Assessing the Condition and Availability of Urban Green Space in Cannaregio, Venice

An Interactive Qualifying Project
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We are here Venice

Abstract

Urban green space provides numerous benefits to cities. However, green space in Venice, Italy is limited, so properly using and maintaining these existing spaces is essential. We identified 489 green spaces in Cannaregio, Venice, and collected detailed data on the availability, amenities, vegetation, and maintenance needs of the 66 spaces that we could access. Only 47 of these are available to the public. This data was used to assess the condition of the spaces and how well the spaces serve the population. We found that the majority of green spaces in Cannaregio are too small to be usable for recreation and social purposes. We also found that most of the green space in Cannaregio is unavailable to the public, that there is not enough available green space, and that existing spaces are not distributed well for the population, based on metrics from the World Health Organization. We identified spaces that, if opened to the public, could better serve the people of Cannaregio. We made this and other recommendations to We are Here Venice, a green stewardship organization in Venice, and we produced a catalog to describe and promote some of the best green spaces in Cannaregio.
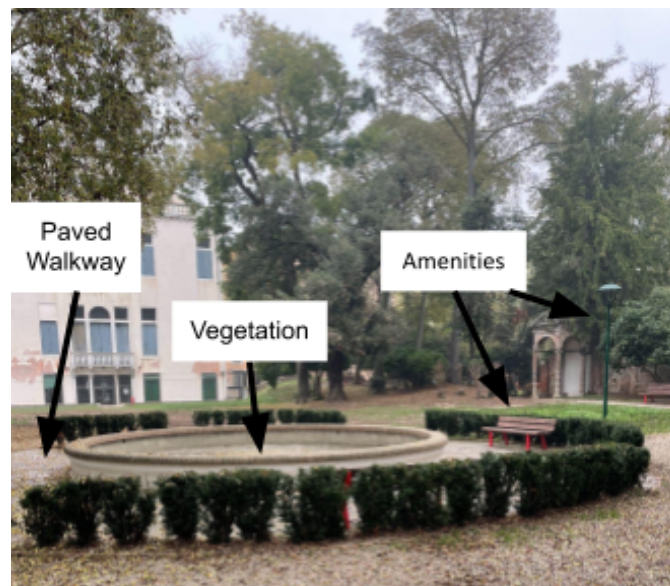
Executive Summary

There are many benefits of having and utilizing green spaces in cities. They improve human well being and provide various environmental benefits to cities. They can be found in the form of parks, gardens, urban wilds, courtyards, farmlands, and small spaces along streets.
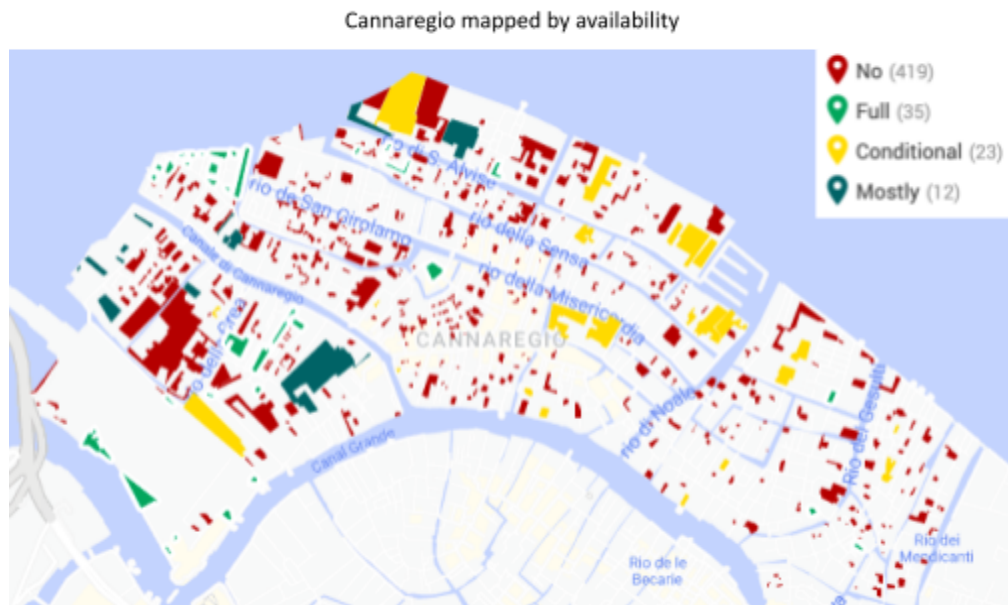
The city of Venice, Italy is limited in its ability to create new green spaces, so utilizing existing green spaces is vital. A complete survey of the green space in Venice would be useful for assessing the state of urban green space and how it might be better managed and used. Previous WPI research teams have begun these efforts by surveying the green spaces in Giudecca and Castello. Our project builds on this work by surveying Cannaregio, the most populated sestieri of Venice. We collaborated with We are Here Venice, a nonprofit that aims to promote the maintenance of green spaces in Venice, in this survey.

The goal of our project was to promote the use, maintenance, and stewardship of green spaces in Cannaregio. We visited all publicly available green spaces, recording the features of each space and noting any maintenance needs, and we assessed the adequacy of these spaces in serving the population. We published our data on a website and created a catalog that features the best green spaces in Cannaregio in order to increase public knowledge of green spaces.

We identified 489 green spaces in Cannaregio via satellite imagery and direct observation. Many of the spaces in Cannaregio are private and were therefore not surveyed, so we recorded only limited data on those spaces. We surveyed spaces that are publicly available–66 of the 489 spaces–and collected data on their availability, vegetation, and amenities such as benches, trash cans and fountains. We took many photos and identified common maintenance needs at the spaces.
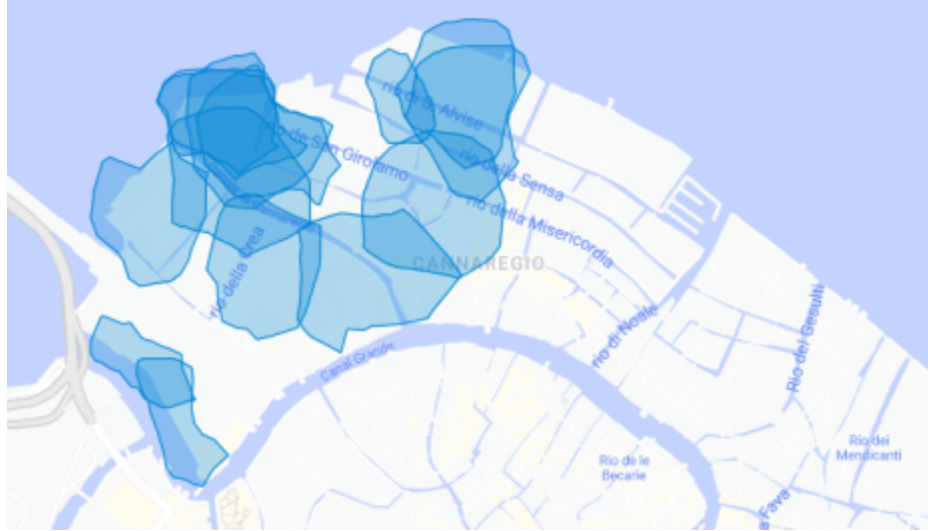

Out of the 489 green spaces, 419 were completely unavailable to the public (private or closed); 12 had limited availability due to restricted hours of operation, and 23 were available only by permission, leaving only 35 completely available spaces. The spaces were also quite small; the median size of all green spaces was 130m².

Cannaregio mapped by availability

No (419)
Full (35)
Conditional (23)
Mostly (12)

The recommended size for green spaces (to make them usable for recreation, socialization, etc.) by the World Health Organization (WHO) is 5,000m². Only 5 spaces met that criterion, and only 1 of those was publicly available. Many spaces were actually very small street plots that are decorative, and not conducive to other uses. It is clear that most of the spaces in Cannaregio do not meet this standard. This leaves only a few spaces being useful to the general public.
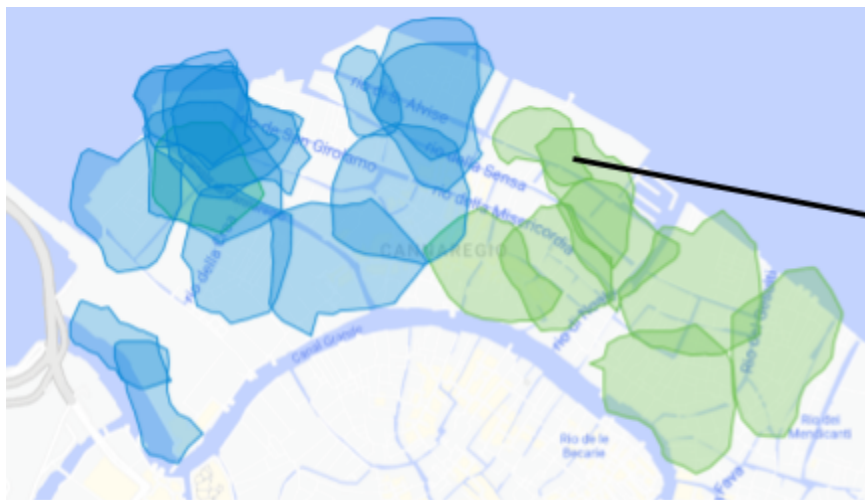
The standard amount of green space needed per individual is 9m² according to the WHO. Based on Cannaregio's population of about 14,000 people, we determined that Cannaregio does not have an adequate amount of green space to serve locals, as there is only 2m² available per person. There is only 1m² per person we consider tourists as well as residents, which we estimate as totaling to twice the population, or around 28,000 people.

Moreover, based on recommendations from the WHO, green spaces should be within a three minute walk from an individual's home to be well used. We used isochrones to show which sections of the sestiere are within a 3 minute walk from 11 green spaces that we deemed usable by the public. Usable spaces are publicly available and either sufficiently large to allow for recreational activities or provide useful amenities.

From this analysis, we see that the eastern section of Cannaregio had no usable green space within this recommended walking distance, which is particularly important given the aging population of Venice. For example, a person living on the east edge of Cannaregio would need to cross about six bridges and six islands to reach the nearest usable green space.

We recommended nine usable spaces that are currently only available by permission be opened to the public, which would double the amount of area covered. This would ensure most residents would have usable green space within a 3 minute walk from their homes.

Casa Cardinal Piazza

We recommended that We here Venice explore the possibility of opening these spaces with the relevant institutions or businesses.

The majority of green spaces in Cannaregio are privately owned–part of the property of private home owners, apartment buildings, businesses, or larger institutions. We recognize that many private green spaces are private for a reason, and the fact that green spaces attached to homes or resident apartments are private may help residents maintain and control green space for themselves, away from Venice's crowded streets and tourists. Thus, we limited our recommendations to opening up larger spaces owned by institutions.

We also identified over 170 maintenance needs across 66 spaces—55 spaces had maintenance needs. Overgrowth of vegetation and litter were the most common. We found that 63% of the spaces that had litter had no trash cans. Cigarettes and dog waste bags were also common, and from this we recommended that more ashtrays and trash cans might be provided. We also found 6 broken benches and 11 damaged fences, among other broken amenities. This information will be useful to the groups that maintain green spaces in Cannaregio, and to potential stewards. We reported these problems to the city of Venice's public complaint system, DIME.

Most Prominent Maintenance Needs

Overgrowth

Litter

We published all of our data on a website, which includes interactive maps of green spaces by availability and area photos. Any website user can click on an image to enlarge it, or a green polygon to see the detailed list of features we recorded on each space. The website also contains a green space catalog that highlights 11 of publicly available and usable green spaces in Cannaregio. This catalog targets Venice's citizens because it includes the amenities at each space along with usage recommendations based on demographic preferences.

