibility for vulnerable populations (Braga City Council & MPT, 2023). The surrounding area of André Soares School, a centrally located public middle school in a dense urban neighborhood (National Statistic Institute, 2021), is a symbol of these tensions. It presents both a high potential for active mobility and persistent risks due to excessive presence of cars and narrow pedestrian and lack of cycling infrastructure in which by focusing on this specific location, the research aims to investigate the role of school street initiatives in advancing the principles of the mobility justice framework, including distributive, recognition, and procedural justice by analyzing how these are addressed through spatial interventions and co-creation sessions, to promote safer, more inclusive, and accessible urban areas in school streets.

1-2 Problem Statement

Despite the recognition of the need for sustainable and inclusive urban mobility, many cities still remain dominated by car-centric planning paradigms. This car-dominance, one way or another, has limited the use of active modes of transport, particularly walking and cycling. In various cases, this has also resulted in inadequate infrastructure, insufficient accessibility, unsafe urban environments, as well as limited inclusivity of diverse users in streets, which are among the most vital public urban areas. The aforementioned limitations disproportionately affect vulnerable groups, including children, the elderly, caregivers with strollers, and people with reduced mobility in a way that spatial and systemic barriers continue to reinforce existing inequalities in access to safe, accessible, inclusive, healthy, and just mobility options in everyday urban life. In this regard, school streets are urban spaces where the presence of vulnerable users is high and the risk of safe access to the school is critical; therefore, these challenges are especially pronounced due to the dominant presence of children as the most important vulnerable group among others. Yet, the potential of school street initiatives to address not only environmental and safety concerns but also procedural and recognition injustices remains underexplored, so the pressing need to investigate how school street initiatives can be designed and governed in ways that redistribute space, amplify marginalized voices, and promote equitable access, contributing to a broader agenda of mobility justice is an urgent need in order to have streets for people rather than for cars.

1-3 Research Aim

This thesis aims to investigate the relationship between school street initiatives and enhancing the achievement of mobility justice by fostering safer, more inclusive, and more accessible urban areas for vulnerable groups, encompassing three dimensions of justice: distributive justice, procedural justice, and recognition justice (Sheller, 2018; Harvey 1973). To this aim, the thesis focuses on the case study of Basic School 2/3 André Soares, a public basic education institution serving the second and third cycles of the Portuguese education

system with students aged 10 to 15, located in the Portuguese city of Braga, with the encouragement of active mobility.

1-4 Research Objectives and Question

With André Soares School as the case study, this thesis aimed to critically examine the role of school street initiatives in enhancing mobility justice, with the following objectives:

- To explore the extent to which the existing situation around André Soares School corresponds to the principles of the mobility justice framework, including distributive, recognition, and procedural justice.
- To explore the contextual spatial, social, and policy-related factors that influence the effectiveness of school street initiatives in promoting safe, inclusive, and accessible mobility for vulnerable groups.
- To explore stakeholder perceptions of participation and co-creation in relation to the principles of procedural justice within the mobility justice framework.

Based on the above-mentioned objectives, the thesis addressed the following question through a mixed-method integrating qualitative, quantitative, and GIS-based geospatial analysis:

- What is the role of school street initiatives within the mobility justice framework in promoting safer, more inclusive, and accessible urban areas for vulnerable groups, while encouraging active mobility?

1-5 Research Methodology

This research adopted a mixed-methods approach, which integrated quantitative, qualitative, and geospatial GIS-based techniques in order to comprehensively understand the area to analyze the relationship between three dimensions of the mobility justice

framework, including distributive, recognition, and procedural justice, and school streets. It combined quantitative data, including demographic, active mobility infrastructure, and car crash data, with GIS mapping of population density within walking radii of 800 meters, 1200 meters, and 1600 meters, approximately correspond to 10-, 15-, and 20-minute walking distances at average speed, which were calculated using simple circular buffers from the city center to identify the geographical and strategic location of the case study in the city of Braga. These were complemented by grounded field observations inspired by Jan Gehl's public space observation method, aimed at creating maps of obstacles and activity patterns in the area. These observations, conducted across different times and days, captured real-time mobility patterns and physical barriers affecting active mobility as well as accessibility of vulnerable groups.

traffic accident hotspots, mobility and urban elements and infrastructural gaps with grounded field observations inspired by Jan Gehl's public space observation method to create maps regarding obstacles and activity mapping of the area. These observations, conducted across different times and days, captured real-time mobility patterns and physical barriers affecting active mobility as well as accessibility of vulnerable groups.

To complement spatial and observational findings, the study drew on perspectives from a wide range of stakeholders, including residents, parents, students, schoolteachers, shop owners, city users, and municipal technicians from the mobility department, through semi-structured interviews analyzed using thematic analysis with the deductive coding approach. Moreover, documentary analysis of local and regional plans further allowed a critical assessment of how mobility justice has been institutionalized in policy in the city. The thesis was situated within the broader JUST STREETS Project and builds on prior academic work; altogether, this methodology enabled a comprehensive understanding of school streets as tools for fostering safer, more inclusive, and accessible urban environments.

1-6 Research Structure and Timeline

This thesis is organized into seven chapters, each contributing to an understanding of the relationship between the mobility justice framework and school streets initiatives. Figure 1 provides a schematic overview of the research design framework and the thesis outline regarding the theoretical framework and the strategy for data collection and analysis.

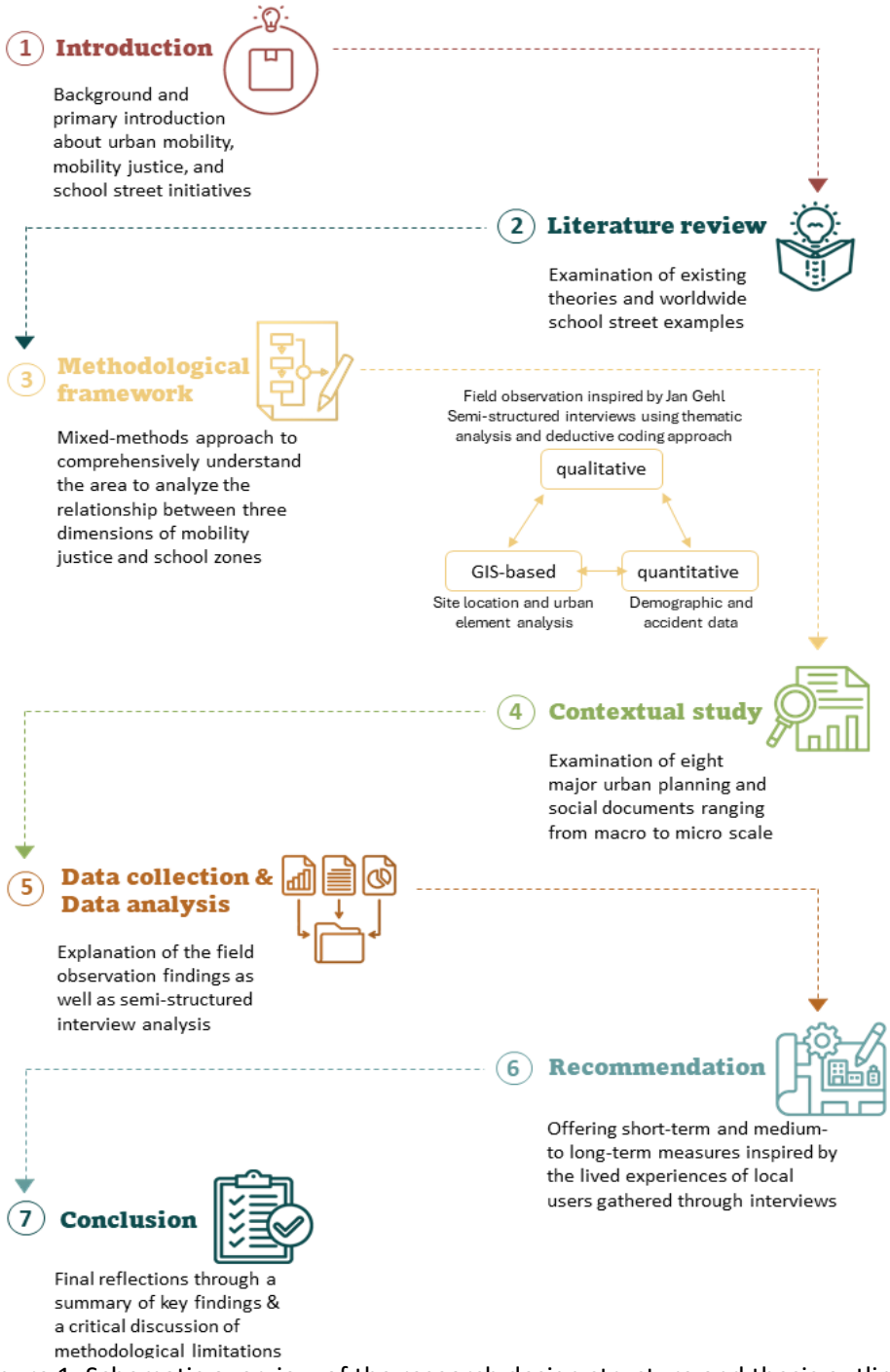


Figure 1: Schematic overview of the research design structure and thesis outline
Source: Elaborated by the author

Ultimately, Figure 2 provides a chronological overview of the principal phases, offering a clear picture of the activities conducted during the development of this thesis, from the initial proposal to the final submission.

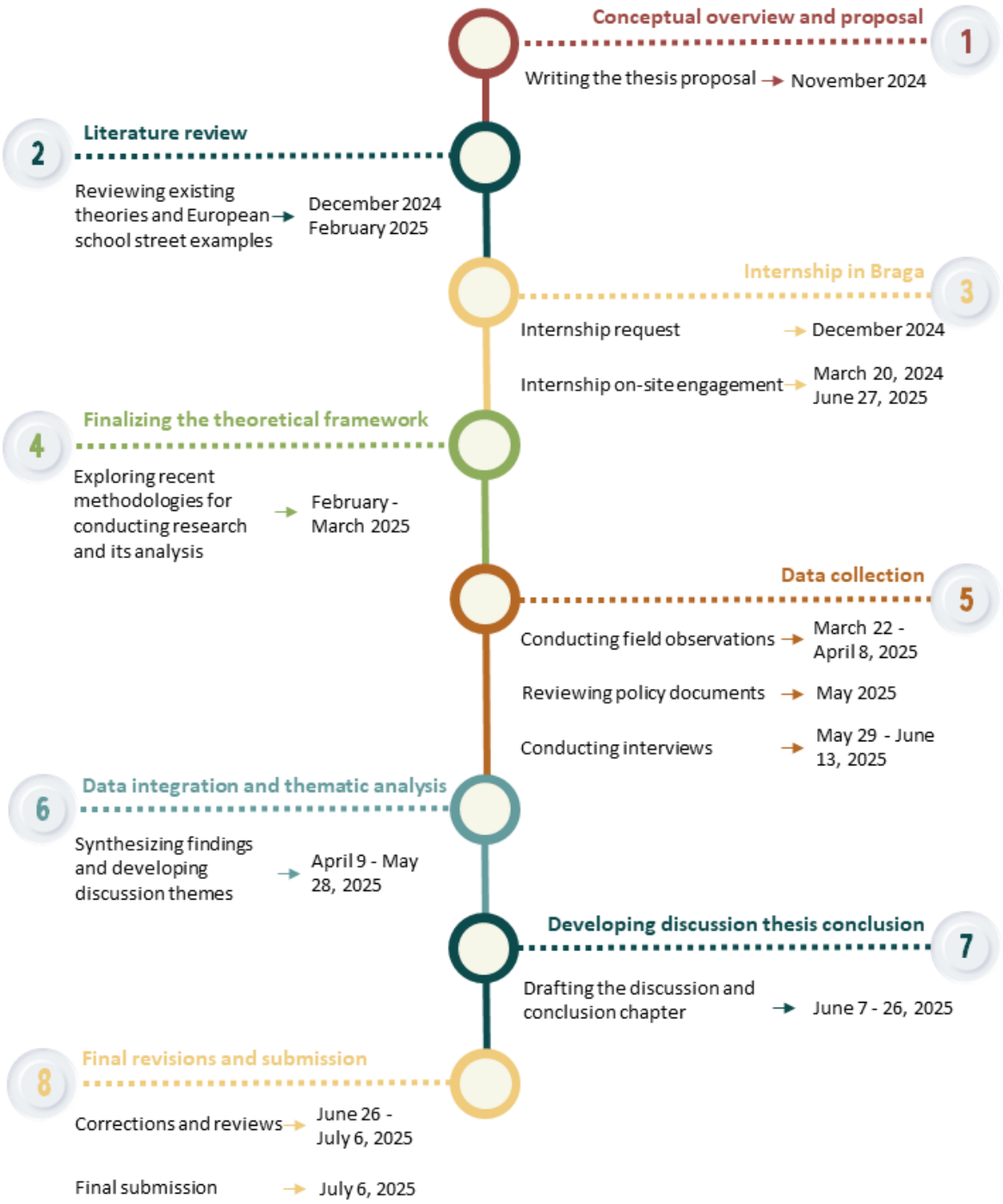


Figure 2: Chronological breakdown of the thesis process
Source: Elaborated by the author

Chapter 2
Literature Review

This chapter reviews existing literature on Urban Mobility and Active Mobility, School Streets, Mobility Justice, and Participatory and Co-creation Approaches, as well as some European examples of School Streets.

2-1 Urban Mobility and Active Mobility

Urban mobility takes place within cities and their surrounding areas which encompasses intraurban, suburban, and interurban movements, that shape social interactions and accessibility (Costa, Morais Neto, & Bertolde, 2017). Historically, mobility evolved from compact and pedestrian-centered cities to more expansive and transit-based urban structures in a way that with the introduction of railways and streetcars in the 19th and early 20th centuries, it facilitated urban expansion, but from the 1930s onward, the rise of automobiles led to suburbanization and a decline in public transit use, and the freeway era further reinforced car dependency, contributed to urban sprawl, and reshaped mobility patterns (El-Sherif, 2021). These shifts, alongside rapid urbanization and inadequate transport planning have resulted in significant mobility challenges and environmental concerns, which as a key social resource, mobility influences interactions across socio-spatial hierarchies and is shaped by factors such as income, employment, gender, age, and transport availability, highlight the need for more sustainable and inclusive urban mobility solutions (Costa, Morais Neto, & Bertolde, 2017).

Sustainable urban mobility aims to address these challenges in order to enhance accessibility and provide efficient, inclusive, and environmentally responsible transport solutions that support daily activities and social interactions while preserving broader societal values (Costa, Morais Neto, & Bertolde, 2017). In recent decades, there has been a notable shift in urban transport policies, moving away from prioritizing road expansion to accommodating growing car use, toward strategies that emphasize sustainable mobility and livable cities; that many western countries have increasingly with the focus on car dependency reduction, expansion of curbed road infrastructure, and promoted alternative transport modes to enhance urban quality of life to pave the way for active mobility as a key strategy for creating healthier, more environmentally sustainable, and socially inclusive urban environments (Jones, 2014).

Active mobility is essential in order to improve public health, reduce environmental harm, and create safer urban environments, and according to the WHO, transport is a major

contributor to air pollution, which is responsible for 569,000 deaths annually in the European Region, road traffic also remains a critical public health issue, with over 68,000 fatalities each year, that make it the leading cause of death among individuals aged 5-29, additionally, traffic noise affects at least 20% of the population, exceeding 50% in urban areas, further compromising public well-being (WHO, 2023). Despite WHO and EU efforts to promote physical activity only one-third of Europeans meet the recommended levels, while car dependency continues to dominate urban transport; since 50% of car trips in Europe are shorter than 5 km, integrating active mobility into daily routines can significantly improve public health, lower emissions, and enhance urban livability (Wegener, 2017). It not only improves health and environmental outcomes but also enhances social inclusion by increasing accessibility and reducing socio-spatial inequalities, with affordable provision and convenient transport options, walking and cycling enable greater participation in social interactions, along with strengthening community connections and reducing mobility-related disparities (Vecchio, Tiznado-Aitken, & Hurtubia, 2020).

2-2 Mobility Justice

Since the world seeks a transition to more environmentally sustainable and socially just forms of mobility, mobility justice has become a critical issue, because of unequal access to safe and reliable mobility continues to create significant disparities, it has highlighted the urgent need for more just and inclusive mobility solutions (Sheller, 2018). The concept of mobility justice emerged from growing concerns about the environmental and social impacts of car dependency, particularly its reinforcing role in shaping inequalities, however, initially, efforts to address these challenges focused on technological and economic solutions, later it became clear that mobility is deeply intertwined with social justice (Sheller, 2020). Moreover, the mobility justice extends beyond access to transport and demonstrates how power dynamics, governance, and economic structures shape movement and reinforce inequalities in a way that calls for shifting mobility systems toward collective and inclusive approaches that challenge exclusionary policies and consider diverse social

realities. Subsequently, to address historical and political factors, mobility justice aims to create equitable, sustainable, and socially responsive transport systems (Verlinghieri & Schwanen, 2020).

Transport systems shape access to opportunities and public spaces, often disadvantaging individuals based on income, gender, or ability, and “Justice considerations focus on disadvantaged populations, intending to enhance equality regarding access and movement” (Haxhija, Duran-Rodas, Wulfhorst, & Teresa Baquero Larriva, 2024). Mobility justice has recently emphasized on the need for equitable and sustainable transport solutions that ensure accessibility for all and at the same time address structural inequalities and environmental responsibility (Sheller, 2020). The unequal distribution of the mobility system continues to affect quality of life for people in underserved areas and marginalized groups, who have limited access to essential opportunities, so ensuring mobility justice in urban life is crucial to prevent social exclusion, reduce accessibility disparities, and ultimately create more inclusive and equitable cities (Haxhija, Duran-Rodas, Wulfhorst, & Teresa Baquero Larriva, 2024). In fact, mobility justice offers a comprehensive framework to understand how power and inequality influence the governance of movement across various scales, from individual bodies and city streets to national borders and global flows, which promotes more integrated and fair responses to interconnected challenges like climate change, migration, and urban transformation (Sheller, 2020).

This research employed a mobility justice framework derived from the JUST STREETS project to analyze how school street initiatives can promote safety, accessibility, and inclusivity in urban environments, focusing on the three dimensions of distributive (Harvey, 1973), procedural (Sheller, 2018), and recognition (Sheller, 2018) mobility justice. These three dimensions are essential to understand not only the fair distribution of mobility resources but also the inclusive decision-making processes and the acknowledgment of marginalized groups’ specific needs and lived experiences.

2-2-1 Distributive Mobility Justice

Distributive mobility justice plays a key role in addressing inequalities in mobility infrastructure and services, which are often worsened by urban challenges like climate change and population growth. While traditional approaches have focused on the fair distribution of mobility benefits and costs, scholars have highlighted the need to go beyond this with the focus on the broader social and structural dynamics involved, so it made the mobility justice has evolved toward a more society-centered approach that emphasizes inclusion and fairness in how urban transformations are planned and implemented, especially for disadvantaged groups (Haxhija, Duran-Rodas, Wulfhorst, & Teresa Baquero Larriva, 2024). Distributive justice concerns the fair allocation of resources, rights, and valued goods, both benefits and burdens, while considering the varying impacts these distributions have on individuals, it also emphasizes the importance of ensuring that the most disadvantaged members of society experience progressive improvements in their neighborhoods (Nthoki Nyamai, 2023).

According to Sheller (2020), at the street scale, distributive mobility justice also involves how the built environment and land use, such as streets, buildings, vehicles, public transit, and infrastructure, are designed and allocated, which have contributed to racially segregated, car-dependent cities, and have reinforced exclusion based on class, gender, ability, and other social factors. In fact, distributive justice requires that public transport systems do not arbitrarily restrict access through physical, social, or systemic barriers, and mobility should not be granted to some groups at the expense of imposing burdens on others who are already underserved, instead, cities should apply socially informed benefit analyses to ensure that public investments in transport and communication infrastructure reduce social exclusion and meet minimum standards of accessibility for all, so principles which advocate for equitable design across all modes of transport, including walking, cycling, and public transit, are crucial to ensure that urban mobility systems distribute space, access, and opportunity fairly, rather than privileging one dominant mode like the private car (Sheller, 2020).

2-2-2 Procedural Mobility Justice

Procedural justice ensures that laws, regulations, and policies have been formulated and implemented through fair, transparent, and consistent processes to guarantee equal rights and social cooperation and as societies become more complex, procedural justice helps balance diverse interests, prevent conflicts, and uphold social integration, which, without it, trust declines, rights are undermined, and governance becomes unpredictable, that is a threat to social stability and justice (Wu, 2024). Focusing on transparency in decision-making, procedural justice also guarantees that societal structures fairly allocate responsibilities and distribute resources, which, regardless of the outcome, promotes fairness in urban processes and enhances trust, accountability, and equity within the system. (Nthoki Nyamai, 2023).

Procedural justice in urban mobility necessitates the active participation of the residents in order to create transport systems that reflect their needs and experiences, in a way that the exclusion of users from planning and decision-making not only undermines fairness but also impacts the effectiveness and accountability of mobility projects, so true justice in urban mobility should not be predefined only by authorities alone; at the same time, it should incorporate diverse perspectives to ensure inclusive and equitable transport solutions. In this regard, recognition of how different user groups perceive justice enhances the development of mobility systems that address social disparities and foster a more just and accessible urban environment (Nthoki Nyamai, 2023).

2-2-3 Recognition Mobility Justice

Recognition justice refers to the process of acknowledging individuals and groups as rightful members of society, ensuring they have equal status, rights, and dignity, by emphasizing the importance of marginalized or oppressed groups' recognition, who deserve fair treatment, preventing their exclusion, and fostering an equitable society. In fact, recognition justice plays a crucial role in affirming identity, granting rights, and ensuring social inclusion, with misrecognition and injustice addressed (Reagan, 2015). This justice dimension influences

public policy to ensure that marginalized voices are heard and respected, which, without this recognition, social and political processes risk becoming depoliticized, reducing justice to a mere balancing of competing interests rather than addressing deeper systemic inequities, hence, it serves as a fundamental principle to create fair and equitable societies where individuals and groups are not only included but actively valued in shaping collective outcomes (Martini, 2023).

Recognition mobility justice in urban areas focuses on acknowledging and addressing the structural inequalities that influence mobility access, particularly for disadvantaged socio-economic groups, with the emphasis on shifting from state-centered approaches to society-centric frameworks that consider not only the distribution of mobility resources but also the social and institutional conditions that contribute to non-domination and non-oppression. By incorporating recognition justice principles, the mobility justice framework ensures that mobility planning accounts for the lived experiences of marginalized and vulnerable groups, in order to help identify and rectify mobility disadvantages linked to decision-making processes, divisions of labor, and cultural dynamics (Haxhija, Duran-Rodas, Wulfhorst, & Teresa Baquero Larriva, 2024).

2-3 School streets as an urban mobility strategy

School Streets are designated car-free zones in front of schools during drop-off and pick-up times (Capital Regional District & City of Victoria, 2019) and are emerging as a low-cost, simple intervention to reduce vehicle usage (BYCS, 2022). In fact, during the drop-off and pick-up times, only active travel[1] (AT) modes are permitted, with exceptions granted for residents and businesses within the designated school streets (Köllinger, 2024), which through the use of basic materials and rapid implementation, School Streets can serve as an initial step toward long-term urban transformation, since over time, these temporary

[1] AT: Active Travel that includes walking, scooting, and cycling.

interventions can evolve into permanent car-free zones, incorporating green infrastructure, seating areas, and community-friendly features that promote social interaction and play (Clarke, 2022). School Streets prioritize children's needs, since they are the most important road users around schools and need to be protected (Rossetti, Caselli, & Torrisi, 2024) to create safe and accessible spaces that enable them to engage in social interactions, active travel, and play during their commute to school (Clarke, 2022). In this regard, daily active travel encouragement is a crucial strategy for increasing physical activity while promoting health, environmental, and social benefits, and despite its advantages, AT has declined among children in many developed countries due to factors like time constraints, distance, and safety concerns (Giles-Corti, et al., 2011). The influx of a large number of students within a short period makes schools a major factor in morning and afternoon peak traffic (Köllinger, 2024), as a result, car travel to school significantly contributes to congestion, increasing toxic air pollution, carbon emissions, and road safety risks (Mayor of London, 2022). Concerns over traffic hazards, inadequate pedestrian infrastructure, and personal safety often deter parents to allow their children to commute to school with active modes, so, parents who drive their children to school, even when it is within walking distance, contribute to further congestion and discouragement of active travel (Giles-Corti, et al., 2011). In fact, the increasing reliance on cars for school trips has contributed to higher road risks for other students, which this growing sense of insecurity prompts even more parents to drive their children to school, further reinforcing the cycle of car dependency (João, Silvab, & Nevesc, 2019). To address these challenges, School Streets provide an effective solution by reducing motor vehicle congestion around school areas during drop-off and pick-up times (Smith, Gosselin, Collins, & Frohlich, 2022), hence, vehicle restrictions along with these interventions create a healthier and safer environment for children and caregivers who walk or wheel to school (Capital Regional District & City of Victoria, 2019).

The idea of school streets began in Bolzano, Italy, in 1989 (EU Urban Mobility Observatory, 2014). Then, it spread across Europe, including Milan, which implemented its first such measures in 2012, and was followed by Edinburgh in 2015 and London in 2017, also in Belgium, Ghent this approach was introduced in 2012, and it has since expanded to France and the UK, as well as other countries like Ireland, the Netherlands, Austria, and the Czech

Republic which have also piloted similar initiatives, but in North America, the idea has more recently been adopted in cities such as New York and New Haven (Clarke, 2022).

2-4 Community Participation and Co-creation

Urban planning has historically been recognized as an applied technique rather than a purely analytical science, inherently tied to the political sphere, however, early planning theories of the 1960s and 1970s largely overlooked its political dimensions, treating it as a technocratic and procedural process. This perspective began to shift in the mid-1970s, with planning increasingly framed as a political discourse, culminating in the 1990s communicative approach, which closely linked planning to political theory and reinforced the transition from top-down to bottom-up urban planning (Pissourios, 2014). This bottom-up approach in urban planning emerged as a response to the limitations of top-down methods, which often failed to address the diverse interests of urban communities with consideration of cities as dynamic spaces shaped by various cultural, economic, and political groups, this approach has prioritized inclusive decision-making by integrating community perspectives into urban development. Unlike traditional models that risk stakeholder conflicts, bottom-up planning encourages dialogue, resolves conflicting interests, and develops a shared vision for sustainable urban growth that reflects residents' lived experiences. (Semeraro, Zaccarelli, Lara, Sergi Cucinelli, & Aretano, 2020).

The growing emphasis on participatory planning underscores the need for inclusive decision-making in designing and managing urban spaces, as the COVID-19 pandemic has further highlighted this necessity. This shifting mobility pattern and transportation challenges have forced local administrations to rethink their strategies. The placemaking methodology[2], which promotes collaboration between public and private stakeholders

[2] The placemaking approach prioritizes community involvement in urban design, ensuring public spaces reflect user needs rather than rigid planning structures. By integrating end-user insights with planner expertise, it creates inclusive, flexible environments that enhance social interactions and cultural relevance.

(Thomas D. , 2016), strengthens the connection between people and their urban environment, ensuring that community experiences and needs drive future planning decisions (Papas, Basbas, & Campisi, 2023). The bottom-up approach emphasizes collaborative decision-making, ensuring urban planning reflects community needs and with focus on integrating mixed-use development, it promotes sustainability, accessibility, and improved quality of life (Deffner, Joost, Weber, & Stiess, 2021). A key component of bottom-up urban planning is authentic community engagement, particularly for marginalized or overlooked populations. By actively involving residents in decision-making, planners can ensure that policies and developments reflect the actual needs and aspirations of those most affected. This approach not only amplifies community voices but also fosters equity, trust, and long-term sustainability in urban development (Staff, 2020).

The need for a bottom-up approach is especially evident in transportation planning, where traditional public participation methods, such as public meetings and comment periods, have historically excluded low-income and disadvantaged populations who often lack the time, resources, or knowledge to engage effectively. In response, policymakers have increasingly prioritized community-based participation, recognizing that historically underserved groups must be empowered to identify mobility gaps and propose solutions that align with their needs. Although legislative efforts and funding initiatives have sought to enhance inclusivity, the effectiveness of these measures remains debated, highlighting the ongoing challenge of ensuring meaningful community involvement (Pinski & McCarthy, 2024). Building on this, transportation planning has long failed to meet the mobility needs of marginalized communities, often overlooking their priorities in long-term strategies. Equitable planning must begin with a genuine assessment of the most pressing unmet needs to ensure that proposed projects provide tangible benefits while avoiding harm. Outreach efforts should focus on engaging underrepresented populations through flexible participation methods and fostering trust through collaboration with community leaders and grassroots organizations. Furthermore, educating communities about mobility equity and transportation options enables informed decision-making, increases participation, and ensures that transportation investments align with the real needs of vulnerable groups (Creger, Espino, & Sanchez, 2018). Figure 3 illustrates the hierarchy of different stages of a

bottom-up approach to mobility equity, beginning with community-driven identification of mobility needs and progressing through education, project prioritization, and voting. This step-by-step process ensures inclusive decision-making by integrating community perspectives at every stage of urban mobility planning.

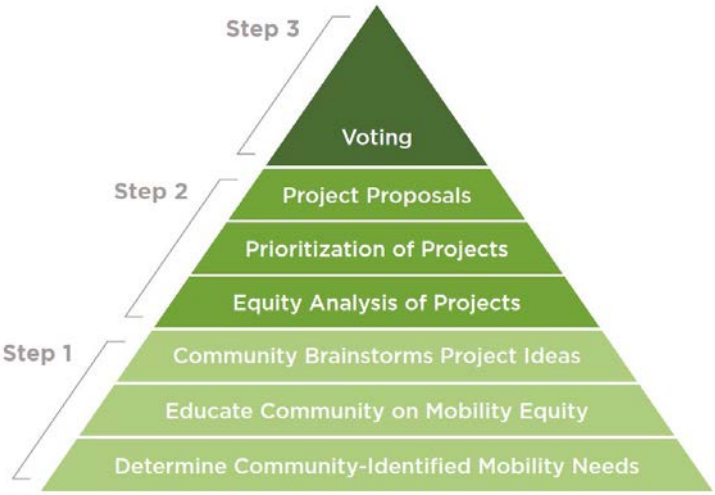


Figure 3: Mobility equity framework
Source: (Creger, Espino, & Sanchez, 2018)

Building on the principles of participatory planning and bottom-up approaches, co-creation has emerged as a powerful method for embedding community engagement more deeply into urban mobility planning. According to Messiha et al. (2025), co-creation refers to the active collaboration and joint problem-solving among diverse stakeholders throughout all phases of an initiative, from identifying the issue to evaluate outcomes, which involving stakeholders at each stage allows initiatives to be shaped by their specific needs and perspectives, increasing the likelihood of effective and lasting implementation (Messiha, Altenburg, Giné-Garriga, Chastin, & Chinapaw, 2025). Co-creation is a collaborative process through which solutions, services, or interventions are developed by actively involving the broad range of stakeholders. By drawing on the collective knowledge, experiences, and creativity of diverse participants, this approach often leads to more effective and contextually relevant outcomes than those produced through traditional top-down planning (Fondazione Giangiacomo Feltrinelli, 2024).

In urban contexts, particularly in regeneration projects, co-creation brings together residents, professionals, and decision-makers to jointly conceive, discuss, plan, and implement actions that deliver meaningful added value (Fondazione Giangiacomo Feltrinelli, 2024). It also offers a promising approach to bridging the science-implementation gap, that is, the disconnect between the knowledge produced by researchers and the information applied in policy and practice (Messiha, Altenburg, Giné-Garriga, Chastin, & Chinapaw, 2025).

2-5 European examples of School Streets

➢ Italy:

In Italian legislation, particular emphasis has recently been placed on the concept of school streets, through Legislative Decree No. 76/2020, the "school zone" was officially incorporated into the Italian Street Code. This law defines "school zones" as urban areas near school buildings, where special protection for pedestrians and the environment is guaranteed, marked along access roads with designated start and end signs (Rossetti, Caselli, & Torrisi, 2024).

Bolzano, a city in northern Italy, has been a pioneer in implementing school streets, where cars are temporarily banned during school drop-off and pick-up times to enhance safety and reduce congestion. Introduced over two decades ago, this initiative aimed to break the cycle of car dependency, where parents driving their children to school inadvertently increased traffic risks, prompting even more car use. Initially met with resistance from parents and residents, the project has since proven highly successful. The partnership between schools, the municipality, police, and school guides has been crucial in enforcing the 15-minute traffic bans before and after school hours. Over time, community attitudes shifted, with schools themselves advocating for road closures. As a result, 80% of primary school children in Bolzano now travel by foot, bike, or bus, significantly reducing accidents and fostering

children's independence in commuting (EU Urban Mobility Observatory, 2014; Solderer & Senfter, 2020; Clarke, 2022).

Figure 4: School streets of Bolzano from METAMORPHOSIS Project
Source: https://www.metamorphosis-project.eu/event/school-streets-bolzano.html

Among Italian cities, ***Bologna*** in Emilia-Romagna Region was part of the "Safer Road to School" project, launched in 2007, which aimed at reducing car traffic around schools and improving safety through measures like bike paths and a walking bus (pedi-bus) program (Pedibus, 2024). Key outcomes included the successful launch of pedi-bus routes, which promoted independent travel and road safety for children. Additionally, traffic calming efforts and communication campaigns, such as cycling safety courses and driver awareness programs, were integral to the project. Impact evaluation showed a 28% increase in student involvement, and over 20% participation in the pedi-bus program. Furthermore, the initiative contributed to a 21.1% reduction in accidents and a 21.65% decrease in injuries from 2007 to 2010 (Zanin, De Chiara, Rossi, & Bologna, 2013; The “Safer Road to School” project, 2013).

Figure 5: School Streets in Bologna
Source: https://www.ilrestodelcarlino.it/bologna/cronaca/pedibus-jtyi20p6

As time passed and the successful results of previous school street projects became evident, other Italian cities began to explore similar initiatives. ***Parma***, for example, took significant steps towards creating safer, more sustainable environments around schools. The "Parma Cambia Spazio" project, launched in 2020, focuses on reducing traffic, pollution, and sedentary lifestyles, especially around schools. The initiative includes the creation of school streets, installation of playgrounds on streets with games painted on the asphalt, traffic calming measures like 30 km/h zones, and the development of bike lanes in residential areas. The project also promotes public awareness through installations like "metro minuto" signs in front of schools that indicate the distance in minutes of the most traditional routes, from various points of the city to school for people to understand it takes less to go by bike than by car. These were done to encourage walking and cycling within the concept of 10-minute city on foot or by bike (Major, 2020). However, they still have ways to go since still there are some school areas in Parma suffer from low walkability levels, particularly in peripheral and rural locations, where sidewalks are either missing or inadequate (Rossetti, Caselli, & Torrisi, 2024).

- **Belgium:**

In Belgium, the implementation of school streets first started in Ghent in 2012 (School streets, n.d.). Then, many other cities and municipalities have followed, gaining momentum over the past decade as part of broader efforts to enhance traffic safety, promote active mobility, and reclaim urban space for children. According to Mobiel 21, these initiatives align with the principles of the child standard, which advocates for traffic environments that are tailored to children's needs and rights. School streets, along with other measures like play streets and low-traffic zones, are considered key to creating safe, accessible, and child-friendly public spaces that support independent and active travel from an early age (Godin & Vanderstraeten, 2025).

One illustrative example comes from Kontich-Kazerne, where the Sint-Montfort Primary School transformed a section of the street into a school street. Initially launched in 2014,

the intervention aimed to manage traffic flow near the school gates during peak drop-off and pick-up hours. For several years, the street was manually closed using temporary fences, with the school staff. To streamline the process and reduce the burden on staff, the school later adopted an Octopus pole system, a specially designed visual marker pole with a built-in retractable boom gate. The extendable barrier, featuring a C3 no-entry sign, is deployed during school street hours and stored within the pole afterward. This installation also serves a promotional and educational role, with the recognizable Octopus mascot helping children understand traffic safety and the meaning of the school street.

Figure 6: School Street in Kontich-Kazerne, Sint-Montfort Primary School
Source: (Mobiel 21, Gemeente Lennik, 2024)

The new setup offers multiple advantages: it provides a lightweight, easy-to-use physical barrier, improves the visual identity of the school zone, and minimizes the operational strain on school personnel. While volunteers are still needed to operate the system, the transition from temporary barriers to the Octopus boom has been received positively by the school community, offering both practical and symbolic improvements in street management. This case underscores Belgium's innovative and context-sensitive approaches to school street design, combining traffic management, child-friendly aesthetics, and local engagement to create safer and more accessible school environments (Mobiel 21, Gemeente Lennik, 2024).

➢ England:

In England, approximately 40% of primary school children travel to school by car, with 25% of pupils in Inner London relying on this mode of transport daily (Mums For Lungs CIC, n.d.). The increasing prevalence of car travel among school-aged children has raised concerns about road safety, traffic

Figure 7: School Street of Van Gogh Primary School
Source: https://crossriverpartnership.org/healthy-streets-everyday/initiative/van-gogh-primary-school-school-street/

congestion, and air quality, particularly in urban areas. In response to these challenges, the School Streets initiative was introduced in ***London***, aiming to restrict vehicle access during peak school drop-off and pick-up times to create safer and healthier school environments (Linton, O'Reilly, Humbert, & Burwell, 2021). Initially, the implementation of School Streets progressed gradually, with only 85 such schemes established across London by 2019.

Figure 8: Hackney School Streets

However, the COVID-19 pandemic in 2020 played a pivotal role in shifting public perceptions of road space usage. As social distancing measures and reduced vehicle dependency became a priority, local authorities accelerated the implementation of School Streets, recognizing their potential to enhance pedestrian safety and improve air quality (Mums For Lungs CIC, n.d.). Among London boroughs, Hackney emerged as a leader in implementing School Streets (Thomas A. , 2022). In 2017, the borough launched a pilot program with five School Streets, which were later permanently established. By March 2021, the initiative had expanded to 37 additional schemes, making it the largest program of its kind worldwide. This expansion directly benefited over 15,000 pupils, offering them a safer environment to walk and cycle to school (Linton, O'Reilly, Humbert, & Burwell, 2021).

The need for safer and healthier streets had been a growing priority in Hackney, as high levels of motor traffic near school gates not only created hazardous conditions for pedestrians but also contributed to increased air pollution. The School Streets program sought to address these challenges through timed traffic restrictions enforced at critical school hours. Motor vehicles were prohibited


Figure 9: Hackney school streets and play

from entering School Street zones, with exemptions granted only to residents, emergency vehicles, and Blue Badge holders.

The scheme was monitored and enforced through ANPR cameras and signage, ensuring compliance and maximizing its effectiveness. The rapid expansion of School Streets was made possible through support from Transport for London and the Mayor's Air Quality Fund, which provided resources for accelerated implementation during the COVID-19 pandemic. The rollout of the initiative followed a structured approach that included selecting schools based on safety concerns, air pollution levels, and traffic data. Additionally, engaging local communities and schools through consultations was essential to gaining support and ensuring the success of the program. The installation of appropriate signage and enforcement mechanisms regulated access and maintained compliance, while continuous monitoring of key indicators such as air quality, traffic displacement, and travel behavior allowed for the assessment of the scheme's impact. The results of Hackney's School Streets initiative demonstrated substantial improvements in road safety, traffic flow, and environmental conditions. Studies indicated that vehicle numbers within School Street zones declined by 85%, with only minimal displacement to surrounding streets. Air quality also showed significant enhancement, with a marked reduction in harmful emissions during operational hours.

