

Weaving sociality: designing social infrastructure for disaster resilience

by

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College of Architecture, Planning & Design

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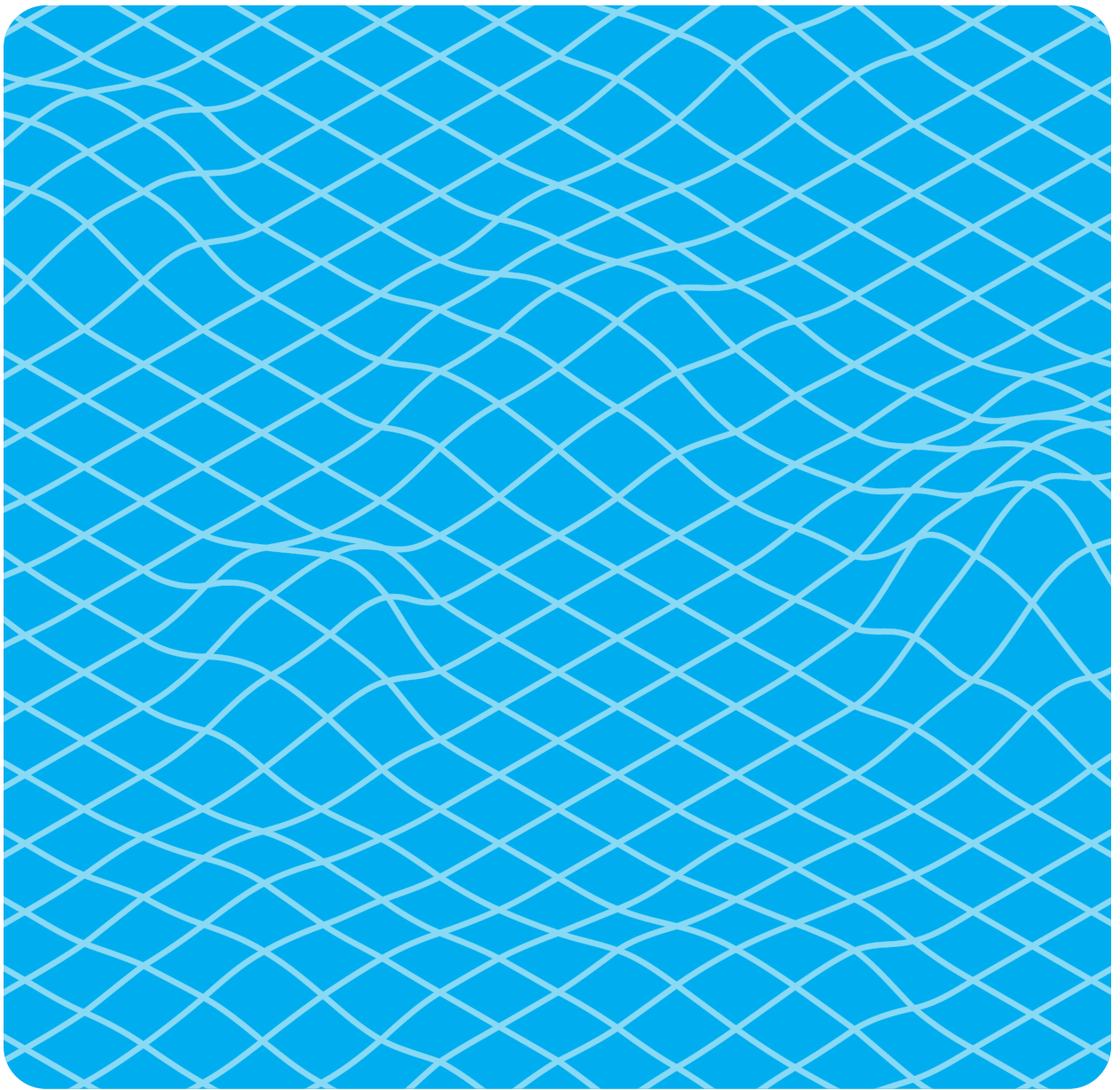
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Abstract

As disaster events become increasingly prevalent and intense, people are becoming more isolated, and social networks are weakening. Poor social connections to one's community puts individuals at elevated risk during times of disaster. Existing research argues that social infrastructure, places that bring people together and encourage social interactions, can help improve social networks, contributing to more disaster-resilient communities. This study builds off past works by exploring how access to social infrastructure sites, both actual and perceived, affects the disaster resilience of the South Providence Community in Providence, RI. This study aims to answer three questions: (1) What social infrastructure typologies are most capable of improving community cohesion and social networks? (2) How accessible are social infrastructure sites within the community, and what are the perceived and actual barriers to them? (3) How can social infrastructure be designed to best improve the social networks of a community? These questions were answered using literature reviews, GIS-based spatial analysis, and interviews. Ultimately, this study proposes a vision plan and designed social infrastructure sites for improving social networks and disaster resilience in South Providence. The research and design outcomes were synthesized into a report that discusses the role of social networks in a disaster-resilient community and shows how improved social infrastructure sites and network building between them improve a community's disaster resilience.



Weaving Sociality

Designing Social Infrastructure for Disaster Resilience

Caleb Jennings

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for Disaster Resilience



"A close connection to another person, even to a pet, made people far more likely to survive." - Eric Klinenberg

as disasters become increasingly prevalent and intense, we drown in social **isolation.**

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Weaving Sociality: Designing Social Infrastructure for Disaster Resilience

A report proposal in partial fulfillment of the requirements for the degree: master of
landscape architecture (MLA)

Kansas State University
The College of Architecture Planning & Design
Department of Landscape Architecture and Regional & Community Planning (LARCP)

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Masters Project Report

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Abstract

As disaster events become increasingly prevalent and intense, people are becoming more isolated, and social networks are weakening. Poor social connections to one’s community puts individuals at an elevated risk during times of disaster. Existing research argues that social infrastructure, places that bring people together and encourage social interactions, can help improve social networks, contributing to more disaster-resilient communities. This study builds off past works by exploring how access to social infrastructure sites, both actual and perceived, affects the disaster resilience of the South Providence Community in Providence, RI. This study aims to answer three questions: (1) What social infrastructure typologies are most capable of improving community cohesion and social networks? (2) How accessible are social infrastructure sites within the community, and what are the perceived and actual barriers to them? (3) How can social infrastructure be designed to best improve the social networks of a community? These questions were answered using literature reviews, GIS-based spatial analysis, and interviews. Ultimately, this study proposes a vision plan and designed social infrastructure sites for improving social networks and disaster resilience in South Providence. The research and design outcomes were synthesized into a report that discusses the role of social networks in a disaster-resilient community and shows how improved social infrastructure sites and network building between them improve a community’s disaster resilience.

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01

Introduction

*the importance of exploring social
infrastructure and disaster resilience.*

A Tool for Weaving Sociality

In 4000 BC, the ancient Mesopotamians were the first to construct infrastructure: the canal. This innovative technology diverts water across dry lands, irrigating large-scale agricultural fields necessary to meet the societal needs of an expanding civilization (see Figure 1.1), creating what is now known as the “cradle of civilization” (Bhugra and Raj n.d.). Similarly, social infrastructure plays a crucial role in meeting modern-day societal needs of an increasingly disconnected world. Social infrastructure sites are the “canals” that bring individuals together, fostering a socially connected, cohesive, and resilient community. They are places that attract people and promote social interaction (Klinenberg 2018; Latham and Layton 2019). Like the canals of Mesopotamia weaving the success of early civilization, social infrastructure is about *weaving sociality*.

In a time of increasingly prevalent and intense disaster events (EEA 2010; Giuliani et al. 2016) and while communities are losing their sociality, becoming further isolated (Holt-Lunstad et al. 2010; Kannan and Veazie 2023; Klinenberg 2018), the need for social infrastructure, now more than ever, is at its highest. This disaster events to social decline relationship consistently escalates towards more life-threatening disaster scenarios. When communities should be coming together for strength, there is separation; when those in power should promote harmony, discord.

Increasing Disaster Threat — Decreasing Sociality

In 1980, the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) began tracking weather and climate-related disasters that reach or exceed \$1 Billion in damages (adjusted yearly for inflation) — aptly named *billion-dollar disasters*. During the 1980s, there was an average of 3.1 billion-dollar disaster events per year, amounting to \$204.9B in total damages. During the 2010s, the average was 12.8 billion-dollar disaster events per year and \$936.3 billion in damages. The current decade, only four



Figure 1.1 | Mesopotamian Canal.
The Mesopotamians were the first to build infrastructure: the canal.

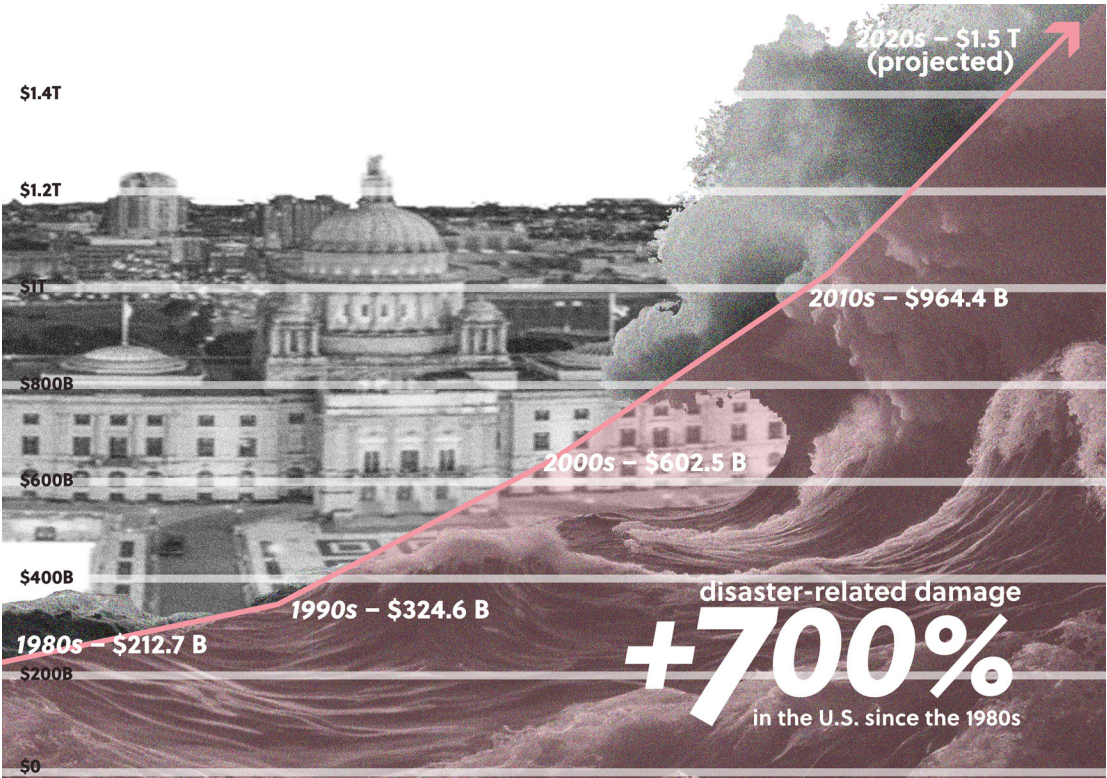


Figure 1.2 | Increasingly Prevalent and Intense Disasters

years in (2020-2023), is progressing as though determined to prove a point. So far, the 2020s are averaging 22 billion-dollar disasters each year and are on track for \$1.5 Trillion in total damages, meaning a 700% increase over a 5-decade period since the 1980s (see Figure 1.2). This alarming increase is due to a combination of two major factors: an increase in development in higher-risk areas (higher property values in coastal regions) and a higher frequency and intensity of disaster events caused by climate change. (NOAA 2022)

The United Nations Office for Disaster Risk Reduction defines disasters as a “serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts” (UNDRR n.d.). Disaster events are generally divided into two broad classifications: *natural* and *technological/man-made*. The natural disaster classification, being the more prominent of the two, includes geophysical (e.g., earthquakes, tsunamis, volcano eruptions),

meteorological (e.g., storms), hydrological (e.g., river floods, coastal floods, and flash floods), climatological (e.g., extreme temperatures, drought, and wildfires), biological (e.g., epidemics, insect infestations, and animal stampedes), and extra-terrestrial (e.g., meteorites) events. (Below et al. 2009; Caldera & Wirasinghe 2022)

Regardless of how a disaster is classified, these are serious events that cause significant damage to communities and the environments we live in. Disasters disproportionately affect poor and marginalized communities; furthermore, individuals with poor social connections to their community experience increased vulnerability (Klinenberg 2018). This is particularly critical when considering the consistently declining level of sociality and increasing isolation within communities (Holt-Lunstad et al. 2010; Kannan and Veazie 2023; Klinenberg 2018). Being socially connected to one’s community has been found to greatly decrease the risk of loss of life during a disaster event (Klinenberg 2018). While some communities have robust, well-connected systems of social infrastructure, others are left with poor systems, which contribute little to community sociality (Klinenberg, 2018; Latham and Layton, 2019). This largely affects the survival chances of individuals during a disaster event. “When social infrastructure is robust, it fosters contact, mutual support, and collaboration among friends and neighbors; when degraded, it inhibits social activity, leaving families and individuals to fend for themselves” (Klinenberg 2018). Strong social networks mean people aren’t left to deal with a disruptions on their own. It means the community, as a whole, and working together is more resilient to disaster events.

Disaster Resilience

As a general term, resilience has to do with a system’s ability to withstand, adapt to, and recover from a disruption (Magis 2010). This study is specifically interested in “community” as the system and “disaster events” as the disruption: *community disaster resilience*. Community disaster resilience is the community’s capacity to adapt to, withstand, and recover from a disruption while maintaining cultural identity,orig-

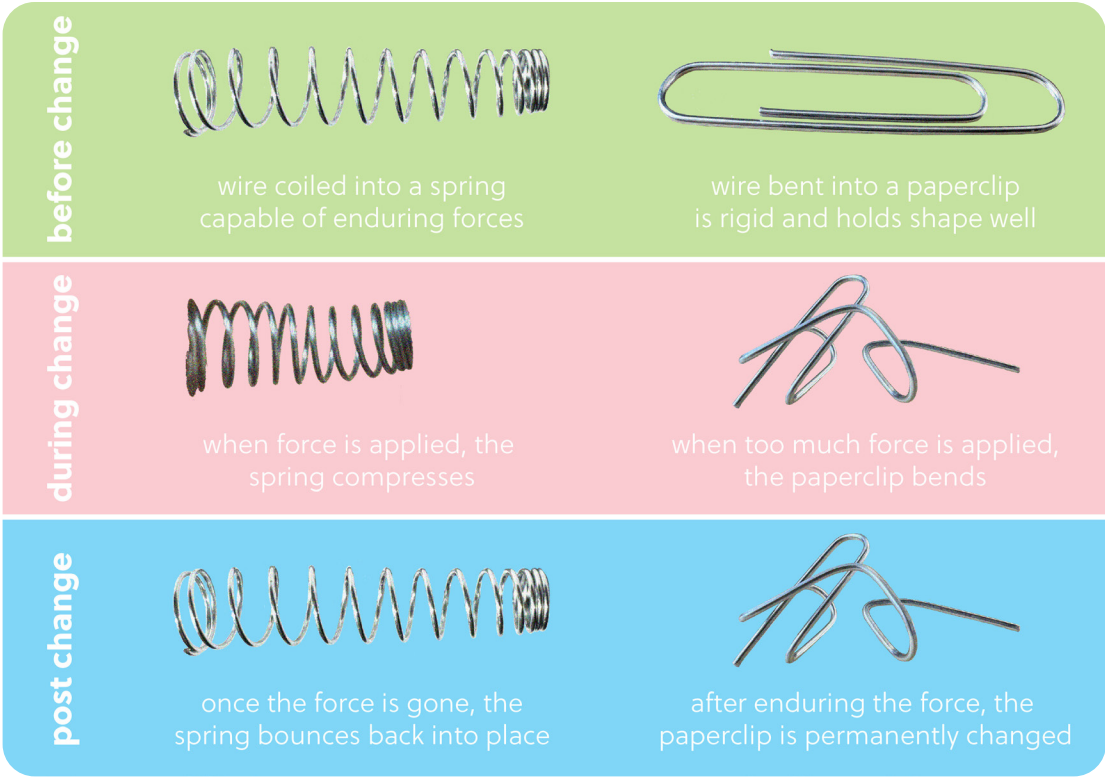


Figure 1.3 | Resilience

inal population, economic viability, etc. (Cox and Perry 2011). Resilience is about flexibility; the ability to adapt under pressures and return to the initial shape. Originally used as a material descriptor, resilience referred to a material’s ability to bend and bounce back rather than break under stress (Norris et al. 2008). While made of similar materials, a spring is designed to be resilient and return to form, while a paper clip, once bent, will not return to its original shape. Community resilience can be seen similarly: the components should be designed to be flexible to external forces and return to place afterwards.

Disaster resilience is a concern in most cities; however, social infrastructure is commonly overlooked as an effective means of achieving it. Rather than approaching disaster resilience from a soft, flexible, people-centered lens, there is a heavy emphasis on large-scale, rigid gray and green infrastructure projects. Rather than the more cost-effective social infrastructure approach, costly and maintenance heavy gray and green infrastructure (Aldrich 2023). Notably, improved social infrastructure benefits a wider range of social issues, such as loneliness, illness, crime, social disconnectedness, and economic issues; rather than only being beneficial during disaster events (Aldrich 2023; Fraser et al. 2022; Klinenberg 2018). It is important to note that other forms of disaster-resilience infrastructure still has its place in our cities; social infrastructure protects human lives and culture but contributes little to mitigating disaster-related damage to the physical city environment, or for rising sea levels (Aldrich 2023). This is not an argument against other types of infrastructure, but one for social infrastructure.

Sparked by sociologist Eric Klinenberg's book *Palaces for the People*, recent literature has shown renewed interest in the concept of social infrastructure. This body of literature explores social infrastructure's impact on fostering community connections, promoting civic engagement, and addressing pressing societal issues. This study seeks to expand upon the growing body of literature from the lens of landscape architecture. Unsurprisingly, social infrastructure and landscape architecture go hand in hand. Both are interested in building stronger, healthier, better-connected communities through more social, inclusive, and sustainable environments.