We aimed to promote the use of green spaces because of the various benefits they provide to individual users and the city. Publishing our data will help the public find green spaces that would best serve them, whether that be by size, location, or the amenities the green space includes. In addition, our maintenance data and the complaints we filed should help to make current maintenance groups locate problems and could also be useful in noting which areas might need more stewardship. Stewardship responsibilities might also include outreach to owners of spaces with limited or no availability to explore the possibility of opening this space up, and providing stewardship in return.

Finally, we urge future research groups to build on our database, inventorying other sections of the historic city. At present, WPI research, including our own, has surveyed a total of 961 green spaces across Giudecca, Castello, and Cannaregio. We hope that our methodology will make it easier to extend this work to other parts of Venice.

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Authorship

William Babincsak

Researched methods for collecting and storing green space data.

Maintained the data backend and ran analyses in QGIS.

Served as an editor for team documents.

Peter Fernholz

Researched who is currently maintaining green spaces in Venice.

Mapped out green spaces in advance using satellite imagery.

Organized data into a catalog that highlights the best green spaces to visit in Cannaregio.

Olivia Garrity

Researched the demographic preferences of urban green space users.

Designed and organized a form for surveying green spaces to aid in data collection.

Served as an editor on team documents.

Justin Santiago-Wonoski

Researched the benefits of green spaces such as the urban heat island effect and improving human well-being.

Developed field maps for the systematic direct observation of green space.

Reported maintenance issues to DIME.

Organized data into a catalog that highlights the best green spaces to visit in Cannaregio.

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Our team would like to acknowledge the following people for their invaluable help on this project:

Professor Fabio Carrera and **Professor Lorraine Higgins** for their guidance and assistance throughout the entire project.

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Introduction

Green spaces in urban environments foster a happier, healthier community. They promote social interaction, improve mental health, and act as a place to exercise and destress for busy city-goers (Borgi et al., 2022). Green spaces support human flourishing all while reducing heat, water runoff and air pollution (Blackman, 2022).

Given the benefits of green spaces, many communities strive to make their cities as green as possible. However, reaping the benefits of urban green space requires more than just installing a park or planting some trees. These spaces need to be designed to suit the specific populations they serve and maintained for the future. Proper maintenance and optimal utilization need to be supported by dedicated maintainers (which we will call stewards) and up-to-date records of urban green spaces' conditions.

The historic city of Venice, Italy is constrained in its ability to create green spaces since it was built on top of a lagoon, so using the green space it has is crucial. While there are some public parks that are well maintained and visited, some green spaces in Venice are inaccessible, in need of maintenance, or not as visible to the general public. Understanding the current inventory of green spaces, their condition, and how to promote their use and maintenance is critical.

Some groups have attempted to document and publicize Venetian green spaces. The Venice Project Center (VPC) sponsored two studies on green spaces, one in 2017 (Drewniak *et al*., 2017) and another in 2021 (Hutchinson *et al.*, 2021). The 2017 study inventoried green spaces in Giudecca, part of the Dorsoduro sestieri in Venice, proposing options to reutilize urban wilds there as parks and recreation spaces. A 2021 team expanded their catalog to include green spaces in Castello, another sestieri, and created interactive online tools others can use to explore all of the data collected by both teams. They also collaborated with We are here Venice (WahV), a non-profit Venetian conservation organization, to provide an online platform where potential stewards might explore the green spaces in need of upkeep. However, there is still limited *publicly available* documentation on green spaces in most of the sestieri.

Since Cannaregio is one of the sestieri that has yet to be documented in depth, we plan to map and collect data on its green spaces to highlight their features and evaluate their availability and condition. This data includes general information such as size and location, as well as vegetation and amenities in each green space. We plan to expand on the attributes recorded in the 2017 and 2021 studies, including more detailed information on maintenance needs (Phillips *et al.,* 2021), and an analysis on what green spaces can be made more publicly available. We hope that this information will be useful for informing the public about these assets and for helping WahV in recruiting stewards and making data-driven decisions on maintaining the space.

Background

In this section, we will discuss the benefits and uses of urban green space, as well as how different age groups have different green space preferences. We will explain how addressing citizens' preferences and perceived benefits can encourage volunteers to work on the green spaces they enjoy most. We will also review the different types of green spaces that can be found in Venice. Afterwards, we will discuss some groups that work to maintain green spaces in Venice and the past projects completed in and out of the Venice Project Center related to green spaces.

Green Spaces Provide Environmental Benefits to Cities

Green spaces are areas with vegetation, whether wild or cultivated. These spaces can provide various benefits to a city. Vegetation reduces the amount of CO_2 in the air, improving air quality (Hutchinson *et al.*, 2021). Some bushes (for example, winterberry, holly, and chokeberries) can absorb and hold water, reducing water runoff (Blackman, 2022). Certain soils allow more water to seep into the ground, preventing it from carrying sediment into streets and streams. Water runoff is common in urban areas due to the amount of concrete and brick.

Green spaces can also minimize the urban heat-island effect, which is "the effect a city's urban development and human activities have upon air temperatures in and surrounding a city" (Magee, 1999, p. 1). Buildings and concrete roads collect heat easier than grassy plains and parks. The absorbed heat dissipates over time, causing urban areas to be hotter than surrounding rural areas. Developed areas with more green spaces absorb short solar waves and hold less heat (Solecki, 2011). Plants act as a canopy to deflect solar waves, preventing stone below them from absorbing heat from the sun. Figure 1 illustrates the urban heat island effect by pointing to materials like concrete and mentioning how it retains heat. The diagram also demonstrates how water vapor is held within the ground of cities which can make it feel humid and allow the heat to stay in the concrete easier.
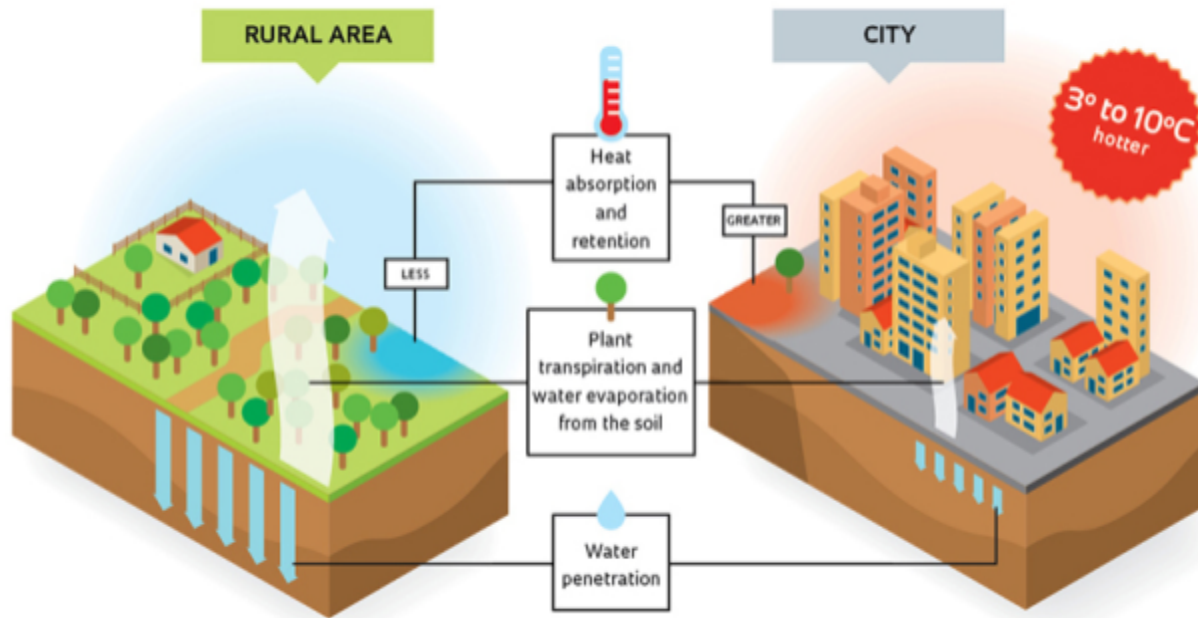
Figure 1. How green spaces reduce the urban heat effect (Player, 2020).

Finally, urban green spaces may have less biodiversity in comparison to nonurban areas, but green space in a city is still able to function as a habitat for wildlife (Gallo *et al.,* 2017), an important environmental benefit. Having different types of green spaces is preferable, as different species will have more options for colonizing (Gallo *et al.,* 2017).

Urban Green Spaces Improve Human Well-Being

Urban green spaces provide a natural, outdoor environment that relieves citizens from the stress of a dense city. They are nice places for social interaction where people can meet up and exercise together, increasing community engagement (European Environmental Agency, 2022; Environmental Protection Agency, n.d.). Green spaces may even provide mental health benefits; one study, for example, showed how children raised in a publicly available green space had a reduced risk for psychiatric disorders (Engemann, 2019, p.1). Another study found that green spaces are beneficial to mental health when they are actively used, and decreased mood and anxiety disorder treatment counts are associated with better access to green space (Nutsford *et al.*, 2013)

Different Demographics Prefer Different Types of Green Space

Even though green spaces have a general appeal, people differ in the types of green spaces they enjoy. According to Palliwoda and Priess, researchers who studied people's perceptions of green spaces (2021), younger generations generally prefer spaciousness and areas with accessible sports facilities, while older generations prefer natural elements and an overall natural aesthetic. Figures 2 and 3 illustrate distinct demographic preferences identified by Phillips *et al.* (2021). People aged 30-44 with

children prefer accessible facilities and equipment and available spaces for relaxation, while those without children prefer natural elements and quietness. Despite distinct preferences, some uses, like relaxation, exercise, and connecting with nature, span most demographics (Phillips *et al.*, 2021).

       Palliwoda and Priess (2021) also noted that "knowing which components of [urban green spaces] contribute to which benefits can help to meet the various demands of urban dwellers" (p.1). The services provided by urban green spaces should suit the preferences of people in the local community. If local green spaces suit their needs, then citizens might be more inclined to both use and help maintain the spaces.
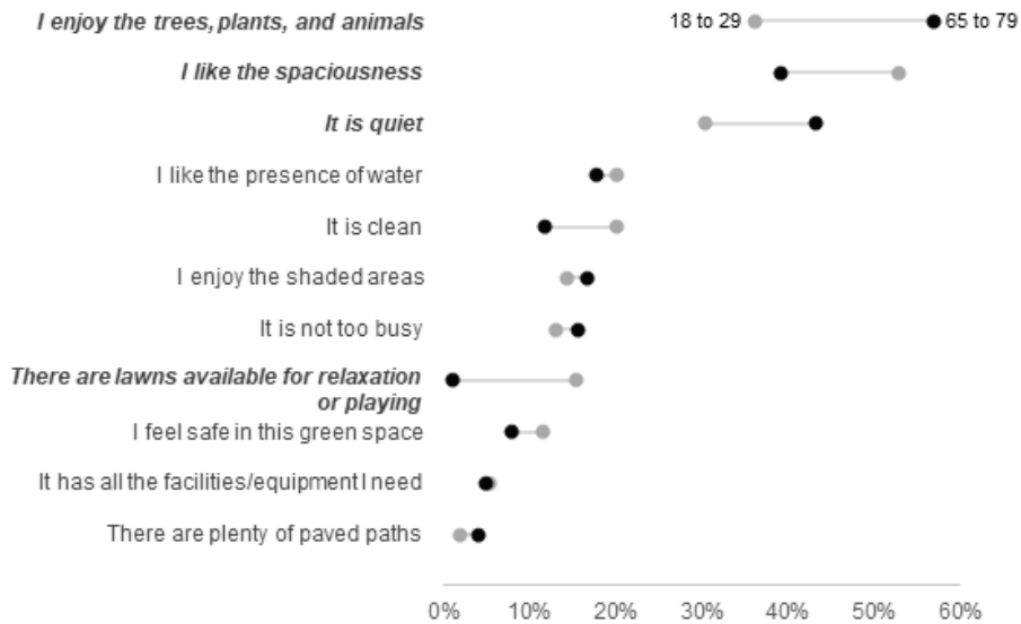
Figure 2. Percentage of positive urban green space attributes identified by people aged 18-29 and 65-79 (Phillips et al., 2021).
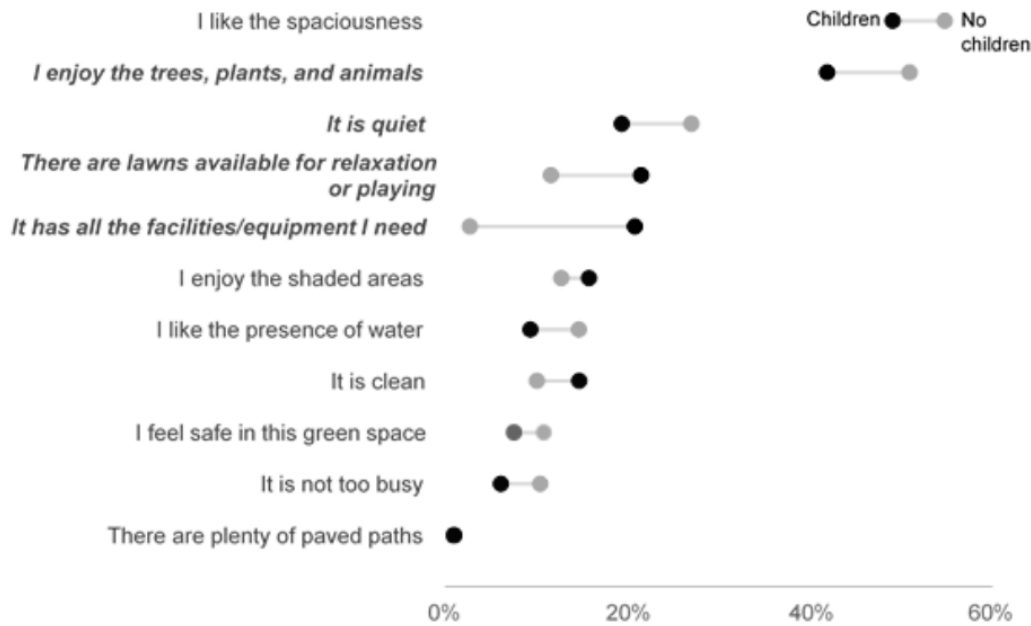
Figure 3. Percentage of positive urban green space attributes identified by people aged 30-44 with and without children (Phillips *et al.*, 2021).