Behavioral changes were evident, as walking and cycling rates increased, while fewer parents chose to drive their children directly to school. Additionally, enforcement measures proved effective, as daily Penalty Charge Notices (PCNs) dropped from 17 to just 2 per day, indicating a high level of compliance over time.

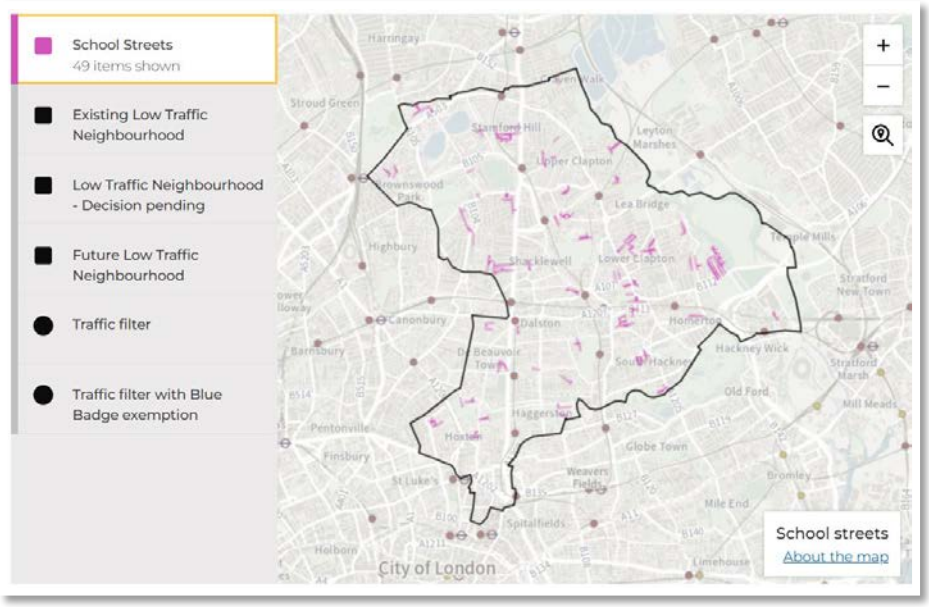


Figure 10: Map of School Streets in Hackney
Source: https://hackney.gov.uk/school-streets

Hackney's School Streets program has gained international recognition, influencing similar initiatives in cities worldwide. The program continues to evolve, with ongoing assessments and refinements aimed at enhancing its benefits for school communities (Linton, O'Reilly, Humbert, & Burwell, 2021). As of early 2025, the success of School Streets has been evident across London, where over 700 School Streets have been established, signifying a major milestone in urban mobility and active travel promotion (Mums For Lungs CIC, n.d.).

➢ France:

In ***Paris***, the rues aux écoles (streets for schools) initiative was introduced in 2019 as part of a broader strategy to improve air quality and reduce vehicle traffic, led by Mayor Anne Hidalgo (Köllinger, 2024). It also coincided with a need for quick responses to the challenges of Covid (What brings a School Street to life?, 2023).

Figure 11: A school street in Paris
Source: Revolta Escolar

This initiative formed a key component of a larger urban mobility agenda, which included significant measures such as banning cars from the city center and implementing the 15-minute city concept. Since its inception, the program has expanded rapidly, with over 210 school streets now established across the city (Clarke, 2022). The School Streets project in Paris transforms urban spaces by promoting outdoor activities, greening efforts, and social interaction, reclaiming streets for pedestrians while integrating with the city's identity (School streets initiative, n.d.).

Figure 12: A school street in Paris
Source: Jesse Coburn

Unlike many other cities, Paris has made a substantial number of its school streets permanently pedestrianized, rather than limiting them to time-restricted closures. These pedestrian areas are often enhanced with green infrastructure, including planters and trees, which not only improve air quality (Johnson, 2024) but also reduce noise pollution and help mitigate the urban heat island effect, an issue exacerbated by climate change (Messager & Langlois, 2021; Olsen, 2023). Furthermore, a quarter of these schemes have been strategically implemented in underprivileged neighborhoods, ensuring that the benefits of safer and healthier streets are distributed equitably across the city. In autumn 2021, the city took further steps toward permanency, transforming 11 school streets into fully pedestrianized zones, covering a total of 3,400m² of newly planted areas and adding 64 trees.

Figure 13: A school street with greenery in Paris
Source: Melissa & Chris Bruntlett

By March 2022, an additional four permanent pedestrian routes were scheduled for completion, aligning with the city's Embellir votre quartier (Embellish your district) initiative,

which aims to integrate greener infrastructure into urban streetscapes. Despite the ambitious scale and rapid expansion of the program, challenges remain. The campaign group La Rue Est À Nous (The Road is Ours) conducted an Observatory of School Streets assessment, allowing residents to evaluate the quality of these spaces. Their findings revealed that, of the 300 most polluted nursery and primary schools, only 27 (9%) had a school street rated as 'good'. While Paris has made notable strides in prioritizing active travel and reducing car dominance, the assessment highlights the need for continued investment and quality improvements to fully realize the program's potential (Clarke, 2022). It should be noted that around two-thirds of Paris's streets have a 30 km/h speed limit, with many converted to single lanes or pedestrian and cycling zones. While these changes promote safety and sustainability, families and children still face challenges navigating busy streets on their way to school and leisure activities (Weedy, 2021). However, the transformation of streets near schools in Paris is continuously advancing, with an estimated 228 streets expected to be redeveloped by 2026 (Streets Observatory at Schools, n.d.).

Chapter 3
Methodological Framework

This chapter provides a detailed explanation of all the steps involved in conducting the mixed-methods approach used in this thesis.

This research employed a mixed-methods approach to comprehensively address the research question, to understand the role of school streets initiatives within the mobility justice framework, in order to promote safer, more inclusive, and accessible urban areas for vulnerable groups while encouraging active mobility. This approach facilitated a structured and thorough examination of diverse data sources regarding safety, inclusivity, and accessibility. With the integration of quantitative (demographic, crashes, and active mobility infrastructure data), qualitative (literature review, document analysis, field observation, and semi-structured interviews) and geospatial (GIS analyses) methods, this study aimed to understand mobility justice framework dimensions including distributive justice, recognition justice, and procedural justice and their relationship with the school street initiatives in the urban context of Braga, Portugal, with a specific focus on the area surrounding André Soares School within the JUST STREETS Horizon Europe Project.

Since the research design combined both city-wide and local-scale analysis, demographic and population data for both the municipality of Braga and the focus area were used. These data were collected from the official statistical sources to contextualize the population density of the city and urban mobility demands. In this regard, to assess the spatial dynamics of mobility, geospatial analysis with GIS tools was conducted, including mapping Braga's Zone 30 km/h, cycling infrastructure, and identifying walking radii of 800 meters, 1,200 meters, and 1,600 meters from the city center, which is the city's pedestrian area. These radii approximately correspond to 10-, 15-, and 20-minute walking distances at average speed, which were calculated using simple circular buffers from the city center to identify the geographical and strategic location of the case study within the radii in the city of Braga. Moreover, the street network, active mobility infrastructure, and access to public transport of the focus area were analyzed to evaluate infrastructural support for active mobility, also, car crashes data for the last ten years, from 2015 to 2025, from the Police sector, and the obstacles considered by the author during field observations, were mapped to generate risks of car crashes map and obstacle diagnosis map.

A key component of the research involved observational fieldwork based on Jan Gehl's (2013) idea for observing public spaces (Gehl & Svarre, 2013), which was conducted directly

in the school area during three daily time slots, including 08:30 to 09:30, 12:30 to 13:30, and 17:30 to 18:30 across working days, weekends, and the Easter holidays. These observations documented counts of different types of vehicles and pedestrians, disaggregated by age group, and recorded physical obstacles affecting walkability and cycling, which allowed for a grounded diagnosis of pedestrian experience and mobility challenges within the focus area. Subsequently, to incorporate diverse stakeholders' perspectives, the study employed semi-structured interviews with key stakeholders, including municipal technicians from the mobility department of the Municipality of Braga, school representatives, including schoolteachers, students, parents, shop owners, and residents, as well as city users of the area. To analyze the interviews, thematic analysis (TA) was employed, which is a qualitative data analysis method for identifying, analyzing and reporting themes[3] within data, including transcription, familiarization and re-reading data, systematically coding features across the dataset, searching for themes, reviewing themes, defining and naming themes, concluding final analysis related to the research question (Braun & Clarke, 2013).

At the outset, a documentary analysis was carried out on several planning and policy documents, including the Braga Master Plan (PDM), the Sustainable Urban Mobility Plan (SUMP), the Landscape Strategy, the Action Plan for Sustainable Energy and Climate (PAESC), Strategic Framework for Cávado 2030 and Master Plan for Economic Development, The Strategic Plan for the Economic Development, Longevity Plan, and Social Development Plan. These were analyzed through the lens of the mobility justice framework to assess how institutional planning documents address the inclusion of marginalized groups, fair and inclusive processes of decision-making, and the fair distribution of mobility resources.

Last but not least, it is important to mention that in this study, a review of prior literature on school streets, child-friendly urban environments, and the mobility justice framework has played a decisive role in informing both the research question and the methodological choices. With the analysis of key studies that have examined similar issues in diverse

[3] Themes capture important aspects about the data in relation to the research question and represent patterned responses within the dataset (Braun & Clarke, 2013).

geographic and social contexts, this research positions itself within a rich and evolving scholarly conversation, which, in the following, the main contributions extracted from three foundational papers that have guided the development of this thesis are represented:

Among the indicators considered by Scheiner, et al. (2019), parental and residential perceptions regarding safety, accessibility, and infrastructure; physical environment characteristics, including pavements and crossings; as well as accident hot spots using GIS data and accident records, have been drawn on in this research in order to analyze safety for both walking and cycling. This included GIS spatial mapping and analysis of car crashes over the past ten years in the focus area, as well as analyzing diverse stakeholders and area users' perceptions regarding safety, accessibility, inclusivity, and infrastructural gaps in the area through semi-structured interviews. Taking inspiration from the aforementioned research methodology and data collection, this research conducted separate field observations and analysis for morning, noon, and afternoon trips in the surrounding school area (Scheiner, Huber, & Lohmüller, 2019). Moreover, the involvement of a diverse group of stakeholders and the use of thematic analysis for analyzing semi-structured interviews were inspired by the study conducted by Todorova, et al. (2025), in which inductive coding was applied (Todorova, et al., 2025), but this research conducted a deductive coding approach, similar to the research by (Buttazzoni, Coen, & Gilliland, 2018), where pre-established concepts from the mobility justice framework guided the identification of key themes and sub-themes, as a clear analytical framework was already in place prior to the interviews, including policy analysis, GIS mapping, and field observations. In this regard, the semi-structured interviews were designed to explore themes related to safety, accessibility, inclusivity, infrastructure, stakeholder perceptions, and their involvement in the planning process, all within the lens of the mobility justice framework, which all provided a holistic, justice-informed analysis of how school streets initiatives can contribute to the vision of the JUST STREETS Project and promote cities for people rather than cars. The approach was grounded in real-world conditions and the ongoing JUST STREETS Project, informed by the mobility justice framework, enabled an examination of who benefits from just urban mobility planning and who may still be left behind.

Figure 14 illustrates and elaborates on the methodological approach in a nutshell.

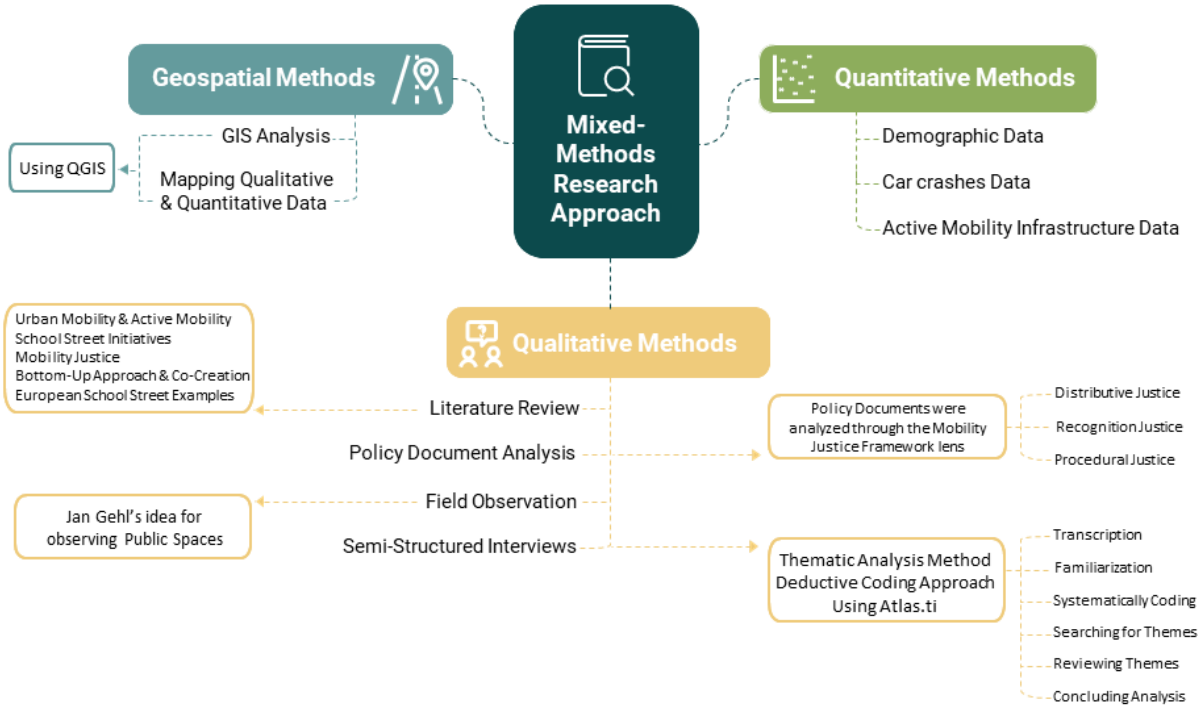


Figure 14: Research methodology process framework
Source: Elaborated by the author

Chapter 4
Contextual Study of Braga

In this chapter, relevant Portuguese urban policy documents are analyzed through the lens of the mobility justice framework.

4-1 Urban Mobility Landscape in Braga

Braga, a northern Portuguese city, is where centuries of history meet the demands of contemporary urban life. With 193,324 residents (National Statistic Institute, 2021), it stands as Portugal's third-largest city after Lisbon and Porto, with roots dating back over two thousand years to the Roman era, when it was known as Bracara Augusta, capital of the Roman province of Gallaecia. This early designation made it a critical administrative and commercial hub for the Roman Empire in northwest Iberia, connected to other cities via major roads, nevertheless, the layout of the city of Braga today still reflects its layered past, as the medieval city, with its irregular street patterns and preserved walls, partially overlays the Roman grid, and landmarks like the Cathedral and historic streets mark this continuity of urban form (Bandeira, 2020). Unlike the structured Roman roads, the medieval street network became more irregular and winding, with narrower blocks and less hierarchical organization, this historic morphology which is still visible and influential in Braga's current urban structure, presenting both a cultural asset and a challenge for modern mobility and planning (Braga City Council & MPT, 2023).

Today, Braga thrives as a vibrant urban center which is characterized by a densely populated municipality (as shown in Map 1), and serves as a regional hub attracting a population 1exceeding one million (Bandeira, 2020), in a way that in recent years, it has become nationally and internationally recognized for its commitment to sustainable mobility, since the city received the European Mobility Week Award 2022, awarded by the European Commission, in recognition of its strong efforts in reducing car dependency and promoting active mobility, as well as some other European Projects in this regard, including REALLOCATE, STEP-UOP, SHARED GREEN DEAL, and JUST STREETS, which included converting car-oriented areas into pedestrian-friendly streets, mobilizing over 100 local companies to support sustainable initiatives, and creating interactive green spaces to enhance urban livability (Directorate, 2023). As part of its ongoing strategy, Braga has focused on redistributing public space, with improvement of the walkability and accessibility of paved areas, encouragement of behavioral change, and working toward decarbonization and climate goals (Braga City Council & MPT, 2023).

Braga's physical and urban form has long influenced how the city has grown and functioned, and its compact layout provides a strong foundation for promoting sustainable mobility by making it easier to shift from car dependence to more efficient and active travel modes (Braga City Council & MPT, 2023). However, like many cities, Braga has prioritized car traffic in recent decades, whether for local or longer trips, leading to well-known challenges such as air pollution, traffic noise, Road safety issues, and elevated rates of motorization have prompted the city to adopt some measures that connects mobility with the design and use of public space, which includes expanding pedestrian access, improving infrastructure for cycling, encouraging multimodal travel for more complex journeys, and reshaping the city to become more inclusive, greener, and more livable, not just for residents, but also for commuters and visitors as well (Braga City Council & MPT, 2023).

The city's urban expansion throughout the 20th century followed a clear west–to–east direction, mainly shaped by the construction of the highway, which enabled the development of new urban centers along the banks of the Este River and supported increased commuting between residential areas and sites of economic activity. On the other hand, while the rise of car use helped consolidate and densify Braga's urban fabric, it also created physical and social divides, particularly where major roads disrupted continuity between various units of the territory, as today, the city's main access roads serve as its core mobility network, dominated by car traffic (Braga City Council & MPT, 2023). In response, there is growing recognition of the need to reclaim inner-block spaces from excessive vehicle circulation, with the aim to redesign these areas by re-establishing neighborhood units, redistributing public space, making it more friendly to vulnerable users, increasing the possibilities for socialization and humanization to support more inclusive, community-oriented uses, through initiatives that reduce traffic, encourage local social interaction, and prioritize pedestrians and cyclists (Braga City Council & MPT, 2023). These plans include the introduction of "zone 30" and shared-use areas, particularly in residential neighborhoods and around key multifunctional spaces like surrounding school facilities (Braga City Council & MPT, 2023).

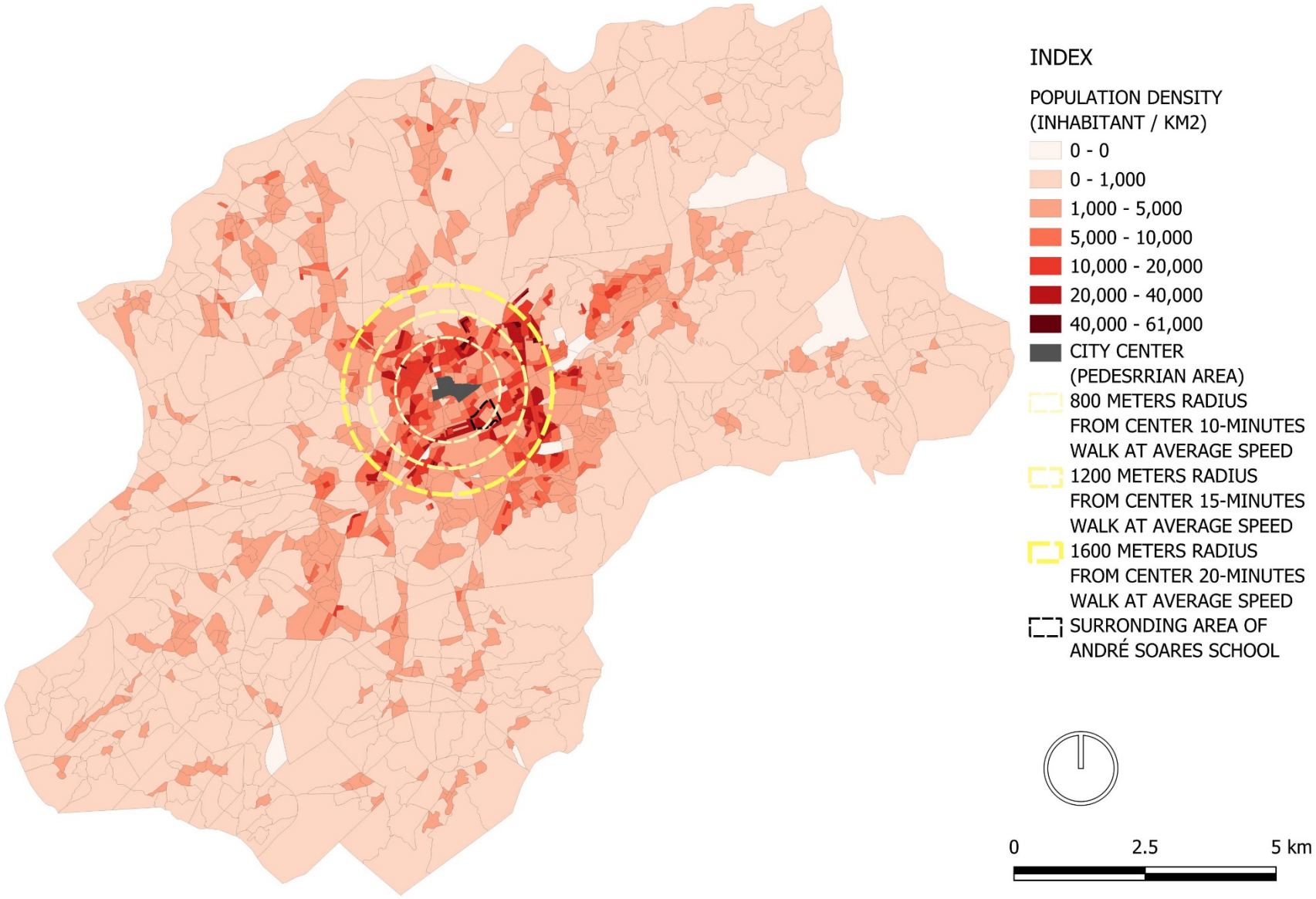
According to the city's SUMP[4], a strategy mobility plan document, "Mobility is an increasingly important issue in the debate on land occupation and transformation, and there is also growing consensus that it plays a decisive role in the effective and efficient performance of the human construction that takes place on territory of Braga. SUMP arises from the need to translate a holistic view of mobility into a highly territorialized perspective that is attentive to the social and land use reality of the municipality. Thus, there is an urgent need to accompany the physical and social transformations of the territory from a strategic perspective and broadened to the new paradigms of sustainable urban mobility" (Braga City Council & MPT, 2023, p. 9).

In this regard, one notable focus in SUMP is the area surrounding **André Soares School**, which, along with the Gulbenkian quarter and the Europa Tower quarter, is part of a broader strategy to implement calmer and more humanized streets, which are being reimagined as safe and accessible environments for soft and active mobility, in order to help reduce greenhouse gas emissions and noise pollution by managing car traffic and reconfiguring parking. Therefore, improving accessibility and mobility for all is seen as inseparable from transforming public space in ways that support walkability and social inclusion in daily journeys (Braga City Council & MPT, 2023).

According to the census 2021 and as shown in Map 1, Braga is a densely populated city, particularly within the central area, a 1600-meter radius, corresponding to a 20-minute walk with average speed from the city center, where the highest population densities are concentrated (National Statistics Institute of Portugal, 2021). It not only highlights the pedestrianized city center but also gradations of walkable zones, including those within 10-, 15-, and 20-minute walking radius from the center, emphasizing the population living within easy reach of central urban amenities. The surrounding area of André Soares School, marked with a black dotted boundary, lies well within this accessible zone, making it a key location for implementing and testing people-centered mobility strategies in one of the city's most populated and active areas (Braga City Council & MPT, 2023).

[4] Sustainable Urban Mobility Plan - Plano de Mobilidade Urbana Sustentável para a Cidade de Braga

Map 1: The Municipality of Braga



Source: Elaborated by the author

4-2 Territory, Master, and Local Plans of the City of Braga

Urban planning in Braga is shaped by a national legal framework that began with the Legal Regime for Territorial Management Instruments, RJIGT, 1999, which set the foundational principles for land policy, spatial planning, and urbanism, and was later reinforced by the Basic Law on Spatial Planning, LBOT, 2014, leading to a revised RJIGT in 2015 (Bandeira, 2020). These instruments define a hierarchy of plans from the National Program of Spatial Planning Policy to Local Detailed Plans, with the Municipal Land-Use Plan serving as the main territorial planning tool at the municipal level (Bandeira, 2020). Braga was among the first cities to adopt a PDM, originally approved in 1994 and revised later, now structured around four pillars as follows (Braga City Council, 2021):

- To improve the quality of urban life through ecological and mobility planning,
- To promote tourism and cultural heritage,
- To attract international investment while supporting local industry,
- To open the municipality to regional and international cooperation.

Planning in Braga also operates through programming tools like the Strategic Plan for Sustainable Urban Development, PEDU, (Bandeira, 2020), which channels European funds toward sustainable mobility and urban regeneration, and the Strategic Development Plan of Braga, which outlines long-term economic and spatial goals (Braga Municipality, 2018), also the Landscape Strategy, now integrated into the PDM, introduces green and blue infrastructure and landscape units aligned with the European Landscape Convention and SDG 11 (Council & Loccimetro, 2020), regional cohesion and cross-municipal coordination are addressed through EIDT Cávado 2030, which emphasizes inclusive mobility, accessibility, and governance (Braga City Council, Intermunicipal Community of Cávado, 2024), additional sectoral strategies, such as the Action Plan for Sustainable Energy and Climate focus on decarbonization, cycling, and school-related mobility (Braga City Council, 2022). All these instruments together form a layered and evolving planning system that faces ongoing challenges, including legal formalism, fragmented timelines, and limited capacity for

reversibility, while increasingly moving toward a more integrated, ecological, justice-oriented, and participatory approach to urban planning.

4-2-1 Sustainable Urban Mobility Plan of the City of Braga

The Sustainable Urban Mobility Plan (SUMP) of Braga is a strategic and guiding document that accompanies the city's physical and social transformations through a future-oriented perspective, and while the development of this plan is not mandatory in Portugal, the municipality of Braga considered it pertinent to develop its SUMP to guarantee the strategic framework for all actions to promote sustainable urban mobility (Braga City Council & MPT, 2023). This plan is grounded in the principles of sustainable mobility. It outlines a comprehensive range of objectives and interventions aimed at improving mobility systems, public spaces, accessibility, and a core dimension of this structural framework, which is its commitment to promote active travel, enhance school mobility as well as school area, and recognize the mobility needs of vulnerable users, hence, central to this vision are proposals that prioritize pedestrian and cycling infrastructure, public transport, redesign urban spaces around schools, and promote behavioral change through education and community engagement (Braga City Council & MPT, 2023).

Among the defined objectives, including creation of a walkable city, a cyclable city, promotion of public transport, an optimized road system, and a balance in urban logistics actions, the plan explicitly targets a cultural and behavioral shift by encouraging civic growth and population-wide awareness, by proposing the design of an urban communication and information plan that goes beyond conventional signage, incorporating alternative and complementary forms of mobility communication, it aims to raise awareness and educate the population, particularly younger generations, while establishing a coherent and assertive framework to support long-term cultural change in how people move through the city (Braga City Council & MPT, 2023). One of the plan’s key themes is the integration of school mobility into the broader mobility system. The SUMP emphasizes the need to understand the theme of home-to-work and home-to-school travel, noting its current

characterization by a strong reliance on individual vehicles. The plan proposes the implementation of rational and sustainable solutions to reduce commuting flows that contribute to congestion and infrastructure overload, which is further connected to broader environmental goals, including mitigation of the ecological footprint and reduction of greenhouse gas emissions, by encouraging shared transport modes and the correction of current travel habits (Braga City Council & MPT, 2023). In the context of public spaces, the plan promotes interoperability between transport modes and the redesign of urban spaces to improve comfort and accessibility, which are evident in addressing school surroundings and their mobility needs (Braga City Council & MPT, 2023). The plan outlines targeted urban design and mobility measures to be implemented within urban blocks, particularly in areas with diverse functions and significant pedestrian activity.

The SUMP proposes that areas surrounding school facilities become top-priority locations for urban (re)design in order to humanize public space and enhance pedestrian and cycling accessibility, thereby improving safety for the school, academic, and sports communities, additionally, it emphasizes the importance of engaging the school community, including parents and local shopkeepers, to foster a safe and supportive environment that encourages children to walk or cycle to school. This effort is part of the broader strategy to develop a “school route” concept, which includes the identification of safe paths supported by awareness and training campaigns aimed at changing mobility behavior among younger generations (Braga City Council & MPT, 2023). To support these goals, the plan calls for the elimination of parking near schools not only through signage but also through reconfiguration of the urban design by proposing the unification of spaces and removal of motor vehicle barriers through changes in traffic direction and partial pedestrianization (Braga City Council & MPT, 2023). The quality of public space is to be enhanced through the introduction of appropriate urban furniture and vegetation, thereby creating spaces where people can walk, stay, and interact also focus on improving pedestrian accessibility, particularly on sidewalks, with an emphasis on removing architectural barriers, creating continuous accessible routes, and introducing tactile paving and other inclusive design features (Braga City Council & MPT, 2023).

The plan also addresses the need for adequate cycling infrastructure as part of the school mobility strategy, by outlining immediate measures to create safer cycle routes with speed limits of 30 km/h[5], specifically to connect schools to each other, to the city center, existing cycle routes, and to major intermodal hubs (Braga City Council & MPT, 2023). Among the short-term interventions are the requalification of planned works on key routes like **Avenida 31 de Janeiro** and the **Rio Este cycle path**, as well as calls for an expansion of **bicycle parking facilities near schools**, designed to accommodate various bicycle types and adapted to long-term and short-term needs, which the additional measures include directional signage for cyclists, cycling awareness initiatives within the academic community, and the promotion of mobile applications to encourage everyday cycling (Braga City Council & MPT, 2023). To further support public transport access to schools, the plan includes extending the SchoolBUS service as part of its broader strategy to promote sustainable transport, with the involvement of the Braga Municipal Transport Authority in redesigning the network and exploring complementary transport modes such as flexible services, cabs, and school transport which is presented as a means of optimizing system costs and enhancing service efficiency (Braga City Council & MPT, 2023).

Moreover, the plan identifies the introduction of a new culture of mobility as a strategic necessity for the municipality, with emphasis on the importance of integrated planning and population engagement, considering the role of residents, institutional partners, operators, and in particular, the school community, to promote a gradual change in modal patterns and everyday behavior, thereby fostering an inclusive, efficient, and people-friendly urban mobility system (Braga City Council & MPT, 2023).

The SUMP also explicitly acknowledges the need for an equitable distribution of mobility resources, infrastructure, and opportunities across all segments of the population, which is a central objective of the plan to “guarantee adequate mobility for the population, promoting social inclusion, competitiveness, and the quality of urban life” (Braga City

[5] The cycle lanes are part of the “Zone 30” because this zone mostly covers the historic center, as shown in map 2, where space is limited and there is not enough space for dedicated cycle lanes. However, with the speed limit, cars and bicycles are able to share the road in this area safely.

Council & MPT, 2023, P. 7). This goal is operationalized through numerous proposals that seek to ensure fair access to transport modes and public space, particularly for traditionally underserved or mobility-impaired groups, it also proposes the development of an Accessibility Promotion Plan for people with reduced mobility, reinforcing the city's commitment to inclusive design and universal access (Braga City Council & MPT, 2023). Moreover, the emphasis on intermodality as a complementary rather than competitive approach, integrating soft modes, public transport, and shared systems, reflects an understanding of distributive equity within a multimodal transport landscape, which is further evidenced by the plan's advocacy for low-emission corridors, school mobility plans, and traffic-calmed zones in residential and multifunctional areas, including around educational and recreational facilities to redistribute space and mobility benefits in favor of vulnerable users, promoting a more equitable urban environment (Braga City Council & MPT, 2023).

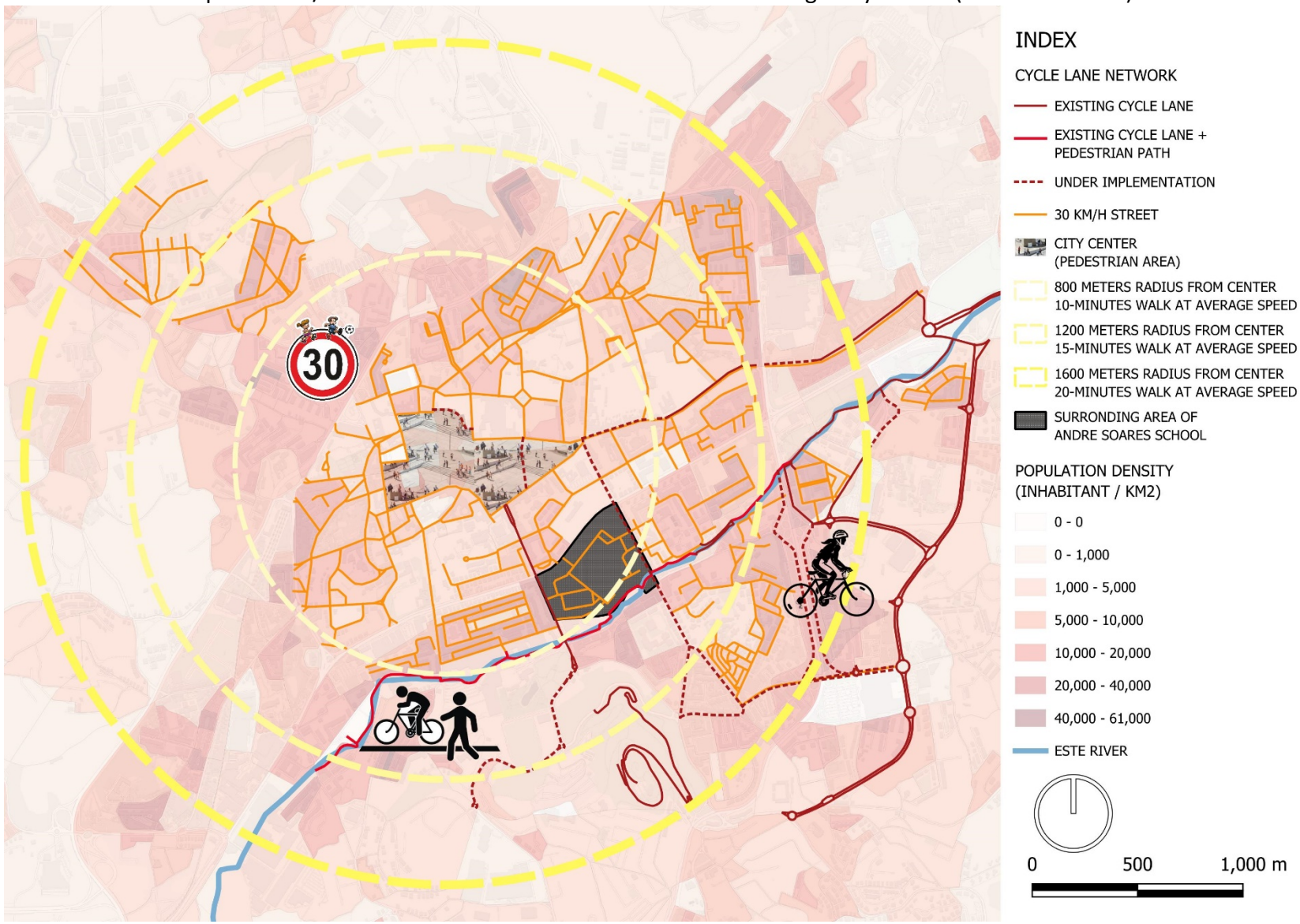
The procedural dimension of mobility justice is also prominently considered throughout the Braga SUMP, which promotes "reading and critically interpreting the reality in place, understanding the territory and designing sets of actions that encourage civic growth and education and awareness-raising among the population" (Braga City Council & MPT, 2023, P. 9). This highlights an intention to ground planning actions in participatory, informed, and reflective processes, in a way that the SUMP positions itself not only as a strategic document but also as a reference tool to support decision-making by the municipality, thus recognizing its role in institutional accountability and governance, so the planning process is described as participatory and iterative, comprising three phases: diagnosis, strategy and proposal, and final deliberation, that integrate "changes deemed necessary by the municipal deliberations and the opinions of external entities" (Braga City Council & MPT, 2023, P. 11). This phased methodology ensures that diverse perspectives are considered and that planning remains responsive to the evolving needs of the community, and to promote a new culture of mobility, the plan also underlines the importance of civic engagement, education, and behavioral change, situating citizens not merely as beneficiaries of transport infrastructure but as co-constructors of sustainable urban futures (Braga City Council & MPT, 2023). However, the plan provides limited insight into the actual procedural justice

mechanisms involved in its development, while external opinions and municipal deliberations are mentioned in the context of the final phase, the extent to which the perspectives of vulnerable groups were actively incorporated into decision-making processes is not elaborated upon.

The recognition justice is also articulated through the plan's attention to the different needs, identities, and lived experiences of various population groups, by explicitly seeking to address the mobility realities of children, youth, the elderly, people with disabilities, and other marginalized users as it commits to creating inclusive communication frameworks and educational strategies particularly for the younger ones recognizing the formative potential of early engagement with mobility culture (Braga City Council & MPT, 2023). This promotion of safe school routes and surrounding public space interventions reflects a deep awareness of the unique mobility patterns and vulnerabilities of children and students, and these proposals aim to promote a safe environment that encourages children to walk to schools and sports facilities engaging not only families but also local communities, including parents and shop owners (Braga City Council & MPT, 2023). Furthermore, the SUMP includes efforts to disseminate mobility information across accessible media, including the creation of apps and websites that support informed decision-making for all users, which also considers the inclusion of accessible tourism routes to ensure that cultural and recreational experiences in the city are available to all, regardless of physical ability (Braga City Council & MPT, 2023).

Ultimately, the plan's detailed proposals for pedestrian and cycling infrastructure, the prioritization of school areas such as the **André Soares School** block, and the promotion of universal accessibility demonstrate an explicit institutional commitment to aligning Braga's mobility strategy with sustainable and equitable urban development principles.

Map 2: 30 km/h Streets Within a 1600-Meter Radius from Braga City Center (Pedestrian Area)



Source: Elaborated by the author

4-2-2 Municipal Master Plan of the City of Braga

The Municipal Master Plan (PDM)[6] of Braga, as the city's primary territorial and land-use planning instrument, provides the legal and spatial framework through which urban land use and mobility infrastructures are regulated and structured. While the document primarily serves as a technical and regulatory tool, it contains key provisions that influence pedestrian and cycling conditions, the design of school environments, and broader principles of sustainable mobility. It links mobility to land-use considerations, notably in the planning of school environments, road hierarchies, and the provision of public infrastructure such as sidewalks and cycle lanes. The structural framework of the PDM is embedded in its functional road hierarchy, delineated in Article 85. Roads are categorized as Main, Secondary, Local Distributor, and Local Access Roads. This classification defines the purpose and mobility priorities of each road type. The relevance to vulnerable users is Local Distributor and Local Access Roads. These are designed to support daily activities such as commuting to schools, promoting pedestrian and cyclist safety and accessibility, and encouraging multimodal travel in a safe and inclusive environment. Local Access Roads prioritize low traffic speeds and incorporate urban design elements such as curb extensions, street furniture, and trees to enhance the comfort and safety of non-motorized users.