Investigating Barriers to Sociality

This study investigated how barriers to social infrastructure sites can impact the sociality of a community. The South Providence Neighborhood in Providence, Rhode Island, was selected as the study community. By analyzing physical and perceived barriers in this community, an understanding of what keeps individuals from accessing social infrastructure sites was achieved. This research was then used to inform design focused on exploring methods to limit, work around, and remove barriers to social places, creating a more socially compelling community. The research was then used to inform the design of a community vision plan for South Providence that seeks to improve sociality to create a better-connected, cohesive, and disaster resilient community. Together with the research, this study discusses barriers to sociality, proposes methods for removing them, and elaborates on how a better-connected community is a more disaster-resilient community.

Research Questions

The following three questions guided this research project:

- RQ1** - *What social infrastructure typologies are most capable of improving community cohesion and social networks?*
- RQ2** - *How accessible are social infrastructure sites within the community, and what are the perceived and actual barriers to them?*
- RQ3** - *How can social infrastructure be designed to best improve a community's social networks?*

02

Literature Review

*connecting social infrastructure sites
to community disaster resilience*

Chapter Overview

This literature review aims to provide a grasp of the current understanding and theories on and relating to social infrastructure and its impacts on community disaster resilience. This review is organized thematically first to define social infrastructure, then explain the importance of social networks within a community and how they are affected by social infrastructure, and finally, to explain the connection between social networks and community disaster resilience and why this is important (see Figure 2.1).

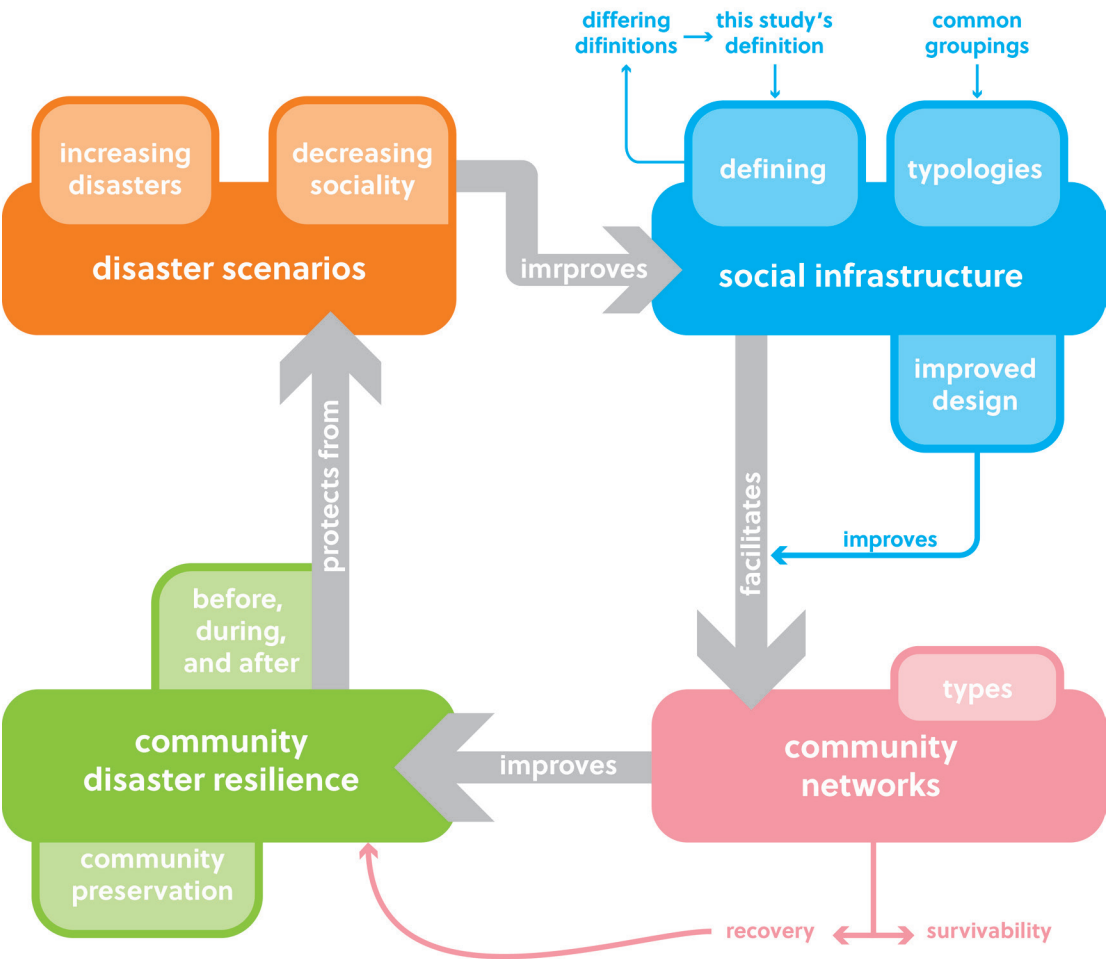


Figure 2.1 | Literature Map

Social Infrastructure

The term *social infrastructure* currently lacks agreement on a central definition — despite this, its prevalence in literature is increasing. The term’s use in literature is traced to disciplines such as economics, engineering, finance, public policy, sociology, and urban planning (Joshi and Aldrich 2022). As the term’s use becomes more common in literature, it is increasingly important to indicate one clear definition for social infrastructure. Before unpacking the varying definitions of social infrastructure, it is important to understand its position under the infrastructure umbrella.

Infrastructure is a core element of all societies; it is deeply embedded into our day-to-day lives and the functioning of our cities (Latham and Layton 2019). Layton and Lathom (2022) describe infrastructure as “the in-between structures and systems that afford and support action.” Despite its prevalence in human life, the term *infrastructure*, commonly associated with gray infrastructure, conveys a cold, inhumane feeling (Joshi and Aldrich 2022). Grey infrastructure is, however, not the sole form of infrastructure but rather one of three broad categories: grey, green/blue, and social (Joshi and Aldrich 2022). Each of these infrastructure types plays a role in disaster resilience; however, with grey and green/blue infrastructure, their function is often directly related to the issue. Whereas with social infrastructure, the primary function may have little to do with disaster resilience, but instead, improvements to sociality result in disaster resilience (Latham and Layton 2019).

Joshi and Aldrich (2022) studied the varying occurrences of the term *social infrastructure*; breaking its use into five broad categories: *education facilities*, *healthcare facilities*, *housing*, *transportation*, and *networking of spaces*. Though related, these different definitions have muddled the meaning of *social infrastructure*. The last category, *networking of spaces*, relates to building social networks through physical spaces (Joshi and Aldrich 2022) and is the meaning argued for by the author. Recently, this use of the term has been the most prevalent and is the one that will be used in this report.

Popularized by Eric Klinenberg in his landmark book *Palaces for the People* (2018), this use of the term *social infrastructure* relates to the network of physical spaces that influence the way people interact with each other (Cox and Perry 2011; Joshi and Aldrich 2022; Klinenberg 2018; Lathom and Layton 2019; Norris et al. 2008). Social infrastructure sites foster an interactive environment that creates and reinforces social connections. These sites range widely; they can be public or commercial spaces, indoor or outdoor spaces. The common element is their social aspects — these are places where people can expect to experience both chance and planned interactions with others. Examples of social infrastructure sites include libraries, community centers, coffee shops, parks, religious institutions, and many more.

The sociality provided by these places is highly important for our day-to-day lives. Not only is social infrastructure essential for “nurturing public life” and building social networks, but it also provides civic and economic values while addressing many issues of contemporary life, e.g., loneliness, illness, social isolation, social conflicts, and exclusivity of space (Aldrich 2023; Fraser et al. 2020; Kelsey and Kenny 2021; Latham and Layton 2019). Importantly, for some social infrastructure sites, the social aspects are additional benefits that can be tacked onto the primary function (Latham and Layton 2019). A library’s primary function, for example, is to provide public access to a wide variety of resources, such as access to entertainment, information, internet/computer use, and learning opportunities. But, in addition, and through its primary functions, a library acts as a social hotspot — fostering new acquaintances and social skills and strengthening community bonds.

Social infrastructure types are typically broken into four broad categories. Though each category has unique characteristics and approaches, each stands out for its social contributions within a community. The categories are as follows:

Community spaces: This refers to public institutions where the community can meet and socialize, including libraries, schools, community centers, public meeting spaces, museums, etc. (Fraser et al. 2022; Latham and Layton 2019).

Third spaces: This refers to businesses that act as meeting places and encourage social interaction, for example, coffee shops, booths at farmer’s markets, salons, bars/pubs, etc. (Fraser et al. 2022; Latham and Layton 2019).

Parks: This refers to a range of accessible outdoor spaces, including parks, community gardens, sports facilities, plazas, etc. (Fraser et al. 2022; Latham and Layton 2019).

Places of worship: This refers to the sites that hold religious congregations, including churches, mosques, synagogues, temples, etc. (Fraser et al. 2022; Latham and Layton 2019).

Social Networks Within a Community

As one of the most social species (Tomasello, 2014), it should be unsurprising that poor social networks have negative consequences for humans when it comes to health and longevity of life (Holt-Lunstad 2020; Holt-Lunstad et al. 2010; Kannan and Veazie, 2023). However, in the recent past and currently, communities are losing sociality and becoming further isolated at an alarming rate (Holt-Lunstad et al. 2010; Kannan and Veazie 2023; Klinenberg 2018). Among the many contributors to this decline are increasingly weakened social networks caused by the degrading and loss of access to social infrastructure sites (Tomaney et al. 2023).

Composed of intricate social networks and connections across varying scales, communities can be understood as an ecosystem. The stronger these networks are, the healthier the community ecosystem becomes (Chaudhury et al. 2017; Latham and Layton 2019; Nuntaboot et al. 2020). The health of this ecosystem largely depends on the presence of social infrastructure; the more robust and better-connected systems of social infrastructure will result in improved social networks (Klinenberg 2018; Tomaney et al. 2023). In these ecosystems, social infrastructure sites act as the collectors of people; they attract a wide range of people into one place. Within them, social interactions are common and natural. The social interactions within social infrastructure sites contribute to the strengthening of social networks within a community (Kandari and Chaudry 2023; Klinenberg 2018; Magis 2010; Norris et al. 2008; Tomaney et al. 2023).

There are three major branches of networks within a community: the first is relationships between individuals (see Figure 2.2) (Cassidy and Barnes, 2012; Klinenberg 2018; Norris et al. 2008); the second looks at relationships between groups or organizations of individuals (see Figure 2.3) (Norris et al. 2008), and the third is relationships that branch out of the community (see Figure 2.4) (Cassidy and Barnes, 2012). Individual relationships are built naturally in day-to-day lives. They include social relationships with family, friends, co-workers, and other interactions. These relationships are the basic unit of sociality. It is relationships between individuals that generate the strongest connections within a community.

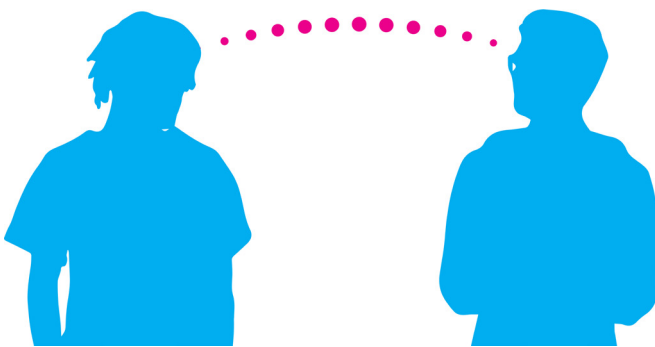


Figure 2.2 | Relationships Between Individuals
These are natural relationships that we build in our day-to-day lives — the people we know.

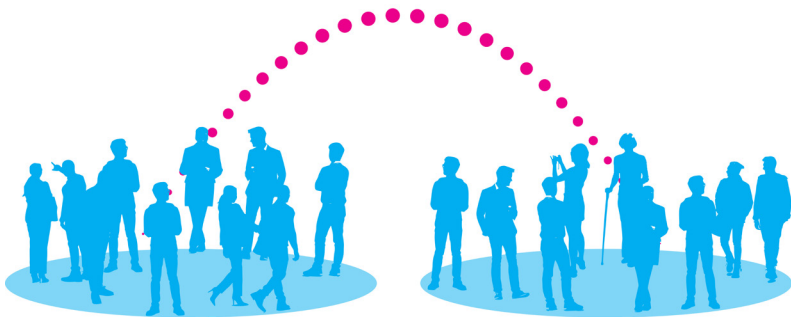


Figure 2.3 | Relationships Between Groups
Relationships between different groups of people can increase the groups members connections and allow these groups to work together if needed.

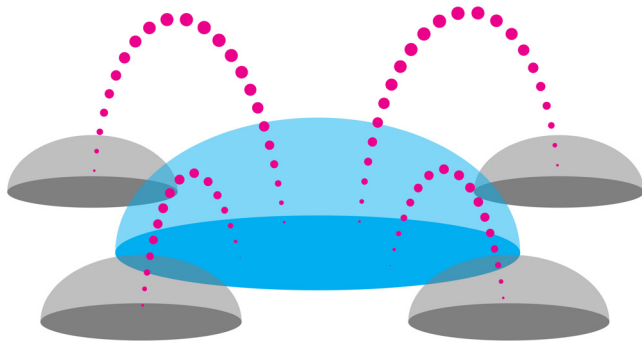


Figure 2.4 | External Relationships
These are relationships from within the community that branch outwards and connect them to the rest other neighborhoods and the rest of the city.

As previously mentioned, social infrastructure increases an individual's interactions with others — especially with new or unknown people (Kandari and Chaudry 2023; Klinenberg 2018; Latham and Layton 2019; Norris et al. 2008; Tomaney et al. 2023). A common way of making new acquaintances is through community groups and organizations; these are strong builders of social networks within a community. The relationships between community groups and organizations are also very valuable (Norris et al. 2008). Not only do inter-group relationships allow for intermingling that can improve an individual's social network, but they also allow different groups to strengthen each other during challenges. Finally, relationships from within the community to the rest of the city are important for a community to thrive. Without these relationships, a community becomes isolated and obsolete from the rest of the city and beyond (Cassidy and Barnes, 2012; Norris et al. 2008). The most robust communities have strong, well-built social networks for each of the three branches.

A community's ability to communicate, adapt, and recover together — to be resilient — during disaster events is crucial. The strength of social networks within a community contributes significantly to an individual's chances of survival during a disaster event. "When social infrastructure is robust, it fosters contact, mutual support, and collaboration among friends and neighbors; when degraded, it inhibits social activity, leaving families and individuals to fend for themselves" (Klinenberg 2018). When strong networks of social infrastructure are present, communities will have improved resilience to disasters (Cassidy and Barnes 2012).

Community Disaster Resilience

In response to increasingly prevalent and intense disasters (EEA 2010; Giuliani et al. 2016), many cities are focused on improving disaster resilience through standard or innovative grey infrastructure. Though disaster resilience is a major concern, social infrastructure is often overlooked as a powerful contributor to disaster resilience. Instead, there is a heavy emphasis on using costly gray and green infrastructure rather than more cost-effective social infrastructure. In his 2023 study of Japan’s 3/11 disasters, Aldrich found that social infrastructure is approximately three times more efficient than gray infrastructure when comparing dollars spent to lives saved, which means that investments into social infrastructure are the most human life-centric approach to improving disaster resilience.

The benefits of improved social infrastructure also work for broader social issues, such as loneliness, illness, crime, and social disconnectedness (Aldrich 2023; Fraser et al. 2022; Klinenberg 2018). It is, however, important to note that gray disaster resilience infrastructure still has its place. Social infrastructure can protect human lives but contributes little to mitigating disaster-related damage to cities or rising sea levels (Aldrich 2023). Each form of infrastructure has its place and should work with each other to maximize the disaster resilience of a city and the communities and individuals within it.