Despite the appeal and need for green spaces, if they are limited in number and are located more than a 3 minute walk away, people will not utilize them (Alexander*,* Ishikawa, Silverstein, 1977). A three minute walk consists of walking 2-3 blocks, and increased distance results in decreased use. The green spaces are typically only used by the people that live near them, so those that live any further than three minutes are much less likely to use them, even though everyone has the same need for green spaces (Alexander *et al.,* 1977). The World Health Organization recommends that a green space should be "at least 0.5 hectares at a linear distance of no more than 300 meters from every home" (Nieuwenhuijsen, 2021).

Green Spaces Need Stewards

Green stewards are people who help maintain green space; they "protect, care for, or responsibly use the environment in pursuit of environmental and/or social outcomes in diverse social-ecological contexts" (Bennet *et al.*, 2018, pg. 1). These stewards, who can be employed or can be citizen volunteers, can contribute to the long-term maintenance and overall improvement of green spaces (Mattijssen *et al.*, 2017). Volunteer stewards may directly maintain the spaces themselves or coordinate with professional maintainers that care for the space. Either way, having people continuously contribute to the upkeep of green spaces allows the spaces to reap the most benefits.

Targeting the desired volunteers, providing a job description, and communicating expectations that match volunteers' schedules and levels of commitment are ways to engage and recruit volunteers (Raviraj, 2022). According to Donorbox, a company that connects nonprofits and donors, retaining citizen

volunteers can be done by matching them with a job that is relevant and enjoyable to them (Macduff *et al.*, 2009). Matching people to green spaces with characteristics they like could help meet this goal.

Venetian Green Spaces Take Many Forms

Green spaces in Venice include parks, gardens, urban wilds, street spaces, farms, and courtyards with vegetation (Hutchinson *et al.*, 2021). There are many parks scattered throughout Venice, some more visited than others. Parks can contain walkways, benches, gardens, and recreational equipment, allowing for recreation, relaxation, and socialization. Figure 4 shows an area of Parco Savorgnan in Venice.

Figure 4. Parco Savorgnan in Venice, Italy.

Many gardens in Venice are in raised beds. They can be public or private, including both community gardens and those on private property. Their purposes include food cultivation and increasing the aesthetic of an area with the colors and scents of various plants and flowers. Farmlands are areas strictly for food cultivation and often do not include raised beds. As a result, they are vulnerable to salt contamination from the lagoon (Da Lio *et al.*, 2015).

Urban wilds refer to uncultivated land within cities that have the potential to be transformed into active ecosystems, if not already active. They are often overlooked and do not have the appealing aesthetic that a garden might have. When there is an even balance between cultural and natural use, they can provide the benefits of a typical green space as they are being used to their fullest potential (Randich, 2017).

Street spaces are areas of green space along streets and buildings. They brighten the appearance of an area though they are typically not large enough for recreation. They can promote biodiversity and help improve the mental health of residents (Biasotti, 2022).

Like gardens, courtyards with vegetation can be public or private, and they are typically associated with a certain building, such as a hotel. Courtyards are often part of the architecture of a building and offer both quiet and somewhat private outdoor areas for recreation. (Hutchinson *et al.*, 2021).

Figure 5. Courtyard of the San Giorgio Monastery in Venice, Italy.

Public Venetian Green Spaces are Actively Maintained

The Consorzio Sociale Unitario (CSU) is a consortium of companies hired by the city that handles all public green space maintenance in Venice (Verde, 2022). There are 22 different companies that form the CSU with 13 of them providing services for green spaces. Different companies provide different types of green services; for example Il Gruppo specializes in fixing amenities like benches and playgrounds (Arredo Urbano, 2022), and Nonsoloverde handles tree maintenance (Cura dell'Albero, 2021). According to Gabriele Zornetta, a representative for Il Gruppo, different groups maintain different sections of Venice as well. Il Gruppo maintains the amenities and grass of the public spaces in Cannaregio (Gabriele Zornetta, Interview, 10/28/2022). They continuously inspect and maintain spaces in a cycle that lasts about 15-20 days, but maintenance is done in a longer cycle during the winter. This group has an internal map of all the spaces they maintain and the jobs that are done on them, but this data is not publicly accessible. All green space maintenance in Venice is conducted by CSU, and different companies within CSU perform different services.

The non-profit We are here Venice (WahV) is interested in promoting maintenance of Venetian green spaces. They work to get the Venetian government to create programs for green stewardship.

They successfully got the municipality to start an 'Adopt a Green Space' program in Castello by using data on the sestieri's green spaces collected by Hutchinson *et al.* in 2021, showing needed maintenance. As a result, a small volunteer group now maintains the spaces in that area (So Young Han, Personal Communication, 09/23/2022).

Venice also has a publicly available system called Dime that can be used to report maintenance issues. Two report types in Dime are specifically for green spaces; they are "verde privado" and "verde pubblico." With this system, residents can submit maintenance requests and track their progress via a ticketing system (Servizi disponibili, 2022).

Researchers Have Collected Data on Some Venetian Green Spaces

Two previous research teams at WPI's Venice Project Center have collected data on some of the green spaces in the historic city, which we discuss below. These studies served as a model for the current research. In addition, others have also documented specific green spaces through books and other publications.

Inventories of Giudecca and Castello

In 2017, a team of WPI students supported by the Venice Project Center and Fattoria Urbana Diffusa inventoried and mapped, via direct observation, every green space in Giudecca (Drewniak *et al*., 2017). The features they recorded for each space are in Table 1. They mostly collected qualitative data on the spaces' condition, soil quality, aesthetics, and upkeep. They then proposed how some of these spaces might be better utilized.

Table 1: All of the features collected by the 2017 WPI team on Giudecca green spaces.

Feature	Description
Type	The classification of the space as a Park, Urban Wild, Garden, or Farm
Area	The area of the space in square meters
Name	The name of the space, if any
Access	If there was full, limited, or no public access to the space
Ownership	If the space is publicly or privately owned
Theme	Noting if the space had a coherent 'theme'
Condition	A summary rating of the condition of the space based on maintenance, aesthetics, invasive species, biodiversity, and soil quality ratings
Reutilization	A potential reutilization option for the space
Vegetation	Types of vegetation at the space (trees, grass, etc.)
Litter	A litter rating of the space based on a rubric
Maintenance	A maintenance rating of the space based on a rubric
Aesthetics	An aesthetics rating of the space based on a rubric
Invasive Species	An invasive species rating of the space based on a rubric
Biodiversity	A biodiversity rating of the space based on a rubric
Soil Quality	A soil quality rating of the space based on a rubric

Reutilization suggestions were made based on the type of green space and what it could potentially be used for. This group found that urban wilds had the most reutilization potential. They also suggested outreach programs for unused farmlands to further increase the "self-sufficiency of Giudecca" (p. 20).

A 2021 WPI research team shifted their focus from developing reutilization plans to supporting campaigns for green stewardship. This team expanded the dataset collected by the 2017 Team to include all green spaces from Castello (Hutchinson *et al.*, 2021) and documented additional features (Table 2). They quantified the different species of trees and plants they observed and the percentage of the space devoted to healthy vegetation, weeds, pavement, and barren ground.

Table 2: Features recorded on Castello green spaces.

Feature	Description
Type	The classification of the space as a Park, Urban Wild, Garden, or Farm
Area	The area of the space in square meters
Name	The name of the space, if any
Condition	A rating of the condition of the space based on a rubric
Litter	A litter rating of the space based on a rubric
Maintenance	A maintenance rating of the space based on a rubric
Aesthetics	An aesthetics rating of the space based on a rubric
Address	The address of the space
Dogs allowed?	If dogs are allowed at the space
Hours of operation	Hours when the space is open to the public
Size	The size of the space as small, medium, or large
Average elevation	The average elevation of the space
Land access	Any potential accessibility issues for those with mobility limitations
Canal access	If there was access to a canal from a space
Crops %	The approximate percentage of the space taken up by crops
Grass %	The approximate percentage of the space taken up by grass
Weeds %	The approximate percentage of the space taken up by weeds
Barren %	The approximate percentage of the space that is barren
Paved %	The approximate percentage of the space taken up by pavement
Ranking	A ranking of the overall condition of the space
Amenities	A list of amenities at the space such as bathrooms, benches, etc.
Tree details	Count and species of any trees at the space
Vegetation details	Count and species of any plants or bushes at the space
Crop details	Count and species of any crops at the space

Data such as area and condition was used to help determine utilization potential (p. 26), but the data collected does not allow for clear analysis. There are errors that would first need to be addressed before data analysis.

In addition to the systematic inventories noted above, the city of Venice maintains a public website with some information regarding the larger parks in the city (City of Venice, 2021). Information like transportation, toilets, and other amenities are specified. There are also many blogs about Venice's green spaces and gardens where bloggers share information on attributes such as whether a park is dog-friendly, whether there are biking or walking trails, canoe areas, boat ramps, basketball courts or other amenities (Cruz, 2020).

A blog called Conoscere Venezia has documented the location and address of various large and small green spaces in Venice with linked articles about their history spaces (Conoscere Venezia, 2020). An example is the Papadopoli Park; the blog explains that the park is 12,000 m^2 and was conceived by Francesco Bagnara in 1834. These blogs are a useful tool in understanding the history of various green spaces, especially in Cannaregio, where our methodology focuses.

Methodology

This project was intended to promote the use, maintenance, and stewardship of green spaces in Cannaregio. In order to achieve this, we set the following objectives:

1. Inventory the green spaces in Cannaregio, Venice
2. Assess the condition and maintenance needs of these green spaces
3. Assess the adequacy of green spaces in serving the people of Cannaregio
4. Create publicly accessible materials to connect green spaces to the public and potential stewards

The methods we used are detailed in Figure 6.