Article 86 expands upon classifications by establishing specific design principles. It mandates that all road categories include appropriate provisions for pedestrians and cyclists, with safety, accessibility, and integration with public transport being central design tenets. Especially on Local Access Roads, the regulation specifies that interventions must promote accessibility, sustainability, and safety, especially for vulnerable users (children, elderly, people with disabilities).

In alignment with soft mobility objectives, Article 88 outlines the establishment of a cycling network. This network includes exclusive cycling routes, shared paths, and bicycle-friendly streets, with a strong emphasis on safety, continuity, and integration. The regulation underscores the importance of connectivity between residential zones, schools, services,

[6] Plano Diretor Municipal de Braga

and public spaces, to support intuitive and uninterrupted mobility for cyclists. The design approach encourages the segregation of cycling paths from motor traffic where feasible, particularly in high traffic areas. Pedestrian areas are treated with similar care (at least 1.5 meters). The plan emphasizes that pedestrian circulation should be protected by strong safety measures and preferably segregated from other forms of traffic. Particular attention is given to crossing situations, ensuring pedestrian safety and comfort. It is considered as an approach that reflects procedural and recognition justice, especially in environments frequented by children and other vulnerable users.

Regarding school environments, although the André Soares School is not mentioned in the plan, it includes a significant section on Operational Planning and Management Units UOPG 20[7], located around the Ferreiros School Park. This planning unit emphasizes accessibility, the preservation of green space adjacent to schools, and the integration of residential development. These objectives aim to balance urban growth with inclusive public space design, particularly around educational infrastructure.

Articles 106 to 108 introduce parking standards, including requirements for bicycle parking in educational settings indicated one space per 10 students and one car space per staff member. Bicycle parking must be accessible, weather-protected, and ideally integrated with urban furniture. Exceptions to parking requirements are allowed if areas are well served by public transport or prioritize pedestrian and cycling infrastructure, or if sustainable mobility plans are submitted. These provisions link mobility planning directly to land use and highlight how parking policy can support broader sustainable goals.

Accordingly, elements of mobility distributive justice are evident in the regulation's intent to ensure equal spatial allocation of infrastructure. This is visible in how cycle lanes and pedestrian networks are mandated to link key urban destinations, educational centers, and green spaces. Moreover, development in expansion areas is guided to provide housing and

[7] UOPG 20- Envolvente do Parque Escolar de Ferreiros

green space, which supports equitable spatial distribution of public and mobility resources, particularly near school zones.

From a procedural justice perspective, Articles 109 and 110 describe the role of Operational Planning and Management Units (UOPGs)[8] in structuring implementation. These articles call for phased project execution and strategies that promote pedestrian and cyclist safety, traffic calming around schools, and integration with existing neighborhoods. While these mechanisms suggest a structure for inclusive planning, the regulation does not detail participatory processes or community engagement frameworks.

Concerning recognition justice, the plan makes targeted references to vulnerable populations such as children, the elderly, and individuals with disabilities. However, the document lacks explicit mention of immigrant families, low-income groups, or language accessibility[9], and cultural accessibility[10] (Braga City Council, 2021). While the regulation structurally supports inclusive mobility through its emphasis on universal access, safe crossings, and green connectivity, particularly around schools and residential area, it does not incorporate equity-based data to guide decisions. This reliance on neutral language and the absence of demographic specificity suggests an implicit focus on a universal user, which

[8] Unidades Operativas de Planeamento e Gestão (UOPG)

[9] Language accessibility in mobility means making sure that everyone, including people with limited literacy, cognitive disabilities, or who do not speak the dominant language, can understand and use transportation services. This involves offering information in multiple languages, using clear and simple language, and avoiding technical expressions so that all individuals can engage with mobility systems effectively and independently (Respectful Language for Those with Limited Mobility or Disabilities, n.d.) (What is language access and why is it important?, 2023).

[10] **Cultural accessibility** is more than just being able to physically enter a space. It is about making sure people from different backgrounds, not just a narrow or dominant group, can actually connect with, understand, and feel included in cultural and public environments. According to Deffner et al. (2015), this includes two important aspects: perceptual accessibility and appropriational accessibility.
Perceptual accessibility means that people are able to make sense of and engage with what has been presented to them. This can be influenced by someone's language skills, education, or familiarity with cultural norms. For example, a person with limited literacy or someone from a different cultural background might find it hard to understand public information or participate in activities that were not designed with them in mind.
Appropriational accessibility goes a step further. It is about whether people can see themselves reflected in the cultural experience and feel that it belongs to them too. It is not just about being present in a space, but about feeling a sense of identity, relevance, and emotional connection. When public spaces, mobility systems, or urban heritage sites fail to reflect the stories, languages, or values of diverse communities, they remain physically open but symbolically closed (Deffner, et al., 2015).

may unintentionally overlook the specific needs of marginalized communities, including people with disabilities (Braga City Council, 2021).

As shown in Table 1, immigrants represent nearly 6% of the population of Braga Municipality. While this may appear to be a relatively small proportion, it is essential to ensure their inclusion in urban planning processes and participatory approaches. Doing so not only upholds principles of procedural justice, by enabling equitable access to decision-making, but also supports recognition justice, by affirming the presence and needs of this population and preventing their marginalization.

Table 1: Citizenship of the whole Population of the City of Braga

Country of Origin	Population	Percentage
Portugal	182042	94%
EU	1854	1%
Africa	977	0.5%
America	7888	4%
Asia & Oceania	561	0.3%

Source: (Brinkhoff, 2021)

4-2-3 The Landscape Strategy within the Scope of the Braga (PDM)

The Landscape Strategy within the Scope of the Braga (PDM)[11] presents a strategic and spatial framework that focuses on landscape as a crucial dimension of urban and territorial planning, placing special emphasis on sustainability, ecological connectivity, and cultural identity. While the document does not explicitly center on mobility planning in the conventional transport sense, it contributes significantly to a justice-oriented urban

[11] The review of the Municipal Master Plan (PDM) of Braga included the elaboration of a Landscape Strategy, which provided relevant information to be integrated into the mandatory documents of the PDM, such as the Territorial Development Strategy, the Regulation, and the Execution and Financing Program, in accordance with the PNAP (National Action Plan for the Territory). This strategy identified landscape units and provided useful information for land management.

planning framework by addressing themes related to sustainable mobility, green and blue infrastructures, and inclusivity. The strategy frames green and blue infrastructure as tools for improving health, well-being, and quality of life, with direct implications for pedestrian and cycling mobility. It emphasizes ecological corridors that connect urban centers like Braga to rural and peri-urban areas, proposing soft mobility routes including walking and cycling paths, as integral to the ecological and cultural landscape. These corridors often align with heritage routes such as the Caminho de Santiago and Roman roads, reinforcing a landscape-based approach to sustainable, non-motorized mobility.

Several pilot actions underscore the value of pedestrian and cyclist infrastructure. For example, the proposed **Parque Poente along the Este River** involves creating leisure spaces with pathways that enhance accessibility and recreation while promoting flood resilience through nature-based solutions. Likewise, the requalification of areas such as the Sacromontes includes the development of soft mobility circuits connecting religious and cultural heritage sites through pedestrian and cycling trails, with infrastructure designed from natural and local materials.

The plan addresses distributive mobility justice primarily through its goal of equitable access to green infrastructure and ecosystem services. It promotes the physical redistribution of mobility-enabling structures, such as pedestrian paths, cycling ecovias[12], and connected recreational areas across Braga's urban, peri-urban, and rural territories. Key examples include the implementation of ecovias along rivers like the Cávado and **Este**, designed to integrate with Braga's cycling network and connect peripheral and central areas. This expansion of soft-mode infrastructure ensures that both urban and rural residents, including those in less served zones, can access high-quality public and ecological spaces. Several pilot actions envision these corridors as multi-functional spaces, enabling leisure, education, and active transportation. Additionally, urban gardens and agricultural parks are planned to serve both ecological and social functions. For instance, the Agricultural Park of Cones

[12] It is a dedicated cycling route, often along the coast or through natural areas, that provides a safe and scenic way to explore an area by bicycle

includes a social model where land is made available for cultivation by residents, supporting not only food security and recreation but also inclusion and local mobility through proximity. These spatial interventions reflect an intent to redistribute mobility opportunities and public amenities toward areas and groups that might otherwise be marginalized in conventional transport planning, thereby contributing to more just urban-rural connectivity.

Procedural justice is partially addressed through the emphasis on integrated, multidisciplinary collaboration and strategic diagnosis involving municipal technical teams. The strategy acknowledges the absence of a participatory component due to pandemic-related constraints and limited time, indicating that community input and inclusive engagement are still pending. This recognition reveals the limitations in procedural justice as the current version of the plan was designed primarily by technical experts. Nonetheless, the methodology proposes mechanisms for future integration into territorial planning processes, especially through the Landscape Quality Objectives (OQP). These objectives are described as necessarily reflective of community expectations and values, which implies the need for participatory definition and iterative governance. Their positioning as the interface between landscape diagnosis and action planning indicates an intent to institutionalize citizen participation in future phases of landscape and mobility-related decisions.

Recognition justice in the plan is expressed through efforts to value diverse landscapes and user experiences, particularly those of rural residents, cultural communities, and individuals engaging with the natural environment. The plan places emphasis on cultural heritage, public green spaces, and ecological leisure areas, reflecting a broader sensitivity to varied community needs. However, it does not explicitly mention marginalized groups such as immigrants, people with disabilities, or low-income communities. Likewise, the strategy lacks detailed provisions for ensuring cultural or language accessibility in its landscape interventions. Despite these omissions, the plan does integrate inclusive design principles that implicitly address the needs of vulnerable and diverse populations. Several pilot actions propose pedestrian and cycling paths built with low-impact, natural materials that are safe and accessible. Public amenities such as picnic areas, playgrounds, and resting points are designed using forest-sourced elements, reinforcing their environmental and social value.

Additionally, the inclusion of school, community, and institutional gardens as educational and recreational spaces reflects a commitment to accessible, multifunctional landscapes. The Sacromontes pilot is a particularly strong example, where multi-surface pedestrian and cycling routes are proposed to improve access to forested and heritage areas. These routes are designed with leisure use in mind, incorporating viewpoints, rest areas, and culturally significant landmarks, thereby broadening access to diverse users with varying mobility needs. Furthermore, the plan emphasizes environmental education through interpretive trails and informational signage, aiming to make the landscape understandable and engaging for people with different knowledge levels and capacities. These features help foster public connection to place and encourage inclusive participation in the landscape, even if recognition of marginalized identities is not explicitly stated.

Last but not least, although not every action is explicitly tied to school areas or specific educational facilities, the plan does suggest educational and inclusive goals. Urban gardens, parks, and ecological corridors are linked to pedagogical opportunities and community engagement, which implicitly benefit youth and school communities. However, there is no direct mention of André Soares School or a targeted strategy for school zones.

4-2-4 Action Plan for Sustainable Energy and Climate (PAESC) of the City of Braga

The Action Plan for Sustainable Energy and Climate (PAESC)[13] of Braga outlines a structured and ambitious framework that integrates sustainable development goals with climate mitigation strategies. At its core, the plan seeks to reduce CO_2 emissions by 55% by 2030 and to achieve climate neutrality by 2050, align with the European Covenant of Mayors[14]. In terms of mobility, the PAESC highlights the transport sector as the largest consumer of final energy (36%) and the leading source of CO_2 emissions (40%) in Braga as of 2019. Despite a

[13] Plano de Ação para a Energia Sustentável e o Clima do Município de Braga (PAESC)

[14] The Covenant of Mayors for Climate and Energy (CoM) is the mainstream European voluntary movement involving local authorities in the development and implementation of sustainable energy and climate policies (Covenant of Mayors, n.d.).

downward trend since 2008, with energy consumption decreasing by 19% and emissions by 24%, the dominance of individual transport remains significant, accounting for 84% of energy use and emissions in the sector.

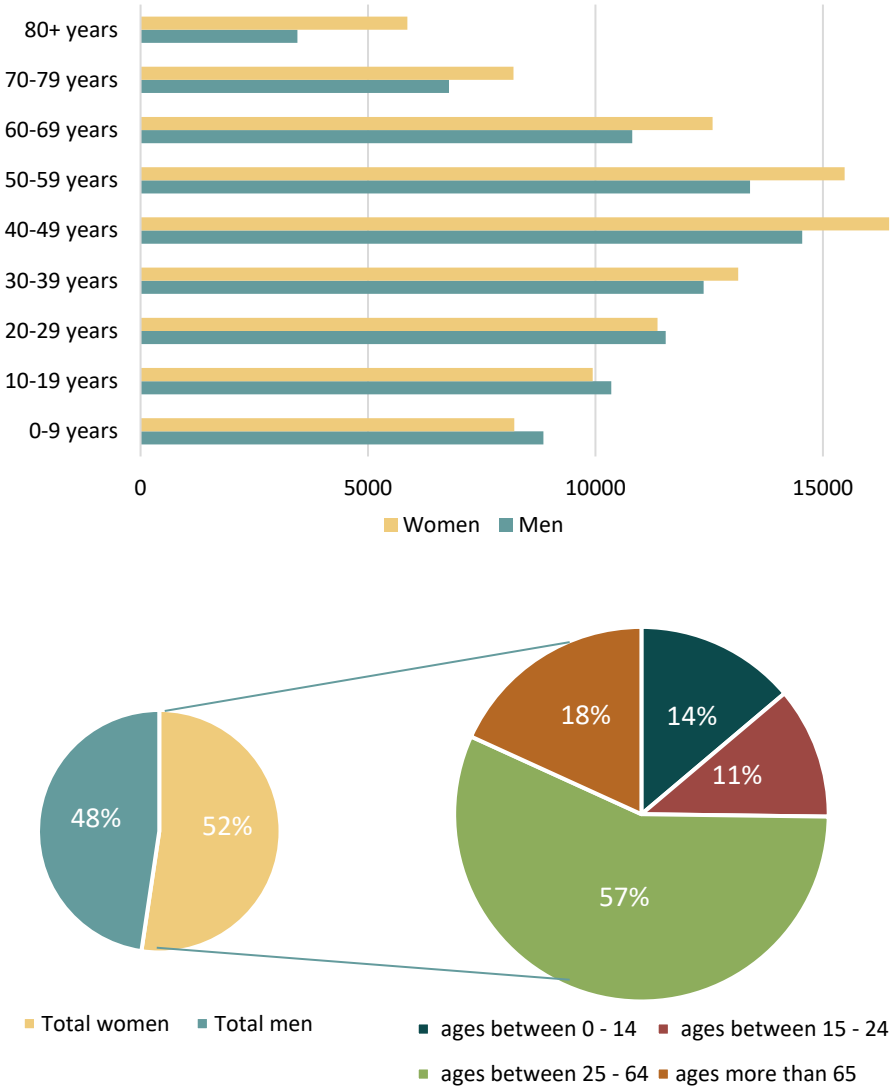
To address this imbalance, and in regard to distributive mobility justice, which is visible in the plan, Braga introduced several concrete measures focused on active mobility and accessibility. These include the integration of a cycling network within the urban center, pop-up shared lanes connecting neighborhoods to schools and key destinations, and the requalification of pedestrian routes that celebrate Braga's cultural and historical identity. These actions actively involve schools, environmental groups, and local associations, reflecting an inclusive, participatory approach to planning. Particularly relevant to school mobility, pop-up mobility projects aim to connect cycling routes directly to major school establishments, fostering safer and more sustainable school commutes. Although André Soares School is not named specifically in the PAESC, the emphasis on linking schools to active mobility networks indicates a commitment to supporting school communities through integrated planning. Projects like the Cávado River Ecovia, the redevelopment of pedestrian routes, and the increased availability of limited-time parking zones aim to redistribute space and mobility benefits more equitably, especially by prioritizing non-motorized and low-emission modes. These efforts are complemented by public investment in electric buses, fleet renewals, and vehicle charging infrastructure, promoting cleaner and more accessible public transport options across the municipality.

The PAESC reflects elements of procedural justice through its recognition of the importance of stakeholder involvement in implementing sustainable mobility measures. It lists schools, cultural and environmental associations, and business associations as key partners in delivering pedestrian and cycling initiatives, indicating an intention to include local actors in the mobility transition. While the plan itself emerges from institutional planning, it acknowledges the need for inclusive governance and calls for broader engagement during the implementation phase. This is reinforced by cross-cutting educational campaigns that promote sustainable transport, energy efficiency, and responsible consumption, specifically targeting youth and local communities. Additionally, the plan encourages civil society

participation through mechanisms such as open calls for monitoring progress and shaping local energy and transport strategies. Although it does not detail how participatory processes, like public consultations or co-design sessions, were conducted during the planning stages, these initiatives suggest a gradual movement toward more inclusive, participatory climate and mobility governance, particularly at the neighborhood and institutional levels.

From a recognition justice perspective, the plan indirectly acknowledges demographic diversity by integrating actions that align transport planning with varied social needs, even though it lacks explicit references to marginalized groups such as migrants, low-income residents, or people with disabilities. The plan promotes active mobility infrastructure, including cycling and walking routes near schools and community hubs, addressing the mobility needs of children and youth. It also seeks to enhance pedestrian and cyclist safety and autonomy across different urban zones, supporting individuals of all ages and physical abilities. Additional measures such as education-focused gardens, public awareness campaigns, and accessible public amenities, demonstrate a concern for inclusivity in the design of urban spaces. Initiatives like pop-up shared bike-car streets and safe school routes further reflect an understanding that mobility is experienced differently across social groups, even if not explicitly stated. These strategies help foster a more inclusive urban mobility system, responsive to diverse capacities and lived experiences within the community (Braga City Council, 2022).

As can be seen from Graph 1, based on data derived from national statistics of Portugal, Braga's population includes a significant youth segment which is 57% of the whole population, then the elderlies with 18% (National Statistic Institute, 2021). These figures underscore the importance of recognition justice in designing mobility systems that accommodate the needs of children, young people, and the elderly.



Graph 1: Age distribution of the City of Braga and its percentage
Source: (National Statistics Institute of Portugal, 2021)

4-2-5 Strategic Framework for Cávado 2030 and Master Plan for Economic Development

The strategic planning framework for the Cávado region of North Portugal, is shaped by two key documents that guide its development over the coming years. The first, the Strategic Framework for Cávado 2030[15], sets out the region's territorial development priorities. It defines a vision based on regional cohesion, innovation, climate and digital transitions, and

[15] The EIDT Cávado 2030: Estratégia De Desenvolvimento Territorial Cávado 2030

the reorganization of public services. Developed through public consultations and stakeholder engagement, it proposes five strategic axes aligned with national and European funding programs. Building on this, the Master Plan for Economic Development[16], developed under the Cávado initiative, outlines the economic strategy. It focuses on entrepreneurship, investment, social inclusion, and education, and is structured around six thematic axes: internationalization, qualification, investment, entrepreneurship, inclusion, and schools. Based on stakeholder input and local diagnostics, the plan addresses the region's specific development needs, with particular attention to innovation, youth retention, rural development, and inclusive economic growth.

The principle of distributive mobility justice is strongly embedded in both the EIDT Cávado 2030 and the Cávado Master Plan, where it is framed as essential to promoting territorial cohesion and social inclusion. The EIDT emphasizes equitable access to both physical and digital mobility, calling for expanded public transport, cycling and pedestrian infrastructure, and improved accessibility for vulnerable populations, particularly in low-density and mountainous areas where mobility and connectivity are limited. Specific measures include the development of a city-wide cycling network, improvements to pedestrian and cycling axes, such as those along the Este River, and the implementation of bike-sharing systems and street furniture to support soft mobility. These initiatives are presented not only as environmental or transport strategies but as tools to reduce car dependence and to enhance intermodality. Moreover, the EIDT Cávado 2030 underscores the role of integrated service planning, including proximity to schools and healthcare, and proposes upgrades to signage and public information systems to better serve individuals with disabilities (Quaternaire Portugal, Comunidade Intermunicipal do Cávado, 2021). Complementing this framework, the Master Plan reinforces the goal of leaving no one behind, advocating for the inclusion of unemployed, low-income, and foreign residents in the region's development through targeted programs. These include entrepreneurship support, executive training, mentorship, and dedicated funding for immigrant-owned startups, further extending the

[16] Master Plan para o Desenvolvimento Económico da Região do Cávado

scope of distributive justice by aligning mobility access with economic empowerment and cultural diversity (CIM Cávado (Cávado Intermunicipal Community), 2023).

The strategic framework recognizes the importance of improving mobility in school environments. The school transport review program, referenced in the EIDT Cávado 2030 document, explicitly includes the re-evaluation of academic and vocational school transport networks to promote equitable and efficient access to education. Furthermore, pedestrian and cycling routes are strategically planned to connect schools with neighborhoods and other key services, aligning mobility infrastructure with the everyday needs of children and families (Quaternaire Portugal, Comunidade Intermunicipal do Cávado, 2021). While no direct mention of André Soares School is present in these files, the inclusion of broader school mobility strategies and proximity-based planning signals attention to educational contexts, which could encompass the area surrounding this school.

Procedural justice has been demonstrated through a multi-stage participatory process that informed strategic priorities. The EIDT Cávado 2030 involved public consultations, webinars, and stakeholder platforms focused on themes such as mobility, climate transition, and service access, drawing input from local governments, civil society, and economic actors (Quaternaire Portugal, Comunidade Intermunicipal do Cávado, 2021). The Master Plan complemented this by organizing focus groups with key stakeholders including NGOs, business associations, and educational institutions to identify barriers and needs, particularly around entrepreneurship (CIM Cávado (Cávado Intermunicipal Community), 2023). While the emphasis was primarily economic, these inclusive processes reflect a broader commitment to participatory, bottom-up governance, helping lay the foundation for more democratic and equitable service and infrastructure planning.

Recognition justice in these two plans is reflected in their attention to social vulnerability and demographic diversity, particularly through support for inclusive entrepreneurship targeting underrepresented groups such as youth, seniors, women, and migrants. Measures include mentorship, tailored training, and startup resources designed to lower barriers to participation. Although people with disabilities are not directly mentioned in mobility terms, the plans promote spatial inclusion and territorial cohesion through investments in

education, digital literacy, and public infrastructure (CIM Cávado (Cávado Intermunicipal Community), 2023) (Quaternaire Portugal, Comunidade Intermunicipal do Cávado, 2021).

4-2-6 The Strategic Plan for the Economic Development of Braga

The Strategic Plan for the Economic Development of Braga (2014–2026, 2018 Edition)[17] is a forward-looking roadmap that sets out a clear and ambitious vision for the city's future. At its core, the plan aims to transform Braga into a dynamic hub of innovation, creativity, and knowledge-based development, placing people and their well-being at the center of its long-term goals. It builds on Braga's existing strengths, its educated population, growing economic base, and rich cultural heritage, while outlining a path for sustainable and inclusive growth. The plan is structured around several key components. It begins with a foundational model of sustainable economic development, updated to reflect changes since its launch in 2014. This is followed by a strategic vision that seeks to evolve Braga from a city known for production "Made in Braga" to one defined by innovation and creativity "Invented/Designed in Braga". It then reviews the progress made, including significant gains in job creation, export growth, and recognition as a national leader in sectors like health, technology, and tourism. The plan identifies Braga's competitive advantages, from its youthful demographics and strong education system to affordable living and robust infrastructure, and translates these into seven strategic development axes, including engineering and innovation, digital technologies, health, tourism, commerce, and territorial planning.

While mobility is not a central focus, the plan's reinforcement of the pedestrianized historic center as a commercial and cultural hub promotes walkability and revitalizes urban life, contribute indirectly to more equitable access to services, particularly for those without private transport. This territorial focus aligns with broader goals of distributive justice, aiming to share the benefits of tourism and commerce with the wider community. However,

[17] Plano Estratégico Para o Desenvolvimento Económico De Braga 2014-2026 Edição 2018

the absence of concrete strategies for improving mobility equity in peripheral or suburban areas reveals a spatial imbalance that risks excluding vulnerable populations. The plan hints at the potential for more inclusive urban development, especially through themes like public space and accessibility, which are critical for groups most affected by mobility barriers such as children, the elderly, people with disabilities, and low-income communities. By treating territory as a development axis, the plan opens the door to reimagining public space not only as an engine for economic growth but as a foundation for social inclusion and justice.

Although the plan mentions various strategic partnerships and sectors like commerce, tourism, and technology, it lacks detailed accounts of participatory mechanisms such as public consultations or community-led planning in its development. There is no specific reference to how decisions regarding pedestrian zones, urban renewal, or commercial revitalization involved diverse community stakeholders. The absence of procedural transparency suggests limited engagement with grassroots or vulnerable groups in the design of the urban mobility or economic framework.

On the other hand, recognition justice is implicitly present through the valorization of the historic center, local identity, and cultural capital of Braga, which reflects an acknowledgment of community heritage and place-based distinctiveness. It highlights the importance of street-level commerce and cultural events, reinforcing the role of public space in everyday life. However, it does not explicitly mention or address the mobility needs or inclusion of marginalized groups such as people with disabilities, low-income populations, or ethnic minorities. The lack of targeted strategies for these groups signals a gap in fully realizing recognition justice in the mobility and spatial planning dimensions of the plan (Braga Municipality, 2018).

4-2-7 Braga Longevity Plan

The Braga Longevity Plan 2024–2027[18] is a strategic municipal tool designed to respond to the challenges and opportunities presented by demographic ageing in the city. Anchored in the principles of active and healthy ageing, this plan seeks to ensure that Braga evolves into a municipality that not only accommodates its ageing population but thrives on intergenerational solidarity, inclusion, and civic participation. The plan is structured around four strategic axes: Well-being & Quality of Life, Participation, Security, and Innovation & Capacity-building, and lays out a comprehensive framework of action. Each axis encompasses specific areas of intervention aimed at fostering social cohesion, ensuring access to healthcare and social support, and promoting environments that are physically, socially, and institutionally welcoming to older residents.

A key focus of the plan is its attention to marginalized and vulnerable populations, including people experiencing economic or social disadvantage, individuals with permanent or temporary dependency, and those living in isolation. Initiatives such as the Bank of Goods and Equipment[19] and the Social Taxi[20] aim to remove structural barriers to autonomy, mobility, and inclusion. Likewise, the Friendly Driver[21] project addresses recognition justice by training public transport drivers to better support the needs of older passengers, acknowledging their specific circumstances and fostering dignified interactions.

Mobility, a critical component of the plan, is addressed through programs like Braga + Mobilidade, which includes the Mini-Bus service offering free urban transport for eligible users, and targeted infrastructure interventions under the Braga Sem Barreiras initiative. This program is particularly relevant in the context of pedestrian areas, walking infrastructure, and the broader push toward sustainable and active mobility. In terms of

[18] Plano para a Longevidade de Braga | Plano Gerontológico 2024-2027

[19] Banco de Bens e Equipamentos

[20] Táxi Social

[21] Motorista Amigo

distributive justice, it seeks to eliminate architectural barriers in public spaces like crosswalks, uneven surfaces, and stairways, thereby enhancing urban accessibility and reinforcing the right to navigate the city safely and independently. While the document does not explicitly mention school streets or cycle lanes, its principles and actions intersect meaningfully with these concerns. The emphasis on inclusive and accessible public space, particularly for those with reduced mobility and elderlies, aligns with broader urban agendas that support safe routes for school children and older generation, and active transport modes like walking and cycling.

The plan exemplifies procedural justice through its inclusive and participatory approach to policy making. It engaged older adults and key stakeholders through gerontological assessments, focus groups, and integration with broader municipal strategies, ensuring that aging-related priorities reflect real community needs. Initiatives like Greater Participation[22] and the Major Assembly[23] further empower older citizens to actively propose and influence local policies. This bottom-up and intersectoral process reinforces the role of older adults as active contributors, not just recipients, in shaping a more inclusive and age-friendly city.

It also addresses recognition justice by acknowledging the diversity of aging experiences and the specific challenges faced by different groups of older adults. It recognizes that factors such as gender, education, marital status, and place of residence shape how people age, with men over 75, unmarried individuals, and those in semi-urban areas being more vulnerable to isolation, cognitive decline, and depressive symptoms. In response, it promotes intergenerational solidarity, community involvement, and the adaptation of services to meet varied needs and abilities. It emphasizes improving transport, public safety, and inclusive infrastructure, particularly for those who are dependent or socially isolated. Above all, the plan contributes to a more just urban environment, one that respects difference, promotes accessibility, and embraces all generations (Braga City Council, 2024).

[22] Participação Maior

[23] Assembleia Maior

4-2-8 Braga Social Development Plan

The Braga Social Development Plan 2024–2030[24] provides a socially grounded framework to guide inclusive and participatory action in Braga. It is structured in two main parts: a detailed Social Diagnosis[25] and a forward-looking Action Plan[26]. The diagnosis component presents a thorough examination of Braga's social fabrics, identifying demographic trends, family structures, educational attainment, employment, health services, and vulnerabilities within the population. It highlights the growth of the foreign-born population, the rise in older adults, and the increase in single-parent households, especially single mothers, who comprise over 86% of such families. Additionally, it reveals the deepening social risks linked to low education, unemployment, social isolation, and economic precarity, particularly affecting children, young people, the elderly, and residents of social housing. These groups are identified as being particularly exposed to exclusion and marginalization. In response, the action plan is built upon a participatory methodology that mobilized various local actors, including parish-level social commissions, communities of practice, and thematic forums such as those for ageing, gender equality, and homelessness. This process is explicitly participatory and iterative, reinforcing principles of public participation and procedural justice. The roadmap for implementation was shaped through continuous dialogue with stakeholders in the local social network (CLAS)[27], ensuring that the perspectives and needs of practitioners and vulnerable groups inform the actions proposed.

Procedural justice in the plan is reflected through its strong emphasis on collaborative governance and proximity-based action. The plan promotes the development of integrated service models and efficient social response systems that include stakeholders and affected families in planning and decision-making. It places particular focus on improving diagnostics around disability through community-level engagement, allowing for more localized and

[24] Plano de Desenvolvimento Social de Braga 2024–2030 PDS Braga 2030

[25] Diagnóstico Social

[26] Plano de Ação

[27] Conselho Local de Ação Social

informed responses. This participatory approach also supports early intervention strategies, ensuring that diverse voices are meaningfully incorporated into the formulation of inclusive public policies.

Recognition justice is explicitly addressed through the plan's focus on the diversity of identities and experiences, particularly among vulnerable populations such as people with disabilities and older adults. It acknowledges the intersectional nature of disadvantage, including isolation, ageism, and dependency, and actively works to counter stigma through public education and greater visibility of these groups in community life. The plan highlights inclusive practices by supporting adapted sports, cultural participation, and intergenerational solidarity, aiming to affirm the value and rights of all citizens regardless of age or ability. Programs such as "Jardim Sensorial", "Projeto Asas para Voar", inclusive arts initiatives, and tailored employment programs, along with partnerships like the UNESCO Creative Cities and Learning Cities Networks, reinforce Braga's commitment to ensuring everyone has a voice and place in the city's cultural and civic life.

Although the plan is comprehensive in its social scope, there are no direct references to school zones, active mobility, walking, pedestrian areas, cycle lanes, or sustainable mobility. These topics fall outside the specific domain of the social development agenda addressed in this document (Braga City Council, Intermunicipal Community of Cávado, 2024). Nevertheless, the principles underpinning the plan, especially those related to justice and inclusion, can support broader cross-sectoral efforts that aim to improve accessibility and equity in urban spaces.

Chapter 5

Data Collection and Analysis

In this chapter, the field observations, their analysis, and geospatial maps, including the mobility and urban elements of the focus area and their distribution, as well as car crashes and everyday obstacles, are explained. Additionally, the analysis of the area's current situation is presented, based on stakeholders' insights gathered through interviews.

5-1 Data Collection Method

This chapter presents the results of observational fieldwork conducted in the surrounding area of André Soares School, a public basic education institution serving the second and third cycles of the Portuguese education system with students aged 10 to 15, to map activity patterns during key school commute hours. This work constituted the initial phase of a broader analysis carried out during the author's internship in Braga, designed to better understand the flow of people and vehicles in the area, particularly during school drop-off and pick-up periods. Hence, this field observation followed a structured methodology developed by the JUST STREETS Project team and served as a foundational layer for assessing everyday mobility concerning the André Soares School environment.

The observational methodology was derived from the idea of Jan Gehl, who advocated field observation as a powerful tool for making people visible in urban spaces, and according to him, this visibility is crucial for informing urban interventions that prioritize human-centered design (Gehl & Svarre, 2013). The study employed a simple set of tools to collect and organize information using a pen, paper, manual counter, stopwatch, and a smartphone. The observations were conducted manually by the author and combined with Gehl's observation method, including counting, mapping, tracing, tracking, looking for traces, photographing, keeping a diary, and test walks, which are explained as follows:

- *Counting:* This is used in public life studies. This case study is a public space intended for people, not cars. This method quantified the number of people and vehicles present, focusing on distinguishing individuals by age group and gender to better understand the various groups of people using the area.
- *Mapping, also called behavioral mapping:* This step was used to document the location and type of activities in the focus area. All observed activities were marked on a map to better analyze the spatial patterns of behavioral patterns in the area.
- *Tracing:* This involved recording the general movement flows of people within the study area. It should be noted that movements were represented as lines in Map 7, the activity map, to offer a visual understanding of how space was navigated and used.

- *Tracking:* To observe an individual's movement, an observer can follow people without their knowledge. In this case, to better understand the routes people most commonly use, the author followed some individuals randomly, whether walking alone, with children, or with dogs.
- *Looking for traces:* This step involved identifying physical evidence of human activity, such as litter in streets, dirt patches on grass, locked bicycles, or even, in this case, the presence of cars, that indicate how space is used which can be registered through counting, photographing, or mapping., In this case, the author captured some photographs, including a locked bicycle on a fence, suggesting that active mobility choices of people use this space, but with a lack of infrastructure. At the same time, traffic congestion revealed the competing presence of vehicles over people.
- *Photographing:* Documenting different situations is essential in public life studies. In this regard, the author captured images to indicate moments such as the agglomeration of parental gatherings near the school entrance, traffic congestion caused by a big load of parked cars, and the various ways students commute to the school, such as on foot, by bicycle, by car, or on bike trains. In the end, the author shot a total of almost 300 photos.
- *Keeping a diary:* This step helped to capture detailed interactions and observations, so the author took notes on the observation papers, such as the number of cars circling in search of parking or even places where people tend to sit, although there was no designated sitting place that the author considered as an obstacle.
- *Test walks:* This step provided an experiential understanding of the area. By walking through the area, the author was able to identify both challenges and potentials of the urban landscape, ultimately informing the development of an obstacle map and a detailed spatial narrative of the André Soares School's surrounding area.

All these observations were made across three distinct time slots each day to ensure a comprehensive understanding of daily patterns. The considered drop-off and pick-up times included 8:30 to 9:30 in the morning, 12:30 to 1:30 in the afternoon, and 5:30 to 6:30 in the evening, since André Soares School offers classes in both the morning and afternoon. Additionally, field observations took place on three separate types of days: normal working

days, weekends, and during the Easter holidays, when no students were present and only school staff and residents were there. Including these different times allowed the researcher to make detailed comparisons of mobility patterns when students were present versus when residents and school staff mainly used the space.

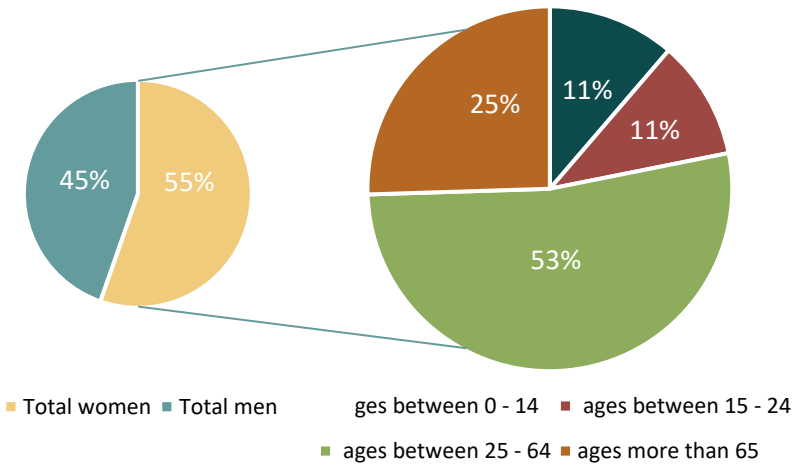
On each observation day, the author arrived on the site fifteen minutes before the start of the time slot. She counted the number of parked vehicles and recorded their license plate numbers to better understand the total number of vehicles parked since the previous day and the number of vehicles that were parked exclusively during school hours. The author then fixed her position to observe and record various forms of activities, including vehicular circulation, pedestrian crossings, people walking with dogs, exercising, socializing, or children playing, each noted with attention to individuals' age and gender.

It is essential to mention that the field observation process encountered a challenge when a few individuals expressed discomfort with license plate recording and contacted the police, consequently, the observer could not record the license plate numbers for one day. Moreover, some alternative methods were briefly attempted, including photographing license plates, voice recording with a mobile phone, and taking notes while walking. However, the observation was conducted without incident on the following days with the written authorization from the municipality of Braga. For detailed information regarding the field observation, some parts of the field observation notes, as well as the access link to all observation days' notes, have been attached in Annex A.

5-2 Surrounding Area of André Soares School

The surrounding area of André Soares School, which is located near the historic center of Braga, was chosen as the case study for this research, attracting a wide range of daily users, including students, caregivers, residents, school staff, and other city users. As shown in Graph 2, the population distribution in this focus area includes 55% women and 45% men, with adults who are aged 25 to 64 form the biggest demographic group with 53%, then,

older adults aged 65 and above make 25%, and children aged 0 to 14, and youth aged 15 to 24, that each represent 11% of the population (National Statistics Institute of Portugal, 2021). These age and gender distribution, as well as the presence of both significant elderly and school-aged populations in the area, together highlight the need for inclusive urban design and urban mobility solutions, which cater to the diverse needs of these groups and the importance of designing streets that are safe, accessible, and supportive of active mobility for all. These demographic characteristics, along with field observations, provide a comprehensive understanding of how street space is used throughout the day.



Graph 2: Population of the surrounding area of André Soares School
Source: (National Statistics Institute of Portugal, 2021)

5-2-1 Mobility and Urban Elements in the Surrounding area of André Soares School

To comprehensively understand mobility and urban elements of the area, Map 3 provides a comprehensive spatial overview of the mobility network and urban infrastructure in the surrounding area of André Soares School, based on the municipal data and direct field observation by the researcher. The road network, based on the categorization of Braga's Master Plan (Braga City Council, 2021), is categorized into three types in the area:

- **The Main roads** (bold black lines), Avenida João XXI, Avenida da Liberdade, and Avenida 31 de Janeiro, which serve as key arterial routes in Braga's urban structure and focus area, carry high traffic volumes and form physical boundaries to the school zone.

- **Local roads** (thin dark gray lines) provide access to residential buildings and local shops and restaurants within the school's immediate area and facilitate internal neighborhood circulation.
- **Private roads** (light gray dashed lines) are typically associated with restricted residential and hospital access or enclosed properties, with public utility limitations.