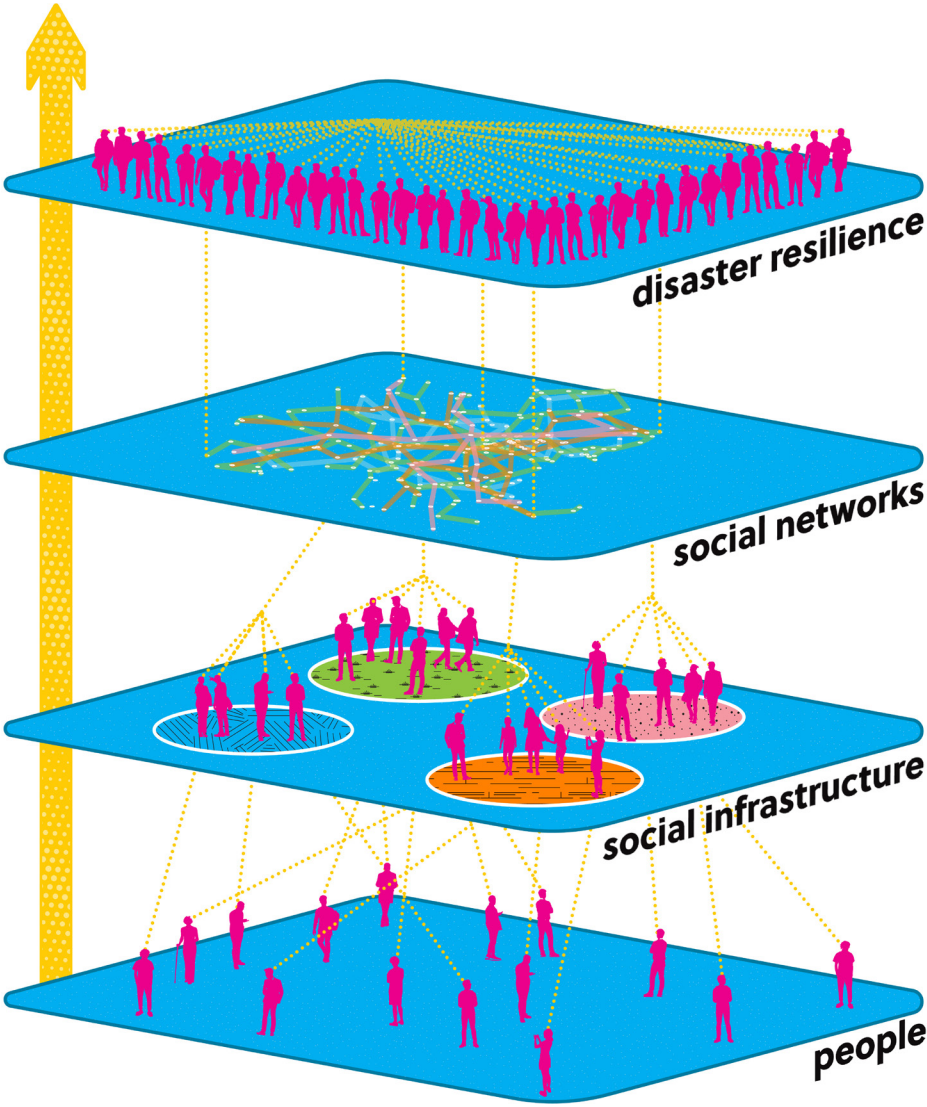
Social infrastructure’s value during disaster events comes primarily before a disaster strikes; the value comes from its contribution to the resilience-building social networks within a community (Cassidy and Barnes, 2012; Klinenberg 2018). During times of disasters, relationships with other individuals and communities significantly reduce the risk of death (Holt-Lunstad et al. 2010; Klinenberg 2018). Strong social networks improve communication, adaptive capacity, and community organization. Good communication is a crucial component of disaster resilience. Communication between individuals helps the community stay knowledgeable and be able to make quick, potentially life-saving decisions during times of rapid change (Cassidy and Barnes 2012; Latham and Layton 2019; Norris et al. 2008). Adaptive capacity is the ability to change as needed during times of disruption. Improving social connections allows community members to work together through change more efficiently than if they were alone (Chaudhury et al. 2017; Norris et al. 2008). Good organizational systems are valuable during disasters, in ways such as evacuation routes or navigating to a shelter. Properly organized disaster relief systems are also valuable, allowing for speedy procurement and distribution of needed resources to the community post disaster (Cassidy and Barnes 2012).

During disaster events, the makeup of social networks can also play a valuable role. A common framework for these social networks is bridging and bonding (Cassidy and Barnes 2012; Lewis 1979; Putnam 2001). Where bridging looks from within the community to the rest of the city. Bonding relates to the networks between individuals and groups within a community. Strong networks that bridge and bond are important for creating more disaster-resilient communities.

Summary of Literature

In summary, the term *social infrastructure*, referring to the network of social spaces, is a growing term in literature and is increasingly accepted as a method for improving sociality and disaster resilience within communities. Social infrastructure sites play an important role in our communities; they bring people together and promote social interactions between them. On top of providing sociality crucial for healthy living and, these interactions build and strengthen social networks within the community. Improved social networks have been connected to the disaster resilience of the community by improving communication, organization, and adaptive capacity (see Figure 2.5). Importantly, the contribution to disaster resilience is only a side-effect of improved networks; at its core, social infrastructure improves community spaces and quality of living. There is a lack of research on how social infrastructure plays an important role in communities by enhancing social networking and social capacity to provide better disaster resilience opportunities. This project explores this gap by exploring how identifying and removing barriers to social infrastructure within a community can contribute to its disaster resilience.

Figure 2.5 | Connecting Social Infrastructure to Disaster Resilience
People are attracted to and encouraged to interact within social infrastructure sites; the interactions that take place within this places builds and strengthens social networks within a community; this improved social network results in a more disaster-resilient community.



03

Methodology

*a framework for exploring barriers to social
infrastructure sites in South Providence.*

Introduction

This study explores the physical and perceived barriers to social infrastructure, which withhold a more social, cohesive South Providence community. It is organized by three research questions that build off each other (see Figure 3.1). The first question, “What social infrastructure typologies are most capable of improving community cohesion and social network?” (RQ1), was answered through a combination of two methods: a systematic literature review and a matrix analysis of the social value of social infrastructure typologies. These methods were supported by community feedback during the interview process described later. The second question, “How accessible are social infrastructure sites within the community, and what are the perceived and actual barriers to them?” (RQ2), was answered in two parts: the first used spatial data to analyze social infrastructure density, networks, and physical barriers in South Providence using Geographic Information Systems (GIS); and the second conducted interviews that explored how residents and community leaders in South Providence perceive access to and barriers surrounding social infrastructure sites. The research results were synthesized into design guidelines to answer the final question: “How can social infrastructure be designed to best improve the social networks of a community?” (RQ3). These guidelines were then used to steer projective design. A series of design strategies were developed to create a vision plan for South Providence that is focused on creating a more social, cohesive, and disaster-resilient community.

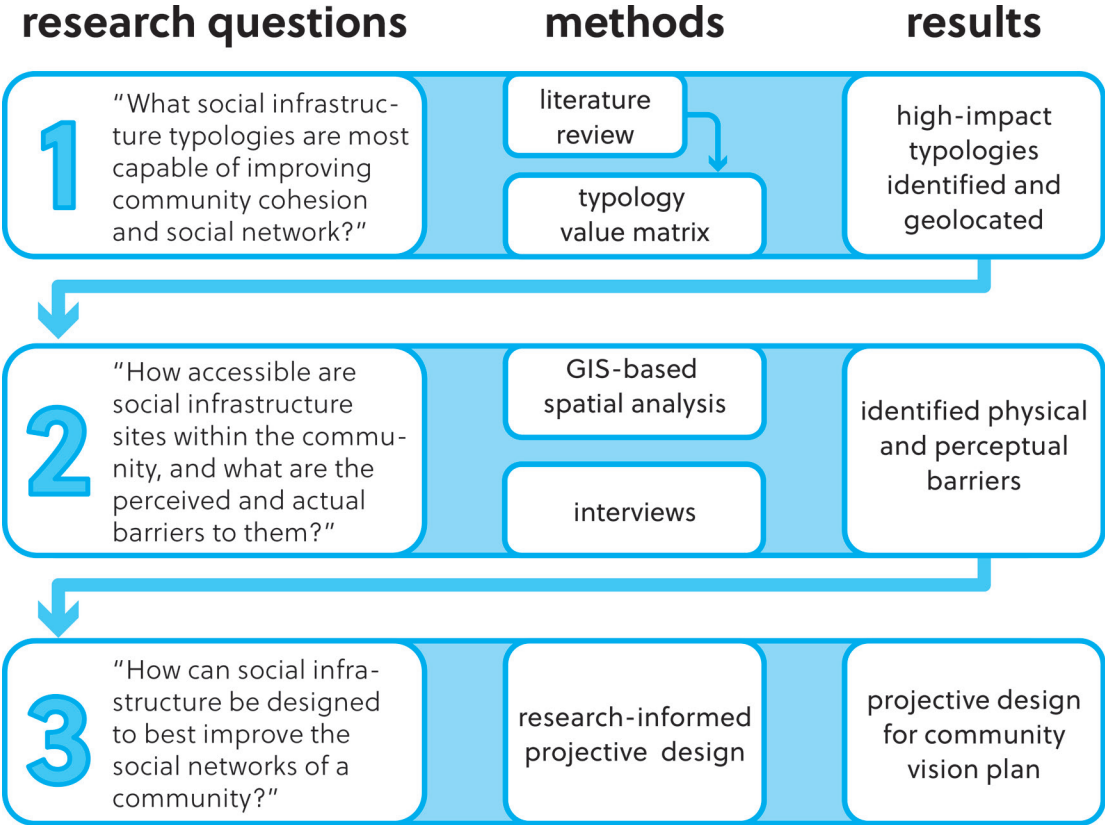


Figure 3.1 | Methodology Diagram

Study Area + Population

Disaster events happen worldwide, though some forms can be predicted and prepared for, most are unavoidable. Coastal areas, which comprise around 10% of the United States' land and 40% of its population, experience elevated risk of disaster events (NOAA n.d.). Though disaster events and a community's response to the disruption vary widely, understanding the impact that access to social infrastructure has on the disaster resilience of a community can, to a certain extent, be generalized. Because of this, it is appropriate for this study to be situated in a coastal city, Providence, Rhode Island (see Figure 3.2).

Providence, like all coastal cities, faces many challenges. A significant concern for Providence is sea level rise; the NOAA predicted a 15" sea level rise for Providence between 2016 and 2050 — an average of 0.44" of rise each year. Additionally, Rhode Island sinks approximately 6 inches each century due to the process called subsidence (NOAA 2009). As the sea rises and the land sinks, water-related disaster events have more severe impacts. From 2000 to 2017, the sea level around Rhode Island rose 3.5", contributing to a 380% increase in tidal flooding statewide in the same period (Sweet et al. 2018).

Boston

Rhode Island

Providence

New York City

Figure 3.2 | State Scale — Rhode Island.

Providence
Population: 189,692

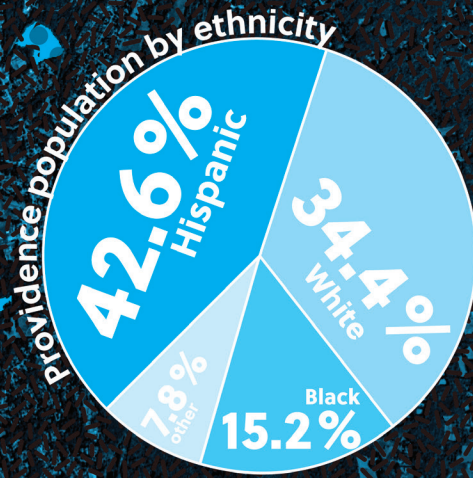


Figure 3.3 | City Scale — Providence.

South Providence

South Providence

Population: 12,687

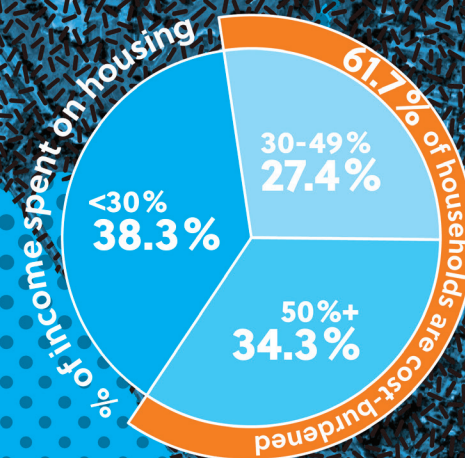
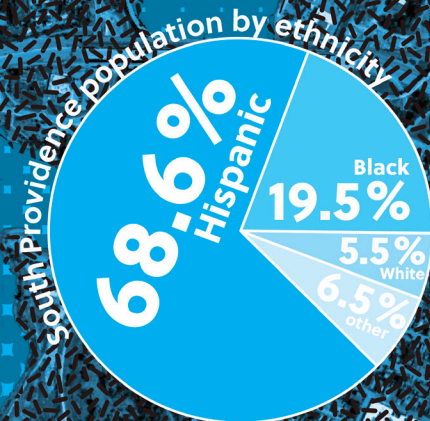


Figure 3.4 | Site Scale — South Providence.

Identifying High-Impact Social Infrastructure Typologies

To answer the first research question (RQ1), “What social infrastructure typologies are most capable of improving community cohesion and social network?”, this study implemented two strategies: first, a systematic literature review was conducted, and second, a matrix for determining high-impact typologies was created. This matrix was used to determine which social infrastructure typologies would have the best capacity for improving a community’s sociality, thus creating a more disaster-resilient community.

A Framework for High-Impact Social Infrastructure Typologies

First, a framework for determining high-impact social infrastructure typologies was created. This framework extracted critical themes from the existing body of literature to organize the typologies and select which qualities would be used to determine their general value.

The existing literature revealed four primary categories of social infrastructure: community spaces, third spaces, parks, and places of worship. Though each category has unique characteristics and approaches, it stands out for its social contributions within a community. These categories were used to organize specific social infrastructure typologies throughout the project.

Typologies from each category were then selected to be analyzed based on their con-

tribution to disaster resilience before, during, and post disruption. The contribution before a disaster event is focused on a typology’s contribution to a community’s sociality, resulting in a more disaster-resilient community. The contribution during a disaster investigates a typology’s ability to help during the initial disruption. Finally, a typology’s contribution after a disaster event is focused on its ability to be utilized by the community during recovery.

The following eight selection criteria were used in the matrix to determine which social infrastructure typologies are the most impactful: *Encounter*, *Accessibility*, *Function*, *Shared Experience*, *Openness During Disaster*, *Impact During Disaster*, *Openness Post Disaster*, and *Impact Post Disaster*. *Openness During Disaster* and *Openness Post Disaster* were rated on a three-point scale from zero to two, where a rating of zero means, in most cases, the typology is not available; a rating of one means its availability varies; and a rating of two means the typology is most always available to people. The remaining categories were rated on a five-point scale from 0 to 4, where 0 means no, 1 means poor, 2 means medium, 3 means high, and four means very high. The value of each typology is then determined by taking the sum of their values from each criterion. In addition, the sociality-related criteria (the first four) and the ones directly related to disaster events (the final four) were totaled separately to show which typologies are strongest in either area.



Figure 3.5 | Community Spaces

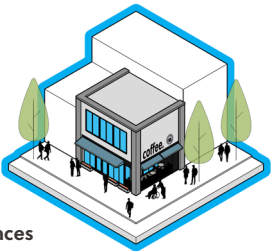


Figure 3.6 | Third Spaces

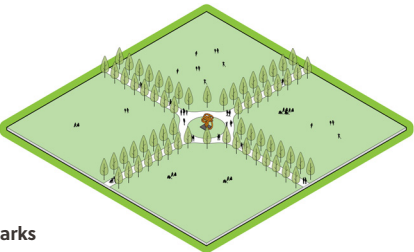


Figure 3.7 | Parks

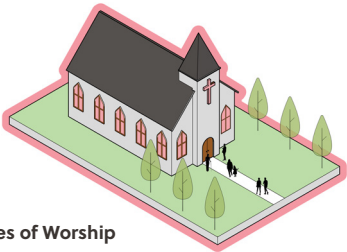


Figure 3.8 | Places of Worship

Community Spaces

This refers to public institutions where community can meet and socialize, including libraries, schools, community centers, public meeting spaces, museums, etc. (Fraser et al. 2022; Latham and Layton 2019).

Third Spaces

Third spaces: This refers to businesses that act as meeting places and encourage social interaction, for example, coffee shops, farmers markets, salons, bars/pubs, etc. (Fraser et al. 2022; Latham and Layton 2019).

Parks

This refers to a range of outdoor spaces including parks, community gardens, sports facilities, plazas, etc. (Fraser et al. 2022; Latham and Layton 2019).

Places of Worship

Including churches, mosques, synagogues, temples, etc. (Fraser et al. 2022; Latham and Layton 2019).

Diverse Encounters

This is interested in the diversity and tendency for encounters to occur. Who comes here? How frequently is incidental social interaction? A park, for example, would have a high encounter value because of the quantity and diversity of people that it attracts.



Figure 3.9 | Diverse encounters.

Accessibility

Rather than analyzing how easy the space is to get to, this looks at how inclusive the space is. For example, a coffee shop — though a good place for incidental sociality — is not accessible for those who can't afford the prices or that don't have interest in the products.

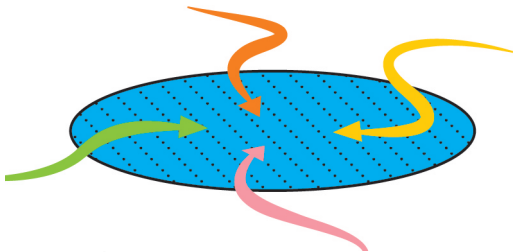


Figure 3.10 | Accessibility.

Practical Use

This analyzes the function of a typology to determine if it is crucial to a community and will attract people to it; does the typology provide essential services outside of its social components.

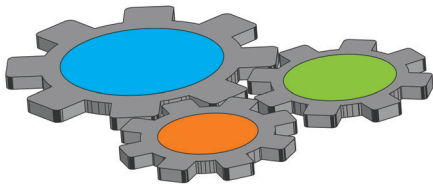


Figure 3.11 | Practical Use.

Shared Experience

This analyzes how well the typology contributes to a sense of shared experiences in the community. For example, in a community garden, individuals work together, teach and learn from each other, all while creating a shared experience.

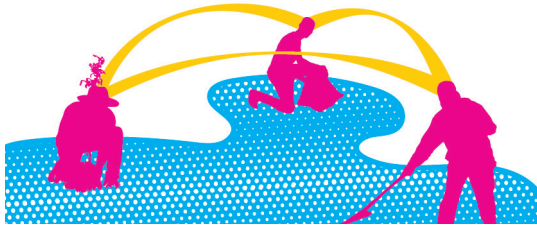


Figure 3.12 | Shared experience.

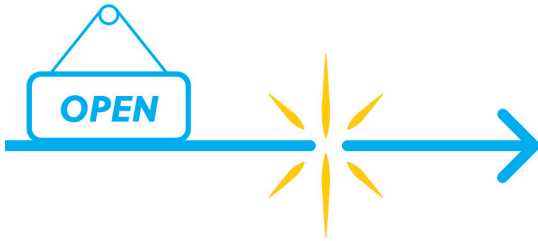


Figure 3.13 | Openness during disaster.

Openness During Disaster

This analyzes the openness of a site during the initial disruption. Is this a place where people can go for shelter?

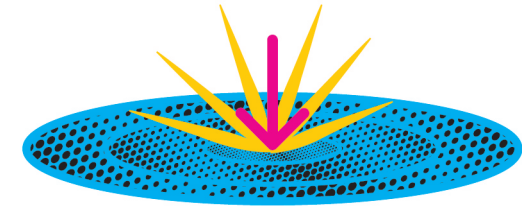


Figure 3.14 | Impact during disaster.

Impact During Disaster

This analyzes the value that the typology provides during a disaster. How does this space help the community during the initial disruption?