Figure 6. Overview of methods for each objective.

Inventorying green spaces in Cannaregio

In this section we discuss how we conducted a systematic, direct observation of green spaces in Cannaregio.

Planning for and conducting data collection in the field

Our group used Google MyMaps (satellite view, shown in Figure 7) to identify green spaces in Cannaregio and mark their locations on a map. The resulting polygons are shown in Figure 8. Using this

information, we assigned each space a unique ID number.

Figure 7. Satellite image of Cannaregio.

Figure 8. Cannaregio's green spaces marked with green polygons.

There are 33 islands in Cannaregio, so we organized our observations by island. We worked from west to east, inventorying a few islands each day until data from each of the 33 islands was collected. We

verified and entered data for the spaces we had mapped ahead of time, but also added any additional green spaces we observed as we walked through the sestieri. We requested entry to some difficult to access spaces with the assistance of We are here Venice; we inventoried these spaces as we got permission. We could not get access to many private areas, so we could not get a detailed inventory of these spaces.

Recording Attributes of the Green Space

As we visited each green space, we recorded general information on the name of the space, its location and size, and its assigned ID number. We recorded what was in the space by taking photographs and recording data that can be organized into three categories: availability, vegetation, and amenities. All of the attributes we recorded by category appear in Figure 9. Many of these features were adapted from Hutchinson et al (2021) and Drewniak et al (2017) to ensure compatibility with datasets collected in other sestieri. They were also motivated by the demographic preference trends previously identified. For example, younger people enjoy spaciousness and open lawns for recreation, so we included a breakdown of the land area in the inventory by percent grass, pavement, barren areas, and weeds. The attributes that were inventoried were not only a continuation of previous research, but they also aided in the connection of green spaces to the public. We also identified any maintenance needs at the space; this process is detailed in a later section.
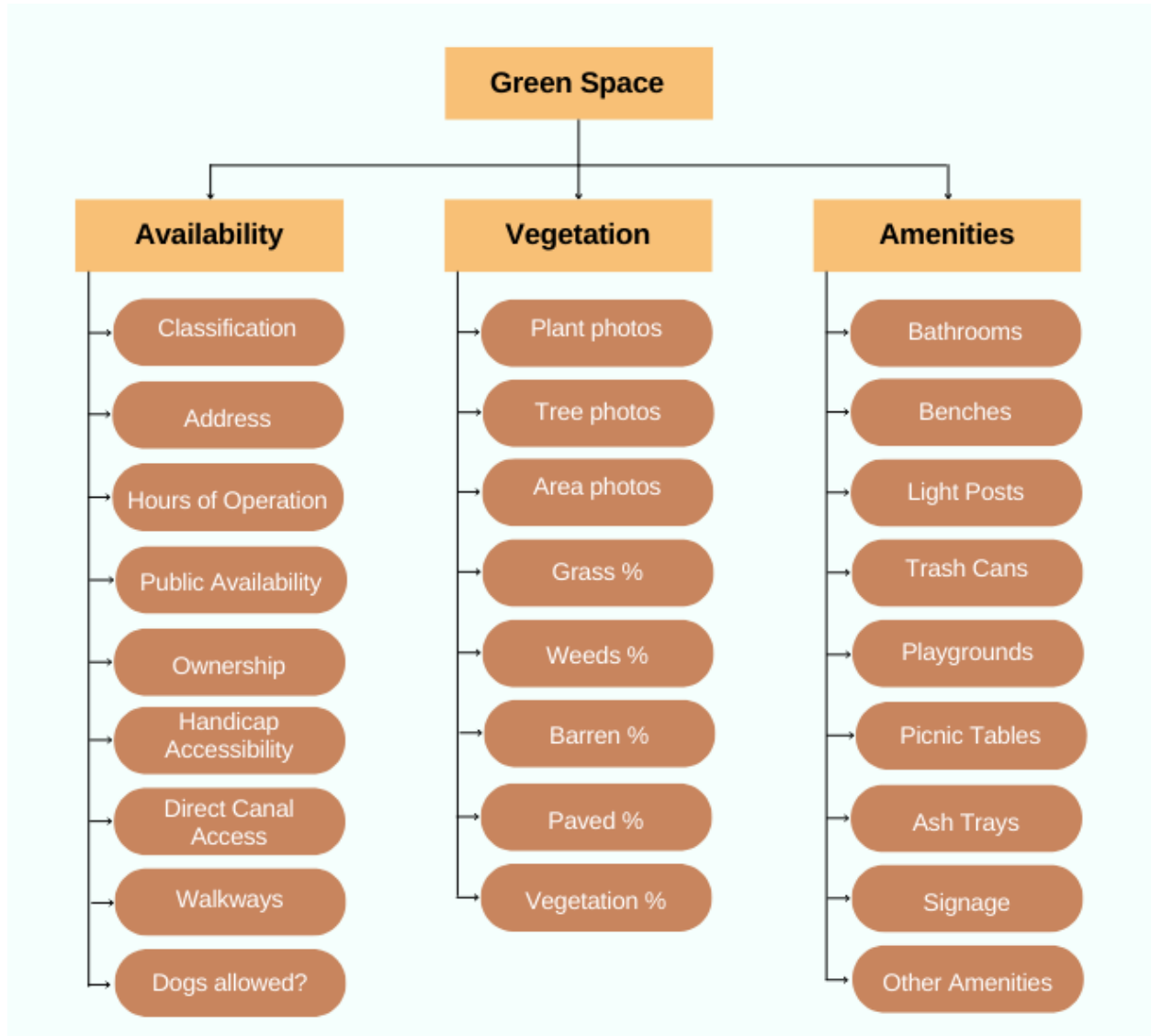
Figure 9. All of the features of green spaces collected, grouped by category.

While walking through the green spaces, we assessed their availability through their hours of operation, ownership (public or private access), handicap accessibility (whether there are flat or wide pathways and ramps), and whether the space has direct canal access (which is useful for those with mobility challenges or for maintenance workers bringing in equipment). We identified 4 types of public availability: fully available, mostly available, conditionally available, and no availability. Full availability means that a space is available at all times, while mostly available means that the availability of the space is limited by hours of operation. Conditionally available means that special permission or a ticket is needed to enter the space, and no availability means that the public is not able to enter the space.

We also classified the space as a park, garden, urban wild, courtyard, farmland, or street space as described in Hutchinson et al. (2021). This type of information can help the public know if and how they might access and use the space. For example, a green space that has paved walkways and is located near the canal would be beneficial for someone that uses a wheelchair or a cane.

We counted the number of key amenities such as bathrooms, light posts, seating, trash cans, playgrounds, and picnic tables at each space. We counted other, rarer amenities as we found them, including art pieces and sports facilities. This information is helpful for knowing how people can effectively use the green spaces, and how what is present lines up with demographic preferences.

We also recorded vegetation, including the approximate percentage of grass, weeds, vegetation, barren area, and paved area at each space. This gave us the general composition of the space's land and could be helpful for those looking to cultivate, reuse, or maintain the land at the space. We took pictures of various plants and trees at each space to allow for later species identification after surveying each space. These photos are also helpful for showing off the spaces to the public.

All of this information was collected using a Google form (Appendix A), processed using the open-source GIS software QGIS, and visualized with Google MyMaps.

Assess the condition and maintenance needs of the green spaces in Cannaregio, Venice

We identified common maintenance needs in green spaces as litter, overgrowth, undergrowth, broken amenities, and cosmetic needs. These maintenance needs were defined to allow for consistent identification, as shown in Figure 10. At each space, the number of occurrences of each maintenance need was recorded (see Appendix B Google Form). Photos and text descriptions of the specific needs were recorded. This maintenance information is useful for future endeavors in recruiting stewards, as the green spaces that need maintenance most and the rationale as to why can be clearly outlined. We also reported all of the needs we found to this system and provided all of the data that we have collected on the needs to the Venetian government.

Maintenance Need	Definition	Example
Litter	Any type of trash that is left in a public area	
Overgrowth	Excess growth of weeds or other plants	
Undergrowth	Absence of grass and other plants resulting in bare areas	
Broken Amenity	Any damage to amenities that might prevent their use	
Cosmetic Need	Any aspect of the space that could be tended to but does not impact the functionality of the space	

Figure 10. Definitions of common maintenance needs.

Assess the adequacy of green spaces in serving the people of Cannaregio

In this section we discuss how we assessed the adequacy of Cannaregio's green spaces in serving the people. For this objective, the adequacy of green spaces means whether there is enough space given the population and if space is available close enough to residents' homes.

Metrics for urban green space per capita

We determined whether there is adequate green space by calculating if Cannaregio meets the standard that cities should have at least 9m² of green space per person (Russo *et al.,* 2018). We summed all the green space areas in the 33 islands of Cannaregio and compared it to the resident population taken from the census. We then calculated the amount of available green space for the resident population using only the publicly available green space area. We also did this calculation including the tourist population.

Metrics for urban green space size and distribution

The WHO also recommends a minimum size for urban green spaces at 5,000m² (Nieuwenhuijsen, 2021) and recommends that space should be within 300m from peoples' homes, which equates to approximately a 3 minute walk. This number is also recommended by urban planner Christopher Alexander, who recommends a minimum size of 60,000 ft², or 5,500 m², (Alexander, 1977) within a 3 minute walk of homes and workplaces. This size allows the space to be large enough for people to feel immersed in nature. Using this metric, we assessed how many of Cannaregio's green spaces are adequately sized and analyzed the distribution of spaces to see if enough are available within a 3 minute walk.

Create materials to connect green spaces to potential stewards and the public

From the previous objectives, we took inventory of the green spaces, assessed their conditions and maintenance needs, and assessed their adequacy in serving the public and can present our conclusions based on this data in an appealing way. To connect green spaces to potential stewards and the public, we visualized this information in a catalog and on our website to describe the attributes and potential use of each space and to capture the interest and attention of the people in Cannaregio. This information can help the public find green spaces that might appeal to their needs, and it will communicate which spaces need care, potentially attracting people that would be willing to aid in the maintenance of the green spaces they enjoy.

Results

We identified **489 green spaces in Cannaregio, and accessed 66**. We categorized the publicly available green spaces by land type, which includes parks (5), gardens (31), courtyards (24), urban wilds (3), and street spaces (29). The majority of green spaces were not publicly available, so 397 spaces were left unidentified. We did not find any farmlands in Cannaregio and found that the median green space size was about 130m². Because of the limited area, the purpose of these green spaces could range from being strictly decorative to allowing for some recreation. This is dependent on who uses the green spaces, since both public and privately owned spaces are included.

We photographed spaces we could access, and added their locations to our green space map. The city of Venice has a public online inventory of its green spaces, but it does not include all of the green spaces in Cannaregio. Their inventory mainly includes only large public spaces, so when cross referencing our inventory with theirs, we found that we did not miss any large spaces and that we have a larger and more complete inventory. While there is an existing inventory for the city of Venice, it is incomplete, and potentially not useful depending on what the public is looking for. The website includes basic information including perimeter and altitude, but this information is not consistent throughout all the green spaces. Our inventory covers all of the green space in Cannaregio and could be more useful for the general public in finding green space and specific features of each.