The pedestrian environment is marked by the **sidewalks** (light gray dashed lines), which vary in width, continuity, and condition throughout the area. Some of them are poor in terms of pavement, some are too wide for cars to enter, and some are too narrow, violating the Master Plan's minimum width of 1.5 meters. These obstacles will be explained in detail in Map 5, the diagnosis map of the focus area.

In the northern and northeastern part, the **staircases** (brown dashed lines) reflect the neighborhood's topography, which poses accessibility challenges, particularly for individuals with reduced mobility or pushing strollers.

Regarding **public transport**, the map indicates the presence of multiple bus stops (red bus icons), mostly concentrated along the main roads that the concentration of them near the school enhances accessibility but may also intensify multimodal traffic flow close to the pick-up and drop-off times. Moreover, there is a bus in the area that only crosses the area early in the morning at around 7 a.m.

There is also availability of **cycling infrastructure**, which distinguish between existing cycle lanes (red lines), that provide active mobility routes primarily along Avenida da Liberdade and adjacent areas of the Este River, which is acting as both a natural boundary and a potential green corridor for active mobility, and cycle lanes under implementation (red dashed line), indicating forthcoming enhancements to the sustainable transport network around the area of André Soares School.

Several **parking areas** (brown blocks) are located within and around the school perimeter, including those directly adjacent to entrances, which contributes to car-centric behavior during school hours.

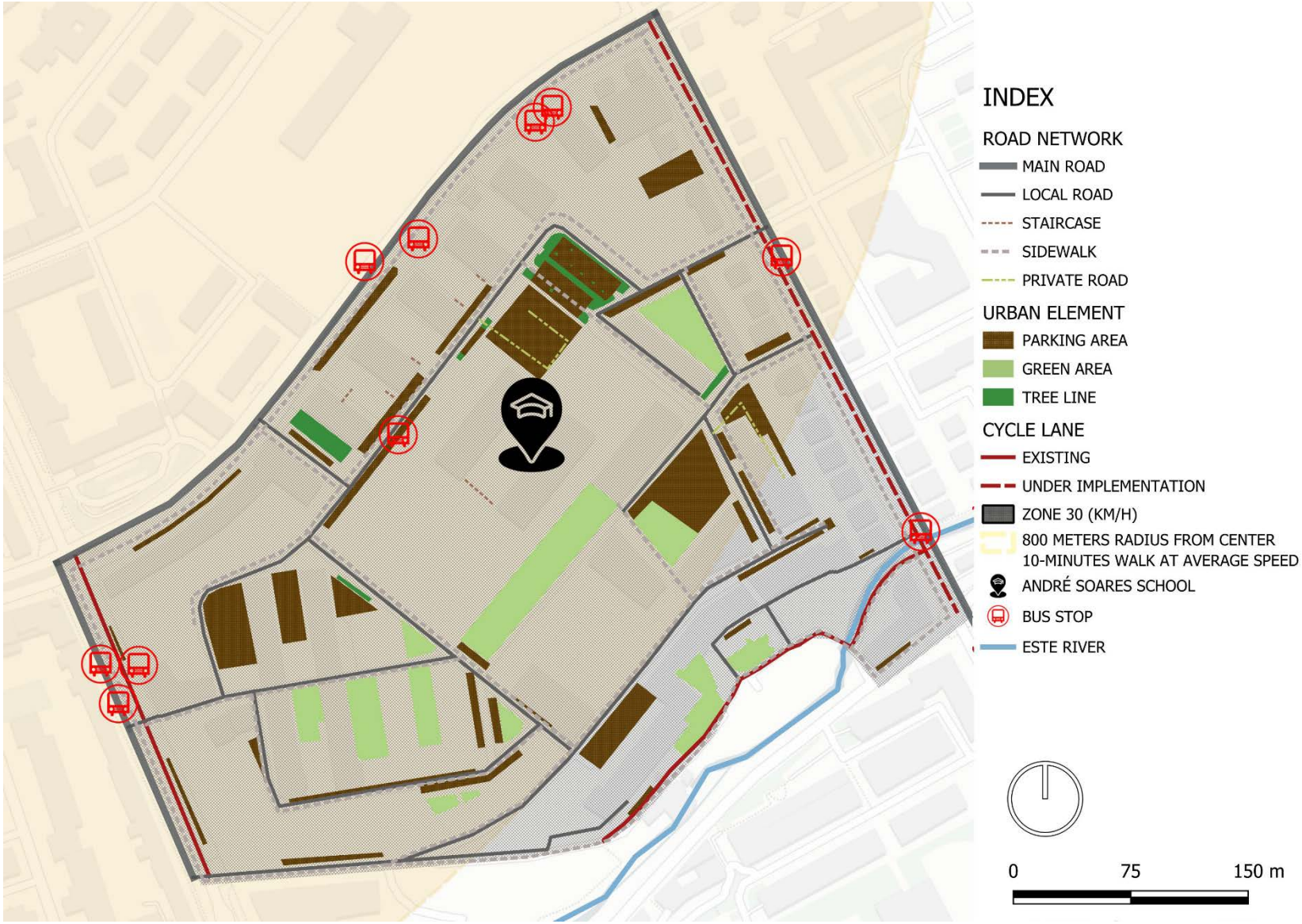
Green areas (light green patches), as well as **tree lines** (darker green lines), mark open and shaded spaces. Some of them are dedicated to the school, some serve as informal play areas or pedestrian buffers but are unevenly distributed and often poorly integrated into the mobility network.

To move towards safer school mobility, the area has also been designated **Zone 30** (the gray hatched area). It is a traffic-calming measure that reduces speed limits to 30 km/h. The needed infrastructure is already available in the area and will be implemented from August 2025.

On Map 1, the location of the focus area within the entire city and its position relative to the city center (pedestrian area) are shown. A closer view is provided on Map 2. They depict the André Soares School's proximity to central Braga and its strategic location regarding access and walkability to the center. Considering Map 3, the major part of the focus area is located within a **800 meters radius from the city center** (yellow boundary on Map 3) which corresponds to approximately a 10-mintue walk at an average speed, and the remaining part is within a **1200 meters radius from the city center** (medium yellow radius on Map 2), which corresponds to approximately a 15-mintue walk at an average speed from the center.

All these findings together reveal the layered and, in some parts, fragmented mobility infrastructure in the area, particularly sidewalks. They underscore the need for planning and design improvements aligned with mobility justice principles, especially those that support safe, accessible, and inclusive school streets.

Map 3: Mobility and Urban Elements in the Surrounding area of André Soares School



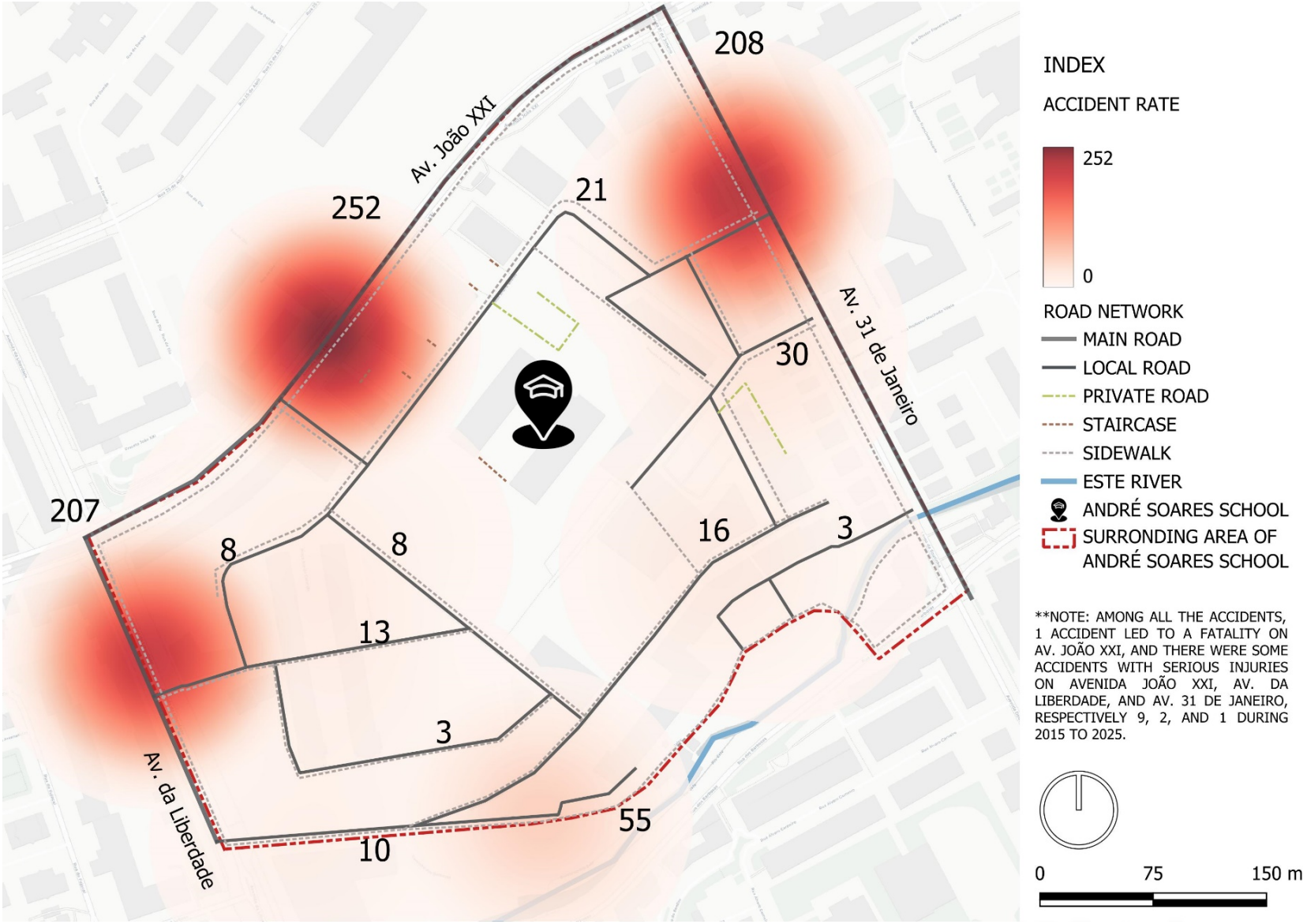
Source: Elaborated by the author

5-2-2 Car Crashes in the Surrounding Area of André Soares School

The area surrounding André Soares School has revealed an uneven pattern of car crashes over the last ten years, from 2015 to 2025, based on the data from the Public Security Police of Braga. The spatial distribution of the car crashes is illustrated on Map 4, which highlights a concentration of crashes along three major arterial roads, around the school area, including Avenida João XXI, Avenida 31 de Janeiro, and Avenida da Liberdade, respectively 252, 208, and 207 car crashes over the last ten years, hence, it can be understood that the school area's vulnerable users, particularly schoolchildren who commute through the area daily, are at risk of car crashes along the main roads. Conversely, the inner streets within the focus area show significantly lower crash counts. Many of these local roads recorded fewer than 20 incidents, with several reporting only three, which suggests a comparatively calmer area in case of traffic, potentially due to their classification as local roads and the presence of some design features that limit vehicle access and speed within the focus area. Therefore, it can be understood that the boundaries pose safety risks, representing gaps in traffic safety planning.

Regarding safety issues due to car crashes, one particular concern is the area around the school's entrance gate, which is a place where the daily routines of drop-offs, pick-ups, and walking routes converge, with an increasing risk exposure precisely where safety should be paramount, here the number of accidents on André Soares Street is slightly higher compared to other local roads in the area, which may not only increase the potential for conflict between vehicles and pedestrians but also may lead to a greater sense of insecurity within the school community. Moreover, the area lacks a connected cycle lane network, and combined with the car crash safety issues, it presents a further challenge, particularly for those who choose to commute to school by bicycle, as a consequence, these conflicts underscore the urgent need for more targeted interventions to ensure that the streets adjacent to the school are not just functional, but genuinely protective of the people who rely on them most, not just within the school gates, but across all the spaces they must navigate to get there.

Map 4: Car crashes in the Surrounding area of André Soares School from 2015 to 2025



Source: Elaborated by the author

5-2-3 Everyday Obstacles to Walking and Cycling in the Surrounding Area of André Soares School

Map 5 is the diagnosis map, presenting a detailed picture of the everyday obstacles to walking and cycling in the area surrounding André Soares School, which by combining spatial data with photographs taken by the author, documents physical barriers that affect the safety, comfort, inclusivity, and accessibility of the area, particularly for children, the elderly, people with reduced mobility, caregivers with strollers and other vulnerable groups. Data for this map were derived directly from field observations conducted by the researcher.

At the center of the map, the highlighted route, marked in yellow, represents sidewalks that are not accessible to people with disabilities due to the absence of leveled crosswalks from the street, as well as sidewalks in poor condition for children, in terms of pavement, including cracked or uneven tiles, missing sections, and degraded surfaces, some with tree roots, make crossing impossible for people using wheelchairs, caregivers with strollers, people with walking aids, and may also pose a danger to small children. Although these are the main sidewalks leading to the school, they are in a deteriorated state, as identified during the fieldwork. Each obstacle is also illustrated through photographs, offering a human-scale view of the street environment. Moreover, narrow sidewalks (shown with the zigzag red and black icon on the map) are documented in the area, which indicates limited comfortable movement of groups, including parents walking with children, people with reduced mobility, and also in some areas, difficult for people to pass each other.

Moreover, illegal and inappropriate parking is another challenging issue. Several photos, including those on the left and right sides, indicate vehicles parked directly on sidewalks, since there are some too wide sidewalks without protective barriers like bollards, which allow cars to enter the sidewalk easily, posing a danger to pedestrians, also areas which are not dedicated to parking, or next to waste containers, significantly narrowing or blocking pedestrian paths and the roads in general, so these behaviors not only force people to walk on the road but also compromise visibility, especially near crossings, which leads to significant danger.

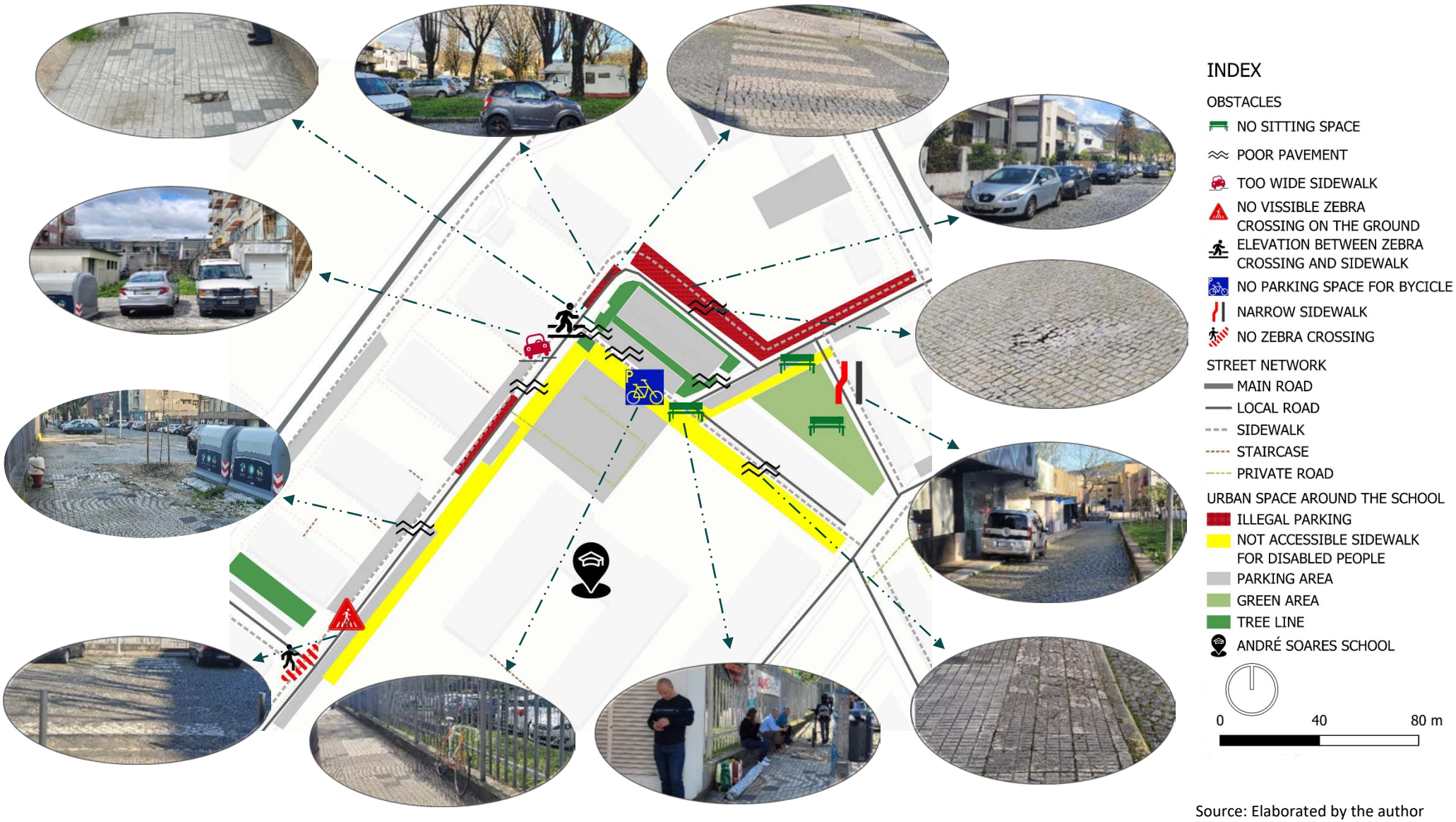
The lack of visible zebra crossings is mapped in some spots, which is crucial to make sure that drivers yield to pedestrians, as well as for making crossings safer and more accessible for people with visual impairments or reduced mobility, the absence of zebra crossing increases the risk of accidents and adds insecurity to pedestrian movements. Add to this, a lack of elevation for zebra crossings, which poses problems for people with reduced mobility, caregivers with strollers, and children, as the road and sidewalk are not at the same elevation, making it difficult for them to cross, there are also areas with no zebra crossings, which make it harder to cross the roads safely. Considering these all, in areas near the school, where foot and car traffic are both high, especially during drop-off and pick-up times, the lack of designated and visible crossings adds considerable risk.

The other obstacle was the absence of dedicated bicycle parking, marked with the no parking space for bicycle icon on the map, which highlights a lack of support for active mobility, from the map, the lower-center photo shows a bicycle was locked to a fence, emphasizing the improvised options cyclists are forced to take in the absence of proper infrastructure.

The lack of seating space, especially near green areas and the school entrance gate, is also noted. While this is a small, but is a meaningful barrier to inclusive urban design, especially for older adults, children, or people with reduced mobility who may need places to rest along their journey, as well as parents waiting for their children.

All in all, each of these elements is not simply a technical issue alone. It is something that shapes how people experience the city every day, and the accumulation of these obstacles, including damaged sidewalks, inaccessible crossings, and car-dominated spaces even on sidewalks, reflect broader patterns of neglect or under-prioritization of active mobility infrastructure, especially in school areas.

Map 5: Diagnosis Map of Obstacles in the surrounding area of André Soares School



Source: Elaborated by the author

5-2-3 Distribution of the Surrounding Area of André Soares School

Map 6 and Table 2 together provide a comprehensive overview of the spatial distribution and area coverage of various urban elements in the focus area, which has a total surface area of 81,924 square meters. The data, which were derived from the Municipality of Braga and the author's field observations, reveal the diverse structure of this urban area, with land use patterns that reflect both the functional character of the school and the broader residential neighborhood context.

The school has the most dominant occupancy in the focus area, 28,528 m², which corresponds to 34.8% of the total area, the biggest percentage among other land uses. This substantial share shows the centrality of the school function in the area and its activity patterns. The second largest category is "other open spaces", including house yards, trash bin areas, and etc., which cover 21.1% of the total, followed by the built area, excluding the school, which comprises 15.5%. These figures suggest that, while the area is heavily related to school, it also accommodates a considerable share of residential, services, and undefined open spaces.

The road infrastructure is another significant land use, including sidewalks, which occupy 7.7% of the area (6,349 m²), highlighting the extent of pedestrian infrastructure[28]. Then, the main roads and local roads occupy 1.3% and 6.9% respectively, which indicates a fair balanced road hierarchy, with local access playing a more significant role. It should be noted that, as previously shown in Map 3, the whole focus area is a Zone 30; thus, it is considered a local area. The parking area occupies 8.1% of the total, with 6,622 m² allocated to designated parking, both the parking area and on-street parking[29]. This indicates a relatively

[28] It should be noted that about 1,298 m² of the sidewalk is not accessible to people with reduced mobility, which is 20 % of the whole sidewalks in the area. It actually reveals critical gaps in inclusive pedestrian design, as shown and explained in the 5th map, which is the diagnosis of obstacles map.

[29] The entire André Soares Road covers 3,905 m². Also, there are 120 designated on-street parking which cover 1500 m² along this street. Moreover, the parking area in front of the school entrance gate, is almost 1500 m². Despite all these designated areas to parking, still there are almost 25 illegal parking along the André Soares Road during the day which accounts for almost 312 m² of the road. Moreover, during pick-up and drop-off times, there are additional examples of illegal parking beyond the identified spots, including overly wide sidewalks where some cars are also parked as mentioned in 5th map of obstacles.

high spatial allocation to car usage. Although there is the presence of multiple bus stops mapped along the main roads, no share of space dedicated to alternative modes like cycling is a drawback of the area.

Another category is green infrastructure, which, although present, it is limited. It represents only 3.8%, and tree-lined spaces only occupy 1.1%. These two categories together are almost 5%, which is a relatively small proportion compared to the built and paved surfaces, which reflects a clear imbalance between built and green areas, which will have effects on environmental quality, comfort, and microclimate in the school surroundings.

Table 2: Quantitative distribution of urban space categories within the focus area of André Soares School

Urban space category	Area (square meters)	Percentage of the whole area
Green area	3080	3.8
Tree line	895	1.1
Parking	6622	8.1
Main road	1070	1.3
Local road	5618	6.9
Sidewalk	6349	7.7
Gas station	127	0.2
Built area	12667	15.5
School area	28528	34.8
Other open spaces like house yards, trash bins, …	16968	20.6

Source: Municipality of Braga and Field observation by the author

All in all, the area faces limited green space and accessible pedestrian and cycling infrastructure, and the presence of illegal parking, non-accessible sidewalks, and undefined open spaces, highlight existing urban inequities. So, the area needs inclusive, green, and active mobility interventions. Given the school's central role, enhancing safety, inclusivity, and accessibility for children and vulnerable users should be a planning priority.

Map 6: Distribution of Urban functions and Mobility features around André Soares School

Source: Elaborated by the author

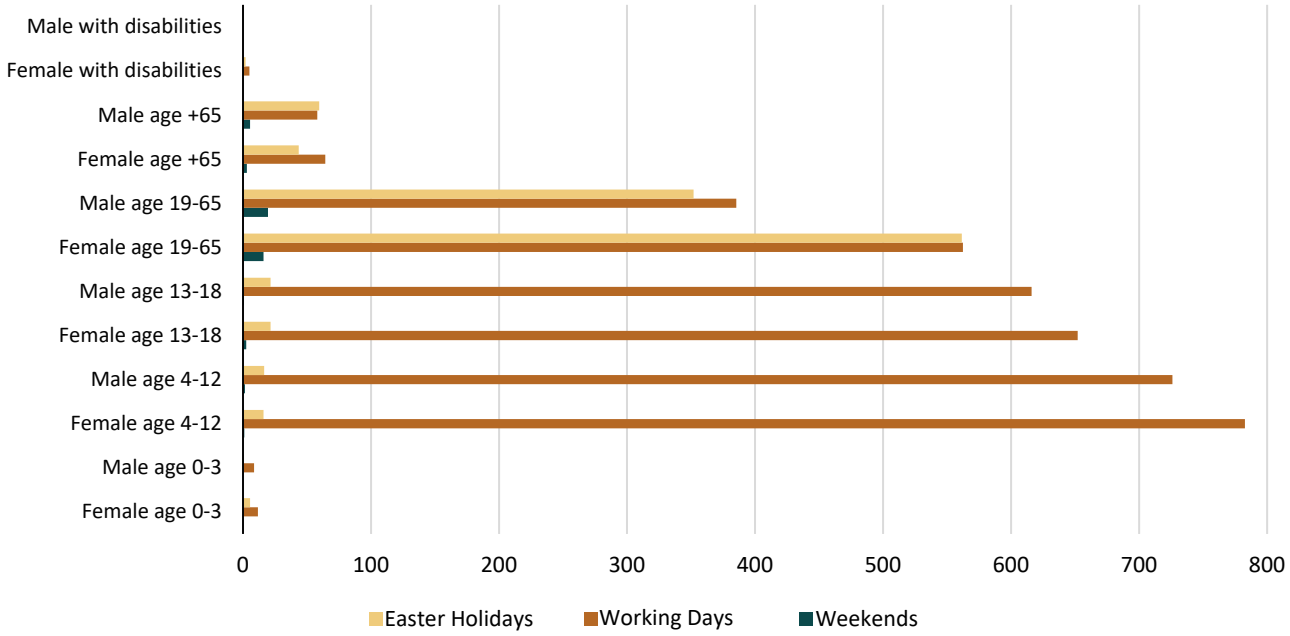
5-2-4 Findings from Field Observation

In this section, the findings from the researcher's field observation are presented, with a detailed analysis of pedestrian and vehicle movement patterns around the André Soares School during the three timeframes of morning, noon, and afternoon in working days, weekends, and the Easter holidays. The observations had a focus on age, gender, and modal distribution to understand mobility dynamics and potential exclusion in the area.

5-2-4-1 People Movement

Graph 3 and Table 3 depict the number of people crossing the area surrounding André Soares School in three different time frames: Easter holidays in yellow, working days in dark orange, and weekends in blue, which the data is disaggregated by both age group and gender, that allows a detailed understanding of mobility patterns in this school area.

In Graph 3, the age distribution of people crossing the area shows that the highest presence belonged to school-aged children, particularly females aged 4 to 12, then to males aged 4 to 12, and teenagers aged 13 to 18 of both genders. In this regard, this proved the school's central role in the community. It is important to mention that the crossings of these groups were significantly higher on working days than on Easter holidays and weekends, since there were no students during these two times, so it reinforces the idea that the school is a strong attractor for daily movement in the area. Additionally, adults aged 19 to 65 also show considerable movement, especially females, mostly caregivers, school staff, or residents, who frequently use the area. Then, the older adult population aged more than 65 indicates much lower activity levels, with females slightly more represented than males, possibly due to social or caregiving roles, and people with disabilities, both male and female, have the lowest presence in the data, which may indicate barriers to accessibility or lower frequency of travel in this area, which is an observation that needs further attention in terms of inclusive infrastructure. Moreover, the number of adults during the Easter holidays highlights the presence of school staff and residents, which indicates outside of regular school days, the majority of users in the area are adults.



Graph 3: People cross the surrounding area of André Soares School with age distribution in three different time frames

Source: Field observation by the author

Turning to Table 3, which is a gendered patterns between working days, weekends, and the Easter holidays that reflects different social patterns, work schedules, and recreational habits, shows that on working days, females represent 54% of total crossings, while males are 46%, and on Easter holidays, the female share increased to 59%, while the male percentage decreased to 41%, which suggest a greater female presence and commuting, who were mostly school staff and residents during this period. In contrast, on weekends, males dominate slightly, representing 54.5%, compared to 45.5% females, since there is no school staff or student at that time.

Table 3: Percentage of total people crossing the surrounding area of André Soares School, with gender distribution in three different time frames

Gender	Easter Holidays	Working Days	Weekends
Female	59 %	54 %	45.5%
Male	41 %	46 %	54.5 %

Source: Field observation by the author

The above graph and table highlight a clear rhythm of peoples' movement around the school, and reveal disparities in who is present in the space and when. The dominance of

children and female pedestrians, especially on working days, suggests the need to prioritize safety and accessibility during peak times, while the low presence of older adults and people with disabilities points to possible mobility exclusions that should be addressed through more inclusive street and mobility design.

5-2-4-2 Vehicle Movement

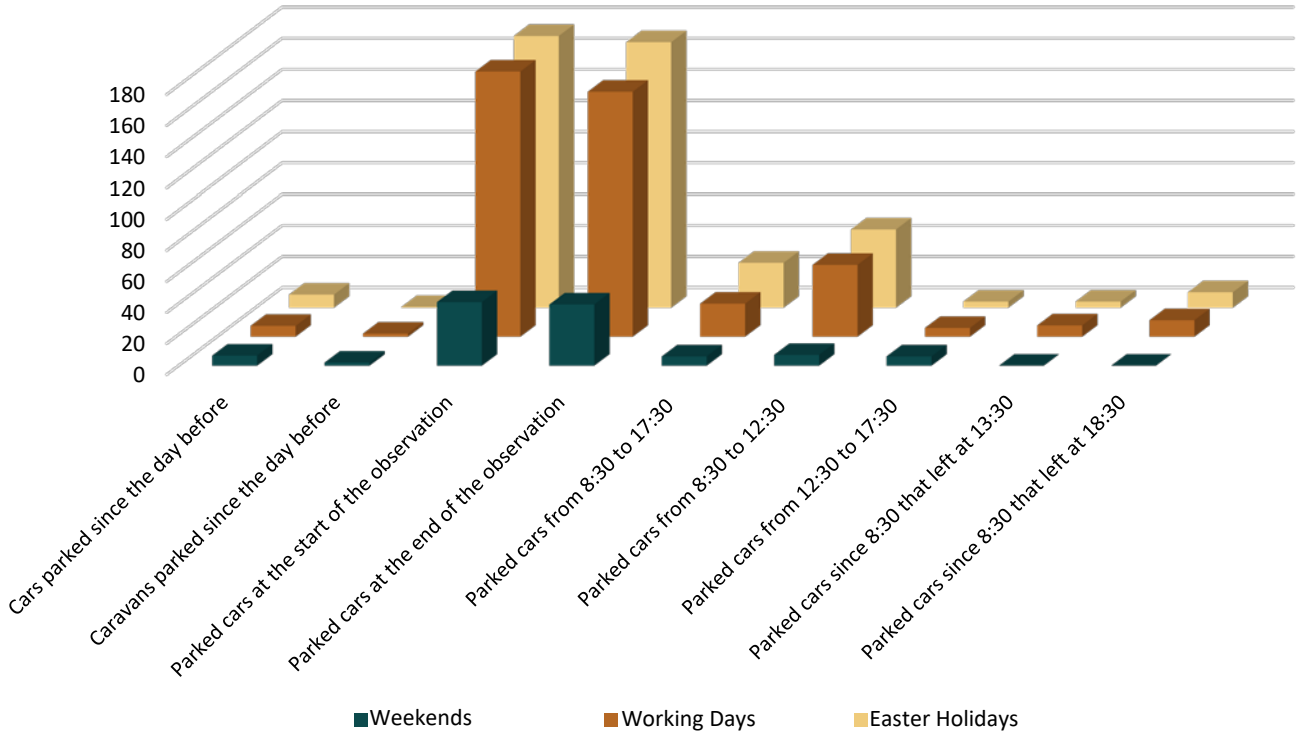
Graph 4, which is a 3D bar chart, highlights the number of parked vehicles during pick-up and drop-off hours around the school across weekends, working days, and the Easter holiday in the morning, noon, and afternoon timeframes.

The tallest bars belong to vehicles parked from the start of the observation at 8:30 and at the end of the observation at 18:30. Those already parked at the start of the observation, particularly on Easter holidays in yellow, show the highest number of parked vehicles across all categories, which, based on the observation, mainly were related to school staff, then, the number of parked vehicles during working days was slightly lower than during the Easter holiday; however, it still showed high daytime car occupancy in the area due to school-related activities and school staff.

Vehicles parked from 8:30 to 12:30 and from 12:30 to 17:30 are more prevalent during working days and the Easter holiday, due to the presence of school staff, which indicates a steady flow of vehicle turnover, but again, the number of vehicles during the Easter holiday is higher than on working days. On the other hand, weekends in dark blue show only moderate activity, often related to overnight or early arrivals, or mostly local residents. A smaller but noticeable number of caravans and vehicles parked since the previous day were present across all three timeframes, which suggests less regulated parking behavior during these times[30].

[30] Based on the Portuguese law and Master plan, Caravans are not allowed to be parked in residential area that in the surrounding area of André Soares School this law has been violated.

It should be noted that the surrounding area of André Soares School, besides the parking area in front of the school, has more 120 other authorized on-street parking spaces, but still, some vehicles park on the wide sidewalks and around 15 others park illegally on André Soares Street, as shown in Map 5 as illegal parking area, which points to substantial vehicle parking pressure during working days, particularly during school hours and also during the Easter holidays since school staff were present. The findings suggest the importance of considering curbside and parking management, as well as school drop-off zones.



Graph 4: Parked vehicles in the surrounding area of André Soares School
Source: Field observation by the author

Graph 5, a 100% stacked column chart, illustrates a comparative view of vehicle behavior, and Table 4 provides the proportion of vehicles crossing the surrounding area of André Soares School during three different day types, including working days, weekends, and Easter holiday.

The most prominent pattern is the dominance of cars crossing the area in all three day types. This category alone accounts for 90% of all recorded vehicle activity on weekends,

83% on working days, and 93% during the Easter holiday, which can be understood that the André Soares Street primarily functions as a crossing road for cars.

A notable difference among patterns between working days and the other two day frames, is that on working days, the percentage of cars that entered and double-parked rises sharply to 12.5% compared to only 1% on weekends and 2% during the Easter holiday, since during the observations, the researcher noticed the cars entering and double-parking in the parking area mostly in front of the school entrance, which led to chaos and heavy traffic during the drop-off and pick-up hours, when children are at school, and they were mostly parents waiting for their children which is related to the prominent role of the school in the area. On the other hand, the proportion of cars entering the parking lot and parking remains relatively low and stable across all days, between 3% and 4%.

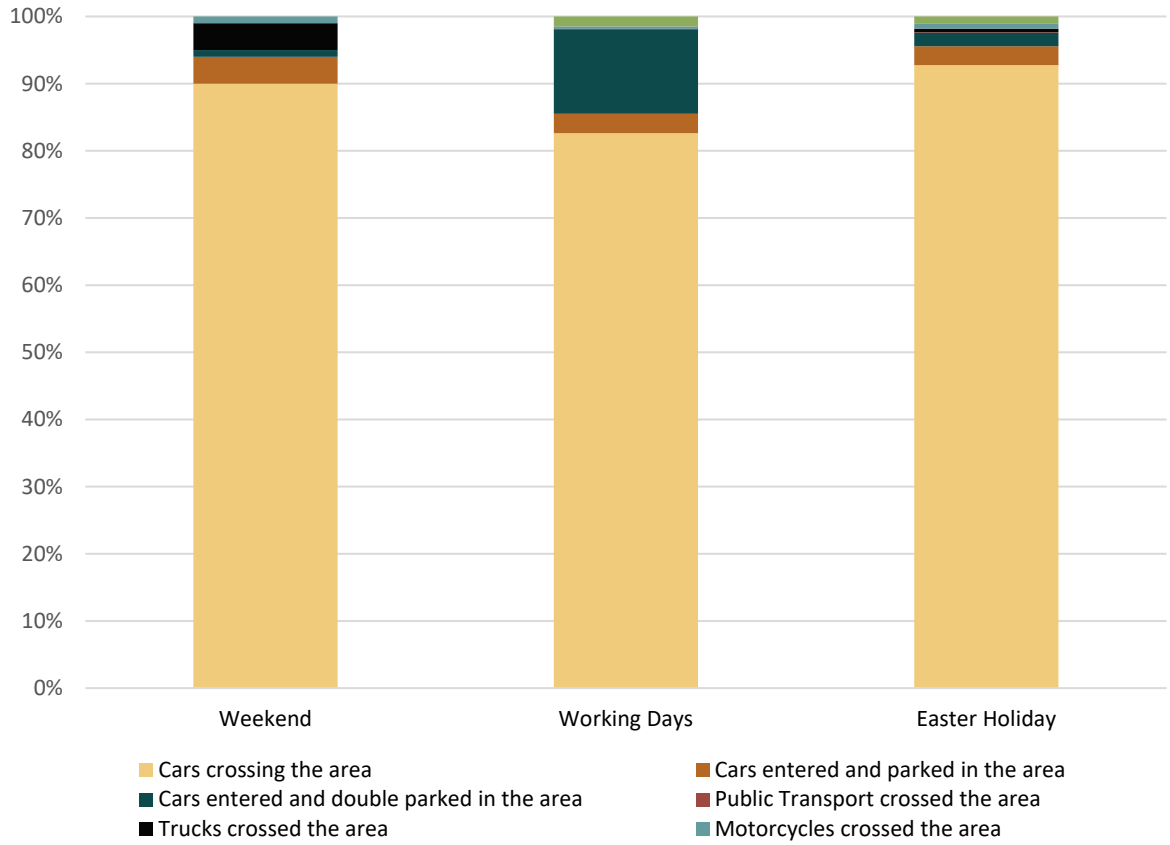
Regarding public transport, there is only one bus that crosses the street early in the morning every day, around 7 A.M., so the observer could not count it in the current observation data. There are buses that circulate near the surrounding area on the three main roads, as shown in Maps 3 and 7. Moreover, some taxis were crossing the area, accounting for just 0.1% on working days and holidays, and 0% on weekends. These data indicate a poor allocation of public transport in the area.

Bicycles and scooters are entirely absent, 0%, on weekends but account for 1% of traffic during working days and the Easter holiday, since some school students and a few schoolteachers use this mode of transport. Trucks, which are mostly municipal waste collection trucks, also follow a similar pattern, indicating that they are relatively more frequent on weekends, 4%, potentially due to reduced traffic restrictions. Another category is related to motorcycles, which remained consistently low, 0.3% on working days, 1% on weekends, and 0.6% on the Easter holiday. Hence, it can be understood that the area has a car-dominated modal pattern with very limited active mobility, particularly during school days and the Easter holiday, since the school staff were present, which may lead to an increased risk of conflict between different transport modes, especially at pick-up and drop-off times.

Table 4: Proportion of vehicles crossing and circulating in the surrounding area of André Soares School
The colors used in this table are consistently applied to the stacked column chart below for clear visual correspondence. Each color represents a specific function observed in the area as described in Graph 5.