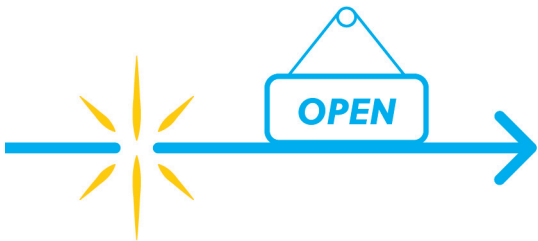


Figure 3.15 | Openness post disaster.

Openness Post Disaster

This analyzes the openness of a site after the initial disruption. Is this a place where people can go for shelter?

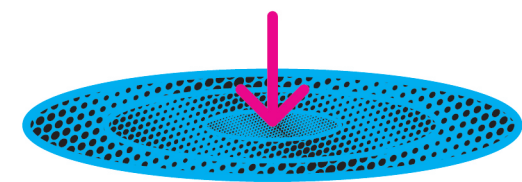


Figure 3.16 | Impact post disaster.

Impact Post Disaster

This analyzes the value that the typology provides during a disaster. What is it doing to support the community? This could be providing goods and services, or acting as a space for community to gather, reflect, and rebuild together.

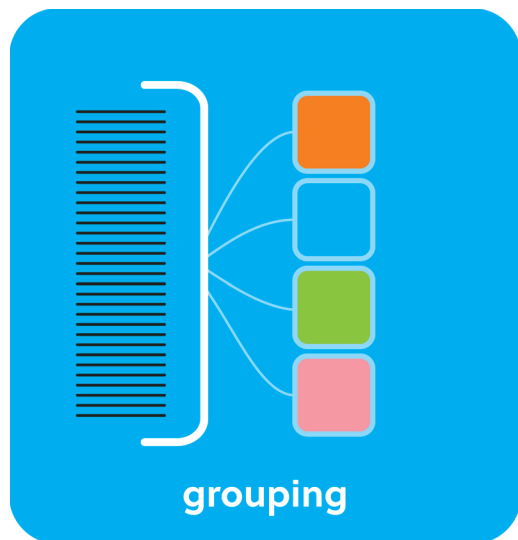


Figure 3.17 | Typology Identification + Geolocation

Identification + Geolocation of Social Infrastructure Sites

Once the high-impact social infrastructure typologies had been determined, the next step was to identify and geocode all sites within the study area of South Providence (see Figure 3.17). The primary method, used for This method was used for the *Community Spaces*, *Third Spaces*, and *Places of Worship* categories, was to use *Google My Maps*. First, each social infrastructure typology group was assigned a list of keywords that represent the selected sites within it (See XXX). The keywords used for *Community Spaces*, were "librar-

ies," "community center," "recreation center," and "community outreach." For *Third Spaces*, keywords include "café," "coffee," "bar and grill," "lounge," "farmer's market," "salon," and "beauty parlor." Finally, for *Places of Worship*, keywords included "places of worship," "church," "worship," "synagogue," and "temple." For each category, the keywords were searched using the built-in search engine and added into a folder — resulting in one folder of geo-located social infrastructure sites for each category. Only results located within the study area were added, and results were filtered based on their relevance. A result that came up under a keyword but did not match the

typology type/category would not be included. A manual search in Google Maps was used to find points that may have been missed in the Google My Maps search engine. This was done by panning through the neighborhood street by street and through the search Google Maps search engine (which proved far more consistent than the Google My Maps engine).

The layer for each typology group was exported to a KML (Keyhole Markup Language) file, which was converted to a Shape File (SHP) and then added to an ArcGIS Pro map. Within the map, the geocode social infrastructure sites were grouped in the same categories and

colored as follows: *Community Spaces* were represented in orange; *Third Spaces* in blue; *Parks* in green; and *Places of Worship* in pink.

For the remaining category, *Parks*, existing data was obtained from the Providence GIS Hub. The shape files were downloaded and added to the same ArcGIS map as the other three categories. The result is a comprehensive map of social infrastructure in South Providence.

Identifying Barriers to Social Infrastructure

To answer the second research question (RQ2), **“How accessible are social infrastructure sites within the community and what are the perceived and actual barriers to them?”**, this study implements two methods: the first is done through GIS mapping to determine physical accessibility to social infrastructure points in South Providence. The second method was interviews with community members and leaders. The interviews were value-coded and used with the findings from the GIS mapping to determine the most prominent barriers to social infrastructure sites within South Providence.

Spatial Analysis of Social Infrastructure

The physical accessibility to social infrastructure in Providence was analyzed using the geocoded social infrastructure sites collected to answer the first research question. This was done by the social infrastructure typology group and as a composite analysis of all social infrastructure typologies. Each social infrastructure group was mapped to show a one-half-mile radius around the sites and then used to analyze accessibility, density, and distribution. Additionally, a heat map of all social infrastructure types helped reveal areas that are most lacking.

Exploring Barriers to Social Infrastructure Through Interviews

Interviews were conducted with South Providence locals and community leaders to explore the perceptual barriers to a more social community. Interviews took place in person and online using Zoom. Both forms of interviews were audio-recorded, transcribed, and coded to determine common themes. Since this research involves human subjects, IRB approval was required prior to the data collection (see Appendix A).

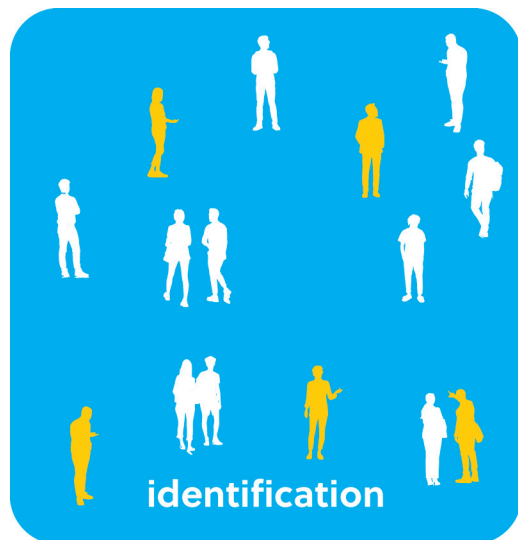


Figure 3.18 | Recruitment + Interview Process

Recruitment

Target participants were community leaders within South Providence, individuals associated with social infrastructure sites within South Providence, and individuals who had relevant expertise in the area. Participants were found using three methods: the first, convenience sampling, was an online search for community leaders; the second, also convenience sampling, was to identify contacts associated with social infrastructure sites located in answer the first research question; and the third method was the use of snowball sampling by asking participants to suggest additional contacts that they felt could make an informative contribution to the study. Once

identified, email correspondence was used to recruit interviewees. In total, twenty-eight potential participants were identified and contacted. Of these, only three were able to participate in an interview — a 10.7% acceptance rate.

Interview Procedure

The interviews were semi-structured by prepared and pre-approved questions (See Appendix C and D) but allow for a natural conversation and questions to take over — the prepared questions acted more as a guide for moving through topics during the interviews. The questions were organized into four parts; the first achieves interviewee's consent

to participant and be recorded for the use of this study. The second through fourth parts investigate perception of community, social infrastructure, and disaster risk (see Figure 3.18).

The first part explained the research and the participants' involvement and asked for their consent before proceeding. This part was required by the IRB and will help participants better understand this study's purpose.

The second part investigates perception of community in the study area. This was intended to establish a better understanding of how they perceive the strengths and weaknesses of the community.

The third part investigated perceptions of social infrastructure in the study area and accessibility to these sites. This helped establish a better understanding of how social infrastructure is used in South Providence and the major physical as well as perceived barriers to these sites.

The fourth and final part investigated perceptions of disaster risk in the study area. Due to its environmental justice issues, South Providence has a higher risk of disaster than other parts of Providence; this section explored local perception of this issue. In addition, this asked about how social infrastructure sites support the community during disaster scenarios.



Figure 3.19 | Data Coding + Analysis.

Data Analysis

To reveal ideas from each interview and organize them that allows comparing and determining common values from the set of interviews, the data needed to be analyzed (see Figure 3.19). The data analysis process was modeled off the *Data Analysis and Interpretation Strategies* section in *Research Design* by Patricia Leavy (2017) and was conducted as follows:

Data Preparation: To prepare the mp4 audio recordings from each interview, it needed to be transcribed. This was done in Microsoft Word using the transcribe feature (Home > Dictate > Transcribe). The .mp4 file was uploaded, and a transcription was produced. Each speaker was named before importing the transcribed text with timestamps into the file. From there, the generated transcription was edited for accuracy manually while listening back to the recording.

Initial Immersion: After an interview had been transcribed, it was carefully read through to gain a sense of the respondents' opinions and key points. During this process, common ideas and themes were identified, and key/moving quotes were extracted to aid in the findings of this data.

Coding: Each interview was read through once more to record each respondent's stance on the key points identified during the *initial immersion* step. This process utilized a matrix to organize each interviewee's position on these themes.

Categorizing: Using a matrix to create groups, similar perceptions/feelings for each theme were grouped to understand which perceptions were the most consistent within the participants.

Interpretation: This step explores the categorized perceptions of common themes and results from the spatial analysis to identify the perceived and actual barriers to social infrastructure in South Providence. The understanding of these barriers was used for the design portion of this project.

Breaking Barriers

Finally, for the third research question (RQ3), **“How can social infrastructure be designed to best improve the connectivity of a community?”**, the results from questions one and two were used to develop a framework for improving social networks and disaster resilience. This framework was then used to inform the design of a community vision plan and specific strategies to create a more resilient South Providence community. The framework was developed in response to the prominent barriers to social infrastructure identified in answering research question two. The framework’s goal was to provide strategies for breaking barriers to social infrastructure. These barrier-breaking strategies were supported by interview responses and existing literature.

04

Research Results

*identifying physical and perceived barriers
to a more social, coherent South Providence.*

Introduction

In conducting the described comprehensive methodology, this study successfully pinpointed the social infrastructure typologies in South Providence with the highest capacity and the most significant barriers keeping the community from these sites. Using this knowledge, practical strategies were identified to address these barriers and enhance the social fabric of the South Providence community.

Determining High-Impact Social Infrastructure Typologies

Social infrastructure typologies were rated a value for each of the eight criteria points (see Figure 4.1). Then, based on the sum of their ratings, they were arranged from highest to lowest. The four highest social infrastructure typologies from each category (*community spaces*, *third spaces*, *parks*, and *places of worship*) are selected for mapping high-impact social infrastructure density. As mentioned in the methodology, the value ratings are divided into two themes: Social and Disaster-Related. The highest rating given was twenty-five, but on average, any rating near twenty is highly impactful. The average rating of the selected Community spaces was 22.7; for Third Spaces, it was 14.75; for Parks, 20.25; and for Places of Worship, 21. The results of identifying social infrastructure typologies revealed that a typology might have little impact on a community’s sociality but much higher value during and after a disaster. For example, a sports stadium is targeted at a specific audience and restricts who can enter (expensive tickets), making it a poor typology for supporting social interactions in a community. However, its value as a place of refuge during and after some types of severe disaster events gives it more value.

Social Infrastructure		Social Criteria			
Group	Typology	Diverse Encounters (0-4)	Accessibility (0-4)	Practical Use (0-4)	Shared Experience (0-4)
Community Spaces	Community + Rec. Centers	3	4	3	3
	Community Organizations	3	3	3	3
	Libraries	3	4	3	2
	Hospitals	1	3	4	1
	schools	3	1	3	3
	Colleges/University	3	1	3	2
	Museum/Art Gallery	3	2	2	3
Third Spaces	Coffee Shops	3	3	3	3
	Sports Stadiums	2	0	1	4
	Bars/Pubs	3	2	2	3
	Salons	2	3	3	2
	Private Rec. Centers	3	2	3	3
	Bookstore	2	3	2	2
	Street/Farmer's Markets	3	2	2	4
	Theater	2	2	2	3
	Coworking Spaces	3	1	2	3
Parks	Pocket Parks	2	3	3	4
	Greenspaces	2	3	3	2
	Playgrounds	3	3	2	3
	Sports Facilities	3	2	3	3
	Community Gardens	2	2	3	4
	Plazas	3	3	2	2
Places of Worship	Churches	2	1	4	4
	Synagogues	2	1	4	4
	Mosques	2	1	4	4
	Temples	2	1	4	4

Figure 4.1 | Typology Value Matrix
Typologies were rated a value for each of the eight criteria points. Then, based on the sum of their ratings, they were arranged from highest to lowest. The four highest social infrastructure typologies from each category are selected for mapping high-impact social infrastructure density.

During Disaster		Post Disaster		Ratings		
Openness (0-2)	Impact (0-4)	Openness (0-2)	Impact (0-4)	Social (0-16)	Disaster (0-12)	Total (0-28)
2	4	2	4	13	12	25
1	4	2	4	12	11	23
1	3	2	4	12	10	22
2	4	2	4	9	12	21
0	0	1	2	10	3	13
0	0	1	2	9	3	12
0	0	1	1	10	2	12
0	0	2	2	12	4	16
1	2	1	4	7	8	15
0	0	2	2	10	4	14
0	0	2	2	10	4	14
0	0	1	2	11	3	14
0	0	1	2	9	3	12
0	0	0	0	11	0	11
0	0	1	1	9	2	11
0	0	0	0	9	0	9
2	3	2	3	12	10	22
2	3	2	4	10	11	21
2	1	2	3	11	8	19
1	2	2	3	11	8	19
1	1	2	3	11	7	18
2	2	2	2	10	8	18
1	3	2	4	11	10	21
1	3	2	4	11	10	21
1	3	2	4	11	10	21
1	3	2	4	11	10	21

Typology Group 1: Community Spaces

The Community Space category revealed itself to be the most impactful. Within it, Community Centers + Recreation Centers received the highest rating of all the typologies, with a value of twenty-five. These spaces are highly accessible places where individuals are likely to meet others from their community. These are spaces that people use and will go to for reasons other than to socialize but are capable of generating a high sense of shared experience when visiting. During times of rapid change and recovery, these sites are crucial for providing community needs and information. The four high-impact typologies included in the Community Spaces category are Community + Recreation Centers, Community Organizations, Libraries, and Hospitals.

Given a rating of twenty-five, Community + Recreation Centers are highly accessible spaces that provide a number of social opportunities within a community. In addition, they are important sites within a community while enduring and recovering from a disaster event. (see Figure 4.2)

Given a rating of twenty-three, the community organization typology includes a range of community-focused organizations that provide support and opportunities to a community. These are accessible spaces that often organize events to improve the community while creating social connections within it. (see Figure 4.3)



Figure 4.2 | Community Spaces



Figure 4.3 | Community Organizations

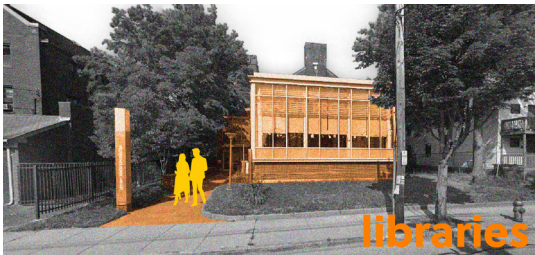


Figure 4.4 | Libraries



Figure 4.5 | Hospitals

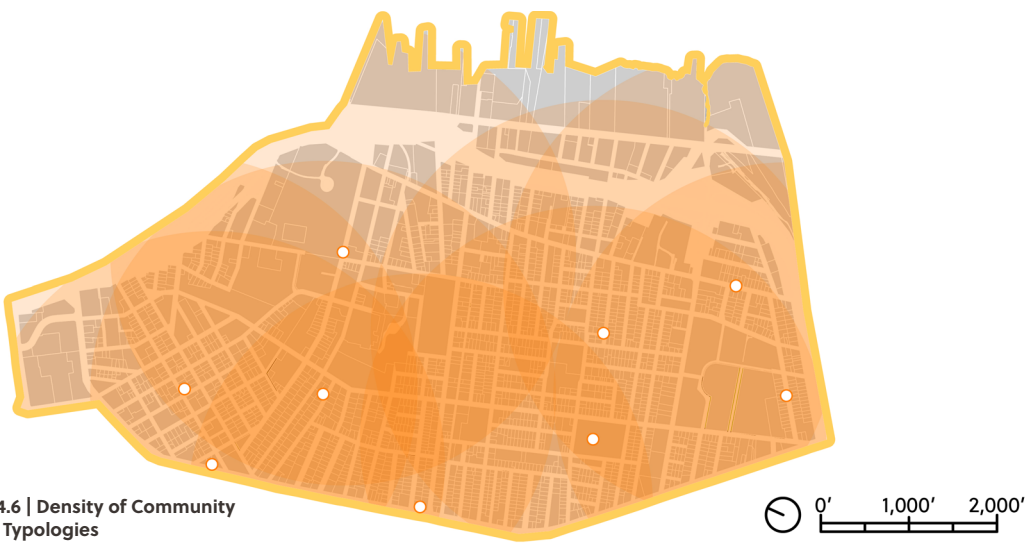


Figure 4.6 | Density of Community Spaces Typologies

With a rating of twenty-two, libraries are an important typology within a community. Simply put, they are providers of information, whether that be through books, access to the internet, or community bulletin boards. The social qualities of a library come naturally but can also be improved with organized events. (see Figure 4.4)

The *Hospital* typology is the outlier of this group; it is not a very social place but has a large contribution during times of disaster and recovery. In addition, the large (typically negative) parking lot can be used as a place to gather during these events. (see Figure 4.5)

Nine *Community Spaces* were identified within South Providence; of these, there are two community centers: the Davey Lopes Recreation Center and the John H. Rollins Recreation Center. There is one library, the South Providence Library, five community organizations, and the final site was the Rhode Island Hospital, which was counted in one point despite being a 60-acre complex (mostly parking).

In terms of distribution, these are dispersed justly within South Providence (see Figure 4.6). The Davey Lopes Rec. Center services Upper South Providence, while the John H. Rollins Rec. Center services Lower South Providence. The South Providence Library is located in Lower South Providence but is relatively accessible from all parts of the community; only a five-minute drive, thirty-minute walk, or sixteen minutes with public transit. The Rhode Island Hospital claims nine percent of South Providence — nearly twenty percent of Upper South Providence — takes up the northeastern corner of the neighborhood.