We identified 176 separate maintenance needs throughout 55 green spaces in Cannaregio, which is 83% of the spaces we were able to access. These maintenance needs include litter, overgrowth, undergrowth, broken amenities, and various cosmetic needs. Overgrowth and litter appeared most often, followed by undergrowth, broken amenities, and finally cosmetic needs. This is shown in Figure 11.
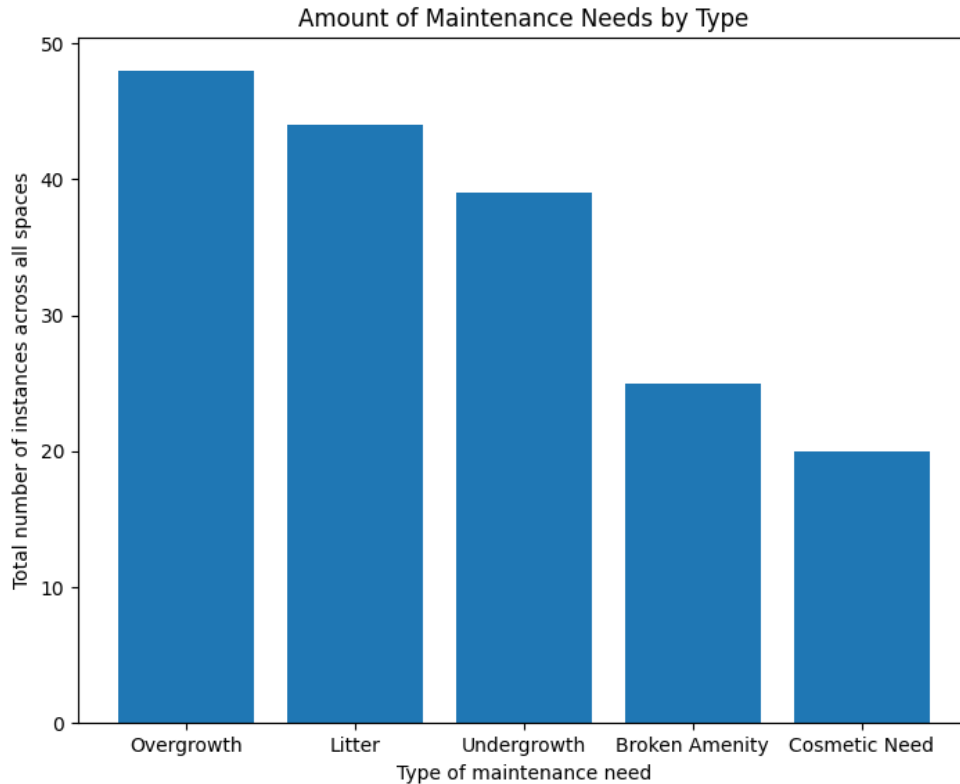
Figure 11. Number of maintenance needs by type.

There were many instances of overgrown grass and weeds in some areas: **35% of accessible green spaces had notable instances of overgrowth**. It is important to note that all instances of overgrowth are not necessarily bad, since it can simply result from natural biodiversity of the space. At this time of year, specifically November and December, undergrowth can be expected due to the weather. It is also possible that at the time of our inventory, the teams that append Cannaregio had not yet gotten to those spaces in their maintenance cycle. However, overgrowth in spaces that are meant to be used is not preferable. In fact, 53% of the green spaces we could access had either overgrowth or undergrowth, indicating that better land care could be needed across some of the spaces in Cannaregio. There are some spaces that have more maintenance needs than others. But, since maintenance is done in a cycle, the varying number of maintenance needs among spaces could be a result of the inventory being done at different times in the cycle.

We found that cigarettes and dog waste bags are a major cause of litter (both in green spaces and throughout the city), as shown in Figure 12. We reported litter needs at 29% of the green spaces we accessed, 63% of those did not have any trash cans or ashtrays. This indicates a need for the addition of trash cans and ash trays to many of the green spaces.

Figure 12. Examples of cigarette litter (left) and dog waste litter (right).

Broken fencing and damaged benches were the most common broken amenities (Figure 13). Of all of the broken amenities we reported, 44% of them were for damaged benches and 28% of them were for damaged fences. Other reports included damaged water fountains, walls, and signs.

Figure 13. Example of a broken bench (left) and fence (right).

Cosmetic needs included bricks being out of place and exposed tarps under mulch. We do not want to advertise problems in the green spaces to the public, so this information is mostly useful to potential stewards and groups that already maintain the green spaces in Cannaregio.

We used Venice's public complaint system, DIME, to cross reference any complaints made regarding green spaces with our identified maintenance needs. We submitted all of our maintenance recommendations based on our identified maintenance needs for each of these spaces, as well as for all broken amenities that we found everywhere in Cannaregio. Our specific recommendations per green space are detailed in a separate document, linked in Appendix C. A detailed discussion of the amenities available at each space can be found in Appendix D.

For all of the green spaces, we identified whether or not they were easily available to the public, and found that **86% of the green spaces were not available to the general public**, as they are privately owned. There are 34 spaces fully available to the public and 13 spaces that are mostly available to the public. There are 23 spaces with conditional availability (Figure 14). "Mostly available" means that the availability is limited by hours of operation, and conditional availability means that special permission or a ticket is needed for entry.

Figure 14. Location and Availability of green space in Cannaregio

Figure 15 clearly shows that **the majority of the green spaces are under 5,000m²**, which is the World Health Organization's standard for green space area. This means that almost all of the green spaces in Cannaregio are too small to give their full benefits. Nearly 99**%** of the green spaces in Cannaregio are under 5,000m², **leaving only 5 green spaces (1%) that meet this standard**. This chart also shows that many of the larger area spaces are not easy to access. Much of the green space in Cannaregio consists of small, unavailable spaces, as shown by the short red lines on the graph.
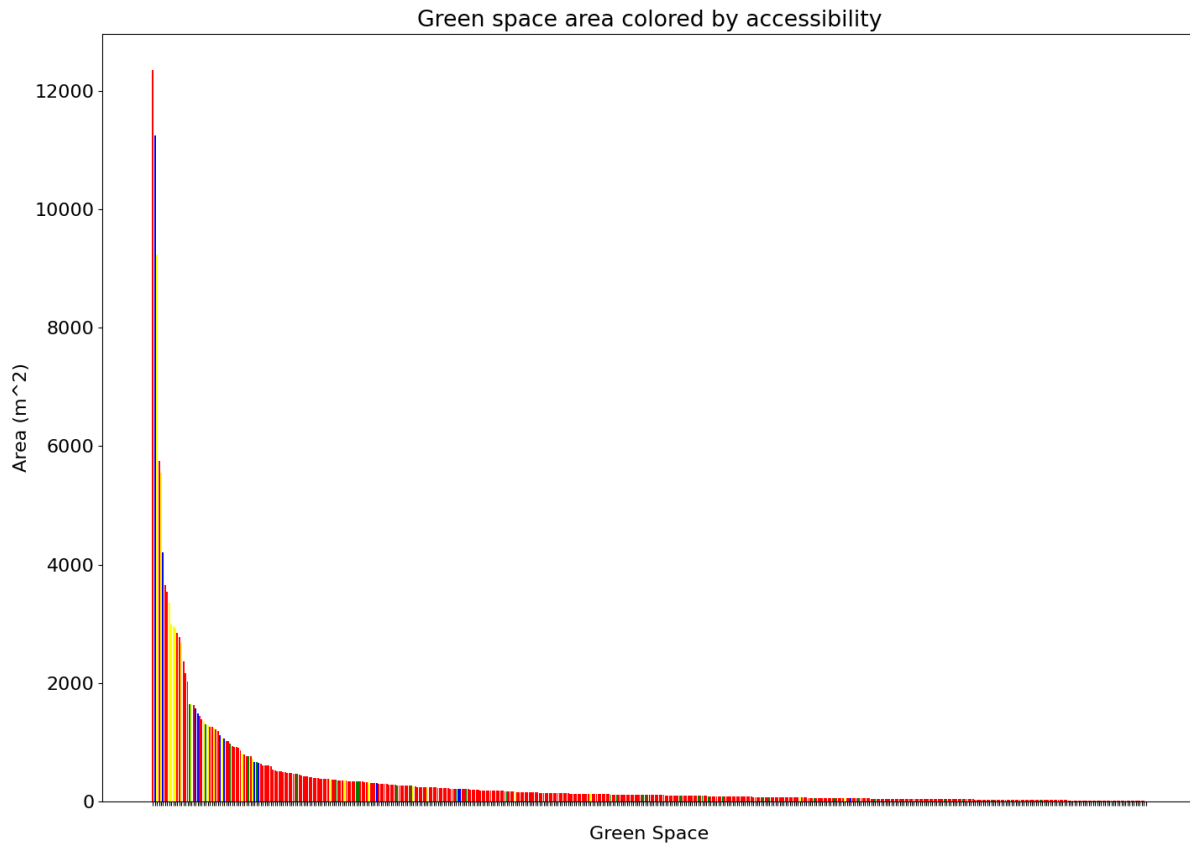
Figure 15. Green space area colored by accessibility.

To make the color coding of Figure 15 more clear, the data is shown on a log scale in Figure 16. It becomes more clear that the majority of the spaces are completely unavailable, represented by the red lines. Some of the larger spaces are of conditional accessibility, shown by the yellow lines. There are few green and blue lines on the graph, representing fully and mostly available space, respectively. These lines are scattered throughout the chart, showing that they include both large and small spaces. Looking at this chart, we can further conclude that green spaces in Cannaregio are small and publicly unavailable.
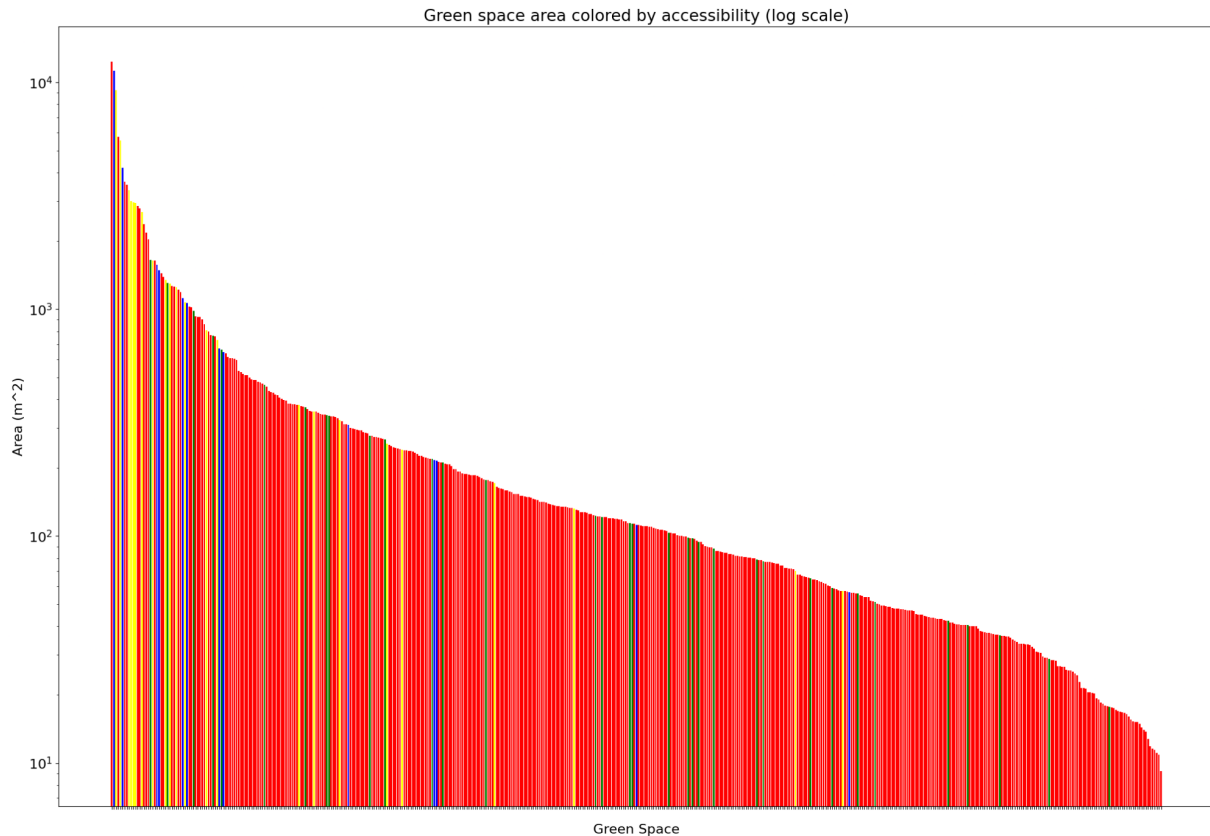
Figure 16. Green space area colored by accessibility, plotted on a logarithmic scale.