Functions	Weekend	Working Days	Easter Holiday
Cars cross the area	90%	83%	93%
Cars entered and parked in the area	4%	3%	3%
Cars entered and double-parked in the area	1%	12.5%	2%
Public Transport crossed the area	0%	0.1%	0.1%
Trucks crossed the area	4%	0.1%	0.3%
Motorcycles crossed the area	1%	0.3%	0.6%
Bicycles/scooters crossed the area	0%	1%	1%

Source: Elaborated by the author



Graph 5: Vehicles crossing the surrounding area of André Soares School
Source: Field observation by the author

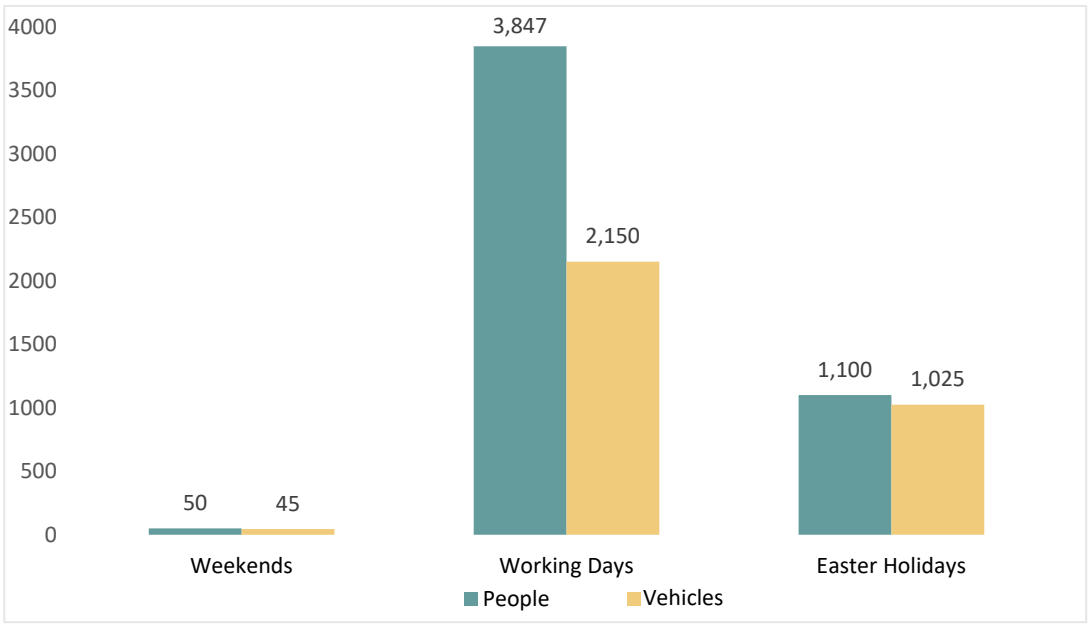
5-2-4-3 Vehicle Versus People

Graph 6 presents a direct comparison between the number of people and total vehicles crossing the school area across the three timeframes, morning, noon, and afternoon, during working days, weekends, and the Easter holiday.

The most evident trend is that working days experience the highest number of both cars and people, with people significantly outnumbering cars. An average of 3847 people recorded crossing, while 2150 cars also passed through, which highlights an intense level of human activity concentrated around the school.

On weekends and Easter holidays, the difference between people and cars is much smaller. In both cases, the numbers drop significantly, which suggests that the function of the area is mainly related to the school's operational rhythm. Also, the difference between cars and people on Easter holidays is few, which points to a more balanced mobility, possibly linked to local residents as well as school staff during these timeframes.

This graph underscores the dual function of the area as both a pedestrian and vehicular corridor on school days, which may make it a critical site for traffic management, safety, and mobility equity interventions, since there needs to be considerable attention to school students.



Graph 6: People versus vehicles cross the surrounding area of André Soares School
Source: Field observation by the author

Map 7, which is an activity map of the surrounding area of André Soares School, provides a comprehensive visual overview of how people use and move through the surrounding area of the school, which emphasizes different types of activities, mobility patterns, and infrastructure elements. Data for this map was derived from the Municipality of Braga and the field observations conducted by the researcher. By layering pedestrian, cycling, and waiting behaviors over the street network with the car commuting routes, the map captures the everyday dynamics of this school-centered urban environment.

Walking was the most common activity around the school, as shown in Graph 6, since the number of pedestrians exceeds the number of cars during weekdays in the area, that they mostly traveled along several routes connecting the main access points to surrounding streets, marked by the yellow lines, which indicate steady pedestrian flow, especially along the sidewalks on the school's perimeter.

Cycling activity is also mapped mainly along the eastern and northwestern edges of the school. The presence of a cycle lane, under implementation, marked by a red dashed line, along the main road reflects current efforts to accommodate active travel. However, the limited extent of dedicated infrastructure suggests challenges for safe and continuous cycling, which leads to a few numbers of cyclists in the area.

The routes that people walking with dogs took, represented in pink, were observed in the northeastern part of the school, which suggests local community use of the area beyond school functions, especially during off-peak times when the observation was conducted. This also reflects the multifunctional character of the area. As can be seen from the map, they mostly passed by the sidewalk close to the school and the parking area, then proceeded to the green area near the school. Therefore, the presence of this green space offers potential for outdoor gatherings, leisure, or waiting zones. The tree-lined areas in the parking lot and along the local roads also provided shade and aesthetic value, contributing to a more child-friendly and walkable environment. Also, in front of the school entrance gate, the yellow star symbol, marks a key point where parents waited during school drop-off and pick-up times for their children, which reinforces the importance of providing safe,

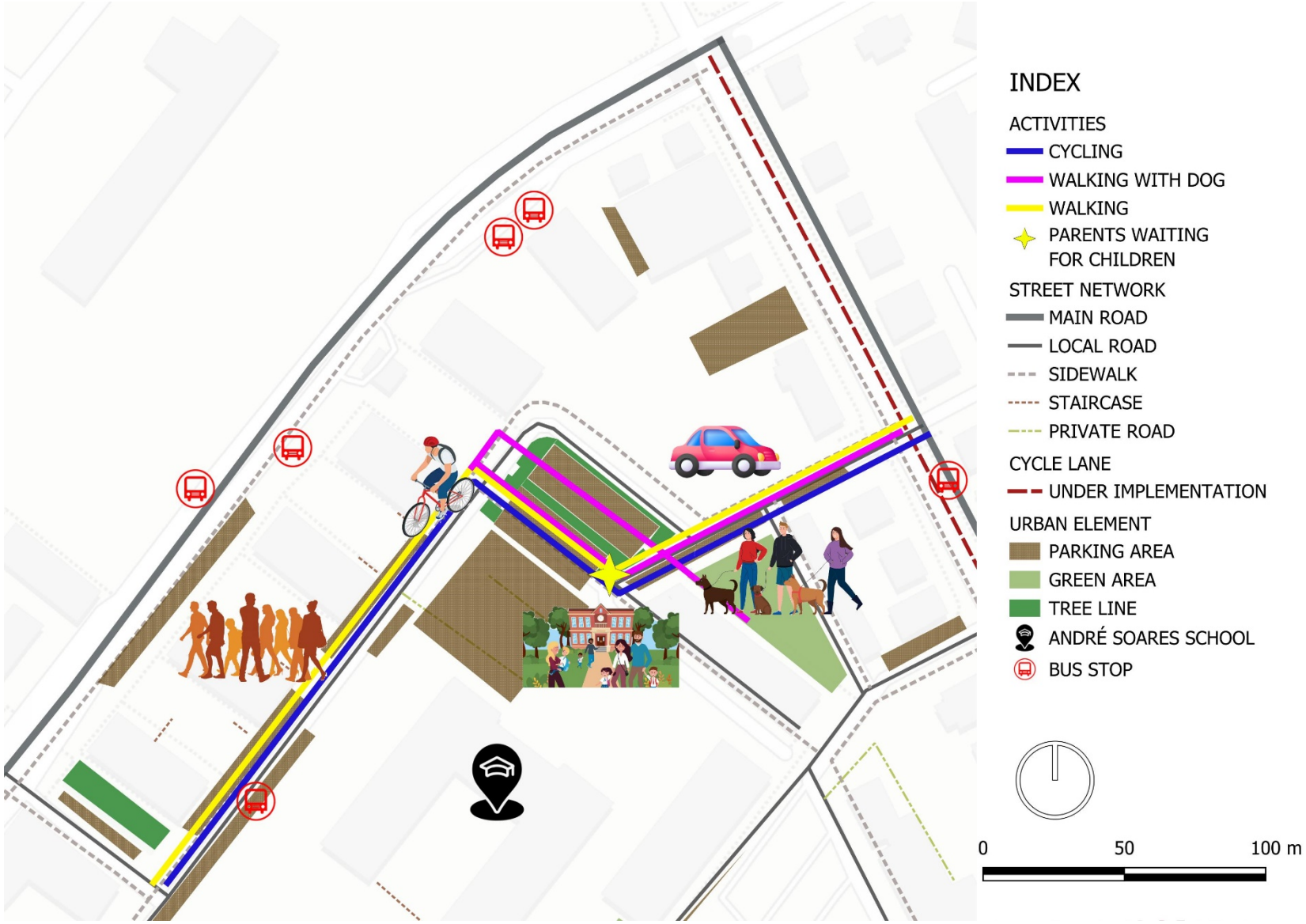
shaded, and comfortable waiting zones, including a sitting area, which the lack of sitting area was previously mentioned in Map 5 as an obstacle.

Subsequently, regarding public transport, multiple bus stops are located along the main road, marked by a thick grey line, surrounding the northern and eastern edges of the school area, as well as one on André Soares Street, but only once in the morning. Their placement suggests that the area is easily accessible via public transportation. However, the distance between the stops and the main entrance may still require additional pedestrian safety measures for children commuting this way.

The map differentiates between main roads, local roads, private roads, sidewalks, and staircases based on the Braga's Master Plan. Most pedestrian and school-related activity was concentrated along sidewalks and local roads, which provide calmer and safer environments than main roads. However, there is still a significant accumulation of cars in the parking lot in front of the school, mostly double-parked ones, during pick-up and drop-off hours.

This activity mapping illustrates how the school acts as a central node in a multifunctional urban network, by capturing not only school-related pedestrian flows but also the surrounding community's use of the space. It highlights overlapping activities like dog-walking, cycling, and parents waiting, as well as commuting with cars. The concentration of pedestrian activity near the school's entrance gate underlines the need for targeted design improvements to prioritize safety, accessibility, and inclusivity, mostly for marginalized and vulnerable people. Furthermore, the map suggests a potential gap in cycling infrastructure. Although infrastructure exists or is being developed, current patterns show walking remains dominant, possibly due to barriers in continuity, safety, or convenience in other modes, as shown in Table 5 and Graph 5; the number of people commuting with bicycles/scooters is very low.

Map 7: Activity mapping of the surrounding area of André Soares School



Source: Elaborated by the author

5-3 Interview analysis:

To acquire a better understanding of the mobility issues as well as the potentials of the area surrounding André Soares School, after comprehensive field observation, a series of qualitative semi-structured interviews were conducted with diverse stakeholders including municipal technicians from the mobility department of Municipality of Braga, residents, parents, school students, schoolteachers, city users, and shop owners. Among thirty-two emails sent to diverse JUST STREETS Project stakeholders, only eighteen stakeholders replied, therefore, this study included a total of eighteen interviews, which were carried out lasting an average of thirty minutes in various locations, including the city hall, the school, and the shops, and some of them were carried out online. Unfortunately, no police sector replied so only this group of stakeholders of the Project were not interviewed. The reason for conducting the semi-structured interviews was the open-ended response nature of this type of survey, which persuaded interviewees to feel free to elaborate on their experiences, perspectives, and recommendations. This flexible approach led to a comprehensive grasp of insights regarding the various perspectives of mobility situation in the surrounding area of the André Soares School, Braga.

The interview questions were divided into two tailored frameworks to address the unique perspectives of the participants regarding their role in the area, as well as the JUST STREETS Project:

The first type of interview was dedicated to municipal technicians from the mobility department of the Municipality of Braga, since they play the central role in planning and implementing urban mobility policies. It was crucial to understand the obstacles they face in each phase of a project, as well as how institutional procedures influence their way of implementation. They were asked about their professional roles, their involvement in the JUST STREETS Project (procedural justice), their perceived challenges and advantages of the area (distributive justice), obstacles they have encountered in each phase (recognition and procedural justice), and their recommendations, so their insights helped to understand

better the challenges that contemporary cities face in shifting from a car-oriented paradigm toward a more accessible, safe, and inclusive environment.

The second type of interview was dedicated to parents, city users, shop owners, residents, schoolteachers. This group of stakeholders was selected since they are mostly the daily users of the area and represent diverse and sometimes overlooked voices in urban mobility planning. Some members of this group were involved in the JUST STRETTS Project's participatory meetings, and some were not. They were asked about their participation in decision-making process (procedural justice), how they perceive safety and accessibility of the area (distributive justice), whether a group's needs were ignored or forgotten (recognition justice), their total believes of the Braga community in relation with using cars, and their opinion about shifting from streets for car to streets for people. It was crucial to understand their point of view to have a comprehensive idea of lived-experience insights into the daily challenges and opportunities, and it helped to identify better physical barriers, cultural barriers, and institutional factors that are limiting safety, equitable access, and inclusivity in the case study area.

The third type of interview was dedicated to school students who are the primary and most vulnerable users of the focus area. Their insights were crucial to understand how the area is experienced by this often voiceless, vulnerable group of users in the city. They were asked about their feelings of safety and accessibility of the area especially in case they want to walk or cycle from home to school and school to home alone (distributive justice), their involvement in decision making process (procedural justice), whether the design of the space accommodates their needs as well as other vulnerable groups (recognition justice), and their insights in shifting towards more sustainable and active modes of commuting. Like the previous group, their perspectives are essential to gain a comprehensive lived experience from diverse age groups with different backgrounds, to better understand the effects of the built environment and infrastructure on daily mobility choices, safety, and accessibility in the area.

The engagement levels of the interviewees in the co-creation sessions of the JUST STREETS Project are visually represented below in Table 5 using the color-coded system for each

stakeholder[31]. The ones who engaged in the co-creation sessions were marked in blue, and the ones who did not engage in the sessions were marked in yellow.

Table 5: List of interview participants and their engagement level with the JUST STREETS Project. Participants who engaged in co-creation sessions are marked in blue; those who did not are marked in yellow.

Involvement Level	Participant's Code	Participant's Role	Date of Interview
	MT 01	Senior technician	May 30th 2025
	MT 02	Senior technician	June 11th 2025
	MT 03	Senior technician	June 4th 2025
	ST 01	School teacher	June 5th 2025
	ST 02	School teacher	June 5th 2025
	ST 03	School teacher	June 4th 2025
	ST 04	School teacher	June 4th 2025
	ST 05	School teacher	June 4th 2025
	SS 01	School student[32]	June 3rd 2025
	SS 02	School student	June 3rd 2025
	SS 03	School student	June 3rd 2025
	CU 01	Researcher	May 30th 2025
	CU 02	Researcher	June 4th 2025
	P 01	Parent	June 12th 2025
	R 01	Resident	May 29th 2025
	R 02	Resident	June 13th 2025
	SO 01	Shop Owner	May 29th 2025
	SO 02	Shop Owner	May 30th 2025

Source: Elaborated by the author

It should be noted that there were some language barriers. In one interview with a resident, the interview was held in Portuguese with the assistance of a colleague from the Municipality of Braga; some interviews were held in English. Some other interviews were conducted by asking the questions in English by the interviewer, the questions were translated to Portuguese as well, and for the ease of the interviewees, the answers were held in Portuguese, which were recorded and transcribed, then they were translated into English. This process was taken to ensure that all participants could express their insights

[31] The idea of a color-coded system to show the involvement level of interviewees during co-creation sessions of the JUST STREETS Project was inspired by (Hosseinzadehbonabi, 2025).

[32] School students who were interviewed did not engage in the Project's co-creation sessions since they were in the classroom at that time, but they were informed about the Project.

clearly, which led to a more inclusive understanding of the discussed issues in the focus area.

As mentioned in the methodology chapter, the thematic analysis method was applied to analyze the data from semi-structured interviews by identifying themes and sub-themes, assigning specific codes to each issue and potential by employing a deductive coding approach since key themes and sub-themes were identified with predetermined codes based on prior theoretical and analyzed takeaways (Fereday & Muir-Cochrane, 2006). The issues and potentials were initially coded in a general way; then, in the final analysis, they were examined in detail by considering each individual stakeholder's perspectives. The code assignment process was conducted in ATLAS.ti software which is a qualitative data analysis software. Each code was dedicated to the main issues and potentials of the area, then their connections with the mobility justice framework, including distributive justice, recognition justice, and procedural justice was considered in the software. This coding process was carried out to organize the perspectives of diverse stakeholders systematically and categorically from different groups, which enabled both bringing together diverse perspectives and in-depth analysis. Since each person has a unique experience and perception of the environment and has different needs, this method makes it possible to develop a comprehensive understanding of a diverse range of demands of an urban area. It brings together insights from a wide spectrum of individuals, from technical experts to school students, offering a holistic and inclusive view that significantly supports the continuation of the research and the development of recommendations based on the diverse needs of the community. Subsequently, specific quotes were highlighted from each individual's points of view and were assigned to the related codes of issues and potentials to reach an overarching comprehension of the current situation of the area.

To better understand the relationship between each issue and potential with the mobility justice dimensions, a Sankey diagram was created to provide a visual representation of this matter by using the tool from the https://sankeymatic.com/ website, seen as figure 15.

Ultimately, in the discussion phase of the thesis, the final argument was made by taking into account the accumulation of all the diverse stakeholder's perspectives as well as author's observations during four-month internship in the Municipality of Braga.

5-3-1 Thematic Analysis of the Area Surrounding André Soares School

In this section, the thematic analysis of data derived from the semi-structured interviews conducted with diverse groups of stakeholders in the area surrounding the André Soares School is presented. Since interviews were conducted with diverse stakeholders of varying educational backgrounds, age groups and genders, including municipal technicians from the mobility department, residents, parents, school students, schoolteachers, city users, and shop owners, unique perspectives as well as comprehensive findings were obtained. The interview questions and analysis were designed to examine key issues and potentials of the area regarding accessibility, safety, and inclusivity through the lens of the mobility justice framework. In detail, the analysis addressed three main themes of distributive justice, recognition justice, and procedural justice, along with their related sub-themes, including equitable allocation of public space and infrastructure, insufficient infrastructure, perceived safety risks, perception of safety, accessibility deficiencies, perception of accessibility, over-dominance of private vehicles, design exclusion for diverse users, lack of environmental change, cultural barriers, cultural and community benefits, education and awareness raising, inclusive and participatory planning process, exclusion from participation and decision-making, and limitations in policy support and funding. By highlighting these perspectives through direct quotes from individuals' insights, this section aims to explore the real-life issues faced by different groups within the focus area. Understanding these real-life challenges and limitations as well as potentials, provided a clearer picture of the current situation of the focus area, which led to practical recommendations for the improvement of the area by considering the role of school streets initiatives.

The Sankey diagram, Figure 15, visually synthesizes the connections between the three themes of mobility justice, including distributive, recognition, and procedural, and their corresponding general sub-themes, which were derived from the qualitative analysis of semi-structured interviews. Each sub-theme was carefully categorized based on its core implications:

- **Distributive Justice theme**

Distributive justice sub-themes focus on the material and spatial inequalities within the urban environment with a general scale, such as the equitable allocation of public space and infrastructure, insufficient infrastructure, perceived safety risks, perception of safety, accessibility deficiencies, and perception of accessibility which reflect how physical conditions and infrastructures are unequally distributed or perceived unequal by people. The over-dominance of private vehicles, design exclusion for diverse users, and lack of environmental change were placed under both distributive justice and recognition justice, since they simultaneously highlight spatial inequities and the failure to accommodate and value the needs and experiences of diverse user groups in the planning process.

- **Recognition Justice theme**

Recognition justice sub-themes, including cultural barriers, cultural and community benefits, education and awareness raising, inclusive and participatory planning, exclusion from participation and decision-making, and limitations in policy and funding, all represent the extent to which different identities, cultures, and voices are acknowledged or marginalized in mobility and planning processes. Moreover, several of these sub-themes overlap with other justice dimensions, highlighting how issues of fairness in distributive justice, such as the over-dominance of private vehicles, design exclusion for diverse users, and lack of environmental change, and procedural justice, including education and awareness raising, inclusive and participatory planning processes, exclusion from participation and decision-making, and limitations in policy support and funding, are deeply interconnected.

➢ Procedural Justice theme

The procedural justice theme includes sub-themes related to how decisions are made and who is allowed to participate, such as education and awareness raising, inclusive and participatory planning, exclusion from decision-making, and limitations in policy and funding. In fact, these themes highlight the importance of transparency, inclusivity, and empowerment in urban governance, which most of these procedural justice sub-themes focused on participation, whether inclusive or exclusive, in decision-making processes, followed by the need for awareness-raising among stakeholders and area users, and the limitations in institutional support. All these sub-themes also overlap with recognition justice, indicating a strong connection between procedural justice and the recognition of marginalized voices in this area. However, there is less thematic diversity within procedural justice, compared to recognition justice and distributive justice, which address a broader range of issues as well as potential in this regard.

Lastly, the Sankey diagram facilitated a nuanced interpretation of the data, allowing for a clearer understanding of the multidimensional nature of mobility justice and injustice in the context of the study area.

Figure 15: Connections between the mobility justice framework and issues and potentials of the surrounding area of André Soares School

Source: Elaborated by author derived from https://sankeymatic.com/

- **Equitable allocation of public space and infrastructure:**

The surrounding area of André Soares School in Braga has both advantages and disadvantages in terms of urban mobility resources and infrastructure allocation.

One of the advantages mentioned was the equitable allocation of public space and infrastructure, which is crucial to ensure that different groups of people have equal access to public space and infrastructure. However, as shown in Graph 7, only a few individuals agreed that the area demonstrates this strength, indicating that most people did not believe the area benefits from equitable allocation of public space and infrastructure.

A municipal technician of the mobility department acknowledged that, despite the area's drawbacks, it also possesses some strengths in terms of infrastructure and resource allocation. He believed that although it might be considered that the area has less attention from the municipality, compared to other area it is considered as acceptable: “infrastructure is not particularly lacking compared to other parts of the city, since there are schools in the city of Braga that are located in areas with no sidewalks at all or very narrow ones, which require more urgent attention”. One example of a satisfactory allocation he emphasized was the school bus system: “the school bus system, which cross several places in the city to bring children to the schools in the city center and André Soares was one of those schools, and for ensuring a safer condition for the bus to stop, the municipality implemented some interventions in the area including removing some parking space to create a better place for the bus to stop and make a safe pathway for the children to reach the school”. Moreover, he mentioned wide streets across the area: “the streets in the area are quite wide and there is considerable space on the sidewalks” (MT 01). A city user also agreed that: “the sidewalks in area are relatively wide” (CU 01), as well as a schoolteacher who agreed with the wide sidewalks (ST 02). Another municipal technician stated municipality’s commitment to mobility improvements: “the municipality is very committed to improving mobility, safety, accessibility issues particularly in the areas surrounding the school” (MT 03).

Given the limited number of participants who agreed with the claim of equitable allocation, it can be understood that the area suffers from unbalanced public space allocation and infrastructure.

- **Insufficient infrastructure**

This claim was the most ranked issue by all stakeholders among all sub-themes, which is inferred that most stakeholders agreed with the issue of insufficient infrastructure in the surrounding area of the school, according to a city user: “I've seen people having trouble getting around in this area because of the poor infrastructure or obstacles, particularly the

elderly" (CU 01). Based on the participants' answers, the following issues were considered in detail as insufficient infrastructure:

There were some critiques about sidewalks and how they are used which reduce accessibility and safety for pedestrians. According to a local resident: "the sidewalks are already claimed for other uses", he mentioned that there are bicycles commuting on the sidewalks which reduce the safety and accessibility of pedestrians (R 01), as well as a schoolteacher claimed: "young people riding bicycles at a certain speed in the middle of the sidewalks, it also becomes unsafe for people who are walking" (ST 02), "sidewalks around the school are narrow" (ST03) and another teacher thought: "it happens that the students who come by bicycle to school, instead of coming along the street they use the sidewalk and there are people walking there that it may be a problem" (ST 04), more to these: "the surrounding area isn't adapted to people's actual needs, that's why we see very few people walking here. I've seen people struggle to get around because of the infrastructure. People with disabilities, especially those in wheelchairs, often have to go into the street because the sidewalks are either blocked or in poor condition" (ST 04), also another schoolteacher mentioned about the necessity of making bike lanes like there are on the avenue not on the sidewalk (ST 05). A city user stated that: "There are cars parked completely on top of the sidewalk, so I don't think it's safe or proper, and it's even worse in terms of accessibility and safety" (CT 01). On top of these a municipal technician mentioned: "some people stop the car on the sidewalks which not only blocks the path for pedestrians, but also would be dangerous in some cases" (MT 01).

Moreover, there were some comments on the poor pavement condition of sidewalks. For instance, a city user mentioned poor pavement: "although the sidewalks are wide, they're very damaged by tree roots due to lack of maintenance, the surface is bad, so it makes it a bit difficult to get around on foot, and difficult for disabled people to move around the block on their own, it's impossible" (CT 01), a municipal technician critiqued: "unevenness of the sidewalks" (MT 03), schoolteachers claimed "this sidewalks are old with lots of little stones and it doesn't offer any safety" (ST 03), "there are zones where sidewalks are very narrow, the stroller doesn't even fit" (ST 01). Also, another city user and schoolteacher mentioned

the problem of tree roots on the sidewalks, “most of the sidewalks don't have a good pavement, they are very irregular, because of the trees which are not in a good place” (CU 03), “the trees, and the roots come out and lift the sidewalk” (ST 05). Hence, it made it difficult for people to commute on the sidewalks safely as one student mentioned: “sidewalk has some pieces of the rock lifted up and some holes in it and you can get some serious injury from it” (SS 02). Regarding people with reduced mobility a schoolteacher believed: “here for people with reduced accessibility, people with baby strollers, with wheelchairs, some sidewalks, even though wide, are very irregular, and there are places where the trees, which are important, but their roots grow and make the sidewalk uneven. And someone with a wheelchair or with a child in a stroller has difficulty passing” (ST 02), another schoolteacher mentioned: “there’s a lady who uses electric wheelchair and she cannot move on the sidewalk, she has to go on the car lane because the sidewalks are full of obstacles and therefore, she has to move among the cars, which is very dangerous. And she herself says that she already had accidents because of this” (ST 01), another teacher critiqued about uneven sidewalks: “the roads the ground must be treated properly, without highs and lows” (ST 05), and according to a student: “sidewalks are not plain and appropriate, and people might fall” (SS 01). A shop owner belied that: “sidewalks are a little small here” (SO 02). Additionally, according to a city user: “the sidewalks do not have the best drain system, the rainwater will stand on the land surface of the street and sidewalk, some days the water is accumulated in the sidewalks and create some little lakes in the sidewalks and also in the streets, so when the the cars cross by, it splashes to the pedestrain” (CU 02).

Another main issue regarding infrastructure was the crosswalks. A shop owner complained the lack of zebra crossing in front of his café: “here does not even have a zebra crossing” (SO 01), a schoolteacher also claimed: “we have some challenges with crosswalks that are not sufficient for a school area, they could be more inclusive and safer to all” (ST 03), and “far distance between crosswalks” (ST 05). A city user claimed that crosswalks are not accessible for all people mostly for vulnerable ones: “several elderly people have commented to me about difficulties they encounter in crossing the sidewalk”, “most of the crosswalks aren't raised and the road surface is still parallel, which makes it difficult for people with reduced

mobility, including the elderly as well as caregivers with strollers" and "it's an area that has few pedestrian crossings" (CU 01) "with the lack of ramps" (ST 02), "there are very few crossing areas" (R 01), other city user also stated: "the crosswalks are not inclusive because for the blind people for example, we do not have the facilities" (CU 02). According to a municipal technician: "in some places in the area there is a lack of crosswalks, and they are not lowered" (MT 03).

Another infrastructure problem people encountered a lot was the inefficiency of public transport, according to a teacher: "we also face difficulties when we want to use public transport. Sometimes to do a short route we have to change buses or we have to go a big round through the city, and we feel that we took more time by bus" (ST 01), a shop owner claimed: "if they have a good public transport like metro, even I do not need my car to my own town to Braga, there are thousands of people like me, but we do not have public transport between every single hours, and the ones that are already are not useful and enough" (SO 01), "people don't use buses because they are not sufficient enough" (ST 03), "sometimes that I lost my bus I need to wait too long to get to come another one" (SS 01), "there are times that later in the afternoon when there is much traffic, the buses get stuck and won't come on-time" (SS 02), and according to a municipal technician: "public transport should be improved" (MT 01).

A further challenge identified was the lack of people-oriented infrastructure, mostly cars were considered in the area. The stakeholders believed that the current infrastructure is more dedicated to cars rather than people: "the roads are much wider than the sidewalks, which are very narrow and not wide enough for strollers or wheelchairs" (ST 04), "mostly the street planning clearly prioritized car traffic and improving vehicle flow, without considering the mobility of people who don't drive, like children, those with strollers, or elderly people. It seems like everything is upside down. Streets were planned for cars, not for people" (ST 02), "It was the cars, many streets for cars to circulate and the people there wasn't much of this care" (ST 01). They also mentioned there is a big parking space which was dedicated to cars: "the parking ends up taking space that was important for people and children to be. Sometimes in the morning, there are parents who come to drop off the

children and park on top of the sidewalks so they block the way for pedestrians, also sometimes for those coming by car who can't move forward" (ST 02).

Some other drawbacks of the area were regarding the lack of urban furniture, according to students: "we need more urban furniture for more relaxing" (SS 01), "I don't really know any other places we can sit" (SS 03),, a resident claimed this lack: " there's a lack of public benches, so people can sit and wait in front of schools" (R 02), and according to a schoolteacher: "there aren't many spaces where people can sit and enjoy themselves, even the nearby cafés outdoor seating is right next to the road, which is terrible, even a public health concern, because people sitting there end up breathing in vehicle fumes. This area can't be considered high quality, even from a health standpoint" (ST 02). There was lack of lighting according to a student: "in the winter there is no lights and it's a bit dangerous for people to walk, there was a place in a school nearby where students walked, they had a crash with the car, because the car did not see the child" (SS 02), "at night, the area does not have public illumination, a very weak light" (CU 02), "lack of lighting and the signage concerned with the children" (ST 05). Moreover, another obstacle was regarding the presence of stairs since a student claimed: "there are a lot of stairs so some people can't go up and sometimes it's hard" (SS 01). Lastly, the problem of lack of proper signage in the area that a shop owner claimed: "for example, the street next to the café is one way from Andre Soares to the other street, but due to lack of good signage, mostly cars cross the street as opposite direction, and the children come, and they do not pay attention, because they think the cars are taking the right direction and going down but suddenly cars came" (SO 01).

Therefore, from these perspectives, it is inferred that the sidewalks in the area are inadequate, not only in terms of physical infrastructure, like poor pavement condition, narrow width, and lack of maintenance due to tree roots, but also in terms of the way they are used, including bicycles and cars in the sidewalks. Crosswalks are also insufficient, often poorly located, and not inclusive for all mostly the elderly people and the ones with disabilities and caregivers with strollers. Moreover, the area suffers from efficient public transport, sufficient urban furniture, adequate lighting, and proper signage. All in all, these

insights together highlight significant infrastructural challenges in the surrounding area of André Soares School.

- **Perceived safety risks**

The issue of safety risks was the second challenging issue among all. Diverse stakeholders agreed with the safety risks currently existed in the surrounding area André Soares School. There were diverse in-detail issues regarding this matter including:

One major concern was regarding excessive presence of cars and their speed in the area. Given that the André Soares school is enclosed by three major arterial roads of the city of Braga including Av. da Liberdade, João XXI, and Av. 31 de Janeiro, one shop owner mentioned a safety concern related to high speed of cars in the mentioned main roads: “the only danger is the fast cars which go on this Av. João XXI which is very close to these two schools” (SO 02). A municipal technician also mentioned car crashes in the area: “there have been some accidents” (MT 02). Also some teachers claimed safety concern regarding massive presence of cars in the mentioned roads as well as the area itself: “it is difficult to cross 31 de Janeiro Street because there are buses, cars and it is difficult for children in the morning and also for all the people to cross the street” (ST 03), she also stated she would not let her children walk and cycle in the area due to the lack of safety and limited visibility of students: “traffic jams which make people nervous sometimes maybe happen to not seeing the children in the street, even if I was a parent I wouldn't let my children come to school by bike” (ST 03), another student emphasized his bad experience related to limited visibility: “it can be very dangerous when we cannot see the other parts of the street, for example my brother once crushed with a scooter when he was walking” (ST 03), more to these, another schoolteacher mentioned that parked cars reduce the visibility of the roads for both children and drivers: “Children don’t have much safety, because the parked cars take away the visibility at the crosswalk” (ST 04). Other stakeholders also had the same concerns regarding the car dominated environment: “I don't think it's safe just because of the excessive presence of cars in that block” (CU 01), “there is traffic in various directions”

(ST 05) “parents are very afraid to let their children walk to school or ride their bikes because there are so many cars coming and going, cars parking badly which makes it very difficult for those who want to cycle or walk, it's not safe” (CU 01), “even if parents wanted to leave the cars at a distance to go and see the children, it was difficult to walk even some distance due to the massive presence of the car, so they would pass between the cars and this creates insecurity” (CU 01). According to a student who suffers from chaotic drop-off behavior by parents, as well as the excessive presence of cars, which made him feel stressed “I do not like the confliction here, cars in the morning are in rush and it makes it stressful. In this school every morning is like everybody gets their kids in the door of school like exactly in the door, so I don't like it since it is a big confusion and conflict, even sometimes cars do not see us” (SS 02). Another student considered the area as unsafe because of the cars “I don't think it's safe even for both walking and cycling” (SS 02).

Moreover, there were some safety concerns regarding cycling in the area, according to a resident: “before we thought it’s safe for children to go to school by bicycle in this area, but nowadays I wouldn’t say it’s safe. It’s probable, but only with the utmost care” (R 01), he also indicated that there was a fear of safety in the area: “they do it out of fear” (R 01). Some stakeholders claimed the relationship between fear and lack of sufficient physical infrastructure which was mostly the lack of dedicated cycle lane: “I see the kids on scooters, always two, not one behind the other, side by side, out into the street, at high speed. Suddenly a car comes, and with their low balance, wow, if they hit something…” (ST 03), and “I also recognize that the infrastructure is lacking. There are no proper bike lanes, it’s almost impossible to cycle safely here”, another teachers stated: “parents wouldn’t allow their kids to cycle because it is dangerous”, “it is not exactly very safe here around the school, there are no proper lanes for bicycles” (ST 01), and “we have young people riding bicycles at a certain speed in the middle of the sidewalks, it also becomes unsafe not only for them but also for people who are walking” (ST 02). A municipal technician mentioned parents’ concerns regarding the safety in the area: “Parents many times don’t let children go on foot or by bicycle to school because of the lack of safety” (MT 03).

What is more, there were some other aspects stakeholders claimed as an unsafe area including safety lack at night due to lack of safety: “I think maybe at nights mostly during winter there might be some problems” (SS 02), and “lack of public illumination at night” (CU 02). Additionally, some stakeholders highlighted the adverse health effects that the presence of cars may have on individuals: “there are cafés nearby which outdoor seating is right next to the road, which is terrible, even a public health concern, because people sitting there end up breathing in vehicle fumes, so this area can’t be considered high quality, even from a health standpoint” (ST 04), she also complained: “the more cars there are here, the more polluted is the air that children breathe and the adults too” (ST 04), a city user also stated when the area is not safe, parents don't feel safe to bring the their kids by walk or bike to school which leads to mor car commuting in the area, and it leads to a vicious cycle: “very noisy place, very polluted place, a very unsafe place like a negative vicious cycle” (CU 02). More to health issues, a municipal technician claimed safety challenges due to “unsafe crosswalks for all” (MT 03), and a schoolteacher stated lack of efficient traffic signage which led to unsafety for the most vulnerable group of the area: “children often get distracted because of lack of signage” (ST 05).

With consideration of all insights regarding perceived safety risks, the area was identified as unsafe by a wide range of stakeholders. The dominant issues included the excessive presence of cars and their speed, mostly on the three main arterial roads of Av. da Liberdade, João XXI, and Av. 31 de Janeiro, which considerably compromised students’ as well as other vulnerable groups’ safety. There were also raised concerns regarding limited visibility of people who are walking or cycling as a result of parked cars, parents’ chaotic drop-off behavior, and the total car-dominated characteristics of the focus area. These challenges not only made both students and residents of the area felt stressed and unsafe, but also increased the health issues caused by pollution from vehicle emissions. Moreover, cycling and walking were perceived as unsafe due to the lack of dedicated inclusive physical infrastructure for pedestrians as well as cycle lanes, which prevented parents from allowing their children to commute freely from home to school with active modes of transport, mostly cycling. Add to these, there were some other ranked concerns, although they were ranked less, considering them is as important as the other challenges, in order to have a safe

school area, including poor lighting at night, and appropriate traffic signage. However, these factors altogether were insufficient infrastructure, which were mentioned in the previous section; they were also considered as safety concerns by the various groups of stakeholders in the focus area. These all, contribute to an unsafe perceived environment for active mobility, reinforcing car dependency, which leads to a negative cycle of pollution, stress, and exclusion of vulnerable groups.

- **Perception of safety**

This potential was among the least ranked codes which indicates the area suffers from safety issues. Nevertheless, a municipal technician believed the safety overall in the area is fine: “most of the pedestrian crossings are leveled with the sidewalks so there is no steps for people to go to streets near the school, so I would say sidewalks’ safety in front of the school is quite well, but if you walk away for 5 minutes it would be a mess”, and “the problem for bikes is not also with the neighborhood because inside the neighborhood cars don't go so fast so it's possible for the bikes to share the space with cars” (MT 01). One shop owner agreed with the area’s safety: “street infrastructure for me is safe”, and “it's safe if people walk on the right place for walking since people are not driving fast here” (SO 02). One city user agreed with safety in terms of car speed in the area: “I consider it to be safer as there is not so much speed” (CU 01), also a school student who lived in the city center felt safe there: “it is alright to walk around the school and it's not that dangerous” (SS 03). A schoolteacher considered the area safe in terms of violence: “I think these areas where I walk are safe areas. Of course, safe in the sense of violence and aggressions” (ST 05). Also, regarding accident rate and drivers’ behavior a teacher stated drivers’ respect toward children in the area and considered the area safe in terms of accident: “we are aware that it is not perfect, but I don't remember accidents with children here around the school, so it is safe” and “I think drivers respect children and are careful about zebra crossings” (ST 03). However, another municipal technician believed it is a medium place in terms of safety: “I think in general of the streets of the area it's safe, it's not very good or very bad, it’s medium

to walk, the sidewalks compared to the other streets in Braga, have a good size to cross" (MT 03).

Owing to the fact that most of stakeholders highlighted the area is not safe enough in terms of reaching there, and a few individuals agreed with its safety, which was mostly in terms of violence, this area cannot be considered as quite safe in all aspects. While a few stakeholders acknowledged certain positive aspects regarding area's safety, including low driving speeds within the André Soares Street, drivers' respectful behavior towards students, and no violence; these perceptions were few and limited, since the stakeholders' overall opinions indicate that safety issues still exist, particularly in case of commuting by active modes of transport. Therefore, it is concluded that the current safety measures are insufficient to meet the wider mobility needs of all area users, especially vulnerable groups such as children, the elderlies, and people with reduced mobility.