South Providence has a range of *Community Spaces* that bring the community together and provide amenities. In addition, the large parking lots, though posing their own issues, could be used to stage community support during and after disaster events.

Typology Group 2: Third Spaces

In general, the *Third Spaces* category was less accessible but very capable of fostering social interactions. Most of these spaces provide a similar social capacity to the *Community Spaces* typologies but are far less impactful during and post-disaster events. The *Coffee Shop* typology, given a rating of sixteen, earned the highest rating in the category. These are familiar places for people to meet up with people or to have incidental social encounters. The outlier in this category was *Sports Stadiums*; this was the only typology to receive a zero for accessibility, due to being targeted at the sports community and being associated with a high cost of attendance. However, like hospitals, their value comes elsewhere. During and especially after certain disaster events, sports stadiums have been epicenters of shelter and communication. The typologies within this group include Coffee Shops, Sports Stadiums, Bars + Pubs, and Salons.

Coffee Shops, given a rating of sixteen, rated very well in contribution towards community sociality but poorly during and post disaster events. These are significant locations for gathering, working, and chance interactions within any community. A visit to one often results in diverse interactions and a shared experience of relaxation with others at the shop. (see Figure 4.7)



Figure 4.7 | Coffee Shops



Figure 4.8 | Sports Stadiums



Figure 4.9 | Bars + Pubs



Figure 4.10 | Salons

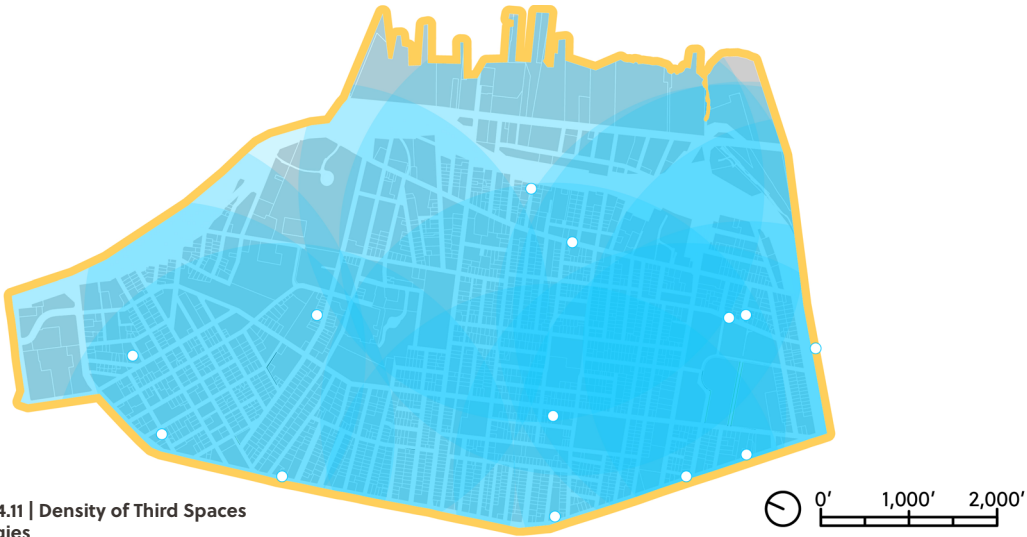


Figure 4.11 | Density of Third Spaces Typologies

Sports Stadiums, with a rating of fifteen, are quite the opposite. These are very social places, but only for a particular audience and those who can afford attendance costs. However, many sports stadiums can act as mass shelters for the adjacent communities during times of disaster and recovery, enabling them to score very highly in the during and post disaster categories. (see Figure 4.8)

Bars + Pubs, with a rating of fourteen, contribute well to sociality within a community but are for a more targeted audience. These spaces typically do not provide much value during disaster scenarios and recovery. (see Figure 4.9)

Salons, also with a rating of fourteen, also contribute to the sociality of a community. These spaces are known for being places to learn, share, and discuss local activities. Many of the salon workers build strong relationships with the regular customers they service. (see Figure 4.10)

Thirteen third spaces were identified within South Providence: five coffee shops, zero sports stadiums, four *bars + pubs*, and four salons. The coffee shops are primarily distributed in Upper South Providence around the hospital complex. The closest sports stadium to South Providence is between two and five miles from most of South Providence. It is also not as suitable as some stadiums for housing people during emergencies. The bars and pubs are distributed relatively evenly through South Providence but tend to be towards the edge of the neighborhood. Finally, the salons are mainly located along Broad Street in Lower South Providence.

Though there are a decent number of third spaces in South Providence (see Figure 4.11), they are mostly small sites isolated from other third spaces or social infrastructure sites. Creating clusters of these sites that could service more people would improve each of their sociability.

Typology Group 3: Parks

The Parks category was able to score well in both the social and disaster-related categories. Parks are welcoming to most people, accessible, and will offer many diverse encounters within them. As places to relax, play, and meet, parks play a significant role in any healthy neighborhood community. The greenspace and accompanying ecological services provided within the parks contribute to healthier communities and can help to mitigate disaster events. In addition, the open space can be utilized during times of recovery after severe disaster events. The selected typologies from the parks category include *Pocket Parks*, *Greenspaces*, *Playgrounds*, and *Sports Facilities*.

Pocket Parks, with a rating of twenty-two, are small parks tucked away throughout a community. These parks often provide places to recreate and relax and act as great places for community members to meet. (see Figure 4.12)

Greenspaces, rated twenty-one, are larger, more natural places for people to spend time in and recreate. Their size makes interactions with others less common in some areas, but they often still have more populated areas within them. Additionally, the size and heavier presence of vegetation produce a larger impact on disaster remediation. (see Figure 4.13)

Playgrounds, rated at nineteen, are less accessible due to their specific target of younger-aged kids. However, these are still



Figure 4.12 | Pocket Parks



Figure 4.13 | Open Space



Figure 4.14 | Playgrounds



Figure 4.15 | Sports Facilities

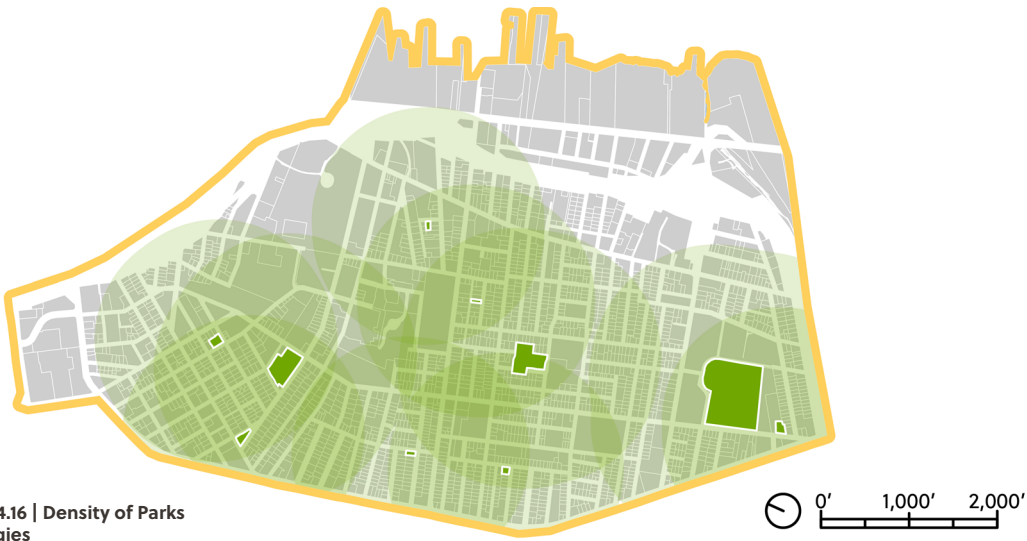


Figure 4.16 | Density of Parks Typologies

very social places for the kids and their guardians. Playgrounds are important for kids to learn to interact with others as they play and share experiences. At the same time, interactions between guardians are common as they oversee their kids. These spaces are an important addition to any community, particularly when there is a large presence of younger families. (see Figure 4.14)

Sports Facilities, also with a rating of nineteen, are a more targeted type of park. These are spaces where people can use courts, fields, and sports amenities for recreation. They can become very social places that promote high levels of shared experience. (see Figure 4.15)

The parks are well distributed throughout the community, though sparser in Lower South Providence (see Figure 4.16). Though there are no larger community parks within the community, directly to the south (past I-95) is Roger Williams Park—a 427-acre park with many amenities, many of which service the entirety of Providence. South Providence would benefit from additional pocket parks spread throughout the neighborhood that are more broadly accessible rather than just being targeted at particular audiences.

Typology Group 4: Places of Worship

Places of Worship are very important places in the lives of many people. These spaces are targeted at their respective religious congregations but are often very open to welcoming outsiders and the communities that they are part of. Places of worship provide many services and opportunities to a community. The included typologies were *churches* (see Figure 4.17), *synagogues* (see Figure 4.18), *mosques* (see Figure 4.19), and *temples* (see Figure 4.20)

Twelve places of worship were identified within South Providence: ten churches and two mosques/masjids. These sites are spread evenly across the neighborhood but tend to be towards the west edge (see Figure 4.21).

churches



Figure 4.17 | Churches

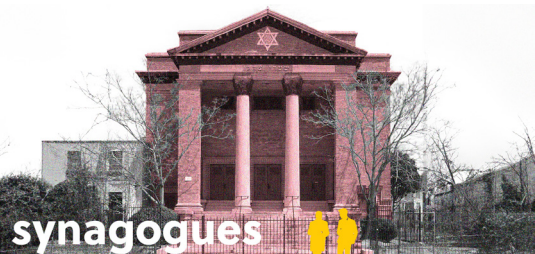


Figure 4.18 | Synagogues

mosques

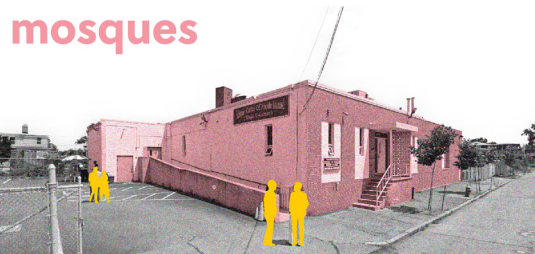


Figure 4.19 | Mosques

temples

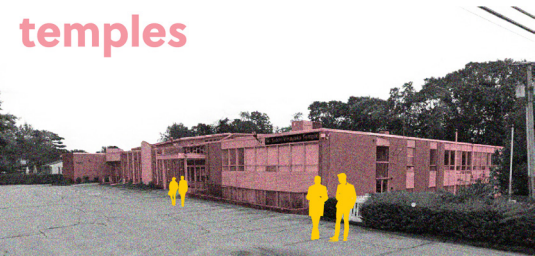


Figure 4.20 | Temples

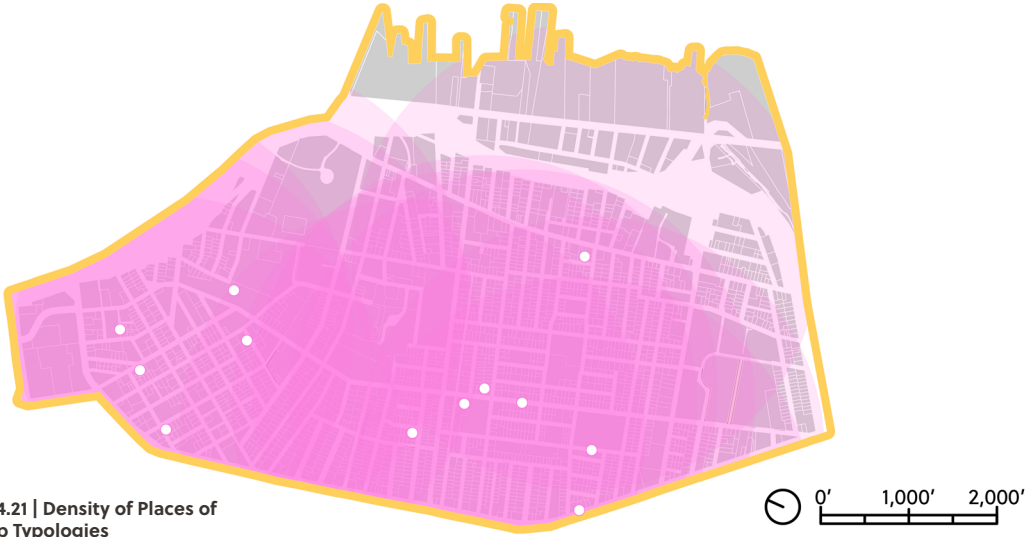


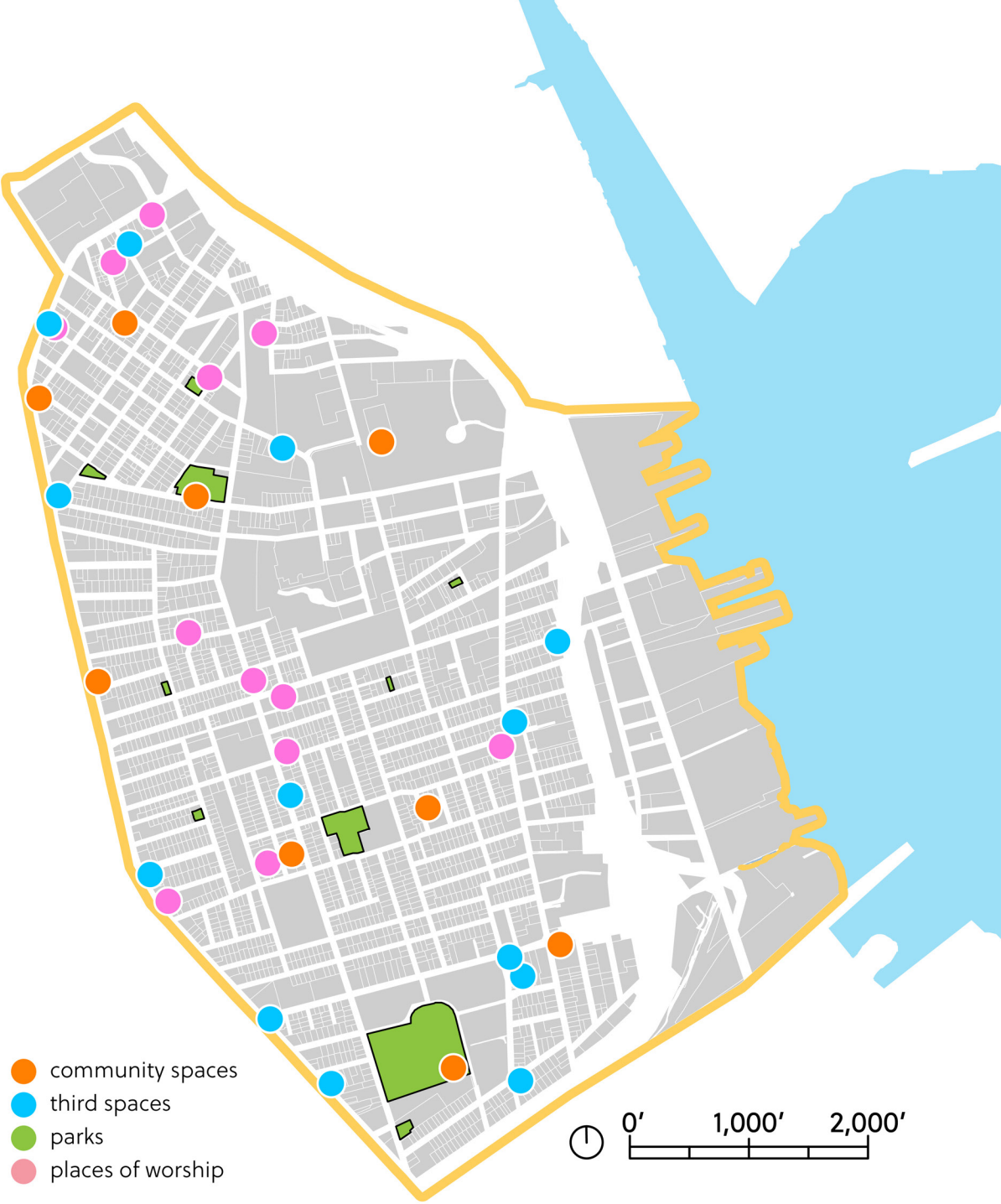
Figure 4.21 | Density of Places of Worship Typologies

Mapping Social Infrastructure Sites

Of the selected social infrastructure typologies, forty-four sites were identified within South Providence (see Figure 4.22). Nine community spaces, thirteen third spaces, ten parks, and twelve places of worship. Over one-quarter of these spaces (twelve) are found along the shared neighborhood border with Elmwood: Broad St.

The density mapping of social infrastructure points in South Providence reveals the most lacking areas (see Figure 4.23). These “dead zones” correspond well with the zoning, often falling within the Healthcare Institution District or various Industrial District types. This makes sense as fewer to no residents live in these areas. Filling these areas in will be necessary if the currently industrially focused waterfront gets transformed.

Figure 4.22 | Social Infrastructure Sites in South Providence



Identifying Perceptual Barriers

The interview and analysis processes revealed that the primary issue was not the presence of social infrastructure but the way these spaces are used, or rather not used. More specifically, it identified barriers to social infrastructure sites (see Figure 4.24). As one participant put it: "There are options: we do have a library on Prairie Ave; we do have parks; we do have social infrastructure there, but for a variety of reasons, they're not utilized." This was unexpected and caused a shift from designing social infrastructure to targeting the barriers that keep these spaces from being fully utilized. However, it's important to note that the lack of social infrastructure sites is not the primary issue; participants still identified a social infrastructure disparity within the South Providence community. The value-coded themes were categorized to reveal four overarching barrier groupings: economic barriers, environmental barriers, image barriers, and political barriers. Addressing the barriers that inhibit sociality and cohesion in the South Providence community is a complex problem. Fulfilling the need for more housing, amenities, and a better living environment risks displacing the already economically pressured community.