We determined whether Cannaregio contains an adequate amount of green space, given its resident population of 14,366. According to the World Health organization, the standard amount of green space per individual is 9m². If all of the green space in Cannaregio is included, then there is 13m² available per individual. However, considering only fully and mostly available space, there is only 2m² available per person. From this, we conclude that **Cannaregio does not have an adequate amount of publicly accessible green space** and that there is a 7m² deficit per person. If tourists are included, which was calculated by doubling the resident population, then there is only 1m² available per individual.

With an already limited amount of green space, Cannaregio has only a few green spaces that are usable. For a green space to be usable, it needs to be large enough to allow for some recreation, and it needs to be publicly available. Many of the fully available spaces are small and decorative, making them not usable. We also considered a space to be "usable" if it is greater than 1,000m² (since so few spaces met the WHO's standard of a green space area of 5,000m²) or it contains useful amenities, such as benches, no matter the size. The spaces that fit these requirements are highlighted in green in Figure 17.

Figure 17. Map of available, usable space in Cannaregio.

We calculated isochrones to visualize what areas of Cannaregio are within a 3 minute walk of the usable spaces, seen in Figure 18. These isochrones only cover about 35% of Cannaregio's land area, leaving a large section of land without usable green space, specifically the eastern side of Cannaregio.
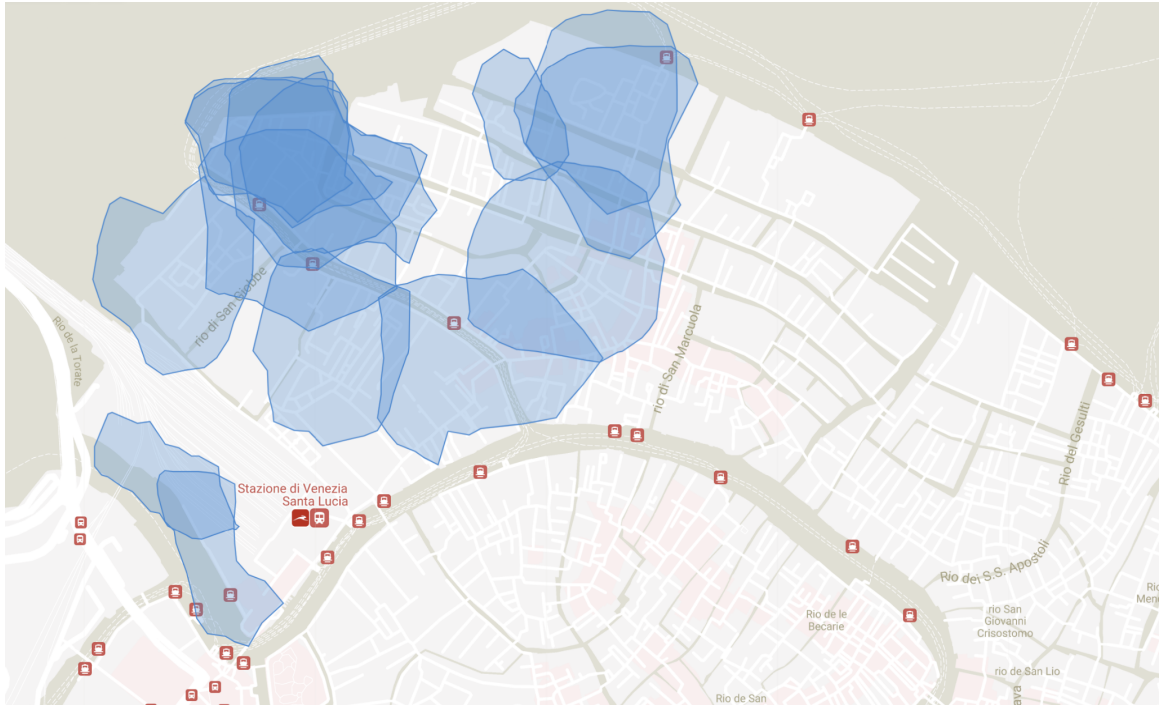

Figure 18. Isochrone coverage of Cannaregio for current usable green spaces.

We recommended that 9 other green spaces in Cannaregio that are currently unavailable or of conditional availability be opened up to make it easier for the public to walk to a green space. Figure 19 shows the usable spaces in addition to the spaces we recommend be opened to the public. Opening these spaces would provide better access to green space for more of Cannaregio, helping to meet the WHO's standards. Details on each of these spaces are available in the document linked in Appendix E.
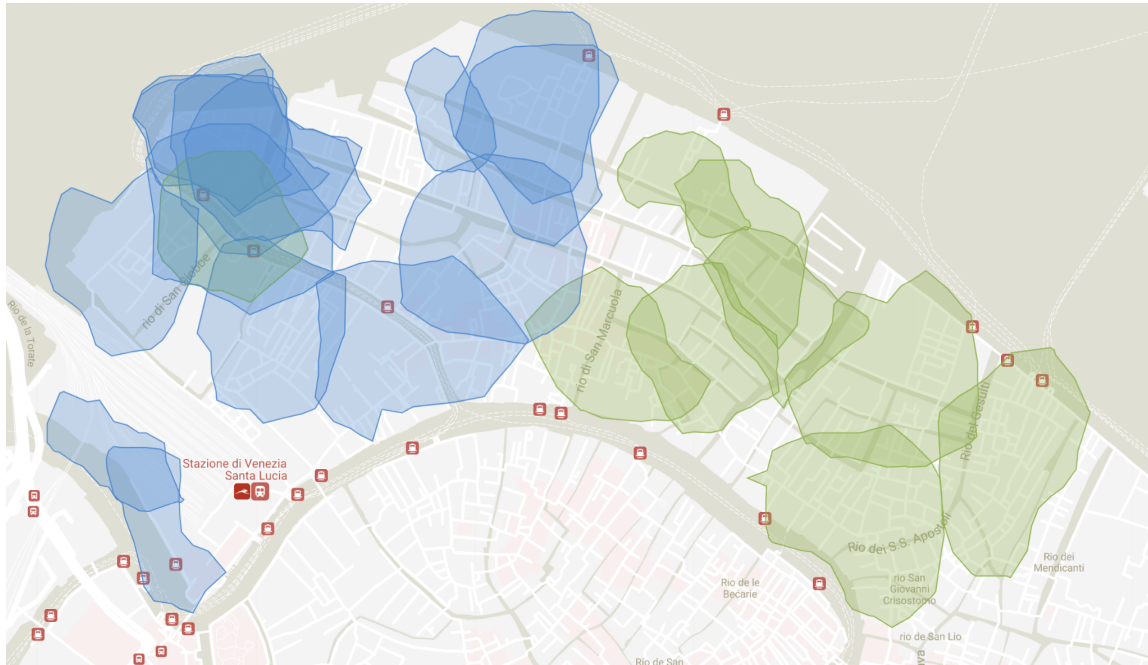

Figure 19. Isochrone coverage of Cannaregio for current useful green spaces and spaces we propose making more publicly accessible.

Figure 19 shows that the area covered is doubled when the eastern green spaces are made publicly available. These spaces are currently not publicly available because they are privately owned by businesses such as hotels, for example. They would be good spaces to open because of their sufficient size and amenities, and it would be reasonable to open these spaces since they are not owned by private citizens. Opening up the remaining spaces would make it easier for groups such as the elderly to travel a shorter distance to a green space, reducing the mileage walked and number of bridges that would need to be crossed. Approximately 25% of the entire Venice population is 65 or older, so we can estimate that the Cannaregio population is similar and would benefit from these changes.

To make our findings easily accessible to the public, we published our data on a website (https://sites.google.com/view/ve22-green/home). This includes an interactive map of the green spaces by area photos (Figure 20) and availability. Both maps are interactive, and anyone viewing the website can click on a photo to enlarge it. Clicking on a photo will allow you to see the enlarged area photo along with the address. This will be useful for website users to see if the space is suitable for them. For the accessibility map, clicking on a highlighted area will allow you to see all of the attributes collected for that space. If someone is looking for the handicap accessibility of a space, they can scroll through the list of attributes and for "Handicap Access" they will be able to see whether it has full, limited, or no

handicap accessibility. Limited handicap accessibility could include a single step to enter the space, but the rest of the space could have paved walkways. These maps would be useful for someone that is looking for a specific attribute or amenity that one area photo might not be able to provide. The information provided by these maps is more refined and specific.
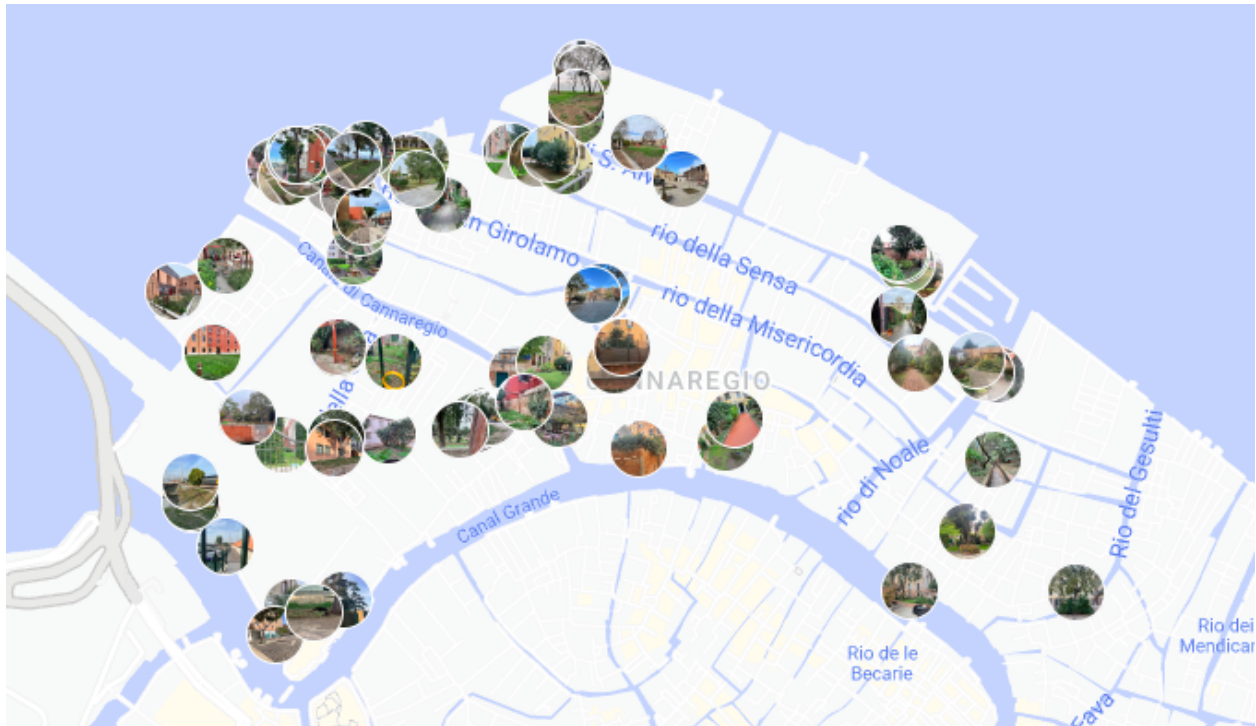

Figure 20. Map of Cannaregio green space area photos.

The website also contains a catalog, which describes the features of green spaces in Cannaregio with full availability (Figure 21). The catalog contains usage recommendations and features the amenities found in each space, all based on demographic preferences. More in depth information on the amenities found in Cannaregio can be viewed in Appendix E.

Best green spaces to visit in Cannaregio

1. Parco Savorgnan

Description: This is a large park that has a few open areas for recreation purposes. There are a lot of walkways through the park with plenty of vegetation scattered throughout the park. Within the park there are multiple playgrounds, which would make it a great park for parents to bring their kids.