- **Accessibility deficiencies**

Accessibility deficiency was the second highest ranked among all stakeholders, which indicates a strong concern regarding accessibility issue in the area surrounding André Soares School. Although a municipal technician believed: "accessibility in front of the school is quite well, but if you walk away for 5 minutes it would be a mess" (MT 01), there were various in-detail issues regarding accessibility not only around the area, but also some pointed challenges right in front of the school, as follows:

One major concern was regarding lack of infrastructure, which led to accessibility issues. According to a municipal technician, there were major problems with infrastructure including: "I consider that the surroundings of André Soares do not have the ideal conditions for movement with soft modes, there are many issues that have to be resolved such as the width of the sidewalks, the trees that have protruding roots and then make it difficult for people with reduced mobility to move. There is some unevenness in the sidewalks and some crosswalks are not lowered" (MT 03), another schoolteacher complained: "some

sidewalks, even though wide, are very irregular" (ST 02). Other schoolteacher also claimed infrastructure problems: "the streets are very narrow, and the sidewalks too. For children, the elderly, and especially people with disabilities, mobility is very difficult, the surrounding area isn't adapted to people's actual needs, that's why we see very few people walking here, I've seen people struggle to get around because of the infrastructure" (ST 04).

Regarding the lack of dedicated infrastructure for cycling, a municipal technician stated: "the main problem provides for me is to reach the neighborhood because all the streets around the neighborhood are big avenues with no cycle lane, only one avenue has it" (MT 01), another municipal technician agreed with this lack: "there are no bike lanes connecting directly to the school" (MT 03), a schoolteacher complained: "for bicycles, the proper lanes would have to be made, which don't exist" (ST 01), more to them, a city user complained: "it's not accessible for bicycles at the moment" (CU 01). She also mentioned the challenges that are faced by not only cyclists but also pedestrians because of the uneven surface: "it is very difficult for those who want to cycle or walk, I'd say it's worse in terms of accessibility, because although the sidewalks are wide, they're very damaged by tree roots due to lack of maintenance and so it makes it a bit difficult to get around on foot" (CU 01), she also claimed the problem with insufficient crosswalks: "it may not be as accessible to walk, and also for disabled people or caregivers with strollers because there's still the same problem of crosswalks not being raised and cars being parked on the sidewalks" (CU 01), also a schoolteacher stated difficulties people face due to uneven surface: "that surface is not plain and it is difficult to cross for all people because they may fall" (ST 03).

Regarding accessibility lacks for people with reduced mobility, a municipal technician stated: "there were complaint from people with disabilities that couldn't go through some places", "if you walk 5 minutes away you will find some situations where there are no ramps" (MT 01), more to this a student agreed with difficulties for this vulnerable group: "In general, for people without disability, it is alright to go to other places it is not very complicated when you do not have any disabilities or difficulties" (SS 03). Add to this, a schoolteacher claimed difficulties these people face: "People with disabilities, especially those in wheelchairs, often have to go into the street because the sidewalks are either blocked or in poor condition" (ST

04), “there are places where the tree roots grow and make the sidewalk uneven and someone with a wheelchair or with a child in a stroller has difficulty passing” (ST 02), in this regard, another schoolteacher pointed out an example about a lady with disability’s sufferings: “there’s a lady who gets around with an electric wheelchair and she cannot move on the sidewalk, she has to go on the car lane because the sidewalks are full of obstacles and therefore, she has to move among the cars, which is very dangerous” (ST 03), a municipal technician also claimed the same challenge: “there is a resident with reduced mobility who made a complaint saying that she could not access the health center” (MT 03). There were also some problems with stairs that a student mentioned: “there are a lot of stairs so some people can't go up and sometimes it's hard” (SS 01), a shop owner also proved this issue: “in some places people mostly children and disabled people cannot cross easily, if they want to go from Andre Soares Street to Av. João XXI. they have to pass the whole buildings because they cannot cross the stairs” (SO 02).

There was also another major challenge because of the excessive presence of cars which in some cases limited the accessibility in the area. According to one city user even parents with cars suffer from accessibility: “even for those who take their children by car, even if they wanted to leave the cars at a distance to go and see the children, it was difficult to walk even some distance due to the massive presence of the car”, she also mentioned a broader aspect of this issue for various groups of users: “moving around is difficult due to the number of cars that are parked, the number of people trying to park, the cars that are parked in the second row both by car or by bike or on foot” (CU 01).

Furthermore, there were some other aspects that stakeholders claimed as accessibility problems in the area, including not being accessible for everyone: “No, they are not accessible for everyone” (SO 01), as well as abusive parking: “also it is important to prevent the abusive parking which made circulation difficult for people with active or reduced mobility” (MT 03), “but it may not be as accessible to walk, because there's still the problem of cars being parked on the sidewalks” (CU 01). Therefore, according to a municipal technician: “there are problems with accessibility that still have to be solved but it must be done altogether the reducing car space and improving the pedestrian area in general” (MT

01), the area acquires more attention and intervention in order to improve accessibility for all.

All in all, accessibility deficiencies in the focus area are a major concern among diverse stakeholders, with multiple barriers identified that limit inclusive mobility. Despite a few positive remarks about accessibility near the school, the broader picture of stakeholders' insights reflect significant challenges, including uneven and narrow sidewalks, protruding tree roots, a lack of lowered and inclusive crosswalks as well as cycle lanes, difficulties for people with reduced mobility, and widespread abusive parking practices, the excessive presence of cars which not only contributes to physical obstacles but also creates danger for both pedestrians and cyclists. Taken together, these findings reveal that the current urban infrastructure does not adequately support safe and equitable access for all users, particularly vulnerable groups, especially children, people with disabilities, and caregivers with stroller.

- **Perception of accessibility**

This potential, like the perception of safety, was among the least ranked codes, which indicates the area suffers from accessibility issues. Nevertheless, a municipal technician believed that the area's accessibility in terms of infrastructure and its vicinity to the central part of the city is quite appropriate: "most of the pedestrian crossings are leveled with the sidewalks so there is no steps for people to go to streets", "in that area accessibility is quite OK because it's located very close to the city center, but it's also not really old it was designed in like 80s maybe 70s", "also being in the city center, is probably closer to people's jobs", "the sidewalks are not so narrow", and regarding crosswalks, he believed they were accessible especially around the school gate: "the pedestrian crossings are leveled with the sidewalks so there is no step to go" (MT 01).

In addition to the municipal technician, another shop owner claims the strength of the area due to the closeness to the city center: "this area is very central you can go everywhere in

10 minutes by walk, you can go to the university in 15 minutes by walk, people can easily walk around here" (SO 02). Another city user stated a reasonable accessibility compared to some critical areas of the city: "in general, it's safe, it's not very good or very bad, it's medium to walk, the sidewalks compared to the the most critical area in Braga, have a good size to cross" (CU 02). Additionally, one schoolteacher agreed with the reasonable accessibility just around the school: "near the school the sidewalks are reasonable for people to circulate but only around the school" (ST 01), on the other hand, another school teacher believed it depends on how far they come from, in case they come from closer area to the school, the accessibility is fine: "for the children who come on foot or ride bicycles, it is accessible, depending on where they come from" (ST 03).

All perspectives considered, although a few stakeholders acknowledged certain strengths in terms of accessibility in the focus area, including the area's proximity to the city center, reasonable physical infrastructure regarding sidewalks and leveled pedestrian crosswalks around the school, the overall perception from the ranked codes suggests that accessibility remains a significant concern in the area since most stakeholders experienced or perceived barriers to accessing the area comfortably and safely. While a municipal technician and a shop owner highlighted the benefits of its location and basic infrastructure, others emphasized that accessibility is limited to specific parts of the area, or it depends on where people are coming from. Hence, despite a few positive aspects, the area cannot be considered accessible, especially for more vulnerable users or those coming from farther distances.

- **Over-dominance of private vehicles**

Over-dominance of vehicles was the fourth highest ranked among all stakeholders, which indicates a strong concern regarding exclusivity of people, as well as accessibility and safety issues in the area surrounding André Soares School.

According to stakeholders various insights, excessive presence of cars was a major challenge in the school area, since a resident considered the area unsafe due to over-presence of cars: “I don’t believe it’s truly safe, because of the large number of cars and the traffic congestion in this area, the number of cars has grown, and so has the population here and the safety problems, the increasing number of cars in the city has compromised children's safety” (R 01), also a city user agreed with the problem of safety out pf this over-presence: “I don't think it's safe just because of the excessive presence of cars in that block” and “even if they wanted to leave the cars at a distance to go and see the children, it was difficult and insecure to walk even some distance due to the massive presence of the car” (CU 01), then she pictured the area as a car-saturated landscape: “it's like walking out of the door and bumping into tons of cars”(CU 01). Another students thought its mostly about cars rather than people: “I think planners mostly focus on the cars, because Portugal is a place where is full of cars there is no mentality of the bikes, pedestrian people and everybody is usually with the car”, he also expressed discomfort with how stressful the presence of cars is for him: “I do not like the confliction here, cars in the morning are in rush and it makes it stressful, they are in stress to go to work and going crazy with the car. In this school every morning is like everybody gets their kids in the door of school like exactly in the door, so I don't like it since it is a big confusion and conflict”, add to this he complained about limited visibility of children due to massive presence of cars: “every day in the morning, everybody is in rush to go to the work and sometimes they are not focused enough, sometimes maybe thinking and stuff and they don't see us” (SS 02), so a schoolteacher claimed it as well: “the parked cars take away the visibility at the crosswalk” (ST 02) , and another student claimed complexity in this regard: “with all the cars that are heading to school it gets very complicated” (SS 03). More to these, a schoolteacher stated a high volume of cars because of parents: “of course this place is not perfect, there are lots of cars in front of school, parents leaving the children and the long queues longer traffic jams right in the morning and the end of the day”, she also complained that “our streets were not prepared for these number of cars” (ST 03), “It was the cars, many streets for cars to circulate and the people there wasn’t much of this care” (ST 01). On the other hand, a municipal technician stated that there is a lack of public space dedicated to people: “normally we have little space dedicated to people, to sidewalks, and a lot of space dedicated to cars” (MT 03).

A municipal technician claimed: “parking is the main challenge that we have” (MT 03), therefore, an additional major challenge that the majority of stakeholders agreed upon was the issue related to the large parking area in front of the school entrance, as well as the excessive number of cars parked throughout the area surrounding André Soares School. A municipal technician and, a shop owner, and a schoolteacher discussed the issue of the parking area not being paid, which attracts many people from the city center to leave their cars there: “I think the challenges are really hard to deal with all that parking around, there are still lots of car space and lots of parking space and it doesn't have any fee to park so people park there and leave their cars for entire a day or even a week and then they take up space that could be used in a much healthier way” (MT 01), “a big problem here is you don't pay to park your car and a lot of people leave the cars here and go to work in the center because at the center they need to pay” (SO 02), “people put the car here in the morning and the car stays for a long time” (ST 05). Other stakeholders voiced concern over the extensive area in front of the school designated for cars and parking : “parking ends up taking space that was important for people to be, when there are no classes, this area is a passing zone and people only use it to park the car in the parking lot, and that’s it” (ST 02), “it's even a bit suffocating because if you look around you see mainly cars coming and going and they use that area a lot of the time just to park” (CU 01), a schoolteacher believed the area does not acquire this amount of parking space in a school area: “I think it's the most negative aspect in that area in the front of the school gate, we have a big parking lot with a lot of cars, one big parking is inside the school for school staff, and another bigger parking lot just in the front of the school gate “there are people who can't find the space to park their cars” (ST 03).

Another major challenge according to stakeholders’ perspectives was traffic, as one schoolteacher stated the relationship between traffic and safety concerns in the area: “the reason I don’t think it’s safe is precisely because of the traffic and the high volume of vehicles in this area, which makes it unsafe, so parents end up driving their children to school” she also mentioned the excessive use of cars among parents: “traffic has gotten worse because parents consistently use cars to bring their children to school, which causes traffic jams during drop-off and pick-up times” (ST 04). Moreover, schoolteachers

mentioned pervasiveness of traffic in the area: “there is traffic in various directions” (ST 05), “we have very difficult traffic at certain hours” (ST 02), “the only problem is the traffic, there is a lot of traffic with hundreds of cars every day” (SO 02), another schoolteacher and shop owner explained detrimental effect of traffic on parental perceptions, which contributes to a heightened sense of insecurity and an overdependence on car use: “there’s a lot of traffic, many cars, and the parents are afraid, so they bring the children as close as possible to the school entrance” (ST 01), “About André Soares, the traffic is a big problem at the beginning and the end of the day since every parents come to pick them by car” (SO 02). Subsequently, a city user and a schoolteacher claimed the problem of traffic for the whole city, not only the focus area: “Braga was designed many years ago for cars and we have a big problem not only in the André Soares School, but also in the other schools in Braga with a lot of traffic mostly in the drop-off and pick-up hours”(CU 02), “there are many people use the car just to make a short distance, and in the city center and other parts of the city traffic is even worse than this avenue especially on pick hours” (ST 03). Lastly, a teacher mentioned the negative impact of traffic congestion on public transit systems: “traffic volume delays buses” (ST 02).

Furthermore, the excessive presence of cars led to limited accessibility for people in the area. According to a resident the abusive parking made limited accessibility and safety for people commuting with active modes of transport as well people with reduced mobility: “many cars parked on the sidewalks” (R 01), a city user also experienced accessibility issues due to over-dominance of vehicles within the area: “Most of the time I go by bike and when I pass in front of the school, it is really difficult due to the number of cars that are parked, the number of people trying to park, the cars that are parked in the second row and that makes it difficult to get around both by car and by bike or walking” (CU 01).

Besides these, some stakeholders highlighted cultural attitudes as a contributing factor to higher traffic volumes, noting that many individuals prioritize private car use due to habits, or perceptions of convenience, rather than opting for more sustainable modes of transport. In this regard, a shop owner believed people used to walk more back then, but now they mostly prefer to use their cars: “Unfortunately, before they mostly walk but now with the

car to everywhere, even if it is possible, they will go directly inside the school and the classrooms with the car" (SO 01); a municipal technician claimed students are accustomed to car and are not aware of other ways to commute including the sustainable ones: "most of them don't even know their alternatives, they're just coming by car" (MT 01); a school teacher highlighted how car use in Braga is driven not only by convenience but also by cultural habits and a preference for comfort, especially in response to weather conditions like frequent rain in the city: "Using car is for convenience but also for laziness. it's easier and more comfortable with the car of course. You know in Braga it rains a lot, and it is better to come by car and park it right at the door of your work or your school. People mostly use cars, everyone has a car, two or three for each family usually, one for father, one for mother, and as soon as their children get 18, they offer them a car and they take the driving license and then there are many people who have the opportunity to have the car, that's why there are many cars in the streets" (ST 03).

More to these all, there were some other challenges, including environmental challenges especially air pollution which was caused from the over-dominance of vehicles. According to two schoolteachers who expressed concerns about air pollution, attributing it to the excessive number of vehicles and highlighting its impact on public health and overall quality of life: "The more cars are here, the more polluted is the air that children breathe and the adults too" (ST 01), and "we have the generation of children commute to school by car, so during pick hours, we have a lot of cars polluting the area" (ST 03). Other city user critiqued car-centric urban design: "but the public space is mostly designed for cars" (CU 02), and the municipal technician mentioned speed of the cars within the area: "excessive speeds practiced by cars" (MT 03). Among all stakeholders, there was only one student who believed the area needs more space for cars, in fact this perspective reflects a minority opinion, highlighted how deeply embedded car-dependency remains in some segments of the younger population: "I think the parking area is small it should be bigger because there are a lot of cars and very small places" (SS 01).

To conclude, the over-dominance of private vehicles in the focus area presents a multifaceted challenge, strongly linked to perceived safety, accessibility issues mostly for

vulnerable groups, including children, the elderly, and people with reduced mobility, as well as environmental challenges and cultural dependency on private car use. Stakeholders emphasized that the area is dominated by cars especially during school drop-off and pick-up times, which lead to traffic congestion, and of course more air pollution as a result, abusive parking by some drivers, reduced visibility, and limited space for active modes of transport; they also highlighted issues regarding the large parking area in front of the school entrance, which is unpaid, as a major challenge that encourages people to leave their cars for a long time and make it as a car jungle rather than a place for children and people to thrive. Add to these, there are some cultural attitudes which further reinforce the existing car-centric environment as well as limiting the shift to more sustainable and active modes of transport.

- **Design exclusion for diverse users**

The perception that the area was not designed for everyone was the fifth most cited concern among all stakeholders, reflecting significant critiques about the exclusionary nature of the area surrounding André Soares School's design and planning process.

A resident complained about the situation where the area is not designed for everyone: "I don't believe the needs of different people, like caregivers with strollers, people with disabilities, children, or elderly residents, are properly understood or respected in planning here", he also mentioned about the difficulties people face while commuting in the area: "there are problems with commuting, especially with access to the school because the crossings aren't designed for everyone, nor is the city designed for us to use safely, at least not for all age groups, I've already seen people having difficulties in moving around. It seems there are groups excluded from using these areas" (R 01), two shop owners also highlighted exclusion of all groups: "No, they are not accessible and for everyone and people are not respected in planning phase in this area" (SO 01), "No here we don't have a place for everyone" (SO 02); more to these, a city user stated there is a more attention to cars than people even in infrastructure which lacks a better signage for cars before the crosswalks: "it's not respected and not designed to prevent the presence of cars, for example before

and after the crosswalks, which makes it difficult for children to cross, so cars stop very close to the crosswalks and it's very difficult for them to cross" (CU 01), she also mentioned the area was not designed for a school zone: "given the large number of young people and children, it seems to me that the space isn't exactly prepared for them, so it's a school zone, but it's not thought of or designed as a school zone at the moment. Although it's not just a school area, it's also a residential area, but what gives it all that dynamic are in fact the young people and the children" (CU 01). On the other hand, she believed in the new interventions, specifically regarding the JUST STREETS Project, people are more respected: "here in André Soares there is this urgency to improve accessibility for all of these people and so I believe that yes, these needs are understood and respected in the planning of the streets and school zones in these new interventions, but it is obviously being done gradually in various areas" (CU 01). Likewise, municipal technicians believed the area was mostly designed for cars not people: "neither the school, nor the neighbors, nor the shopkeepers benefit much from the current surroundings since the area is used for parking or as a cut-through route to avoid traffic, so I don't think any of these groups benefit from the current surroundings" (MT 02), "pedestrians in general and children are very neglected", he also agreed with the necessity of reducing space for cars: "reducing car space and improving the pedestrian area in general" and "lots of unnecessary parking and the car space is still too much" (MT 01).

Moreover, as previously discussed in accessibility deficiency section, some stakeholders highlighted design exclusion for diverse user in case of accessibility challenges. Some school community mentioned some accessibility problems and considered them as not designed for everyone: "roads are not for all, because they are not plain so it's hard because people could fall" (SS 01), "I think there are some problems especially with the strollers and the wheelchairs because the roads in Braga are not always plain and some has some holes" (SS 02), "the sidewalks in certain areas should be wider especially around the school, they also have the lack of ramps" (ST 05), "the roads are much wider than the sidewalks, which are very narrow and not wide enough for strollers or wheelchairs, the surrounding area isn't adapted to people's actual needs. That's why we see very few people walking here. I've seen people struggle to get around because of the infrastructure. People with disabilities,

especially those in wheelchairs, often have to go into the street because the sidewalks are either blocked or in poor condition" (ST 04), "we have young people riding bicycles at a certain speed in the middle of the sidewalks, it also becomes unsafe for people who are walking" (ST 02), "even for those who come by bicycle, it becomes very difficult" (ST 02), "some sidewalks, even though wide, are very irregular and are not sufficient for people with reduced accessibility, people with baby strollers, with wheelchairs" (ST 02); a schoolteacher also highlighted that the parking is a big obstacle that excluded people from the area: "parking ends up taking space that was important for people to be" and "this area, when there are no classes, is a passing zone. People only use it to park the car in the parking lot, and that's it" (ST 02); they also highlighted lack of considering all groups of people in planning phase: "Most of the time, the street planning clearly prioritized car traffic and improving vehicle flow, without considering the mobility of people who don't drive, like those with strollers, or elderly people. It seems like everything is upside down. Streets were planned for cars, not for people" (ST 04), "In general, streets are not well designed for everyone, there are no proper lanes for bicycles and it was the cars, many streets for cars to circulate and the people there wasn't much of this care" (ST 01), "particularly people with disabilities are often overlooked in street and sidewalk planning" (ST 04), "planners see people but they don't care about it because they do nothing to change the things" (SS 01), "I think streets are not for all. For example, for blind people, they need more help and resources, because if they're not accompanied by someone else they won't know where the car is coming from, when the traffic light is green" (SS 02), "I think that planners mostly focus on the cars, because Portugal is a place where is full of cars there is no mentality of the bikes, pedestrian people and everybody is usually with the car, so they mostly focus on cars" (SS 02); they also complained not considering students: "I don't think there is much things for student life" (SS 02); and they complained about only concerning city center for improvements: "I think at the people only focus on the city center because it's where the people from outside come to visit and forget the people who live far" (SS 01).

Besides school community, other stakeholders highlighted the perception of exclusion since the city was designed for cars back then: "Braga was designed many years ago for cars and we have a big problem not only in the André Soares School, but also in the other schools in

Braga with a lot of traffic mostly in the drop-off and pick-up hours of entry and going out to the class we have a lot of cars the street" and "but in the current moment, different groups needs were not understood, and the area is not designed for all people", the city user also mentioned accessibility gaps which led to feeling of exclusive design for all: "crosswalks are not the best ones for a school area, they could be more inclusive and more safe to all" and "the crosswalks are not inclusive because for the blind people for example, we have a big difference with the roads and the sidewalks, which is not good for people with the wheelchair" (CU 02). Conversely, a municipal technician claimed in the planning phase there is always attention paid to all people, however, sometimes there are some obstacles which solving them would be difficult: "I think that we always take that into consideration, but sometimes it is difficult to implement given the dimensions of public space, due to the lack of dimensions of public space, normally we have little space dedicated to people, to sidewalks, and a lot of space dedicated to the car and to the use of the car" and "since we don't have much space in public space to intervene" (MT 03).

Ultimately, various stakeholders raised the significant concern of a not designed area for everyone, since they pointed out the exclusionary nature of the area's urban design and implementation, particularly the prioritization of cars over people. Moreover, infrastructural gaps, including narrow or poorly maintained sidewalks, lack of crosswalks and far distance between them, lack of leveled sidewalks and crosswalks, lack of inclusive infrastructure for people with disabilities, caregivers with strollers, and active modes of transport, and insufficient planning for children and the elderly all together reflect a broader failure to address the needs of all area users. In fact, some improvements are being made through recent interventions, especially under the JUST STREETS Project, but the process is gradual.

- **Lack of environmental change**

There was unanimous agreement among all stakeholders that the area surrounding André Soares School has seen little to no substantial changes or even improvements. While they

highlighted some changes in the main roads enclosing the area, the André Soares Street itself had not experienced any changes.

Among diverse stakeholders, a schoolteacher highlighted that during the planning or even rebuilding stage, the school users as well as local residents were not respected: “around the school they forgot to improve it, it is 12 years since the whole school was rebuilt. But around the school they did nothing and if they respect that they would have done it before” (ST 03); add to this, a resident, a city user, and shop owners claimed no improvements in the area: “there haven't been any significant interventions to improve challenges” (R 01), “this area did not have any changes” (SO 01), he also stated a perception of being ignored: “here always has been the same. Nothing has been changed in Andre Soares, this area is a little bit forgotten” (SO 02), “I don't think they have any improvement in that area during last years” (CU 02). Additionally, other schoolteachers highlighted no noticeable change and improvement in the focus area: “I haven’t seen much change” (ST 02), “Near the school there have not been any changes” (ST 05), and “the street of the school itself hasn’t had big changes in traffic direction” (ST 03).

Considering all insights, diverse stakeholders expressed dissatisfaction with the lack of environmental change and improvement in the focus area. Despite major interventions on nearby main roads regarding cycle lane and traffic direction on Av. da Liberdade and Av. 31 de Janeiro, the André Soares Street has remained largely unchanged which led to a feeling of neglect among diverse stakeholders, who emphasized the absence of infrastructure improvements, traffic adjustments, and pedestrian-focused as well as cycling-focused interventions. In fact, the lack of action over more than a decade, even after the school was rebuilt twelve years ago, reinforces the school community’s perception of being overlooked in urban planning priorities.

- **Cultural barriers**

Cultural barriers were a medium cited concern among diverse stakeholders, which reflects a car-dominance culture among people of the city of Braga. A municipal technician highlighted a strong car-dominance culture of the Braga residents: “we still have a very strong car culture” (MT 01), “the biggest barrier here is the car, the mentality is still very car-centric” (MT 02), likewise, some stakeholders mentioned that attitudes toward car use have changed over time, by noting differences between past and current situation which the car use have been expanded a lot: “before they mostly walk but now with the car to everywhere, even if it is possible, they will go directly inside the school and the classrooms with the car” (SO 01), “I used to study in this school when I was younger and I went to school walking with my friends now that society is different the parents normally pick them by car and it creates a lot of traffic” (SO 02), “parents are afraid to let their children go alone I don't know why, because 30 years ago everybody went to school alone, it was a kind of shameful for the children among others to see the child going with their parents it's like you're not grown up enough. now they don't even think about that they want their parents in front of the school with the car” (MT 01); besides these, a city user highlighted a normalized acceptance of car dominance in public space and the tendency of people not to question the overwhelming presence of cars and instead show sympathy toward cars and drivers’ needs: “it's curious that people aren't bothered by the presence of cars. people think that the presence of cars is something they have to put up with because people need a parking space. People are re very sympathetic to those who use cars in their daily lives and feel that they have to have a place to park their car” (CU 01). Add to these, a shop owner and a schoolteacher mentioned car usage even in short distances: “people go by car to everywhere even like 1 kilometer” (SO 02), “there are many people use the car just to make a short distance and in the afternoon in the city center and there are other parts of the city that are even worse in traffic than this avenue especially on pick hours” (ST 03), also, a city user stated that car usage for short distance and its relationship with convenience as well social symbolical status of car dependency: “this is a cultural habit because a lot of movements are within short distance which can be shifted for a walk or cycle or a bus transportation so these habits it's a core cultural habits from comfort and this is like a

sociological and psychological dimension of the car dependency because the car are also the symbolical status of the person" (CU 02); another stakeholders also reflected how car ownership has been seen as a symbol of social and economic advancement, especially among younger generations: "people felt the need to show that they had already improved their lives, and the way to show they had improved was having a car, being able to have a car to go everywhere, mostly by young people, going to the café by car, visiting grandma by car, it shows a little that they already have more economic power, even if it's illusory" (ST 02); another schoolteacher highlighted autonomy and preference for personal comfort over shared travel among people: "there's a lot of car use, mother, father, children, everyone has their own car. Each person drives separately to school, work, university and there's no thought like, we're four, let's go together, it's more like, I don't have to wait for you, bye, I'll go when I want" (ST 05), a schoolteacher also mentioned car tendency culture of people of Braga: "residents often worry about their garages and cars. People are stuck in their routines, and it takes time and effort to change that, there's a cultural tendency in our community, and in Portugal in general, to use cars too much, people love driving" (ST 04).

In addition to the previous insights, a city user emphasized that cultural norms, rather than municipal policies, are the main barrier to change, particularly the everyday reliance on cars and the perception of walking as a leisure activity rather than a mode of transport: "I would say that the biggest obstacle is not the municipality, it is in fact people who are not vulnerable groups, normally people who use cars and don't have any kind of mobility limitation, who end up being an obstacle to change, because they don't recognize that it is a necessity and therefore the biggest obstacle is in fact the culture of the population itself, without a doubt people make very short journeys by car. walking is often only used as a sport. People like to walk at the end of the day or very early in the morning, but they don't like to walk to work or to school, so it has a very different cultural and social meaning" (CU 01), she also mentioned that that many people cannot envision life without a car since they associate quality of life with car use, so they struggle to recognize the potential benefits of alternative mobility modes, which becomes a major barrier to change: "I think that people aren't ready yet, that is to say they don't recognize the benefits that it could bring to their lives because they've never thought of their lives without the use of a car, so the car is so

present in them that they think that their quality of life revolves around the means of transport they use, and as long as we think like that, it will undoubtedly limit any kind of change and even try to change people themselves" (CU 01). Ultimately, another city user supported the car dependency with recent census data: "Yes, Portuguese people are very car dependent, based on the last data of the national census, we have the 66% of population that travel by car 2/3 of the people go by car to go to work every day and Braga is higher 70% go by car based on the last data, maybe now 2025 is higher than this data" (CU 02).

Another major cultural barrier which diverse stakeholder agreed upon was the convenience cars brought to individuals' lives. In this regards, a student mentioned the shorter time of commuting with car than by walking or cycling: "there are a lot of people more go by car than on foot, there is just more practical and faster because if you need to go by foot or on a bike, you need to wake up earlier and it takes more time, so I think it's just like everything about time" (SS 01), a city user also claimed a wrong mindset which is shaped by car dependency: "people don't feel that it's quicker to walk than to drive, but most of the time walking and cycling are much quicker, but people don't have that perception, so people especially younger ones aren't used to walking, so there's a lack of autonomy among young people, and that's very much due to the car and the lack of appreciation for walking" (CU 01). A shop owner highlighted the relationship between the faster pace that cars have brought to people's lives and the increasingly sedentary lifestyle that has resulted: "people will go by car everywhere it's faster it's really easy and then people are becoming sedentary" (SO 02), a schoolteacher also mentioned laziness as a consequence of the convenience associated with car dependency: "Using car is for convenience but also for laziness. it's easier and more comfortable with the car of course. You know in Braga it rains a lot, and it is better to come by car and park it right at the door of your work or your school" (ST 03). Lastly, in regards with convenience, a city user emphasized that car dependency is deeply rooted in daily routines which is supported by the ease of driving and parking in the city, she believed although there seems to be some poor infrastructure for walking and cycling, even improved conditions won't lead to meaningful change unless car use is restricted, since the perceived convenience of driving discourages people from

considering alternative modes of transport: “convenience, so this dependence on the car, so people don't know any alternatives. the car plays a very important role in people's lives and that's the main thing stopping people from walking or cycling. the area obviously has major structural problems in terms of infrastructure and so this is also a constraint, but I still say that we could even put the best infrastructure there, but it's unlikely that if we don't restrict the use of cars and the ease with which we use cars in the city, people won't want to change at all. I think what's stopping people from walking and cycling is how easy it is to drive and park in the city. It's really easy and so people don't feel that walking or cycling is necessary because everything is very fast and fluid, so we have a city that has a lot of traffic problems at peak times and so it's difficult but at the same time people don't feel it's difficult because it's already part of their routine and they're already prepared to spend 20 or 30 minutes in traffic so this routine is part of their daily habits” (CU 01).

There were some other cultural barriers mentioned by stakeholders, including outdated ideas and resistance even among municipal members. According to a municipal technician, there was a problem with pavement cultural barrier by internal resistance even within the municipality when it came to adopting more innovative, pedestrian and child-friendly solutions: “Sometimes we have issues with pavements because we want to build ones that are better for pedestrians and children to play, but people in public works, even in the municipality, are stuck in the old ways, when we try to use more child-friendly pavement, they say no. We also want to use this type of pavement in car lanes, so drivers feel like they’re entering pedestrian space and slow down; of course, this needs proper construction techniques, but many people here still don’t know how to do it or think it's not possible. They believe small blocks will break under cars, but in places like the Netherlands, they use them in car lanes, and it works, cars go slower and it’s safe, so we still have this problem inside the municipality that people stuck in the past who haven’t understood that we can change the pavement culture” (MT 01); similarly, two city users highlighted the resistance to change, this time among community members and local stakeholders themselves: “the involvement of people is fundamental, but normally when they participate they resist a lot because they assume that everything is fine and that they don't want to change, but I think that if they tried other ways of living in the city they would like it, but that means taking

risks, experimenting, which society doesn't normally like" (CU 01), and an example of previous resistance among the community: "they tried to attack the municipality during a rebuilding phase of another avenue, that they are crazy they don't think for us and this is a dictatorship and they brought political questions to the table it was a very controversial time" (CU 02). Last but not least, there was another cultural barrier related to not using public transport which a student and claimed: "I think there is a culture belief, because like my father he even doesn't know how to get a bus" (SS 02), and a schoolteacher mention a social stigma that people consider public transport for those with fewer resources: "they would no longer have the idea that public transport is for the poor" (ST 02). Moreover, a parent mentioned failure to comply with driving laws as a barrier among people: "the problem is we don't follow the traffic law, and what happens in the area around André Soares is that many drivers, both parents and people who work there don't follow the rules" (P 01), also a resident claimed this issue: "sometimes cars drive too fast and don't respect the rules, and that makes the area in front of the school unpleasant" (R 02).

Overall, cultural barriers which were widely recognized as a critical obstacle to shift toward more active, sustainable, inclusive, safer, and accessible urban mobility, are over-reliance on private vehicles, social norms and symbolic status tied to car ownership, convenience that car usage brought to individuals' lives, as well as resistance to change not only from community but also from municipal institutions. In this regard, the perception of walking and cycling as inferior or impractical, as well as the stigma around public transport, further hinders efforts to promote active modes of transport. At the final stages, the analysis in this regard, plus paying attention to previous sections, reveals that addressing the over-dominance of cars requires not only infrastructural and regulatory changes but also cultural and behavioral shifts toward more accessible, more inclusive, and safer urban mobility and urban environment.

- **Cultural and community benefits**

In addition to all cultural barriers which were demonstrated throughout the previous section, there were some cultural and community benefits, which are contributing to more sustainable and active, as well as safer and inclusive urban mobility, a few stakeholders mentioned them, though.

A schoolteacher expressed optimism signs of gradual cultural change on walking and cycling, especially for health reasons, she also believed improvements regarding cycling is slower than walking: “active mobility in our city wasn’t much. now there is more, but still, it is very little. If we compare with, the city of Amsterdam, which is the opposite where almost nobody drives, everyone rides a bicycle or walks. Culturally, here we don’t have it, but now people are changing regarding walking. There are very interesting pedestrian lanes next to the small river nearby, and people walk a lot there, so people today care about health, so walking is important for health and there are many people walking. About cycling, it is changing, yes, I believe that it will change in the coming years but slowly, some students and teachers are coming by bicycle which didn’t happen before, but these habits are slowly changing. I think the city of Braga is on the right path now” (ST 01), another schoolteachers highlighted the change towards more active mobility alternatives: “however there are many younger people that's nowadays are changing their mode of transport they are using more bicycles and scooters now there are many people use it the electric ones” (ST 03), similarly, a municipal technician also walking is more preferred among sustainable modes of transport in the focus area: “pedestrian culture in this school more than in others” (MT 01), and a student confirmed the walking culture among students: “here are some people that are going on their foot and walking” (SS 02). Furthermore, regarding cycling a city user pointed to a rise in cycling, especially since the COVID-19 period, noting more people of all ages, including children: “post COVID and during COVID maybe we can see some hope signs of more people cycling in Braga, because we have more cycling lanes now and is more safe for cycling and I see more people cycling in the city not only the average adults but also the kids which is interesting and hopeful aspects, with parents with small children on the bike to go to school” (CU 02), a shop owner also stated the improvements towards cycling: “I think

some people are changing now and that is all the people that go by bicycle more often here and I think things are changing" (SO 02). On top of these all, a resident declared that the culture of active mobility is still underdeveloped in their community, and it is just in the beginning phase to emerge and have not yet become normalized or widely accepted: "Culturally, we're in an embryonic phase regarding walking and cycling" (R 01). On the other hand, a city user remarked a positive shift in public engagement, by emphasizing individuals who participate in discussions have become more thoughtful, aware, and analytical, which indicated growth in civic awareness: "the critical sense of the people who take part in community meetings has improved a lot" (CU 01).

With the consideration of all insights, while the cultural landscape in Braga remains largely dependent on car usage, the analysis highlights emerging signs of positive change towards walking and cycling, with a growing awareness for their health benefits, as well as community awareness with the increasement in community engagements. Although these shifts are still in their early stages, they represent valuable opportunities for future active, inclusive, safe, and accessible mobility strategies which will support long-term transformations.

- **Education and awareness raising**

Awareness raising was one of the lowest ranked potentials among the diverse stakeholders in the area surrounding André Soares School, which suggests that limited attention has been given to the initiatives with the aim of informing, engaging, and educating the community in order to improve mobility issues as well as enhancing active modes of transport.

Among diverse groups of stakeholders, one municipal technician, one city user and one schoolteacher highlighted the awareness raising efforts in the area. The schoolteacher mentioned an awareness raising project in the school for promoting cycling among students: "there is a project in the school that has to do with promoting the use of bicycles in this school and in other schools in Braga" (ST 03), and a city user also satisfied with her

learning experience with JUST STREETS Project: “the experience has been very positive, so it has always been in an environment of a lot of discussion, a lot of training” (CU 01). Moreover, a municipal technician pointed out the actions that were taken to raise collective awareness so far: “we start building raising awareness for the young stage of life”, he also claimed children are not aware of more sustainable ways of commuting to school due to the massive use of car by parents: “but they don't know their alternatives, so we need to tell them this stuff and we start raising awareness with them which is really important”, likewise, he emphasized the importance of parents’ presence in awareness raising sessions, noting that they are sometimes influenced by their children and once the idea is introduced, they become more open and adaptable to the issue: “the parents are even more important to be in these meetings because when we raise awareness with children they will tell the parents. sometimes it's even more effective to tell the children who will then try to convince their parents to do something then to talk to the parents who are already so focused on one idea and want change” (MT 01).

Considering all stakeholders’ perceptions regarding awareness raising, this initiative about mobility patterns in the focus area appears to be underdeveloped, as reflected in the low attention and participation given to this issue by stakeholders. While there are some awareness raising projects in the school as well as the JUST STREETS Project, still a limited scope of these educating initiatives is felt.

- **Inclusive and participatory planning process**

Among all stakeholders, most confirmed that they were involved in community engagement sessions and decision-making participations. Although a majority of the responses pertained to the JUST STREETS Project, this can be seen as a hopeful point not only for urban planners and municipal professionals but also for the users and residents of the focus area. People are aware of the real-life challenges since they commute daily in the area and are willing to work with the municipality to address those challenges; therefore, by identifying the diverse needs of individuals, urban specialists can design more inclusive neighborhoods.

A shop owner shared his involvement in community meetings by emphasizing the importance of these gatherings, especially by including local voices in discussions about safer school areas: “Yes, we were in the meeting with the teachers. We had two meetings there to talk about my opinion, because I'm here all day and I see many happenings here, so I think they have to do these meetings for having safer schools” (SO 01), a city user also highlighted his involvement for the first time: “Yes because I am one of the stakeholders in JUST STREETS Project, so that was the first time I could express my opinion and ideas” (CU 02), schoolteachers also claimed their involvement in participatory meetings only regarding JUST STREETS Project: “my experience was with this project called JUST STREETS” (ST 04), “now with the JUST STREETS is when this topic was launched” (ST 05), “The only time that my opinion was asked was now, when I participated in the JUST STREETS Project. Other than that, no” (ST 01), while two other schoolteachers mentioned their more involvements in participatory meetings not only for JUST STREETS: “this is the second project that we are involved in as a school that deals with these issues of mobility and safety around André Soares school” (ST 02), and “I’ve been asked for my opinion several times and have participated, not in decision-making, but in giving suggestions to help improve things” (ST 03).