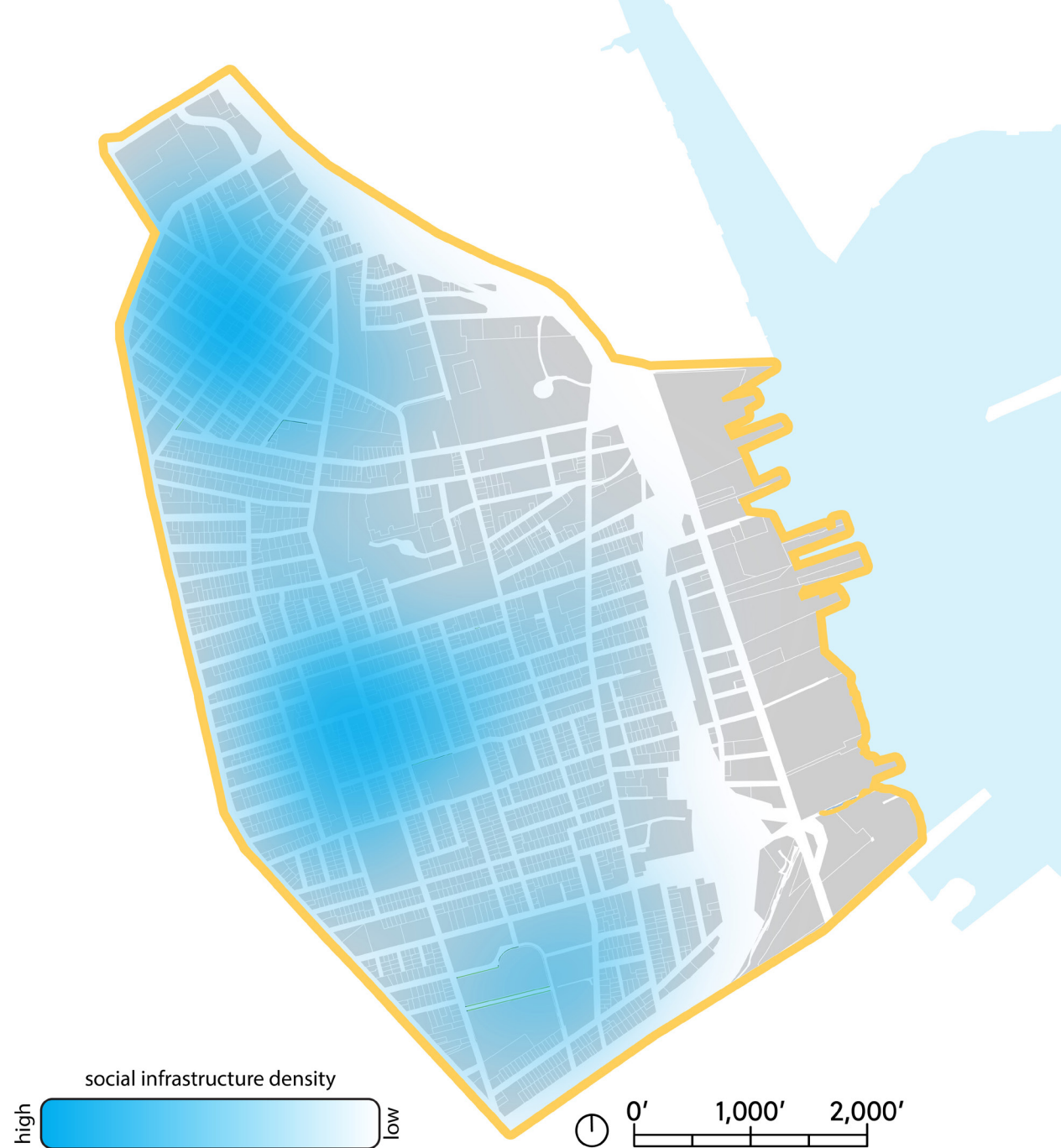


Figure 4.23 | Social Infrastructure Density in South Providence

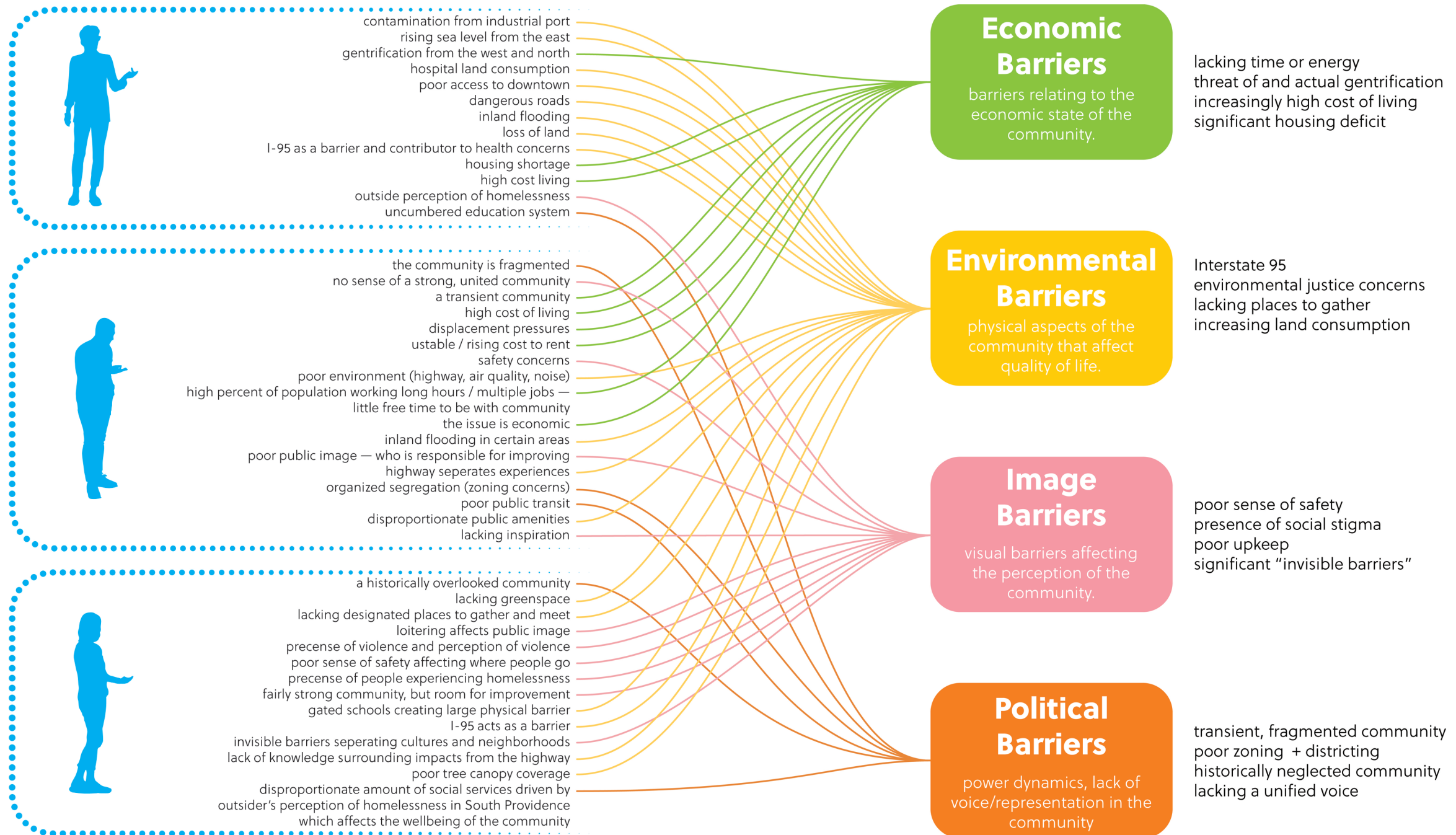


Figure 4.24 | Barrier Identification



Figure 4.25 | Economic Barriers

Economic Barriers

During the interviews, it was determined that the primary barrier to achieving a more socially thriving South Providence was economic (see Figure 4.25). Financial stresses can significantly impact an individual's capacity to participate and flourish within a community. If someone is financially struggling and working long hours or multiple jobs to make ends meet, they will unlikely have the time or energy to become deeply involved in their community. In general, South Providence faces significant economic challenges: 39% of the community is below the poverty line (U.S. Census Bureau 2021). Due to the systemic economic inequality that affects the social fabric of a community, economic barriers were identified as a major hurdle to building social cohesion in South Providence. Within this class of barriers, the interviews identified four economic barriers to explore: (1) **Time + Energy**, (2) **Gentrification**, (3) **High Cost of Living**, and (4) **Housing Deficit**.

Breaking economic barriers is a far deeper issue than can be solved through this proposal, but rather one that would require a

multidisciplinary approach that targets city and national policies. Economic barriers can be targeted by controlled transformation (Brown 2014). Community improvements that focus on the financial aspect of a community, e.g., affordable housing units and spaces for locally owned businesses, can be implemented carefully where the community has a voice and displacement protection. In 2021, Providence released its *Anti-Displacement and Comprehensive Housing Strategy* report, acknowledging the housing issue in Providence and providing protection for communities at risk of displacement (City of Providence, Rhode Island 2021). It is, however, still important for communities to organize a plan that protects and preserves their community while making space for its improvements. These strategies will not directly or by any means entirely address this issue in South Providence; however, growth is coming towards South Providence, so it will be necessary for the community to work together and control this growth to mitigate damage to the community and maximize the benefits.



Figure 4.26 | Environmental Barriers

Environmental Barriers

The next issue identified was *Environmental Barriers* (see Figure 4.26). The environment one lives in significantly affects one's quality of life and willingness to participate in community affairs. South Providence is isolated by Interstate 95 and forced to suffer various environmental justice issues resulting from the nearly 200,000 vehicles that use this stretch of the highway daily and the industrial port area to its east. In addition, there is a significant lack of green space, tree canopy coverage, and places for people to gather. The interviews revealed that these issues create a physical disconnect from the rest of Providence while impacting the sense of pride in the community. This category identified the following barriers: (1) **Interstate 95**, (2) **Environmental Justice Issues**, (3) **Lacking Gather Places**, and (4) **Land Consumption**.

Breaking environmental barriers is well within landscape architecture's range to tackle. The physical environment in South Providence is lacking for various reasons. A combination of larger-scale street improvement projects, such as the city of Providence did on Broad St. in 2023 (City of Providence n.d.), and smaller community-organized and led neighborhood improvement projects. It is also essential to address the environmental challenges posed by Interstate 95, such as its runoff and the pollutants it brings into the neighborhood. These projects should focus on increasing greenspace, which will positively impact the quality of life and help mitigate environmental justice issues faced in the community. In addition to the improved sociality, an improved environment makes navigating disaster scenarios more manageable and safer.

Image barriers (see Figure 4.27), closely related to environmental ones, can significantly affect



Figure 4.27 | Image Barriers

Image Barriers

one's willingness and inspiration to participate in the community. Interviewees identified that South Providence's image creates perceptual issues of safety, influencing how people move through the community. An unclear understanding of who is responsible for the upkeep of the neighborhood results in little to no commitment from community members. The interviews also identified that varying images/personas across Providence's neighborhoods are an invisible barrier separating the different experiences and cultures. The image barriers can be grouped into the following categories: (1) **Sense of Safety**, (2) **Social Stigma**, (3) **Poor Upkeep**, and (4) **Invisible Barriers**.

Breaking the image barriers is also highly achievable through organized community groups and neighborhood upkeep. When there are signs that a space is cared for, it will appear more welcoming and safer (Nassauer 1995; Peinhardt 2023). Furthermore, the Broken Glass Theory, popularized by George L. Kelling and James Q. Wilson, states that the presence of disrepair and vacant lots can contribute to more disrepair and poor public image (1982). Meanwhile, repurposing these vacant lots into productive places for sociality and mitigating environmental elements can improve the public image and contribute to a more social community.

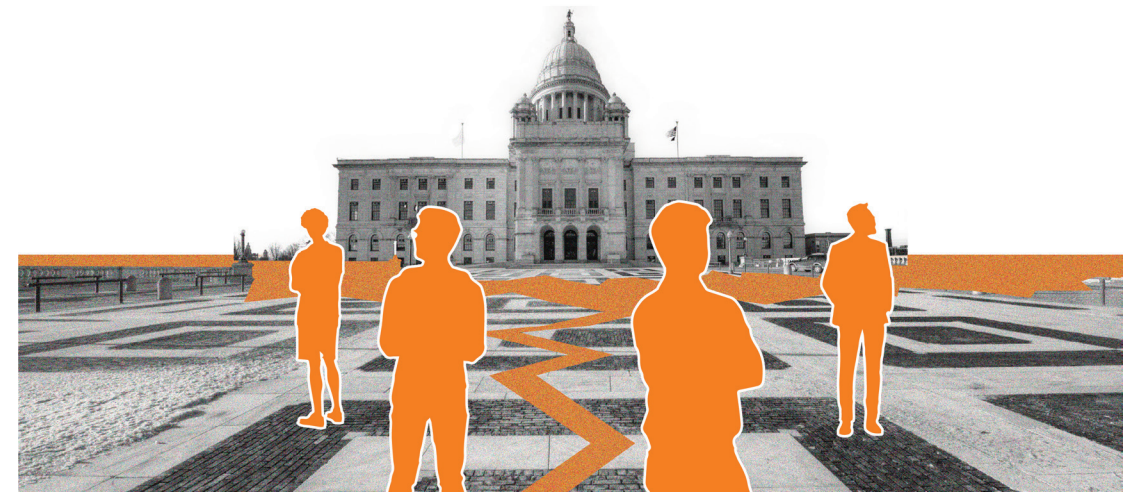


Figure 4.28 | Political Barriers

Political Barriers

The final barrier type identified during the interviews was Political Barriers (see Figure 4.28). Seventy-three percent of South Providence's housed population are renters. This transient nature of the neighborhood results in a fragmented community with no strong political voice. This, paired with the community's history of being overlooked and the outsider's view of the neighborhood, creates a weaker care for and sense of community. In addition, the interviewees discussed a pattern of decisions to put homelessness infrastructure in South Providence because of its status as a lower-income neighborhood. The interviews identified the following types of *Political Barriers*: (1) **Transient, Fragmented Community**, (2) **Zoning + Districting**, (3) **History of Neglected Needs**, and (4) **Poor Public Transit**.

Addressing the barriers to political barriers, like the economic barriers, are more complicated. Many of the previously mentioned methods would contribute to an improved sense of community in South Providence. A better-connected, less fragmented community will have a stronger political voice. As mentioned, for economic barriers, this strengthened voice will be valuable for controlling the development and changes within the neighborhood. To further improve the sense of togetherness and pride in one's community that can inspire more participation, restoring and emphasizing community history and culture in tangible ways is important. Examples of this are commemorative monuments and the redevelopment of a historically important center.

05

Designing Sociality

Moving from research to design:
envisioning a more social, cohesive,
and resilient South Providence.

Background + Site Analysis

Challenges

As identified during the research phase, the South Providence community is fragmented and faces many large challenges. The neighborhood suffers from poor relationships with three regional entities: the Rhode Island Hospital, Interstate 95, and an active industrial port area. The community has no control over these entities' actions but does share the consequences in the form of a range of environmental justice issues (Figure 5.1). Pollutants from the Interstate and industrial waterfront are pushed into the community by winds coming off the bay. Coupled with the poor tree canopy cover in South Providence, air quality is poor, leading to high asthma and cancer rates (Carini 2022). Additionally, this low tree canopy cover, with a high area of impervious land cover in South Providence, causes high levels of urban heat island effect. Outdated piping and lack of pervious land cover make the neighborhood prone to inland flooding. While sea level rise also poses the threat of land loss and more severe flooding. On top of all of this, the image of the community from outside neighborhoods is poor and often does not accurately portray the community. A substantial portion of the community faces financial hardships, and the unemployment rate is high. Additionally, economic pressure from outside threatens gentrification within the community. Expansion of the Rhode Island Hospital and pressures of other development threaten to force the community out. The financial hardships and high level of temporal residency that South Providence faces make addressing these issues a difficult task.

Opportunities

Despite these challenges, the South Providence community has many opportunities to create a healthier, better-connected environment by creating better relationships with the regional entities and mitigating environmental justice issues (see Figure 5.2). Currently, the prevalence of vacant lots damages the community's image and sense of safety, however, this provides an opportunity to flip the script on these by converting them into socially and environmentally productive spaces throughout the neighborhood. New projects that connect the community to the waterfront and downtown are being planned. These connections could help to limit the invisible barriers between communities. Interstate 95, though a major challenge to the community's health and well-being, does provide easy access to most of the city for individuals with vehicle access. Additionally, it acts as a protective barrier from coastal flooding, storm surges, and sea level rise. The Rhode Island Hospital has a significant opportunity to become a community resource rather than a challenge that the community is forced to deal with. The softening of the edges and improvement of relationships between these entities will be crucial for improving the state of the community.