General Information:
Total land Area: 11240m^2
Address: Calle Pesaro, 427, 30121 Venezia VE

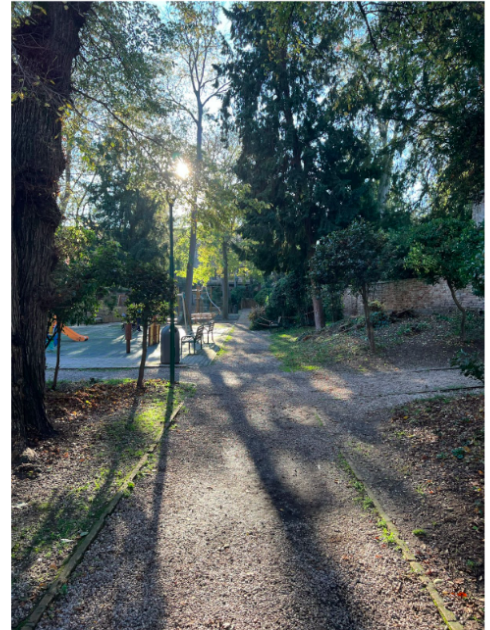**Limited Availability: Open between the hours of 7:00-20:30**
Canal Access: Direct water access.
Land Access: Can be accessed from several open gates along the perimeter.
Handicap access is limited due to the gravel pathways.

Amenities:
This park has benches, light posts, trash cans picnic tables, drinking stations, as well as water fountains.

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Figure 21. A sample page from the green space catalog that highlights Parco Savorgnan.

This catalog will further aid in providing easily accessible information to the public. Similarly to the interactive maps, the catalog highlights amenities found at the space and includes general information such as address and land area. We also make demographic recommendations based on the features to make it easier for the public to decide which spaces would best suit them.

The targeted audience for the website and catalog is Venice's resident population so they can find a green space that is beneficial or attractive to them. These outreach materials would also be useful to tourists if they are looking for new places in Venice to visit.

Conclusions

We have created a publicly available dataset of 489 green spaces in Cannaregio, Venice, of which 47 are available to the public. We have made this data easy to navigate with an interactive map and a narrative catalog, both available on our website. We reported maintenance needs of the available space to the city of Venice through the public complaint system DIME. We have also analyzed the availability of the usable space in Venice based on WHO guidelines. We determined that, by all metrics, the current green spaces in Cannaregio fall below the standards. This is because the majority of green spaces in Cannaregio are both small and unavailable to the public, and all of the usable space is located in the western side of the sestiere. We identified spaces that, if opened to the public, could better serve the people of Cannaregio. We made these recommendations to We are Here Venice, a green stewardship organization in Venice, in hopes that agreements could be made to open more green space to improve availability in Cannaregio.

Recommendations for Future Studies

Here we discuss our recommendations for additional research for future teams.

Catalog the Rest of Venice

Four sestieri still remain unsurveyed: Santa Croce, San Polo, Dorsoduro, and San Marco. The past three research projects have only surveyed one sestieri per term. However, we believe the rest of the city can be done during one or two more IQP terms. This is because the remaining sestieri are heavily populated areas with minimal green spaces and the survey methodology has already been well developed, so spaces should be able to be surveyed efficiently.

Find Alternatives to Google MyMaps

Google MyMaps is a good tool for viewing spatial data and making it publicly available. However, it is not maintained well by Google and would lag considerably with just our data from Cannaregio. It would likely not be capable of handling all of the data from the entire city in one map. We suggest looking into the alternative for the future. We recommend that the new application be friendly to use for those who aren't in a STEM field and have a general education, as well as being publicly accessible. Google MyMaps isn't used by just students but by our sponsor We are Here Venice as well as any other city authorities wanting to look at the data we collected. It is, however, still a good tool to use to store the data that we have on a cloud database, but new options should be considered for making the data publicly available.

Centralize a Database for All Green Teams

We have a single .kml file that contains all of the spatial and tabular data for each green space in Cannaregio. We have this in our team Google Drive and on Google MyMaps. The photos from each space are stored in Google Photos and are viewable on the MyMaps map. The data for the Castello and

Cannaregio green spaces is not stored this nicely, with different files for spatial and tabular data as well as a mix of file types. This makes it difficult to analyze the data and view photos from previously inventoried sestieri. We recommend synthesizing all data into a central database on Google MyMaps in a new, centralized Venice GREEN Google account. As more photos are added, this may reach the 15GB limit provided by Google. A simple solution to this issue is to pay for larger Google Drive storage for the Venice GREEN account when this becomes an issue.

Assess the Environmental Health of Green Spaces

An important aspect of urban green space is the health of their vegetation. Since we conducted this study from October-December, it is difficult to accurately assess plant health. Future teams could explore plant health with methods like the normalized difference vegetation index (NDVI), soil analysis, and plant identification apps like Blossom or PictureThis, if they come during warmer seasons.

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Appendices

Appendix A: Inventory Form

Handicap Access

○ Full

○ Limited

○ None

Handicap Accessibility Notes

Your answer

Direct Canal Access

○ Yes

○ No

○ Other:

Bench Count

Your answer

Light Post Count

Your answer

Playground Count

Your answer

Picnic Table Count

Your answer

Water Fountain Count

Your answer

Ash Tray Count

Your answer

Bathroom Count

Your answer

Trash Can Count

Your answer

Other Amenities
Ex. Amenity 0: #, Amenity 1: #

Your answer

Are Dogs Allowed

◯ Yes

◯ No

◯ Other:

Percent Grass

	1	2	3	4	5	6	7	8	9	10	
1-10%	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	90-100%

Percent Paved

	1	2	3	4	5	6	7	8	9	10	
1-10%	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	90-100%

36

Percent Crops

	1	2	3	4	5	6	7	8	9	10	
1-10%	○	○	○	○	○	○	○	○	○	○	90-100%

Percent Barren

	1	2	3	4	5	6	7	8	9	10	
1-10%	○	○	○	○	○	○	○	○	○	○	90-100%

Percent Weeds

	1	2	3	4	5	6	7	8	9	10	
1-10%	○	○	○	○	○	○	○	○	○	○	90-100%

Type of Green Space

- ☐ park
- ☐ garden
- ☐ farmland
- ☐ urban wild
- ☐ courtyard
- ☐ Other: _____

Walkways

- ☐ none
- ☐ paved
- ☐ dirt
- ☐ Other: _____

Signage

⬆ **Add file**

Plant Photos

⬆ **Add file**

Tree Photos

⬆ **Add file**

Area Photos

⬆ **Add file**

Amenities Photos

⬆ **Add file**

Other notes

Your answer

Appendix B: Maintenance Need Form

Maintenance Need Form

wbabincsak@gmail.com Switch account

The name and photo associated with your Google account will be recorded when you upload files and submit this form. Your email is not part of your response.

Green Space ID

Your answer

Type of need

- [ ] Litter
- [ ] Broken Amenity
- [ ] Overgrowth
- [ ] Undergrowth
- [ ] Cosmetic Need
- [ ] Other:

Number of Instances

Your answer

Description

Your answer

Images

⬆ Add file

Appendix C: Maintenance Recommendations

Parco Savorgnan: Litter

Green Space ID 9: Broken Water Fountain.

Green Space ID 385: Broken Fencing

Green Space ID 141: Broken Benching and Fencing

Green Space ID 251: Fallen Fence

Green Space ID 48: Broken Bench, Light, and Wall

Green Space ID 62: Broken Fences

Green Space ID 278: Broken Fence.

Appendix D: Overview of Amenities in Cannaregio

Figure D.1 shows the percentage of spaces in which specific amenities are found. The most prominent amenities were light posts and benches, with the percentage of occurrences dropping sharply for the rest of the amenities we inventoried.

Figure D.1. The percentage of spaces key amenities occur in.

Light posts were the most commonly occuring amenity: there was at least one light post around 80% of green space in Cannaregio. This is likely due to a large amount of the publicly accessible spaces being street spaces, and this would allow the public to know which spaces they could use until late in the evening. Benches were present at 55% of spaces, and trash cans were present at 33% of spaces. This is useful for people looking for places to sit and relax, as the public would know that this is an option at half of the accessible spaces. It would also be useful to know that less than 10% of the spaces contained picnic tables, playgrounds, and bathrooms, all amenities that would be useful for children. This is likely due to the limited number of parks. Since there are so few, it would be important for parents to know where these are located. About 10% of the spaces contained ash trays, which would be useful for people that smoke. It would be beneficial for adults to know in which green spaces they could properly dispose of their cigarettes, especially to reduce the amount of litter caused by cigarettes.

Appendix E: Recommended Green Spaces for Potential Opening

Purpose

This information mainly intended as actionable information for green stewardship organizations, such as our collaborator We are here Venice, as a result of our research. Here, we describe 8 urban green spaces in Cannaregio, Venice that we have identified as promising locations to look into for making more publicly available through green stewardship. As of now, these spaces are either only available to certain groups or are completely unavailable to the public. If made more open, these areas could provide valuable, local green space to the residents in the eastern side of Cannaregio.
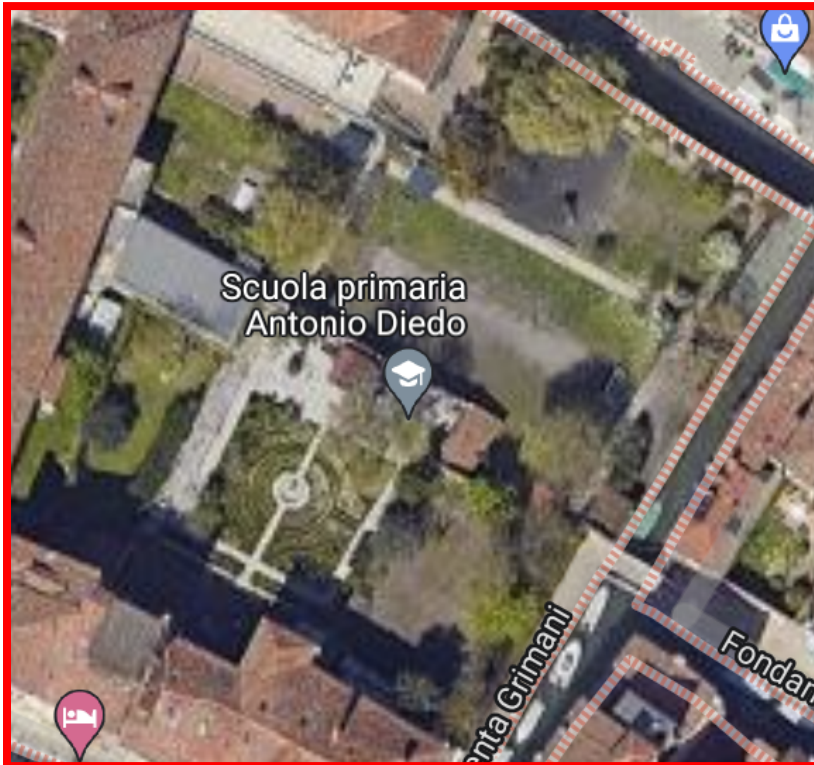
Rationale

Why these spaces?
1. These spaces are predominantly on the eastern side of Cannaregio, where there is the biggest need for available green space.
2. These spaces are large enough to be used. Many of the green spaces in Cannaregio are below 130m^2 in area. For reference, the World Health Organization recommends a minimum size of 5000m^2 for urban green spaces. While many of these spaces do not meet the 5000 square meter recommendation, would still provide value if opened, and many are larger than 1000m^2.
3. The spaces have hope in being made more available. Many of the spaces in Cannaregio are small spaces owned by private individuals, and our goal is not to try and open all private land. These spaces are institutionally private as they are owned by places like schools and hotels, so they are already available to some groups of people. This could make opening them up a more achievable goal.[1]