A municipal technician expressed the necessity of involving parents in community meetings: “it's good to have more parents there, and it's the hardest people to bring to the meetings because they don't have time or are not interested, but it's really important. We started this with Andre Soares already, but also we did with other schools too” (MT 01), he also highlighted the importance of participation of children since they are the most vulnerable group and he assumed if they design the area for children, it could be inclusive for all: “children are the most vulnerable group and if you design for the children you are designing for everyone that we usually say” (MT 01); moreover, he mentioned a big participatory process with stakeholders in focus area during JUST STREETS: “we did a very big participatory process with shop owners, with the residents, with many people, and it went really well, people participated a lot. The JUST STREETS Project is really good because we have the opportunity to go to the school and have meetings with several teachers, students, and even parents. It's not the first one; we already did this a few years ago with other

schools. The thing with schools is that you have to repeat things every few years because the children change, so we did this a few years ago, we're doing it now again, and we hope to do it again in the future" (MT 01); another municipal technician mentioned some participatory process in the focus area: "Regarding participatory processes, I know that there is the JUST STREETS, STEP UP and the EDP Energia que Move" (MT 03). Add to these all, a city user stated the André Soares School's ongoing involvement in urban projects, emphasizing strong engagement from teachers and students but with a limited participation from residents and shop owners: "this school has already been part of several projects, like SHARED GREEN DEAL and now JUST STREETS, and I've also participated in them. That year I had the chance to take part in decisions about the streets. We always have very enthusiastic participation from the school, especially the children, young people, and teachers, but not so much from the residents or shopkeepers, who are usually very resistant. Still, as far as I know, all the residents, parents, and shopkeepers in this area have been invited to take part in the JUST STREETS project and in some form of street planning" (CU 01).

The analysis of diverse stakeholders' perceptions regarding the inclusive and participatory planning process in the focus area reveals a growing effort to involve local communities in shaping urban space, both from the municipality and the city community. While participations still remain uneven among all community members, mostly with limited engagement from parents, residents, and shop owners, the overall experience suggests a promising shift toward more collaborative and participatory urban planning, so in order to reach inclusive urban mobility solutions, it is crucial to ensure continuity, expand outreach, and foster trust between all stakeholders.

- **Exclusion from participation and decision-making**

As discussed in the previous section, the participation of most stakeholders was limited to the JUST STREETS Project, and according to stakeholders who claimed they have not been involved in any participatory meetings at all, a lack of broader participatory engagement in the surrounding area of André Soares School has been identified.

According to stakeholders, a resident mentioned he was never participated in any participatory meetings: “No, I have never been asked before” (R 01), a shop owner also stated the same: “No, it’s the first time you are asking me” (SO 02); also students remarked although they were aware of the JUST STREETS Project meetings, they could not participate since they had class on that day, they also mentioned there were no other participatory meetings: “We know that the JUST STREETS participation exists here in the school but we were in the music school so we could not join the participation meeting. But about other meetings, I would say no, and this was the only one here” (SS 01), “No, only the JUST STREETS that we were not here that day” (SS 02). Moreover, schoolteachers pointed out the absence of diverse stakeholders in the participatory meeting: “I do not think other people were involved” (ST 01) and “As far as I know, no, they have not been involved” (ST 04). Add to these all, a city user noted that very few parents, shopkeepers, or residents have taken part in participatory processes since they believe the existing conditions are acceptable and they show little interest in change: “we've had a few parents taking part, few or almost none, shopkeepers and even in relation to the residents, it's a public that finds it difficult to want to take part. I think this happens because they think everything is fine, they don't understand the difficulties that they assume are naturalized in the difficulties of accessibility, there is a lot of complacency, and people don't want to change much either” (CU 01).

Although projects like JUST STREETS have promoted some extent of engagement among a diverse group of stakeholders, the analysis reveals that some community members, including residents, parents, even some shop owners, and students, have remained excluded from participation in the decision-making process, and their voices have not been heard.

- **Limitations in policy support and funding**

This part was discussed only with municipal technicians during semi-structured interviews, in addition to the urban plans previously reviewed in chapter three, in order to better understand the limitations and obstacles which are from a policy perspective at both the city of Braga as well as the surrounding area of André Soares School.

In this regard, a municipal technician highlighted the fact that while pedestrian-focused policies are generally easy to implement, limited municipal funding remains a major barrier: “the policies point to pedestrian in general and it's not hard to implement” and “the funding is always a problem, there are lots of opportunities from the European Union we try to take all the opportunities that we can but when it comes to the municipal funding it's very hard because you have lots of stuff to spend the money, we do some small things but when it gets to bigger things, it's really hard to implement. we do as we can we want to go to every school if we can, but it has to be a little by little because we don't have enough funding for everything” (MT 01), he also criticized that the national entity prioritize car infrastructure to such an extent that even implementing basic pedestrian measures, like crosswalks, can be challenging in some cases: “This national entity is very focused on guaranteeing that cars have very good street to go and sometimes it's even hard to put a pedestrian crossing” (MT 01); specifically in the case of André Soares School he declared that pedestrian-focused policies are generally easy to implement, though challenges occasionally arise with pavement improvements: “in this specific area of André Soares, the policies point to pedestrian in general and it's not hard to implement sometimes we have a problem with pavements because we want to build them better for pedestrian, also for children to play” (MT 01). Moreover, other municipal technician agreed with the prioritization of cars in planning: “in mobility we always try to create projects, but when it comes to financing and execution, it’s not easy due to several financial and execution constraints, because all the processes are very time-consuming. And there’s always a preference for cars. Everything related to car mobility always takes priority over removing cars from these areas” (MT 02).

In continuation of his statements, another municipal technician remarked that while current policies support pedestrian improvements, the strong car culture in Braga makes

implementation difficult despite there being no formal policy barriers in this regard: “As for policy barriers I won't say there are actually barriers because the policies are focused on improving things for pedestrians but sometimes it's quite hard to implement because they still have a very strong car culture” (MT 03), she also identified local residents and shopkeepers as the main obstacles to change, particularly due to their resistance to removing parking spaces: “I think the main barrier would be the resident neighbors, the shopkeepers, because as I said, the removal of parking, parking spaces, would directly affect their life, their routine, and that is the main obstacle that we have” (MT 03), in addition, she noted that politicians in Braga are generally supportive of accessibility improvements and that efforts are being made to secure funding to support interventions around schools and the city: “I think that the politicians here in the city of Braga are perfectly aligned with accessibility and the improvement of accessibility and its implementation. Regarding the funds, we have developed many applications in order to get the funds and the necessary support to intervene in the surroundings of schools and in the city” (MT 03).

The insights provided by municipal technicians indicate that while Braga’s local policies are largely supportive of pedestrian improvements, practical implementation faces some challenges, which include limited municipal funding, a deeply rooted car culture, and occasionally resistance from residents and shopkeepers. Despite these obstacles, the alignment of local political will and active efforts to secure funding offer a positive outlook for future interventions.

In the following table, a comprehensive summary of all identified themes, corresponding sub-themes, and detailed descriptions within each sub-theme is presented. This table serves to consolidate the findings from the thematic analysis, offering a clear and structured overview of the key issues and potentials explored through the lens of mobility justice framework by highlighting how various aspects of distributive, recognition, and procedural justice are reflected in the everyday experiences and perceptions of diverse stakeholders within the focus area.

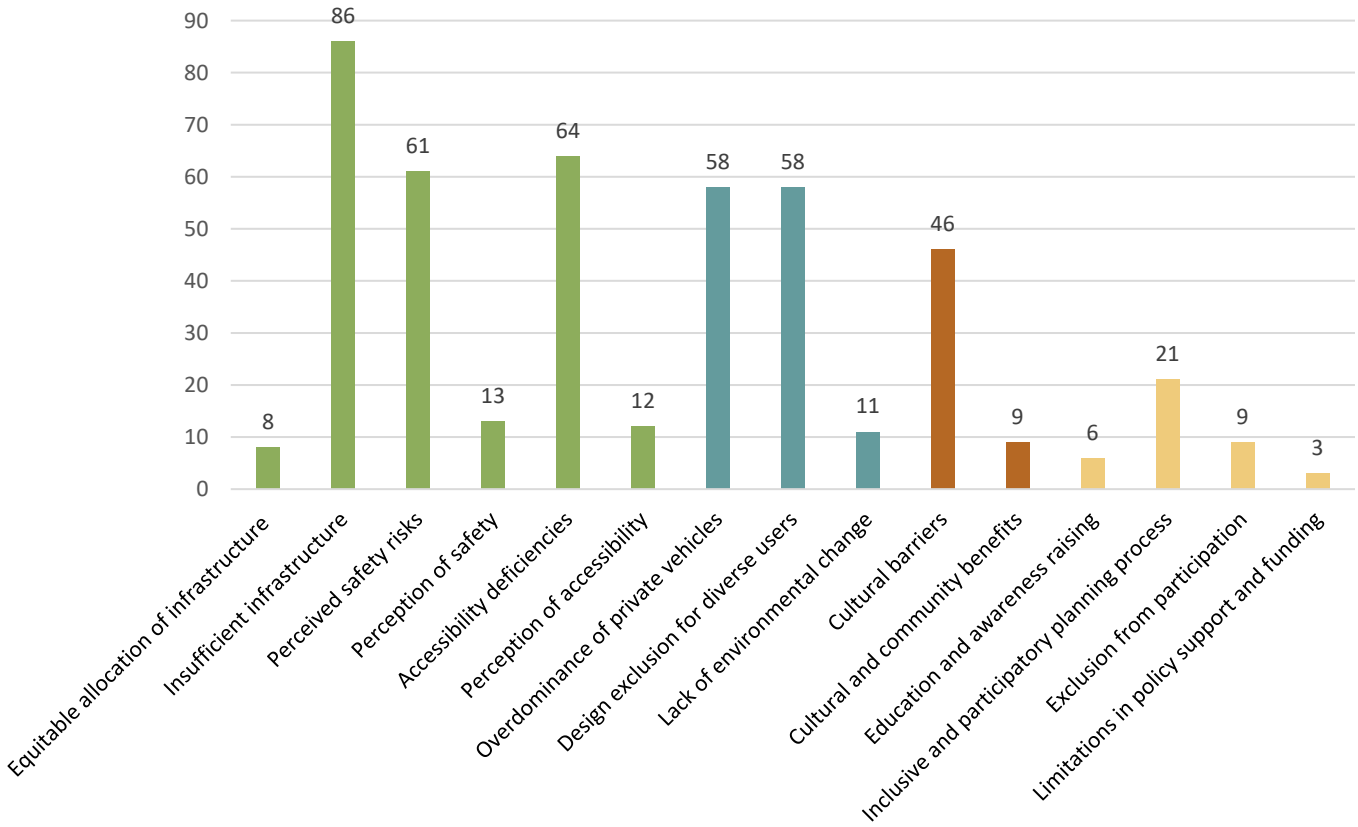
Table 6: Thematic breakdown of Distributive, Recognition, and Procedural Justice dimensions. The color coding represents each justice dimension for visual clarity and cross-reference with Graph 7: Green: Distributive justice; Blue: Overlaying categories, both distributive justice and recognition justice; Orange: Recognition Justice; Yellow: Overlaying categories, both recognition justice and procedural justice

Theme	Sub-theme	Details within each sub-theme
Distributive Justice	Equitable allocation of public space and infrastructure	Acceptable infrastructure Satisfactory resource allocation Sufficient sidewalks
	Insufficient infrastructure	Sidewalks and their usage Sidewalk poor pavement condition Lack of crosswalks Inefficiency of public transport Lack of people-oriented infrastructure Lack of urban furniture Lack of lightening Presence of stairs
	Perceived safety risks	Excessive presence of cars and their speed Safety concerns regarding cycling due to lack of dedicated cycle lane Lack of safety at night Adverse health effects like air pollution Parents considered area unsafe
	Perception of safety	Safe to walk Safe in terms of violence Respectful behavior towards students from drivers
	Accessibility deficiencies	Lack of infrastructure Lack of dedicated cycling infrastructure Accessibility lack for people with reduced mobility Excessive presence of cars Not accessible to everyone Abusive parking
	Perception of accessibility	Area's proximity to center Reasonable sidewalks Leveled pedestrian crosswalks
Distributive Justice Recognition Justice	Over-dominance of private vehicles	Excessive presence of cars Not paid parking Traffic Limited accessibility for people due to excessive presence of cars Car dominance culture Environmental challenges Car-centric urban design
	Design exclusion for diverse users	Not designed for everyone Prioritization of cars over people Narrow and poorly maintained sidewalks Lack of crosswalks and far distance between them Lack of leveled sidewalks and crosswalks Lack of inclusive infrastructure for vulnerable people Lack of inclusive infrastructure for active modes of transport Insufficient planning for children

	Lack of environmental change	Unchanged area with the feeling of neglect from people Absence of infrastructure improvement Lack of traffic adjustments Lack of pedestrian and cycling-focused intervention
Recognition Justice	Cultural barriers	Over-reliance on private vehicles Social norms and symbolic status tied to car ownership Convenience that car brought to individuals' lives Resistance to change Stigma around public transport
	Cultural and community benefits	Emerging signs of positive change towards walking and cycling Community engagements and awareness
Recognition Justice Procedural Justice	Education and awareness raising	Awareness raising projects
	Inclusive and participatory planning process	More involvement of the local community Collaborative and participatory urban planning
	Exclusion from participation and decision-making	Exclusion from participation and decision-making process for some certain community groups
	Limitations in policy support and funding	Challenges of practical implementations Limited municipal funding Rooted car culture Resistance towards change

Source: Elaborated by the author

The issues related to infrastructure for active mobility, perceived safety with the focus on vulnerable groups, including children, the elderly, people with reduced mobility, and caregivers with strollers, as well as cultural barriers, participation in decision-making processes, and limitations in policy support and funding, are presented below:



Graph 7: Frequency of justice-related issues coded from the semi-structured interviews. The color of each bar corresponds to the justice category it relates to, matching the categories in Table 6: Green: Distributive justice; Blue: Overlaying categories, both distributive justice and recognition justice; Orange: Recognition Justice; Yellow: Overlaying categories, both recognition justice and procedural justice.

Source: Elaborated by the author

Chapter 6

Design Guidelines and Recommendations

In this chapter, some short-term and medium to long term measures are proposed, inspired by the lived experiences of local users gathered through interviews.

After the documentary analysis of planning and policy documents, a city-wide analysis of demographic and population data, and spatial infrastructure analysis, as well as detailed observation of the area to understand challenges and potentials of both city of Braga and specifically the surrounding area of André Soares School, the research was further enriched by semi-structured interviews to comprehensively understand obstacles and opportunities both from municipal technician perspectives as well as the insights of diverse stakeholders who commute daily in the area, including school community such as students and schoolteachers, parents, residents, shop owners and city users. Ultimately, the research came up with a set of practical short-term measures, within the next one to two years, and long-term measures, within the next five years. While not a citizen science initiative in the strict sense, this research proposed some recommendations by incorporating lived experiences of local users and their perspectives as well as the suggestions of diverse stakeholders, which were gathered by asking them what they would change in the area around André Soares School to make it safer and more accessible for everyone.

Short-term measures:

1) Introduce a kiss-and-ride zone away from school entrance

Action:

- Mark one area away from the school and not immediately at the school gate for short-term time periods during drop-off and pick-up hours

Why:

- A proper designed zone for kiss-and-ride reduces congestion right at the entrance, enhances traffic flow, and keeps children out of direct vehicle paths.

How:

- Using road paint, cones, or temporary signs in order to encourage brief stops only, possibly managed by school staff or maybe police during peak times.

2) Improve the pavement of sidewalks and make them wider

Action:

- Repair broken pavement, widen sidewalks where possible, and remove obstacles, for example, poles or parked cars.

Why:

- Even minor improvements in sidewalks will reduce tripping hazards and make foot traffic smoother and safer, mostly for vulnerable groups in the area.

How:

- It will be made by the municipal maintenance team to target the worst sections. This action is straightforward and low-cost.

3) Enhance school-zone signage and lighting system

Action:

- Add attention-grabbing signage such as flashing “School Zone”, “Zone 30 km/h” markers, painted speed limit signs, and bold zebra crossings, as well as improved street lighting.

Why:

- Bold painted zebra crossings can reduce accidents and injuries, it will make drivers more aware of pedestrians by improving the visibility.

How:

- Apply high-visibility road paint and fluorescent signs, replace old lamps with brighter and child-scale lighting. These interventions are inexpensive and easy.

4) Prohibit vehicles in front of school entrance

Action:

- Declare a permanent pedestrian-only area immediately at the entrance gate of the school, with no cars and no motorcycles.

Why:

- Removing vehicle presence enhances child safety, reduces stress for parents, and creates a welcoming arrival zone.

How:

- Install a gate, bollards, or removable barriers. Use clear signage and possibly supervised implementation during peak hours.

5) Improve pavement quality for cyclists and provide bicycle parking

Action:

- Resurface critical pavements around the school with smooth, slip-resistant pavement to reduce vibration and injury risks of cycling. If the signage will be adequate people can cycle on the street and share it with cars since it is already a zone 30. Install bicycle racks both inside the school grounds, for students and staff, and outside near the entrance, for parents and other users.

Why:

- Smooth pavement encourages safer and more frequent cycling among children and youth. Secure, visible parking increases confidence to cycle and prevents bikes from being left in unsafe locations.

How:

- Start with short stretches, even just one or two blocks near the school, using modular pavement or asphalt patching. Install basic U-shaped or wave-style racks under cover if possible.

6) Revitalize the existing triangular green space with an inclusive design.

Action:

- Add benches and shaded seating, under new trees, and pergolas, plant native trees and low-maintenance greenery to increase biodiversity and provide shadow, improve lighting system for safety and comfort, especially in winter.

Why:

- Trees and greenery provide shade, noise buffering, and air quality benefits, and seating areas encourage longer use and social interaction, especially for vulnerable or older people. Moreover, lighting enhances evening safety, encourages more equitable access during winter hours, and since the area is also used by people walking with dogs, small dog parks can be implemented.

How:

- Use a phased, low-cost intervention strategy, like start with one or two benches and tree planting, engage nearby residents and students in choosing tree species or co-designing a minor decorative feature like a painted wall, mural, or signage, incorporate inclusive design by ensuring flat paths and clear separation between seated areas and dog play areas, and install low-height and child-friendly lighting.

7) Close half of the parking lot closer to the school to the cars, twenty-eight parking spaces, and add greenery and urban furniture on it, as well as the school entrance

Action:

- Along with a play space, plant trees or shrubs in the cleared parking section and install benches or planters.

Why:

- Greening creates a healthier microclimate by reducing air pollution, offers shade, adds aesthetic appeal, and conveys a community-friendly message.

How:

- Use lightweight planters for easy installation and relocation; also implement urban furniture like benches with sheltered spaces to protect users from wind and rain.

8) Taking the advantage of presence of school in the area for implementing awareness-raising programs for schoolteachers, students, as well as their parents in order to promote sustainable mobility among the young generation of the community

Action:

- Develop and implement mobility education campaigns within the school, including interactive workshops, themed activity days, and visual materials such as posters and student-made content promoting active travel.

Why:

- Awareness-raising helps shift mindsets and build a culture of active mobility by people's understanding of its benefits, including healthier lifestyles, improved safety, and reduced traffic.

How:

- Collaborate with local NGOs and municipal technicians as well as the school community to deliver age-appropriate content and activities, as well as integrating mobility topics in workshops and seminars, distributing informational leaflets to parents, and promoting campaigns using school newsletters and social media channels.

Medium to long-term measures:

According to the SUMP, taking into account the planned implementation of a BRT system in the city of Braga within the next five years (Braga City Council & MPT, 2023), the improvement in public transport quality may allow for the elimination of all parking spaces in the parking lot in front of the André Soares School and the reduction of the traffic caused by private vehicles into a square free from cars.

9) Reallocate the parking lot, all sixty-one parking spaces, into a square for children and a relaxation space for residents.

Action:

- Dedicate one of the two existing parking spaces and convert it into a mini play area for children during their free time.

Why:

- A small pocket park and small green public space will enhance the quality of life in the area, and it can improve physical activity, foster social interaction, and bring ecological and safety benefits without large-scale redevelopments.

How:

- Install benches, planters, low fences, and basic toys or markings for play by scheduling their use during peak hours, ensures safety and supervision. In the first place, tactical urbanism can be used for the experimental phase.

Chapter 7
Conclusion

In this final chapter, an indication of the research question and objectives, the academic standpoint of the researcher, the employed methodological approach and its analysis, and limitations and constraints faced during both the research phase and the internship phase are addressed.

This thesis set out to explore how school street initiatives can enhance safety, inclusivity, and accessibility of an urban environment, particularly for vulnerable groups, while promoting active mobility practices such as walking and cycling. Inspired by the concept of the JUST STREETS Project and its emphasis on mobility justice in urban settings, the central aim was to examine the extent to which the principles of distributive, recognition, and procedural justice are reflected in the context surrounding André Soares School in the Portuguese city of Braga. In detail, by identifying the contextual spatial, social, and policy documents, as well as considering stakeholders' perceptions regarding participation in decision-making, this thesis investigated the role of school street initiatives in enhancing safety, accessibility, and inclusivity through the lens of the mobility justice framework.

To achieve the research objectives and answer the research question, this thesis employed a mixed-methods approach, encompassing quantitative, qualitative, and geospatial GIS-based methods. This mixed and integrated methodology was carefully chosen to examine the multifaceted dimensions of the mobility justice framework, including distributive, recognition, and procedural justice in accordance with school street initiatives and their relationship with safety, accessibility, and inclusivity of the surrounding area of André Soares School. The qualitative method was central to the research, involving semi-structured interviews with 18 diverse stakeholders. These interviews were investigated by the thematic analysis method guided by three main themes of the mobility justice framework, and some sub-themes regarding advantages and disadvantages existing in the area in case of infrastructure, safety perceptions, cultural norms, and institutional conditions, which were employed by a deductive coding approach, since key themes and sub-themes were identified with predetermined codes based on prior theoretical and analyzed takeaways. Moreover, field observation across different time frames including morning, noon, and afternoon, on working days, weekends, and the Easter holidays, according to Jan Gehl, was carried out to capture real-life mobility dynamics in the focus area, which led to identification of infrastructural barriers toward active mobility as well as pedestrian and vehicle flows crossing the area. This field observation contributed directly to the analysis of distributive justice, aiming to understand how space and mobility infrastructure were allocated. It also informed the assessment of recognition justice by

highlighting which user groups were not considered in the area, primarily disabled individuals, children, and caregivers with strollers. Additionally, the study conducted content analysis of eight key urban planning documents, the most important being the Sustainable Urban Mobility Plan (SUMP), to understand better how institutional strategies incorporate, or fail to incorporate, with participation and recognition of diverse mobility needs. Besides, quantitative methodology was also employed to contextualize and support qualitative findings. The demographic data helped to identify vulnerable groups regarding the age data, while car crash statistics from 2015 to 2025 highlighted the safety risks in the focus area. Subsequently, the geospatial GIS-based mapping added another key layer of depth understanding of the area by visualizing existing conditions, street networks, active mobility infrastructure, and risks, considering existing data from the Municipality, the Police sector, and the field observations by the researcher. This visual tool supported the analysis of distributive justice by highlighting inequalities in space allocation, accessibility, and infrastructure.

The research faced some challenges, including time constraints for conducting interviews as well as time limitation during the internship that the researcher was not able to attend a future workshop of the JUST STREETS Project with the vulnerable groups to better understand their demands, limited access to some specific stakeholders, including people with reduced mobility, and the Police sector. Moreover, there was an absence of questionnaire responses already distributed by the Municipality among parents which had initially been planned as a part of the methodology, given the limited number of responses, 47 parents responded out of approximately 1200 students, the researcher was compelled to remove this method from the research methodology because of lacked sufficient scientific value. This obstacle was acknowledged and addressed by reinforcing the qualitative strand of the study through interviews and document analysis. Last but not least, some language barriers affected interactions with parents and some residents, which, if the researcher knew the local language, she could have conducted more interviews and gathered more diverse perspectives regarding the focus area. However, despite all the challenges encountered, the current applied methodology proved highly effective as it was well suited to the research question and objectives, offered a robust and flexible framework that

identified real-life challenges and generated meaningful and valid findings. The triangulation of methods, at the final stage, enabled a comprehensive understanding of how school streets initiatives can promote mobility justice in order to have a safer, more accessible, and more inclusive urban environment.

From the theoretical perspective, this research contributed to the growing body of work on mobility justice by applying its three dimensions (distributive, recognition, and procedural justice), to the context of school street initiatives in the focus area, to understand how urban mobility policies and street-level interventions affect diverse user groups, particularly vulnerable ones. The study not only reaffirmed the value of this tripartite justice framework but also demonstrated how it can be used as an analytical lens in mobility studies through the combination of qualitative interviews, spatial observations, and review of planning documents. In doing so, the research revealed where each mobility justice dimension was fulfilled or lacked in both practice and planning documents. Although it was explicitly documented in diverse plans that infrastructure must accommodate sustainable mobility, the area encountered insufficient infrastructure regarding active mobility as well as deficiencies in accessibility and safety, hence the area did not meet the distributive justice completely with emphasize of school street initiatives, since it did not meet the needs of vulnerable groups mostly people with reduced mobility, students, and caregivers with strollers which represented that the area was not designed for all. Furthermore, cultural barriers existing both in the area and throughout the city revealed that the need for car was predominantly acknowledged, while alternative mobility needs were overlooked, indicating that recognition justice was not fully achieved. Furthermore, while the participatory approach was explicitly mentioned in the SUMP and more generally referenced in other plans, engaging diverse stakeholders proved to be somewhat challenging, as municipal technicians noted that involving parents and residents was difficult. Although the majority of interviewed stakeholders claimed to have participated in the JUST STREETS co-creation sessions, a few others noted they were not involved. Interviews with area users' stakeholders revealed perceptions of limited participation in decision-making processes, with most involvement occurring through the JUST STREETS Project. These findings highlighted some gaps in procedural and recognition justice, particularly regarding how

community needs were addressed in the focus area. In this regard, it is worth noting that plans like the SUMP have acknowledged the importance of public engagement, and the municipality has made notable efforts to involve citizens in co-creation sessions, with efforts that have yielded positive outcomes, as seen in initiatives like the JUST STREETS project, according to stakeholders. However, the analysis suggests that in some cases, such commitments are sometimes challenging in practice.

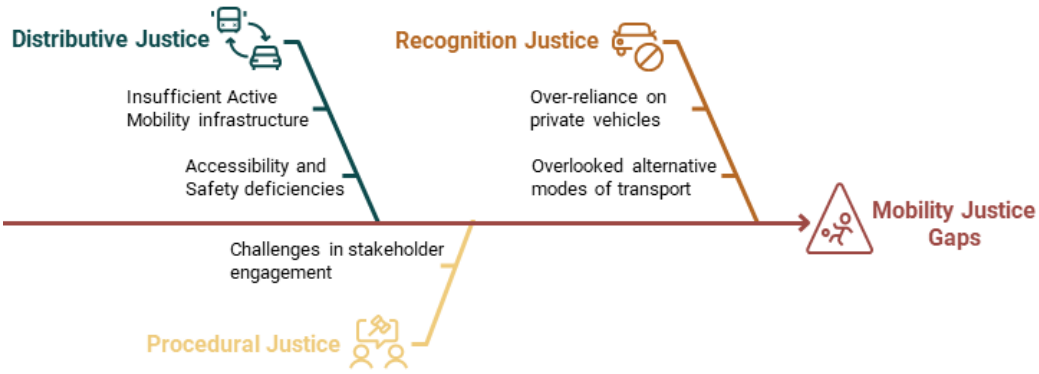


Figure 16: Mobility Justice gaps in the surrounding area of André Soares School
Source: Elaborated by the author

Ultimately, all the mentioned localized analysis contributed to generating context-sensitive and justice-oriented recommendations, including both short-term and mid-term to long-term measures according to the needs expressed by diverse stakeholders, which were guided by the goal of advancing safer, accessible, and inclusive mobility solutions, in order to support the JUST STREETS Project.

Last but not least, it is worth noting that the city of Braga already benefits from a pedestrianized area in its historic center. Since the André Soares School is located within approximately an 800-meter radius, corresponding to a 10-minute walk at an average speed, from the pedestrian area, extending pedestrianization to the school's surroundings presents a valuable opportunity for systemic active mobility improvement within the city. Although this thesis highlights existing obstacles and opportunities, it remains to be seen how the city will advance its pedestrianization strategy in practice. In this regard, integrating school street initiatives, when guided by the principles of mobility justice, into the ongoing efforts to pedestrianize Braga's urban fabric could serve as a pivotal step toward creating a more accessible, safer, and inclusive city.

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Annex

Annex A: Field observation sheets

Annex A includes selected samples from field observation conducted in the surrounding area of André Soares School, which were carried out on weekdays, weekends, and during Easter holidays, at three different time periods: morning, noon, and afternoon. The aim was to document the mobility pattern of the area, including street use, pedestrian behavior, car circulation, and obstacles. The full dataset is available in the following link:

https://drive.google.com/file/d/1HBjYcbfQM2posPwiGuMxz4QMW0BxToq3/view?usp=drive_link

Sample 1:

Date: Tuesday, April 8th, 2025 - Easter holiday

Time: 8:30 to 9:30

Key observations: Vehicle license plate numbers were documented and compared with the previous day to understand how many vehicles had been parked since then. This was done every morning to better understand the number of vehicles that use the parking area on consecutive days. Moreover, the travel behavior and number of people using different modes of transport, and their route of commuting, had been documented for further analysis.

DIRECT OBSERVATION RECORD

JUST STREETS Project – The area around the EB 2/3 André Soares School

Name	Afefeh
Date/day of the week	Tuesday (April 8th)
Hours	8:30 – 9:30 AM
Meteorology (weather)	Sunny 15°
Notes	10 cars were parked since yesterday.

I. VEHICLE COUNTING

	A	B	C	D
1	Reduced mobility	3607JZ	24TF91	32ZD45
2	08UI61	87IQ50	AB80IN	AF87AS
3	2975JE	50TH05 - Caravan	62IN66	800025
4	BP78QL	45AJ53	86MP78	0455NP
5	92GS29	83EJ39	7539PB	06SQ18
6	AU60OS	0735JVB	77AT28	2741NX
7	3XG97	went 92DN30 - 8087RT	21FM85	0238RN
8	13UU31	58HA61	14GH65	09VZ74
9	3872ZV	1340VI	42JQ76	40CG96
10	470P17	went 29BA24 - 80QL37	55IN54	1461NA
11	BB52HF	29PL51	went 23MQ66 - 23AS13	698A94
12	25QU2A	4862VL	53VJ78	88NB71
13	99JV74	18VU62	98UX14	BR11SH
14	empty	83LF63	470V61	46HL50
15	–	1UP74	BB30HA	17DP56
16	–	–	AF94RO	50RV07
17	–	–	–	AU43HS

DIRECT OBSERVATION RECORD

JUST STREETS Project – The area around the EB 2/3 André Soares School

Name	Aleteh	Map
Date/day of the week	Tuesday (April 8th)	
Hours	8:30 - 9:30 AM	
Meteorology (weather)	Sunny 15°	
Notes		

I. VEHICLE COUNTING

Counting vehicles crossing Rua André Soares or parking in this area.

30 cars were looking for parking

Vehicle type	car	PT	truck	motorcycle	Bicycle/Scooter	others
crossed 453			2	2	2	
parked 11 → parked 11 → double	ddddddddddd d					
Number of vehicles parked at the start of the observation	60					
Number of vehicles parked at the end of the observation	60					

DIRECT OBSERVATION RECORD

JUST STREETS Project – The area around the EB 2/3 André Soares School

Name	Afefeh	Map
Date/ day of the week	Tuesday (April 8th)	
Hours	8:30 - 9:30 AM	
Weather	Sunny 15°	
Notes		

I. COUNTING PEOPLE

Counting people crossing Rua André Soares.

City-Users	0-3	4-12	13-18	19-65	+65	People with disabilities
Female				226	12	
Masculine		3	1	118	22	

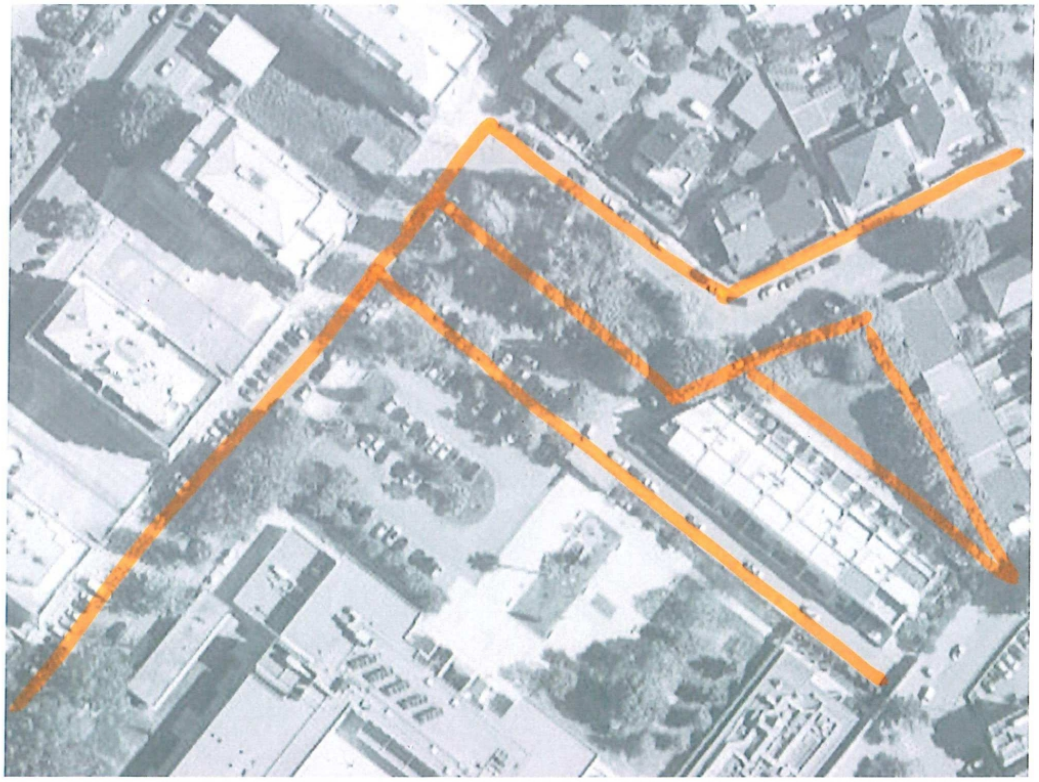
DIRECT OBSERVATION RECORD

JUST STREETS Project – The area around the EB 2/3 André Soares School

Name	Aleteh	Legend
Date/ day of the week	Tuesday (April 8th)	CB - Children at play –
Hours	8:30 - 9:30 AM	PC - Walking the dog 9
Weather	Sunny 15°	AG - Waiting –
Notes		SO - Socialize (talk, etc.) –
		PE - Physical exercise –
		SE - Sitting –
		O - Other
		PD - Travel route (number of people) 382

I. ACTIVITIES IN THE PUBLIC SPACE

Categorization of the type of activities observed on Rua André Soares.



1

Sample 2:

Date: Monday, March 28th, 2025 - weekend

Time: 12:30 to 13:30

Key observations: Vehicle license plate numbers were documented and compared with the previous timeframe, morning, to understand how many vehicles had been parked since then. This was done every noon to better understand the number of vehicles that use the parking area in the weekend to realize whether they are local or not. In addition to the parking behavior, vehicle movement, pedestrian activity, and the number of people using different modes of transport, as well as the use of public space, had been documented for further analysis.

DIRECT OBSERVATION RECORD
JUST STREETS Project – The area around the EB 2/3 André Soares School

Name	Atefeh
Date/day of the week	Sunday (March 23rd)
Hours	12-13
Meteorology (weather)	Cloudy - rainy
Notes	14 cars were parked since morning

I. VEHICLE COUNTING

	A	B	C	D
1	Reduced mobility	IHP 565 - Caravan	empty	empty
2	7236 PF 00/03	31 NI 05 11/08	empty	empty
3	BG98EU	empty	empty	empty
4	empty	9079 HJ	empty	empty
5	empty	empty	empty	empty
6	28 CQ 23	29 BA 24 05/12	empty	empty
7	53 FI 81 08/03	empty	empty	AC 94 U2
8	empty	25Q U24 16/07	empty	empty
9	empty	empty	empty	empty
10	FY 914 PR - Caravan	FE 71 ABF - Caravan	empty	empty
11	empty	16762Q 05/03	empty	empty
12	BK 42382 - Caravan	empty	2138 HG	empty
13	empty	50 TH 05 - Caravan	21 VS 40 18/11	empty
14	empty	01 22 RJ 01/03	empty	empty
15	[redacted]	[redacted]	empty	empty
16	[redacted]	[redacted]	empty	empty
17	[redacted]	[redacted]		64 NM 15 11/09

4 people inside

YX 72 DKE - Caravan

1

DIRECT OBSERVATION RECORD

JUST STREETS Project – The area around the EB 2/3 André Soares School

Name	Atefeh	Map
Date/day of the week	Sunday (March 23rd)	
Hours	12-13	
Meteorology (weather)	Cloudy - rainy	
Notes		

I. VEHICLE COUNTING

Counting vehicles crossing Rua André Soares or parking in this area.

Vehicle type	car	PT	truck	motorcycle	Bicycle/Scooter	others
crossed	✓✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓ ✓ 29		✓ ✓trash 2	✓ 1		
parked	✓→in André Soares ✓→in André Soares 2					
Number of vehicles parked at the start of the observation	20					
Number of vehicles parked at the end of the observation	20					

DIRECT OBSERVATION RECORD

JUST STREETS Project – The area around the EB 2/3 André Soares School

Name	Atefeh	Map
Date/ day of the week	Sunday (March 23rd)	
Hours	12 - 13	
Weather	Cloudy - rainy	
Notes		

I. COUNTING PEOPLE

Counting people crossing Rua André Soares.

City-Users	0-3	4-12	13-18	19-65	+65	People with disabilities
Female		✓ 1	✓ 1	✓✓✓✓ ✓✓✓✓ ✓✓✓✓ ✓✓ ↓ trash bin 19	✓✓ 2	
Masculine		✓✓✓ ↓ For trash bin 3		✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓ ✓✓✓✓✓ ✓ 19 ↓ For trash bin	✓✓ 2	

DIRECT OBSERVATION RECORD

JUST STREETS Project – The area around the EB 2/3 André Soares School

Name	Ateleh	Legend
Date/ day of the week	Sunday (March 23rd)	CB - Children at play –
Hours	12 - 13	PC - Walking the dog 8
Weather	Cloudy - rainy	AG - Waiting –
Notes		SO - Socialize (talk, etc.) –
		PE - Physical exercise 1
		SE - Sitting –
		O - Other 30
		PD - Travel route (number of people) 42
		for trash bin 3

I. ACTIVITIES IN THE PUBLIC SPACE

Categorization of the type of activities observed on Rua André Soares.

Sample 3:

Date: Friday, March 28th, 2025 - working day

Time: 17:30 to 18:30

Key observations: Vehicle license plate numbers were documented and compared with the previous timeframe to understand how many vehicles had been parked since then. This was done every evening to understand better the number of vehicles that use the parking area for the whole day, as well as from noon to evening. In addition to the parking behavior, vehicle movement, pedestrian activity, and the number of people using different modes of transport, as well as the use of public space, have been documented for further analysis.