Site Analysis — Challenges

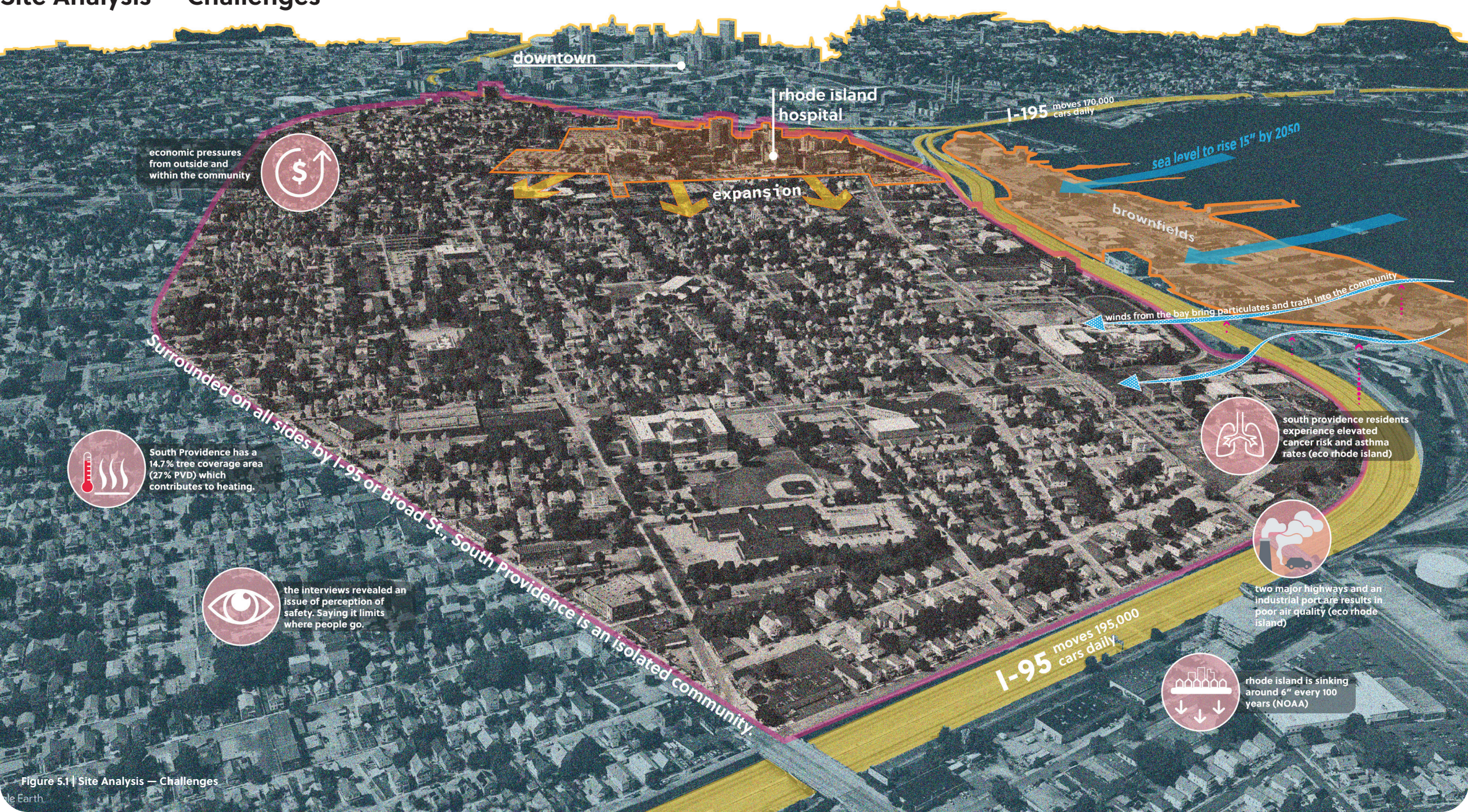


Figure 5.1 | Site Analysis — Challenges

Site Analysis — Opportunities



Figure 5.2 | Site Analysis — Opportunities
Google Earth

Community Vision Plan

Overview

In response to the need for more social communities and worsening disaster events, this vision plan is focused on breaking barriers to a more social, cohesive, and resilient South Providence community. Informed by barriers identified in the previous chapter through interviews and expanded upon with further site analysis and research on South Providence, this vision plan proposes conceptual design typology that targets these barriers in South Providence. In response to the economic barriers, the plan incorporates methods that bring housing and local business spaces, while providing displacement protections to the community. Environmental barriers are addressed through mitigative and preventative methods. Addressing image barriers involves multiple approaches that improve the environmental image and sense of safety within the neighborhood. Finally, political barriers are targeted by strengthening the sense of community and pride that inspires a unified political voice to navigate the future of the neighborhood. Addressing these barriers improves the social capacity and community disaster resilience of South Providence.

Scales of Interventions

The vision plan’s proposed design interventions are broken into three scales: small, medium, and large-term projects (see Figure 5.3). These different scales of interventions within the community can also be seen as a road map; projects should start small and build up to larger ones as more community support and protections are gained. Small-scale interventions include enhancing community programming and establishing a series of pocket parks throughout the neighborhood. This helps to create a better-connected community while generating visual cues that by working together, the community is capable of making improvements. The medium-scale interventions include establishing a green barrier between the neighborhood and Interstate 95 and improving the streetscapes and accessibility within the neighborhood. These interventions greatly improve the image of the community as well as mitigate environmental justice issues. Finally, the large-scale interventions propose the development or enhancement of social hubs within South Providence as well as solidifying the community’s place in South Providence. These interventions are meant to be tackled once the community has a strong unified voice and vision so that they are able to have control over what occurs rather than be pushed out of South Providence by gentrification.

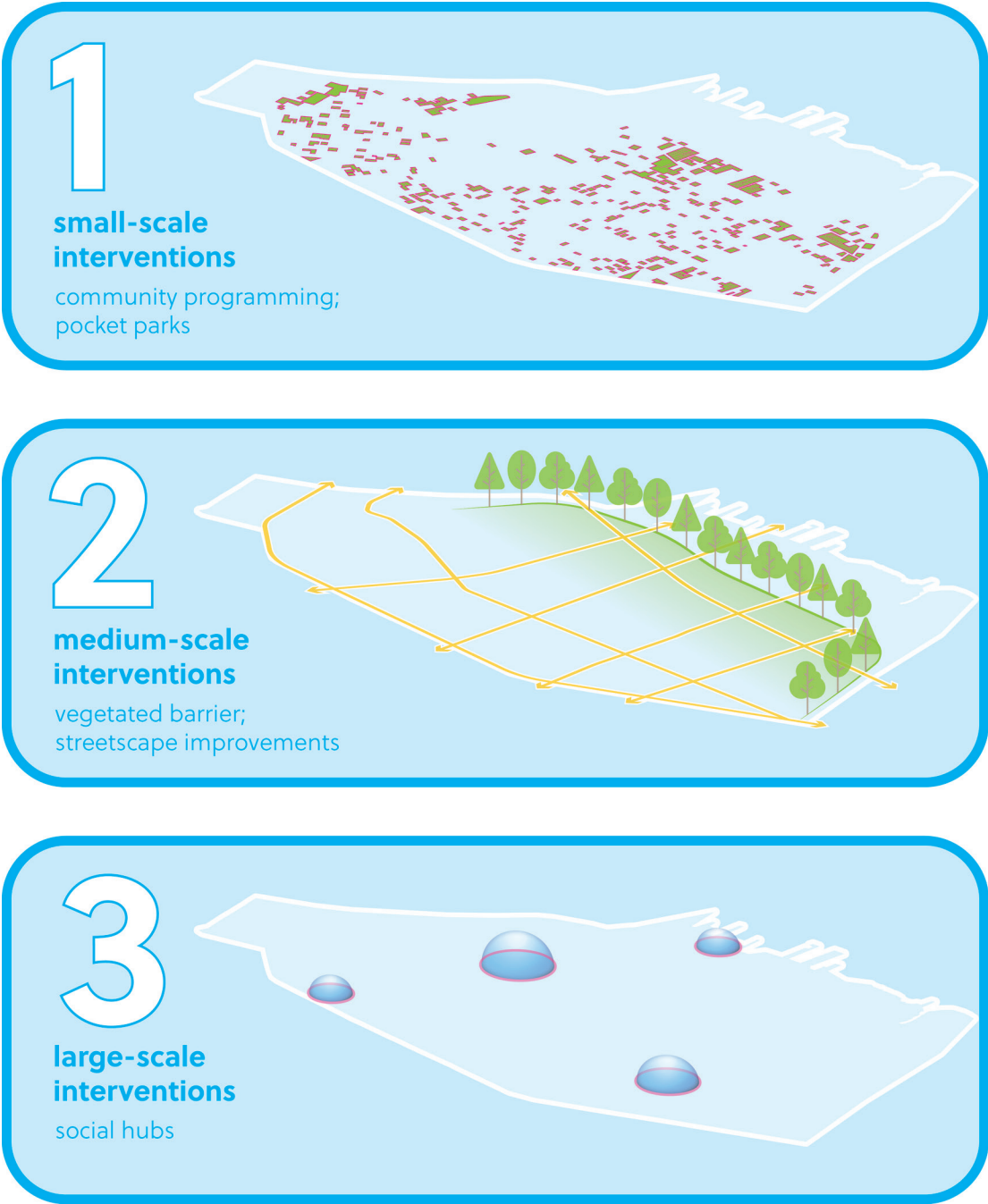


Figure 5.3 | Vision Plan Intervention Scale + Order



The small-scale interventions of the vision plan aim to improve the social connectivity of the South Providence Community. Social connections are the driving factor towards a healthy, disaster-resilient community. Two methods are proposed to achieve this: organized community programming and repurposing vacant

lots into pocket parks (see Figure 5.4). A major barrier to sociality in South Providence was time; many people work multiple jobs or long hours, leaving little time or energy to be involved. Pocket parks, in close proximity to an individual like this, can help encourage sociality by providing an easily accessible

opportunity. These pocket parks also address environmental and image barriers by taking up vacant lots and transforming them into more productive spaces, socially and ecologically. Community programming can include the cleanup and transformation of these lots to help promote a sense of ownership/respon-

sibility for the spaces within the community and ensure that the supported activities within the spaces match the desire of those who will utilize them. These spaces and additional community programming that help to build a stronger community will contribute to a stronger, more unified political voice.

Community Programming

Community programming can have a large impact on the development of social connections within a community. These programs should draw people from their normal routines and promote engaging interactions between them. This vision plan divides community programming into two categories: community service and activities. The first group, community service, includes programs that seek to improve the neighborhood environment. Examples include tree planting days (see Figure 5.8), clean-up days (see Figure 5.9), and street painting days (see Figure 5.10). These activities involve labor but improve the neighborhood and leave the participants feeling good. Additionally, the shared experience helps to create and strengthen social relationships and networks within the community. The second group, activities, are more socially focused programs. These are activities that have the potential to draw many people and can create very social environments. Examples include farmer's markets (see Figure 5.6), block parties (see Figure 5.5), and night events, such as movies, live music, or light shows (see Figure 5.7). These events can attract people from all parts of the community and have great potential for creating new social connections and generating community pride.

Community programming can benefit by working with businesses within the community. This helps to build a healthier relationship and could benefit the events to have more support pulling things together. Having a variety of events is also important to improve the program's reach into the community. Additionally, there should be a mix of regular events that promote stronger relationships over time and one-time or seasonal events that can target a larger audience and potentially get more members involved with the community. Finally, identifying and developing a central community space for larger events to be held can be beneficial. With enough support, this space can evolve to include the necessary infrastructure for events, such as a stage for live music or a screen for community movie nights.

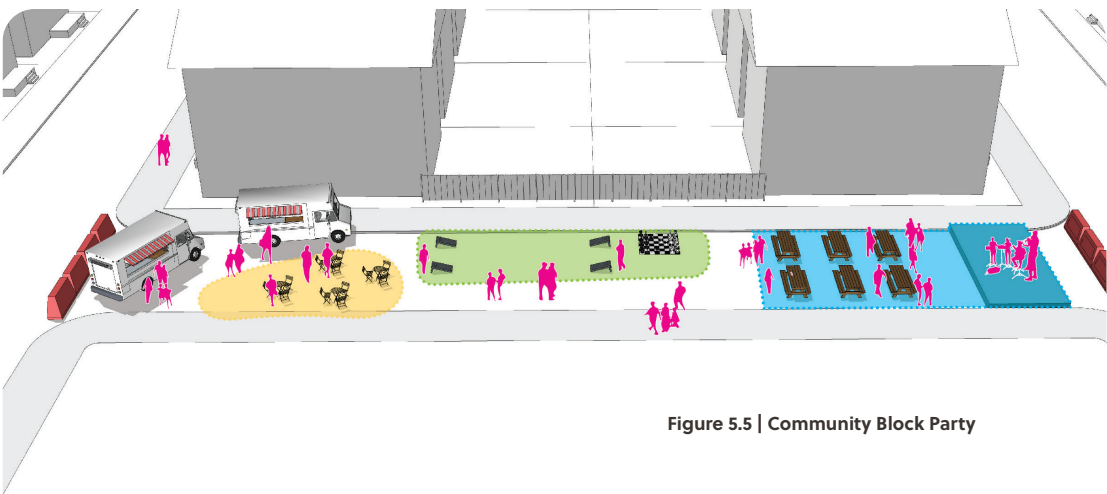


Figure 5.5 | Community Block Party

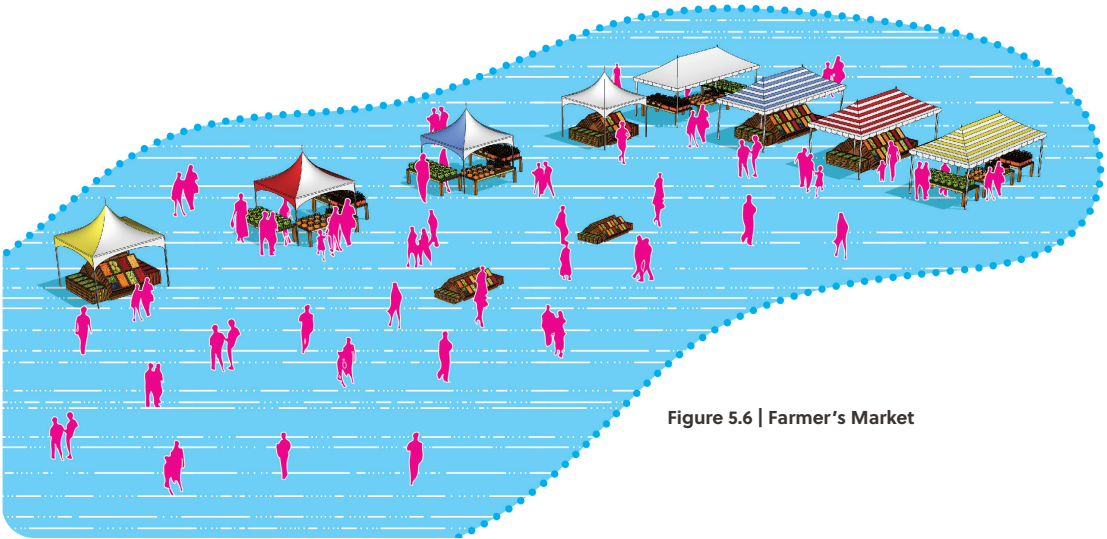


Figure 5.6 | Farmer's Market

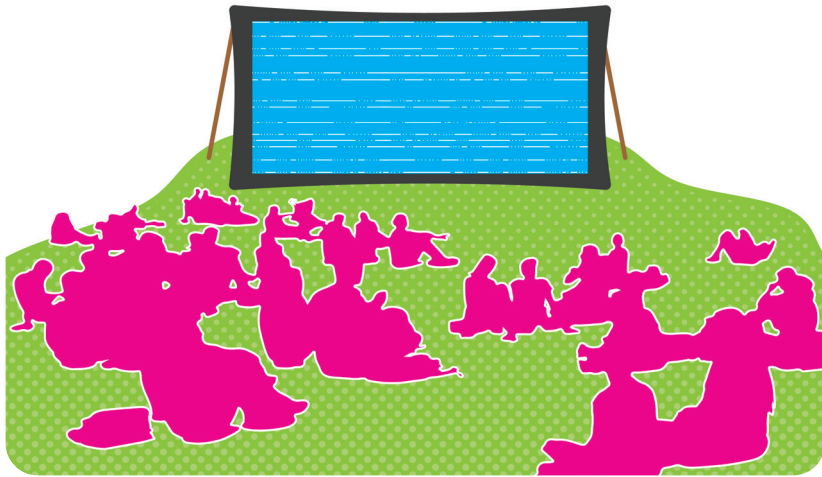


Figure 5.7 | Community
Movie Night + Watch
Parties



Figure 5.8 | Tree Planting
Day



Figure 5.9 | Clean-up Day



Figure 5.10 | Community Art

Community Pocket Parks

Pocket parks are an effective method of improving coherence and sociality within a community. At the same time, incorporating vegetated bioswales and additional trees makes these spaces capable of countering environmental justice issues such as poor air quality, urban heat island effect, and flooding. In South Providence, the median year a house was built is 1966, though much of Lower South Providence was built in 1939 (City-Data n.d.). The age of these homes, paired with a history of the neighborhood’s history of disinvestment, has resulted in the removal of housing units; many are now one of South Providence’s 522 vacant lots. Establishing a vacant lot redevelopment system focused on providing small green spaces for the community has significant potential to improve the social connections amongst the residents and provide spaces for gathering or spreading information during specific disaster scenarios.

Design Guidelines

Due to their size and connectivity to the community, the design of these lots should be carefully considered with a strong emphasis on community engagement. Each lot should be crafted to suit the needs and lifestyles of those in proximity (see Figure 5.11). These should be spaces for the community to gather, play, relax, and socialize; who better to ask what would best facilitate these needs than themselves?

The designs of these spaces should provide a mix of active and passive amenities to ensure a more welcoming space for all users (see Figure 5.12). A place for a group of kids to play tag while their parents uncoil from their day of work. To maximize the space, design features should accommodate multiple purposes (see Figure 5.12). For example, landscape mounds can be used by children of all ages to climb and play on; an adult could use the same mounds as a place to lay and soak in the sun after work. To ensure a positive sense of safety, designing pocket parks to be visible from the streets is essential. In coordination with the goal of improving tree coverage and greenspace, planting design should include a window of visibility, typically from two to six feet above the ground (see Figure 5.13). Including waste and recycling receptacles can help keep the park clean, but periodic community workdays will be necessary for the longevity of these spaces. (The Trust for Public Land 2020; Spirn et al.1991)

Pocket Park Typologies

Each vacant lot has its own unique set of opportunities and challenges. This study provides four community pocket park typologies for vacant lots: the *corner park*, the *missing tooth park* (named after the type of vacant lot), the *connector park*, and *community gardens*.