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[1] Note: we have not reached out to the owners of any of these spaces to investigate their willingness to open up; that is the next actionable step from this document.
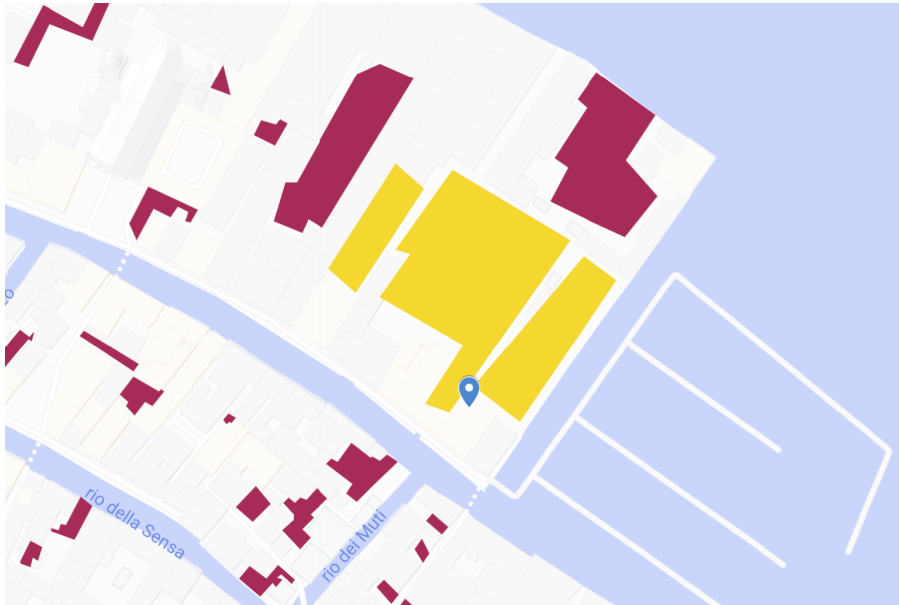
Scuola primaria Antonio Diedo

This is a space that is part of an elementary school. We are unaware of how available this space is to children and families that are not part of the school or during non-school hours, since we have been unable to successfully get in contact with them so far. It is for the same reason that we could not access the space ourselves and see what is there. Further inquiry is needed for the availability and amenities at this space.

Address: Near Fondamenta Grimani, 2384-2385

Casa Cardinal Piazza

These are two areas that we believe are both owned by the hotel Casa Cardinal Piazza. Together, there are totals to nearly 5000m^2, making them prime spaces for public availability. You also do not need to pass through the hotel lobby to access the spaces, as there is access from a door on the outside.

Contact Information for Casa Cardinal Piazza:
Email: info@casacardinalpiazza.org
Web: www.casacardinalpiazza.org
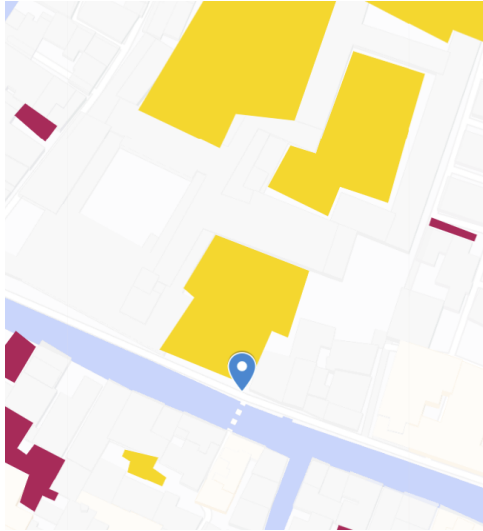Address: Sestiere Cannaregio, 3536, 30121 Venice

Unknown Ownership

This is a large area of green space that is viewable from satellite imagery but seemingly unavailable to the public. We have so far been unable to identify the owner of this space, as there are many potential candidates near it, including at least three hotels (Casa Baseggio, Good Wine Apartments, and Casin dei Spiriti) and the Old school of Santa Maria della Misericordia. It is one of the largest spaces in Cannaregio at approximately 2500m^2, making it valuable to look into in the future.

Address: near Fondamenta de l'Abazia, 3557-3551

Liceo Classico ed Europeo "Marco Foscarini"

This is a space that is associated with a high school. This is another case where we have been unable to identify the availability of the space to non-members of the school and/or during non-school hours. We can, however, confirm that we were denied entry when we got to this space during our field visits, so it is non-trivial to access. We have also been unable to get in contact with the school for more information about the space.
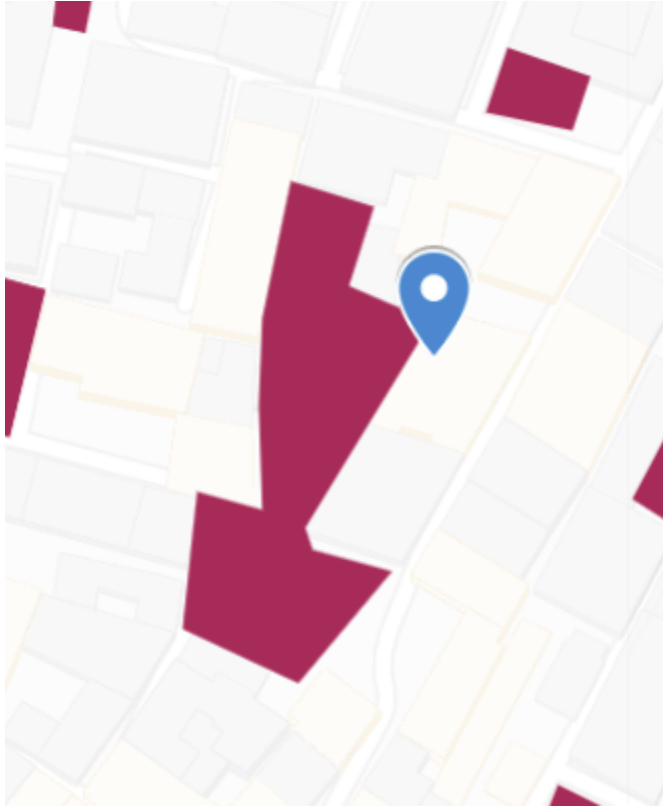
Contact information for Liceo Classico ed Europeo "Marco Foscarini":
Website: https://www.convittofoscarini.edu.it/
Phone: +390415224845
Address: Fondamenta Santa Caterina, 4940A

Near Villa Lala-Zedda

This is a space that is located near the nursing home Villa Lala-Zedda. Our best guess is that this is a part of the nursing home, but we have been unable to confirm this. This is one of the largest spaces on the far east side of Cannaregio, even though it is only approximately 800m^2. For this reason, it would be worthwhile to further investigate the availability of this space. Younger people--particularly students--could serve as great stewards for this place because the stewardship could facilitate inter-generational connections between the students and the people at the home.

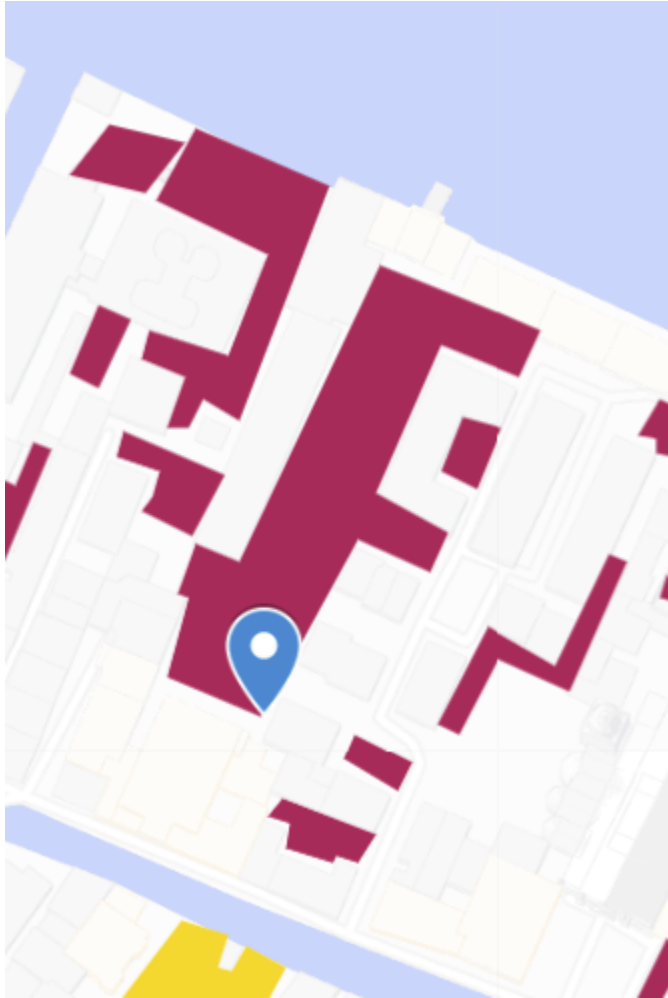Address: Ramo Del Volto, 30121 Venezia VE, Italy

Near Palace Smith Mangilli Valmarana

This space is on the back side of the Palace Smith Mangilli Valmarana, but is gated off from the street. This makes us believe that the green space is associated with the Palace. Though this Palace is listed as a "historical landmark" and "site" in the city, there is not much information available on it online, especially regarding accessing it or the green space near it. Further inquiry is needed to determine the potential availability of this green space.

Address: 30100 Venice, Metropolitan City of Venice, Italy

NH Collection Venezia Grand Hotel Palazzo dei Dogi Garden

This is a large, elegant garden owned by the NH Collection Venezia Grand Hotel Palazzo dei Dogi on the northern end of Cannaregio.
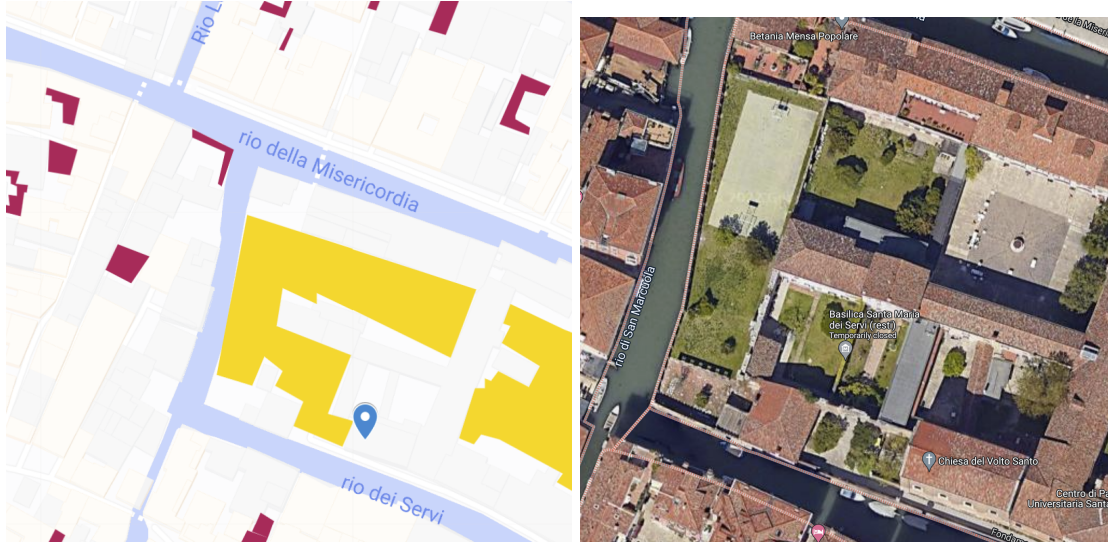
Contact
Website:
https://www.nh-hotels.com/hotel/nh-collection-venezia-grand-hotel-palazzo-dei-dogi?utm_campaign=local-gmb&utm_medium=organic_search&utm_source=google_gmb

Phone: +39 041 220 8111

Address: Fondamenta Madona de l'Orto, 3500, 30121 Venezia VE

Email: nhcollectionpalazzodeidogi@nh-hotels.com

Near Chiesa del Volto Santo

This is a large area of green space near the Chiesa del Volto Santo. We believe that at least some of this area is currently owned by a hostel, but are still unsure of the ownership status of the rest.

Address: Near Fondamenta de la Misericordia, 2601A