DIRECT OBSERVATION RECORD
JUST STREETS Project – The area around the EB 2/3 André Soares School

Name	Aleteh
Date/day of the week	Friday (March 28th)
Hours	17:30 - 18:30
Meteorology (weather)	Sunny 18°
Notes	From 8:30 to 17:30 → 23 cars were parked (11 cars left at 18:39 From 12:30 to 17:30 → 4 cars were parked

I. VEHICLE COUNTING

	A	B	C	D
1	Reduced mobility	BB23NV	empty	32D45
2	44VE14	57PP42	64NU84 - went empty	AV78EN
3	99JV74 - empty	34 went MB87 - 34BX40	went AB07QI - 24HA26	090G37
4	2975JE - empty	empty - 56VR18	went 4514TV - 88VL77	22GC53 - empty
5	62TB95 - empty	56FE60	went 0028DM - VE76HJ	86MP78 - empty
6	AU600S	161M52	06BB86	1461NA - empty
7	9328PF	went 14GH65 - 57SI72	2897HX - empty	1140XL - empty
8	empty	11QJ19	7518QU	01QI41 - empty
9	75EG45	went 79CF11 - AV302R	3161HV	8579RZ - empty
10	25QU24	96QJ20	went 31DU31 - AF48RQ	8453TX - empty
11	40IB49	went 95BS58 - 2955PF	AA08EP - empty	went 21FM85 - 4479MVV
12	empty	empty	AX72NF - empty	empty
13	07TL67	50TH05 - Caravan	empty - A047PL	went 222046 - 73TI99
14	empty	69QC76	went AQ35CS - 99PU72	went AQ2300 - 50XE86
15	—	6911TT	46GU69	21VS40
16	—	—	47JN12	went 77DC30 - 45EU68
17	—	—	—	went 56RF10 - AE89AR

DIRECT OBSERVATION RECORD

JUST STREETS Project – The area around the EB 2/3 André Soares School

Name	Aleksh	Map
Date/day of the week	Friday (March 28th)	
Hours	17:30 - 18:30	
Meteorology (weather)	Sunny 18°	
Notes		

I. VEHICLE COUNTING

Counting vehicles crossing Rua André Soares or parking in this area.

→ 975

Vehicle type	car	PT	truck	motorcycle	Bicycle/Scooter	others
crossed		1 taxi 1		6	11	
parked 108 → d 24 → parked						
Number of vehicles parked at the start of the observation	53					
Number of vehicles parked at the end of the observation	41					

DIRECT OBSERVATION RECORD

JUST STREETS Project – The area around the EB 2/3 André Soares School

Name	Atefeh	Map
Date/ day of the week	Friday (March 28th)	
Hours	17:30 - 18:30	
Weather	Sunny 18°	
Notes		

I. COUNTING PEOPLE

Counting people crossing Rua André Soares.

320 263

City-Users	0-3	4-12	13-18	19-65	+65	People with disabilities
Female	6			255	30	2
Masculine	3				21	

304 235 251

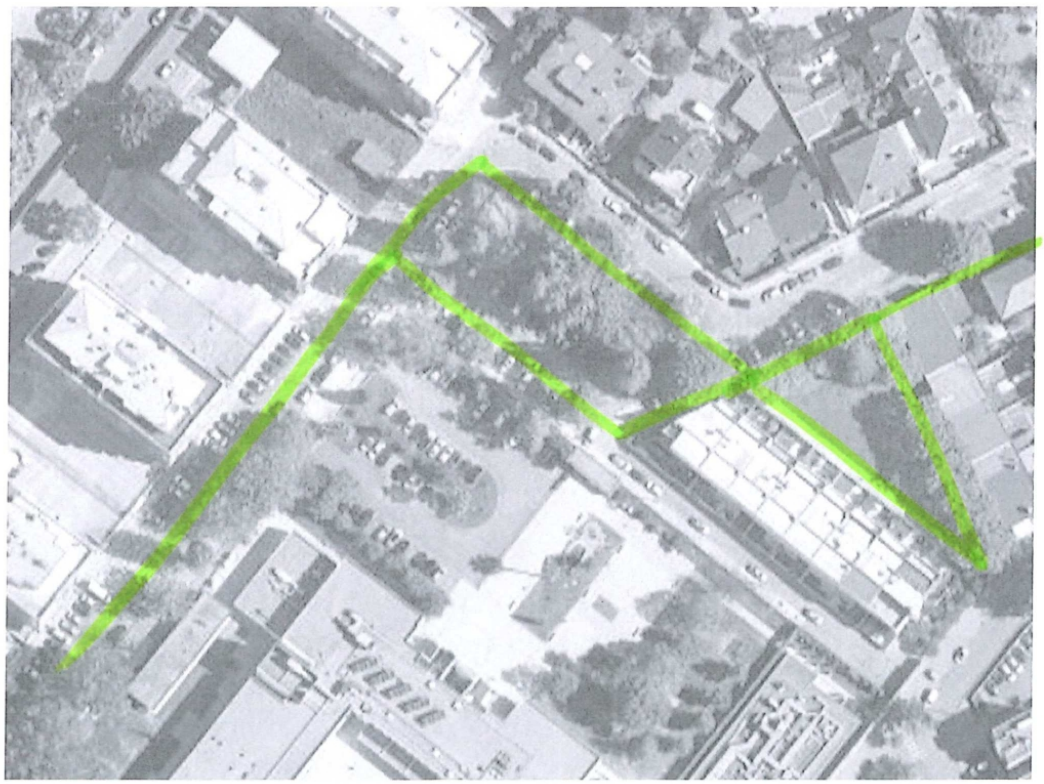
1

DIRECT OBSERVATION RECORD
JUST STREETS Project – The area around the EB 2/3 André Soares School

Name	Afereh	Legend
Date/ day of the week	Friday (March 28th)	CB - Children at play –
Hours	17:30 - 18:30	PC - Walking the dog 4
Weather	Sunny 18°	AG - Waiting 290
Notes	crossed	SO - Socialize (talk, etc.) PE - Physical exercise SE - Sitting 2 with dog + 20 O - Other 1374 PD - Travel route (number of people) 1690

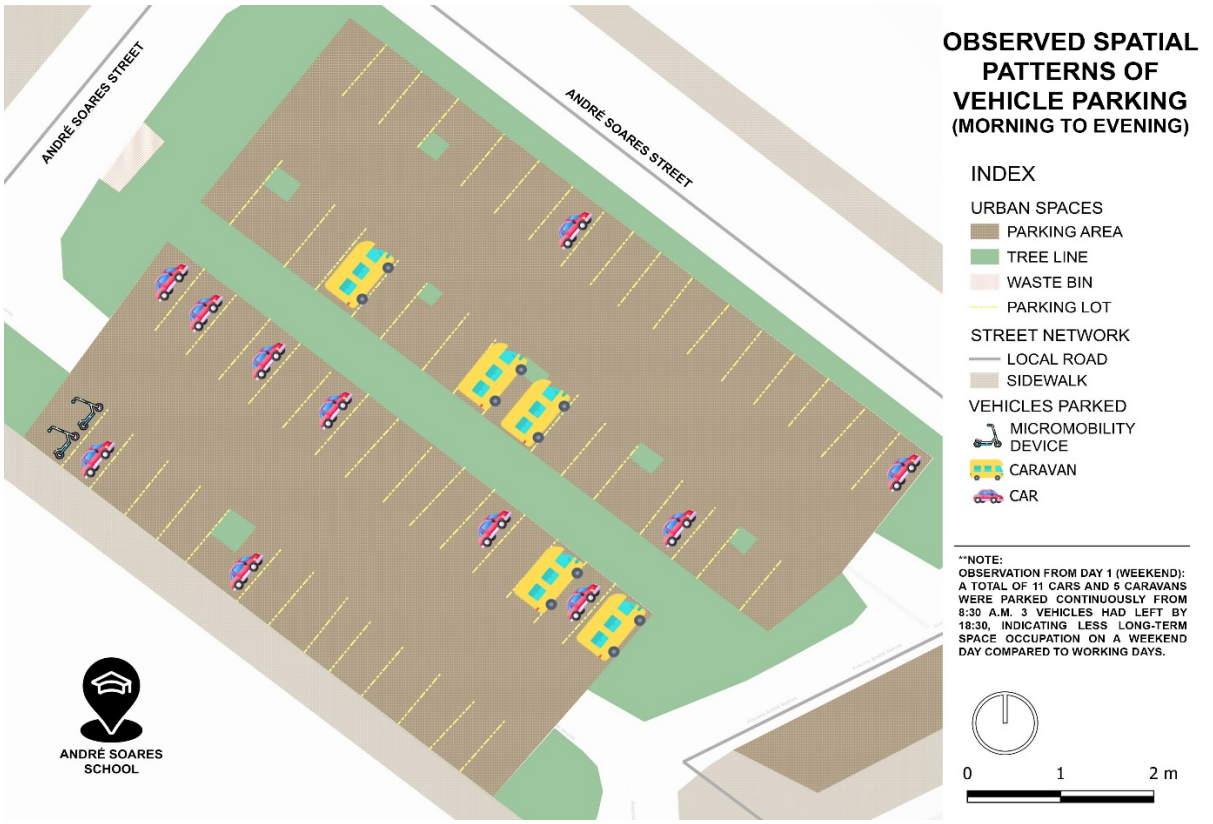
I. ACTIVITIES IN THE PUBLIC SPACE

Categorization of the type of activities observed on Rua André Soares.



Annex B: Maps of Parking Distribution

This annex section presents a series of maps produced by the author using QGIS, illustrating the location of parked vehicles within the parking area in front of the entrance gate of André Soares School during field observations. The maps are organized by time of day and type of day, including working days, weekends, and the Easter holidays. They were used to analyze parking activity and spatial patterns across different timeframes: morning, noon, afternoon, the entire day, and changes from one day to the next. The maps reveal a predominance of vacant parking spaces on weekends, indicating low residential or school-related demand, and a reduced presence of vehicles compared to working days. On working days and during the Easter holidays, the maps show low turnover from morning to evening, alongside consistently high parking demand, often involving non-resident users. Overnight vehicle occupancy patterns suggest that long-term parking demand is low relative to the daily usage driven by school-related activity, which underscores the strong influence of school operations on parking activity, even on non-school days when some institutional activity continues. The maps also document the recurring presence of caravans parked in the area, despite regulations prohibiting them.



OBSERVED SPATIAL PATTERNS OF VEHICLES PARKED (SINCE THE PREVIOUS DAY)

INDEX

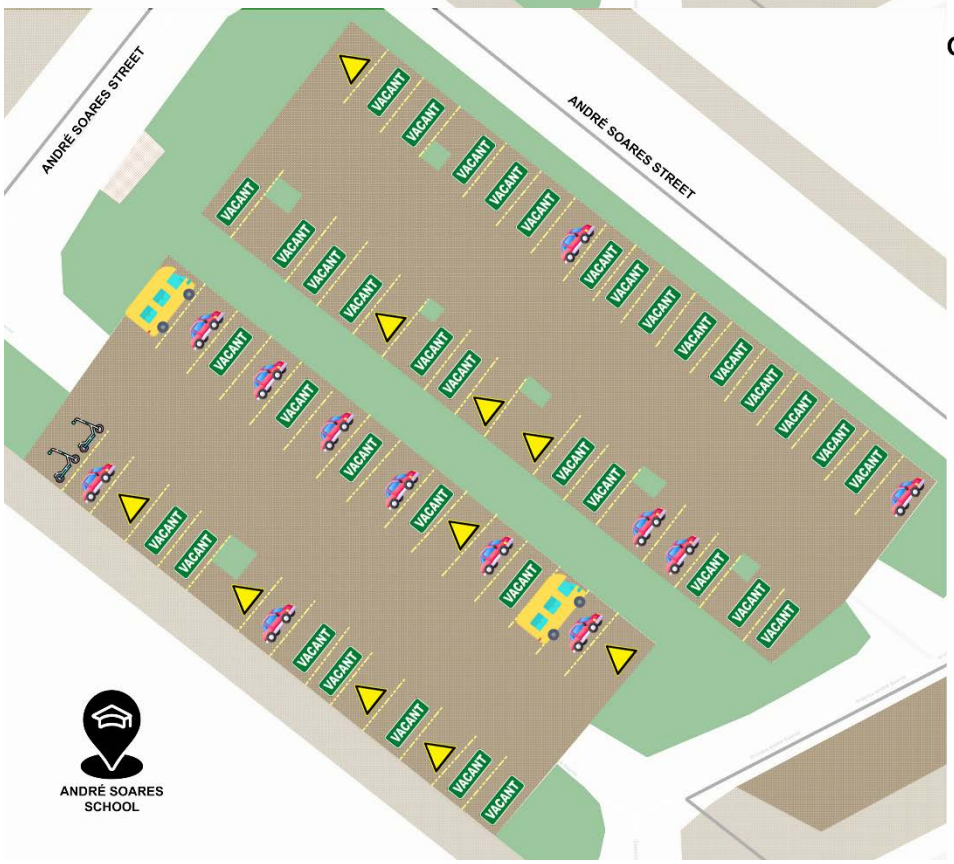
URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR

**NOTE:
OBSERVATION FROM DAY 2 (WEEKEND): A TOTAL OF 10 CARS AND 3 CARAVANS WERE PARKED CONTINUOUSLY SINCE THE PREVIOUS DAY, INDICATING LESS LONG-TERM SPACE OCCUPATION OF VEHICLES OVERNIGHT COMPARED TO THE USAGE DURING THE DAY IN THE PARKING AREA (13 SPOT OUT OF 61 WERE OCCUPIED).

0 1 2 m



OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (MORNING TO NOON)

INDEX

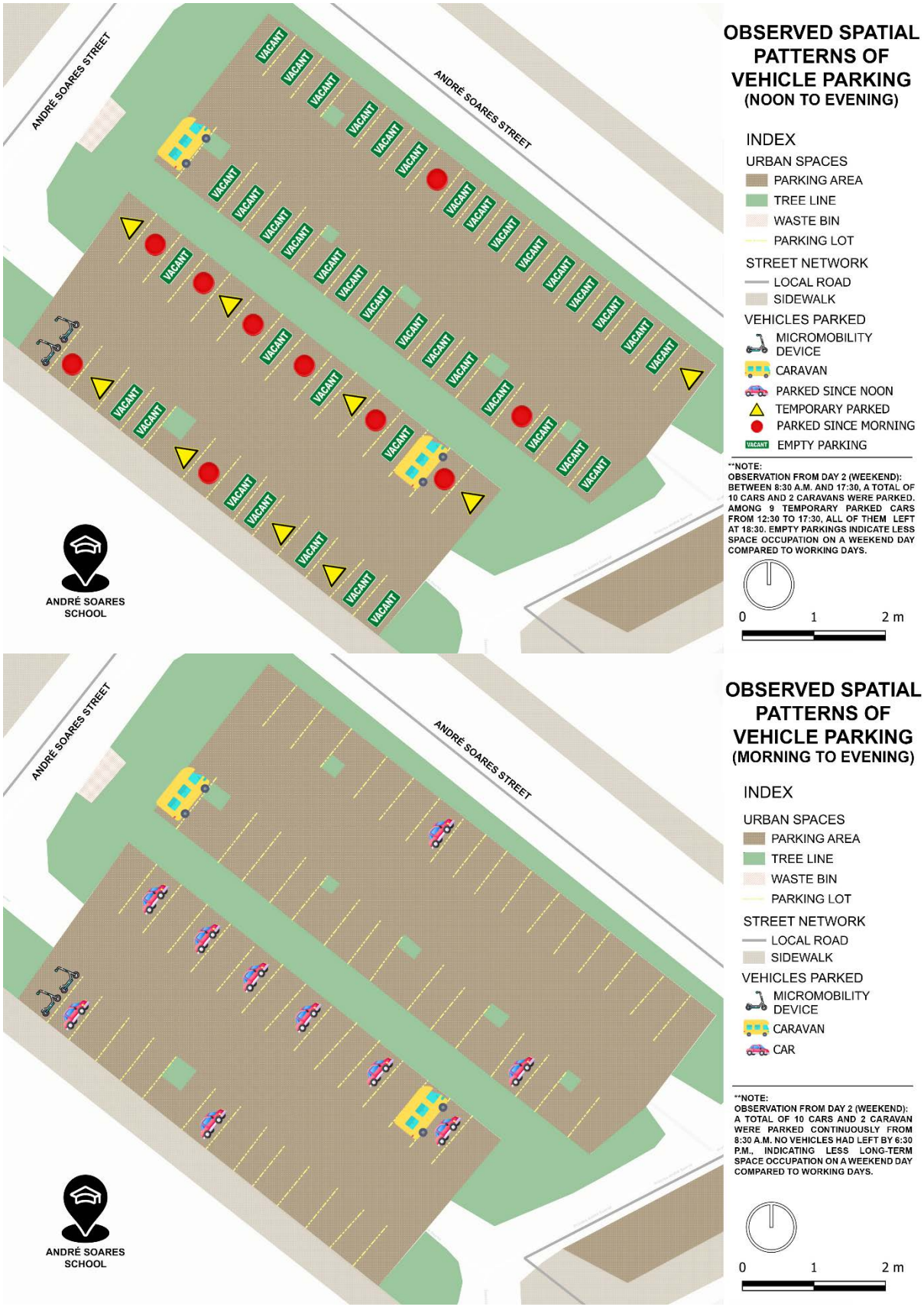
URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR SINCE MORNING
- VACANT EMPTY PARKING
- TEMPORARY PARKED

**NOTE:
OBSERVATION FROM DAY 2 (WEEKEND): A TOTAL OF 12 CARS AND 2 CARAVANS WERE PARKED FROM 8:30 A.M. TO 12:30. AMONG 6 TEMPORARY PARKED VEHICLES, 4 WERE CARAVANS WITH PEOPLE INSIDE. EMPTY PARKINGS INDICATE LESS SPACE OCCUPATION ON A WEEKEND DAY COMPARED TO WORKING DAYS.

0 1 2 m


ANDRÉ SOARES STREET
ANDRÉ SOARES STREET
VACANT
ANDRÉ SOARES SCHOOL
OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING
(NOON TO EVENING)
INDEX
URBAN SPACES
PARKING AREA
TREE LINE
WASTE BIN
PARKING LOT
STREET NETWORK
LOCAL ROAD
SIDEWALK
VEHICLES PARKED
MICROMOBILITY DEVICE
CARAVAN
PARKED SINCE NOON
TEMPORARY PARKED
PARKED SINCE MORNING
VACANT EMPTY PARKING
**NOTE:
OBSERVATION FROM DAY 2 (WEEKEND): BETWEEN 8:30 A.M. AND 17:30, A TOTAL OF 10 CARS AND 2 CARAVANS WERE PARKED. AMONG 9 TEMPORARY PARKED CARS FROM 12:30 TO 17:30, ALL OF THEM LEFT AT 18:30. EMPTY PARKINGS INDICATE LESS SPACE OCCUPATION ON A WEEKEND DAY COMPARED TO WORKING DAYS.
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2 m

ANDRÉ SOARES STREET
ANDRÉ SOARES STREET
ANDRÉ SOARES SCHOOL
OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING
(MORNING TO EVENING)
INDEX
URBAN SPACES
PARKING AREA
TREE LINE
WASTE BIN
PARKING LOT
STREET NETWORK
LOCAL ROAD
SIDEWALK
VEHICLES PARKED
MICROMOBILITY DEVICE
CARAVAN
CAR
**NOTE:
OBSERVATION FROM DAY 2 (WEEKEND): A TOTAL OF 10 CARS AND 2 CARAVAN WERE PARKED CONTINUOUSLY FROM 8:30 A.M. NO VEHICLES HAD LEFT BY 6:30 P.M., INDICATING LESS LONG-TERM SPACE OCCUPATION ON A WEEKEND DAY COMPARED TO WORKING DAYS.
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OBSERVED SPATIAL PATTERNS OF VEHICLES PARKED (SINCE THE PREVIOUS DAY)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR

**NOTE:
OBSERVATION FROM DAY 3 (WORKING DAY):
A TOTAL OF 8 CARS AND 2 CARAVANS WERE PARKED CONTINUOUSLY SINCE THE PREVIOUS DAY, INDICATING LESS LONG-TERM SPACE OCCUPATION OF VEHICLES OVERNIGHT COMPARED TO THE USAGE DURING THE DAY IN THE PARKING AREA (10 SPOT OUT OF 61 WERE OCCUPIED).

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (MORNING TO NOON)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR SINCE MORNING
- VACANT EMPTY PARKING
- TEMPORARY PARKED

**NOTE:
OBSERVATION FROM DAY 3 (WORKING DAY):
A TOTAL OF 37 CARS AND 2 CARAVANS WERE PARKED FROM 8:30 A.M. TO 12:30, THAT ONLY 6 OF THEM LEFT THE PARKING AT 13:30. ONLY 1 VACANT SPACE, WHICH IS FOR DISABLED PEOPLE, INDICATES LONG-TERM SPACE OCCUPATION ON A SCHOOL DAY.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (NOON TO EVENING)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- PARKED SINCE NOON
- VACANT EMPTY PARKING
- TEMPORARY PARKED
- PARKED SINCE MORNING

**NOTE:
OBSERVATION FROM DAY 3 (WORKING DAY):
BETWEEN 12:30 AND 17:30, A TOTAL OF 9 CARS WERE PARKED. ADDITIONALLY, 16 CARS AND 2 CARAVANS WERE PARKED SINCE MORNING UNTIL EVENING. BY 18:30, ONLY 10 OF THESE VEHICLES HAD LEFT. THIS LEVEL OF PARKING TURNOVER INDICATES HIGH PRESENCE OF VEHICLES ON SCHOOL DAYS.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (MORNING TO EVENING)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR

**NOTE:
OBSERVATION FROM DAY 3 (WORKING DAY):
A TOTAL OF 15 CARS AND 2 CARAVAN WERE PARKED CONTINUOUSLY FROM 8:30 A.M. ONLY 9 VEHICLES HAD LEFT BY 6:30 P.M., INDICATING LONG-TERM SPACE OCCUPATION ON A SCHOOL DAY.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLES PARKED (SINCE THE PREVIOUS DAY)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR

**NOTE:
OBSERVATION FROM DAY 4 (WORKING DAY):
A TOTAL OF 6 CARS AND 2 CARAVANS WERE PARKED CONTINUOUSLY SINCE THE PREVIOUS DAY, INDICATING LESS LONG-TERM SPACE OCCUPATION OF VEHICLES OVERNIGHT COMPARED TO THE USAGE DURING THE DAY IN THE PARKING AREA (8 SPOT OUT OF 61 WERE OCCUPIED).

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (MORNING TO NOON)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR SINCE MORNING
- VACANT EMPTY PARKING
- TEMPORARY PARKED

**NOTE:
OBSERVATION FROM DAY 4 (WORKING DAY):
A TOTAL OF 49 CARS AND 2 CARAVANS WERE PARKED FROM 8:30 A.M. TO 12:30, THAT ONLY 6 OF THEM LEFT THE PARKING AT 13:30. ONLY 1 VACANT SPACE, WHICH IS FOR DISABLED PEOPLE, INDICATES LONG-TERM SPACE OCCUPATION ON A SCHOOL DAY.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (NOON TO EVENING)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- PARKED SINCE NOON
- VACANT EMPTY PARKING
- TEMPORARY PARKED
- PARKED SINCE MORNING

**NOTE:
OBSERVATION FROM DAY 4 (WORKING DAY):
BETWEEN 12:30 AND 17:30, A TOTAL OF 4 CARS WERE PARKED. ADDITIONALLY, 22 CARS AND 2 CARAVANS WERE PARKED FROM MORNING UNTIL EVENING. BY 18:30, ONLY 12 OF THESE VEHICLES HAD LEFT. THIS LEVEL OF PARKING TURNOVER INDICATES HIGH PRESENCE OF VEHICLES ON SCHOOL DAYS.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (MORNING TO EVENING)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR

**NOTE:
OBSERVATION FROM DAY 4 (WORKING DAY):
A TOTAL OF 22 CARS AND 2 CARAVAN WERE PARKED CONTINUOUSLY FROM 8:30 A.M. ONLY 12 VEHICLES HAD LEFT BY 6:30 P.M., INDICATING LONG-TERM SPACE OCCUPATION ON A SCHOOL DAY.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLES PARKED
(SINCE THE PREVIOUS DAY)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR

**NOTE:
OBSERVATION FROM DAY 5 (WORKING DAY):
A TOTAL OF 9 CARS AND 2 CARAVANS WERE PARKED CONTINUOUSLY SINCE THE PREVIOUS DAY, INDICATING LESS LONG-TERM SPACE OCCUPATION OF VEHICLES OVERNIGHT COMPARED TO THE USAGE DURING THE DAY IN THE PARKING AREA (11 SPOT OUT OF 61 WERE OCCUPIED).

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING
(MORNING TO NOON)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR SINCE MORNING
- VACANT EMPTY PARKING
- TEMPORARY PARKED

**NOTE:
OBSERVATION FROM DAY 5 (WORKING DAY):
A TOTAL OF 45 CARS AND 4 CARAVANS WERE PARKED FROM 8:30 A.M. TO 12:30, THAT ONLY 10 OF THEM LEFT THE PARKING AT 13:30. ONLY 3 VACANT SPACE, AMONG TOTAL 61, INDICATES LONG-TERM SPACE OCCUPATION ON A SCHOOL DAY.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (NOON TO EVENING)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- PARKED SINCE NOON
- VACANT EMPTY PARKING
- TEMPORARY PARKED
- PARKED SINCE MORNING

**NOTE:
OBSERVATION FROM DAY 5 (WORKING DAY):
BETWEEN 12:30 AND 17:30, A TOTAL OF 4 CARS WERE PARKED. ADDITIONALLY, 21 CARS AND 2 CARAVANS WERE PARKED FROM MORNING UNTIL EVENING. BY 18:30, ONLY 11 OF THESE VEHICLES HAD LEFT. THIS LEVEL OF PARKING TURNOVER INDICATES HIGH PRESENCE OF VEHICLES ON SCHOOL DAYS.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (MORNING TO EVENING)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR

**NOTE: OBSERVATION FROM DAY 5 (WORKING DAY):
A TOTAL OF 22 CARS AND 1 CARAVAN WERE PARKED CONTINUOUSLY FROM 8:30 A.M. ONLY 11 VEHICLES HAD LEFT BY 6:30 P.M., INDICATING LONG-TERM SPACE OCCUPATION ON A SCHOOL DAY.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLES PARKED (SINCE THE PREVIOUS DAY)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR

**NOTE:
OBSERVATION FROM DAY 6 (THE EASTER HOLIDAYS):
A TOTAL OF 8 CARS AND 1 CARAVAN WERE PARKED CONTINUOUSLY SINCE THE PREVIOUS DAY, INDICATING LESS LONG-TERM SPACE OCCUPATION OF VEHICLES OVERNIGHT COMPARED TO THE USAGE DURING THE DAY IN THE PARKING AREA (9 SPOT OUT OF 61 WERE OCCUPIED).

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (MORNING TO NOON)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR SINCE MORNING
- VACANT EMPTY PARKING
- TEMPORARY PARKED

**NOTE:
OBSERVATION FROM DAY 6 (THE EASTER HOLIDAYS):
A TOTAL OF 47 CARS AND 2 CARAVANS WERE PARKED FROM 8:30 A.M. TO 12:30, THAT ONLY 2 OF THEM LEFT THE PARKING AT 13:30. NO VACANT SPACE INDICATES LONG-TERM SPACE OCCUPATION ON A SCHOOL DAY.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (NOON TO EVENING)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- PARKED SINCE NOON
- VACANT EMPTY PARKING
- TEMPORARY PARKED
- PARKED SINCE MORNING

**NOTE: OBSERVATION FROM DAY 6 (THE EASTER HOLIDAYS):
BETWEEN 12:30 AND 17:30, ONLY 2 CARS WERE PARKED. 28 CARS AND 1 CARAVAN WERE PARKED FROM MORNING UNTIL EVENING. BY 18:30, ONLY 11 OF THESE VEHICLES HAD LEFT. THIS LEVEL OF PARKING TURNOVER INDICATES HIGH PRESENCE OF VEHICLES ON THE EASTER HOLIDAYS WHICH ONLY SCHOOL STAFFS WERE PRESENT NOT STUDENTS.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (MORNING TO EVENING)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR

**NOTE: OBSERVATION FROM DAY 6 (THE EASTER HOLIDAYS):
A TOTAL OF 30 CARS AND 1 CARAVAN WERE PARKED CONTINUOUSLY FROM 8:30 A.M. ONLY 11 VEHICLES HAD LEFT BY 6:30 P.M., INDICATING LONG-TERM SPACE OCCUPATION ON A NON-SCHOOL DAY.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLES PARKED (SINCE THE PREVIOUS DAY)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR

**NOTE:
OBSERVATION FROM DAY 7 (THE EASTER HOLIDAYS):
A TOTAL OF 9 CARS AND 1 CARAVAN WERE PARKED CONTINUOUSLY SINCE THE PREVIOUS DAY, INDICATING LESS LONG-TERM SPACE OCCUPATION OF VEHICLES OVERNIGHT COMPARED TO THE USAGE DURING THE DAY IN THE PARKING AREA (10 SPOT OUT OF 61 WERE OCCUPIED).

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (MORNING TO NOON)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR SINCE MORNING
- VACANT EMPTY PARKING
- TEMPORARY PARKED

**NOTE: OBSERVATION FROM DAY 7 (THE EASTER HOLIDAYS):
A TOTAL OF 51 CARS AND 1 CARAVAN WERE PARKED FROM 8:30 A.M. TO 12:30, THAT ONLY 6 OF THEM LEFT THE PARKING AT 13:30. ONLY 1 VACANT SPACE, WHICH IS FOR DISABLED PEOPLE, INDICATES LONG-TERM SPACE OCCUPATION ON THE EASTER HOLIDAYS WHICH ONLY SCHOOL STAFFS WERE PRESENT NOT STUDENTS.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (NOON TO EVENING)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- PARKED SINCE NOON
- VACANT EMPTY PARKING
- TEMPORARY PARKED
- PARKED SINCE MORNING

**NOTE: OBSERVATION FROM DAY 7 (THE EASTER HOLIDAYS):
BETWEEN 12:30 AND 17:30, ONLY 6 CARS WERE PARKED. 26 CARS AND 1 CARAVAN WERE PARKED FROM MORNING UNTIL EVENING. BY 18:30, ONLY 9 OF THESE VEHICLES HAD LEFT. THIS LEVEL OF PARKING TURNOVER INDICATES HIGH PRESENCE OF VEHICLES ON THE EASTER HOLIDAYS WHICH ONLY SCHOOL STAFFS WERE PRESENT NOT STUDENTS.

0 1 2 m

OBSERVED SPATIAL PATTERNS OF VEHICLE PARKING (MORNING TO EVENING)

INDEX

URBAN SPACES
- PARKING AREA
- TREE LINE
- WASTE BIN
- PARKING LOT

STREET NETWORK
- LOCAL ROAD
- SIDEWALK

VEHICLES PARKED
- MICROMOBILITY DEVICE
- CARAVAN
- CAR

**NOTE: OBSERVATION FROM DAY 7 (THE EASTER HOLIDAYS):
A TOTAL OF 27 CARS AND 1 CARAVAN WERE PARKED CONTINUOUSLY FROM 8:30 A.M. ONLY 9 VEHICLES HAD LEFT BY 6:30 P.M., INDICATING LONG-TERM SPACE OCCUPATION ON A NON-SCHOOL DAY.

0 1 2 m

Annex C: Interview Questions

This thesis conducted semi-structured interviews considering the role of each stakeholder. As a diverse group of stakeholders, including schoolteachers, students, parents, residents, shop owners, and other city users, were interviewed, the interview questions for some categories differed, while the questions for parents, schoolteachers, residents, shop owners, and city users were the same. The following section presents all the questions. It should be noted that some interviews were conducted in Portuguese, and the questions were translated into Portuguese, but here the English versions of the questions are provided.

Interview Outline: Municipal technicians from the mobility department

- Personal and Professional Background

1. Could you please introduce yourself and your current role in your organization?
2. Could you please share the reflection of your work with school streets initiatives and how does your institution engage with issues related to mobility, safety, accessibility, and inclusivity particularly in school zones?

- Involvement with the André Soares School Area

3. Could you describe any past or current initiatives focused on safety, accessibility, walkability, or traffic regulation in the city and specifically in that area?

Follow-up Questions:

- Were the initiatives reactive (e.g., in response to accidents or complaints) or proactive?
- What were the main goals of those interventions?

- Recognition of Community Needs and Vulnerabilities (Recognition Justice)

4. What groups do you consider most vulnerable or at risk when it comes to school accessibility and safety? (e.g., children, caregivers, people with disabilities, the elderly, caregivers with strollers)
5. Are their specific needs and constraints considered in mobility infrastructure or traffic regulation around schools in Braga, specifically André Soares School Area?

Follow-up Questions:

- Are there any population groups whose needs you feel are often overlooked in school access planning?
- Are there situations where multiple vulnerabilities overlap, for example, parents with disabilities or elderly caregivers, and how are these cases considered in your planning?

- Participation and Decision-Making Processes (Procedural Justice)

6. What participatory processes exist for the school community (students, parents, teachers) and residents to express their mobility needs or concerns?
7. What challenges exist in making these participatory processes inclusive?

Follow-up Questions:

- Were there any tools or platforms used to gather community input (e.g., surveys, meetings, digital platforms)?
- How is the feedback from these participatory processes incorporated into actual decisions?

- Equity in Infrastructure and Investment (Distributive Justice)

8. Is the surrounding area of André Soares School receiving comparable attention and resources compared to other neighborhoods or school zones?
9. Are there specific funding or policy barriers to implement fairer school mobility infrastructure?

Follow-up Questions:

- What criteria are usually used to prioritize school street investments (e.g., accident data, complaints, school size, pupils' age)?
- Are there neighborhoods or schools in Braga that tend to receive more frequent interventions? Why?
- Have you observed any inequalities in how different groups experience mobility around the school?

- Observed and Desired Changes

10. How would you describe the current conditions for safety, accessibility, walking, and cycling around André Soares School?
11. What improvements (if any) have been made recently, and what challenges still persist?
12. If you could implement any change tomorrow, what would it be?

Follow-up Questions:

- What time periods (e.g., morning drop-off, afternoon pick-up) are most problematic?
- Have specific improvements (like crosswalks, traffic signs, police presence, …) had a noticeable impact?
- What are the most common complaints or requests from the school community?

- Reflections and Recommendations

13. Are there any overlooked issues you believe should be part of the conversation around school zones?
14. Are there other individuals, institutions, or documents you believe I should look into as part of this research?

Follow-up Questions:

- What do you think is the biggest barrier to achieving more just school streets (zones) in Braga?
- Have you seen examples of failed interventions that offer important lessons?
- What kinds of data or evidence do you think are most important for shaping good school mobility policy?

Interview Outline: Residents, Schoolteachers, Parents, City users, Shop owners

- Personal information

1. Could you please tell me a little about yourself, about your occupation, your age, and how long you have lived in the surrounding area of André Soares School?
2. How do you usually commute in the surrounding area of André Soares School?
3. What are your usual routes in the area?

- Safety and accessibility (Distributive Justice)

4. Do you feel it's safe and accessible for children to go to school on foot or by bike around the André Soares School area? Why or why not?
5. Do you notice any safety and accessibility problems that affect people moving around in this area (mostly for the elderly, children, people with disabilities, caregivers with strollers)?
6. Do you think that the street in general and crossings and sidewalks in the area are designed for everyone (e.g., elderly, children, people with disabilities, caregivers with strollers)?

Follow-up Questions:

- Have you seen people struggle to get around here because of poor infrastructure or obstacles?
- Are there areas or groups that seem to be left out or less considered?

- Inclusivity (Procedural Justice)

7. Have you ever been asked for your opinion or participated in decisions about the streets, traffic, or safety near the school?
8. Do you think involvement from people like you would help improve the city? How?

Follow-up Questions:

- In case you have been asked for your opinion, how was your experience? Were your opinions considered?
- If the municipality wanted to improve the streets around the school, how would you like to be involved (e.g., community meetings, surveys, school events, etc.)?
- Do you know if other residents, parents, or shopkeepers were involved in any street planning?

- (Recognition Justice)

9. Do you think the needs of different people in the area, like caregivers with strollers, people with disabilities, children, or elderly residents, are understood and respected in planning the streets and school zones?

Follow-up Questions:

- Can you think of any example where a group's needs were ignored or forgotten?

- Changes and Future Improvements

10. Have there been any changes in the last few years in terms of traffic, safety, or street design near the school? If yes, do they help? Why or why not?
11. If you could change one thing about the area around André Soares School to make it safer and more accessible to everyone, what would it be? And how would this change help vulnerable groups like children, the elderly, or people with disabilities, caregivers with strollers?
12. What would make it easier for children and people to walk or cycle in the area?
13. Do you think there's a cultural habit or belief in the community that makes people drive more and walk less? What could change that?

Follow-up Questions:

- Do you think these changes would help make the whole area better, not just for children, but for everyone?
- What is stopping people to walk or cycle in the area?
- How do you think changes could affect your own daily life or work?

Interview Outline: Students

- Personal information

1. Could you please tell me a little about yourself, and how long you have lived/studied in the area around André Soares School?
2. How do you usually get to the area around André Soares School?
3. What are your usual routes in the area?

- Safety and accessibility (Distributive Justice)

4. Do you feel it's safe and accessible for you to go to school on foot or by bike around the André Soares School area? Why or why not?
5. Do you notice any safety problems that affect people moving around this area (mostly for the elderly, children, people with disabilities, caregivers with strollers)?
6. Do you think that the street in general and crossings and sidewalks in the area are accessible and designed for everyone (e.g., elderly, children, people with disabilities, caregivers with strollers)?

Follow-up Questions:

- Have you seen people struggle to get around here because of poor infrastructure or obstacles?
- Are there areas or groups that seem to be left out or less considered?

- Inclusivity (Procedural Justice)

7. Have you ever been asked for your opinion or participated in decisions about the streets, traffic, or safety near the school?
8. Do you think involvement from people like you would help improve the city? How?

Follow-up Questions:

- In case you have been asked for your opinion, how was your experience? Were your opinions considered?
- If the municipality wanted to improve the streets around the school, how would you like to be involved (e.g., community meetings, surveys, school events, etc.)?

- (Recognition Justice)

9. Do you think the needs of different people in the area, like caregivers with strollers, people with disabilities, children, or elderly residents, are understood and respected in planning the streets and school zones?

Follow-up Questions:

- Can you think of any example where a group's needs were ignored or forgotten?

- Changes and Future Improvements

10. What do you like or not like about the street outside your school?
11. If you could change one thing about the surrounding area of André Soares School to make it safer and more accessible to everyone, what would it be? And how would this change help children like you?
12. What would make it easier for you to walk or cycle to school?
13. Do you think there's a cultural habit or belief in the community that makes people drive more and walk less? What could change that?

Follow-up Questions:

- Do you think these changes would help make the whole area better, not just for children, but for everyone?
- What is stopping people to walk or cycle in the area?
- How do you think changes could affect your own daily life?