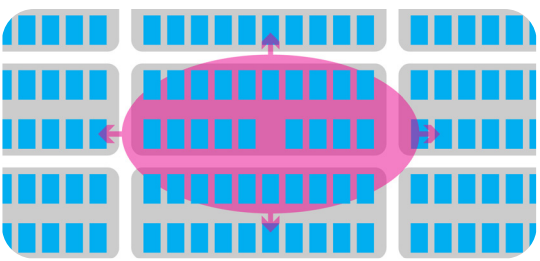


Figure 5.11 | Designing for Community in Proximity
Each lot should be crafted to suit the needs and lifestyles of those in proximity. These should be spaces for the community to gather, play, relax, and socialize; who better to ask what would best facilitate these needs than themselves?

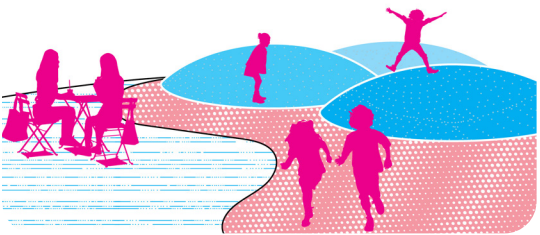


Figure 5.12 | Multifunctional Space
The designs of these spaces should provide a mix of active and passive, multifunctional amenities to support a variety of uses and people.



Figure 5.13 | Window of Visibility
Though it is important to increase the vegetation, planting design should include a window of visibility, typically from two to six feet above the ground to allow for easily visible and safe-feeling parks.

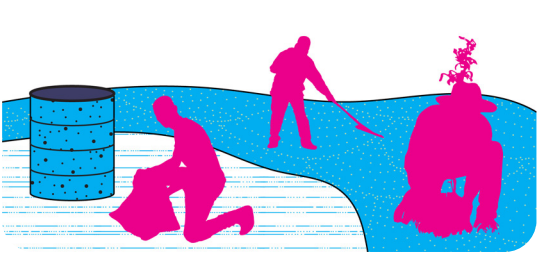
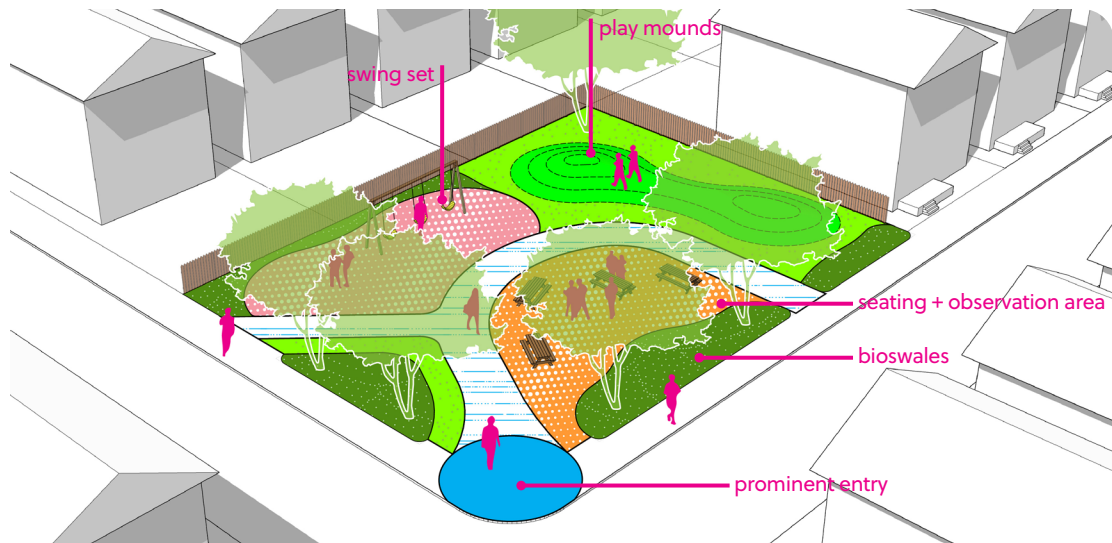


Figure 5.14 | Community Maintenance
Organized community groups and clean-up days can promote better social connections within the community while supporting a healthier, cleaner living environment.



Typology 1: Corner Parks

As the name suggests, a *corner park* can be built where there are vacant lots at the corner of a block (see Figure 5.15). These sites are more accessible and visible, creating a higher sense of safety. Particularly with larger lots or when there are multiple adjacent lots, a pocket park here is most capable of reaching further through the neighborhood and becoming a popular community destination. Due to the potential of being more trafficked, investing in larger play equipment is more appropriate (as opposed to more hidden missing tooth lots), which can help drive them to become an important community amenity for young families with children.

Figure 5.15 | Pocket Park Typology 1: Corner Parks



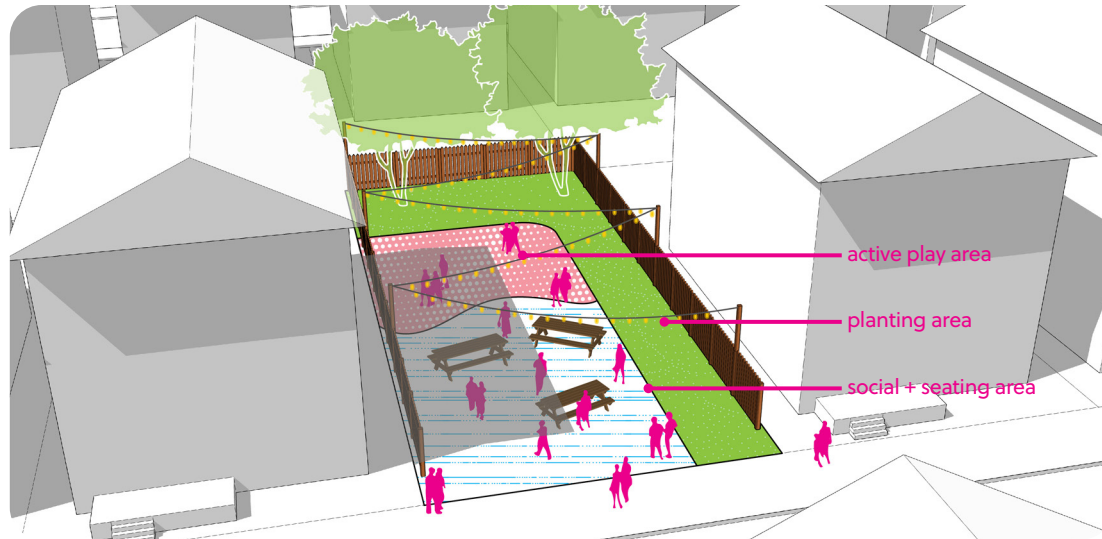
Figure 5.16 | Analysis of Peace and Plenty Park



Figure 5.17 | Image of Peace and Plenty Park

Peace and Plenty Park

Peace and Plenty Park (see Figure 5.17), located in the Elmwood neighborhood of Providence, is an excellent example of a vacant lot that was converted into a community park in South Providence. This 0.39-acre park provides picnic tables, benches, traditional play structures, a natural play area, and a little library. It is situated at the corner of Peace and Updike Streets, is highly visible from the street, and is associated with being a clean space (based on Peace and Plenty Park reviews on Google Maps). This park is fenced off and can be accessed through four different gates. The park is also associated with the 0.41-acre Peace and Plenty Community Garden on the opposite side of Peace Street. Peace and Plenty Park is a popular place to play, have family picnics, and host events (see Figure 5.16).



Typology 2: Missing Tooth Park

A missing tooth is a vacant lot that creates a gap between an established row of buildings or homes (Spirn et al.1991). In South Providence, most homes sit within narrow lots and are between thirty and forty-five feet tall. This results in a dramatic gap between the homes and can result in a decreased public image. However, transforming productive pocket parks in these missing teeth could improve the neighborhood's public image and sociality (see Figure 5.18). The scale of these parks creates a sense of enclosure, which, suitable for creating an intimate space for the closest neighbors, can also threaten the sense of safety within the park. The design of these parks should maximize visibility, include lights, and be programmed for use to deter unwanted activities.

Figure 5.18 | Pocket Park Typology 2: Missing Tooth Park

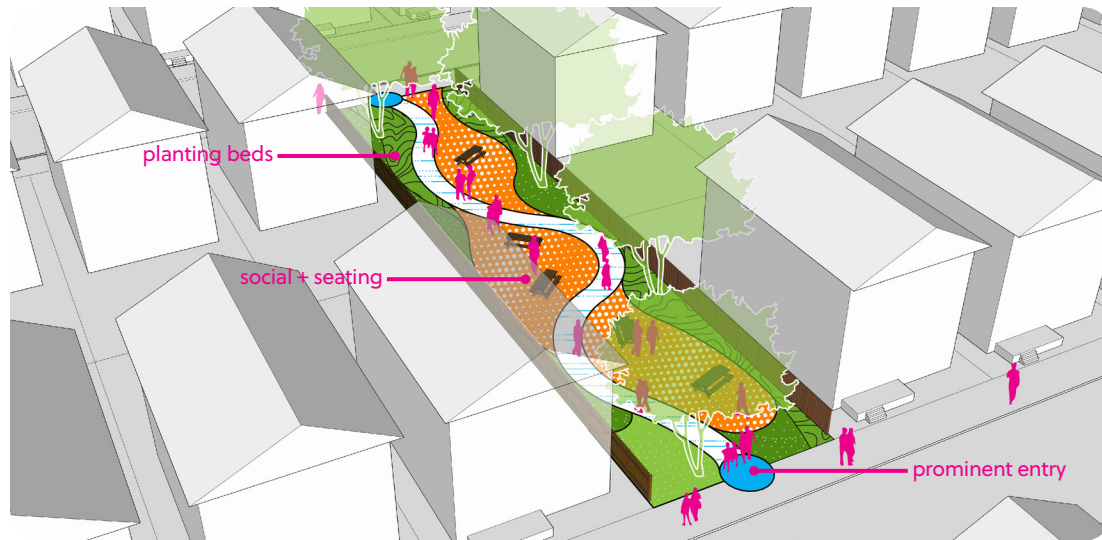


Figure 5.19 | Analysis of Cheryl M. Fisher-Allen Tot Lot.

Figure 5.20 | Image of Cheryl M. Fisher-Allen Tot Lot.

Cheryl M. Fisher-Allen Tot Lot

The Cheryl M. Fisher-Allen Tot Lot is a 0.1-acre park in the West End neighborhood (see Figure 5.20). Designed for children between the ages of two and five, it includes play structures, belt and bucket swings, nature play features, and seating for accompanying guardians. Though the Cheryl M. Fisher-Allen Tot Lot is not designed to accommodate everyone, it is a good example of how specific needs within the community can be met (see Figure 5.19).



Typology 3: Connector Parks

A connector lot is where two adjacent vacant lots connect back-to-back, creating a new corridor through the block. Implementing a pocket park within the sites can reinforce the value of a connection through the block. With entry/exit points on both ends of these sites, connector parks provide a higher sense of safety than a missing tooth park. The design of connector parks should emphasize the linkage while incorporating amenities that attract the community to it and promote social interactions. Whereas a missing tooth pocket park may draw people from one side of a block and the row of houses across the street, a connector pocket park can draw people from both sides, fostering a better connected and more expansive social network (see Figure 5.21).

Figure 5.21 | Pocket Park Typology 3: Connector Parks

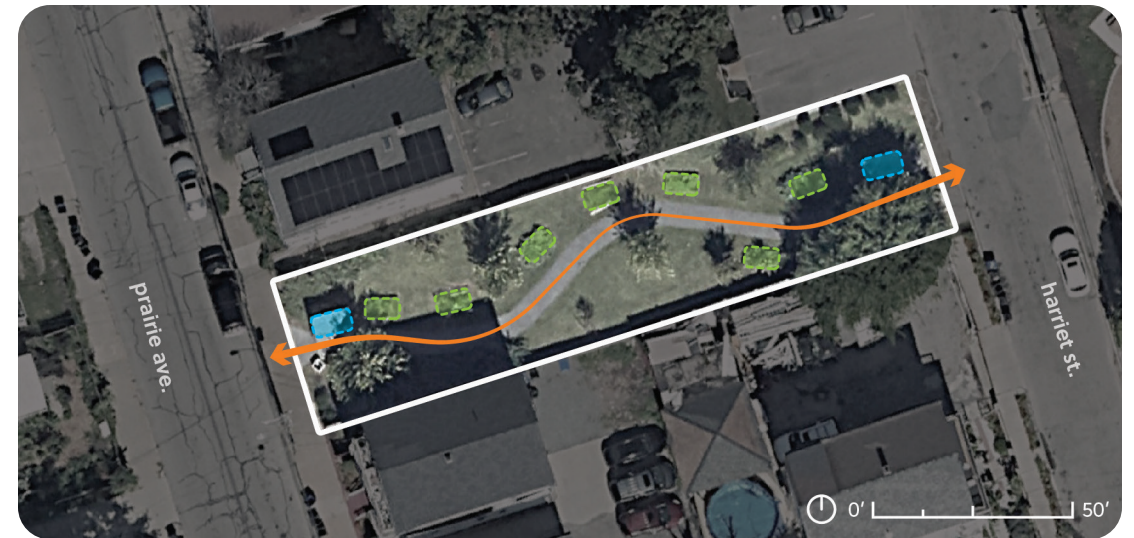
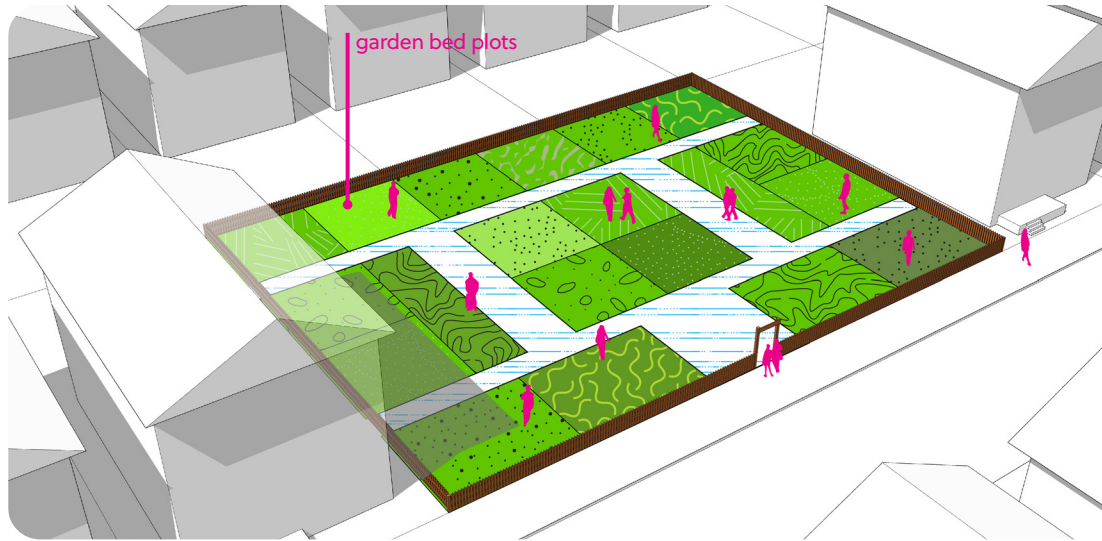


Figure 5.22 | Analysis of the Walking School Bus Path.

Figure 5.23 | Image of the Walking School Bus Path.

Walking School Bus Path

Mary E. Fogarty Elementary School coordinates a “walking school bus” to help students who live too close to qualify for bussing get to and from school safely and on time (see Figure 5.23). Reclaiming two vacant lots, this 0.15-acre park creates a connection between the elementary school on one side to the Groundwork RI Greenhouse and community garden and South Providence Library on the other (see Figure 5.22). The park has shaded seating areas that establish either entrance and a series of raised planting beds and shrubs along the paved path. Additionally, this park serves as a place for the adjacent residents to spend time and socialize.



Typology 4: Community Garden

Most vacant lots can be converted into a community garden (see Figure 5.24); however, certain conditions make this approach more beneficial. The most crucial factor to consider is sun exposure: having a south-facing lot is the ideal condition for a community garden. The size of the vacant lot/s is also important. Having more lot area not only provides room for additional beds but also increases the amount of light the garden can receive. Finally, existing community garden density and community desire should be considered to determine if this is the most beneficial approach to a vacant lot.

Figure 5.24 | Pocket Park Typology 4: Community Garden

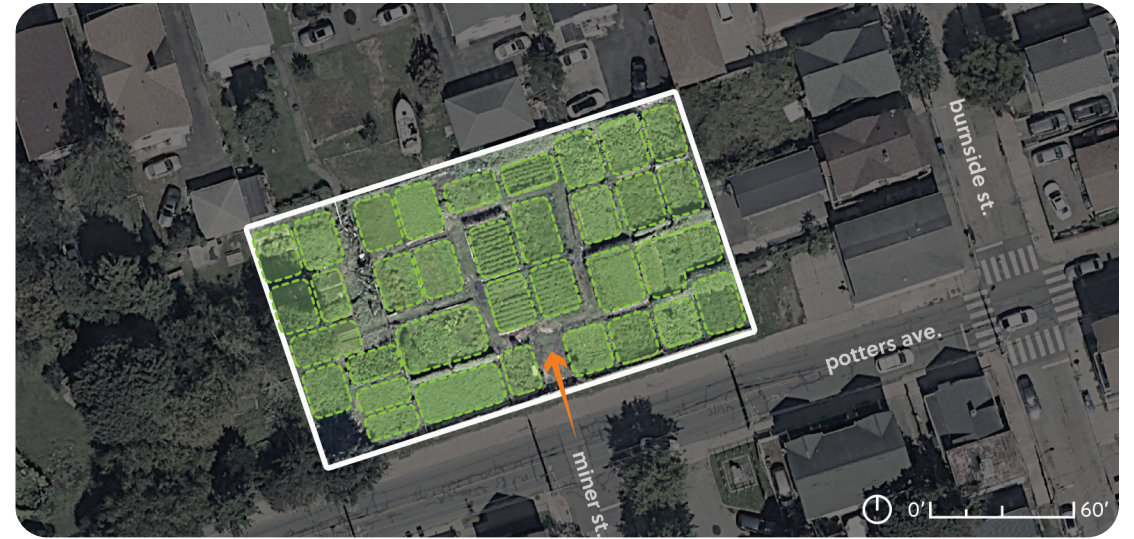


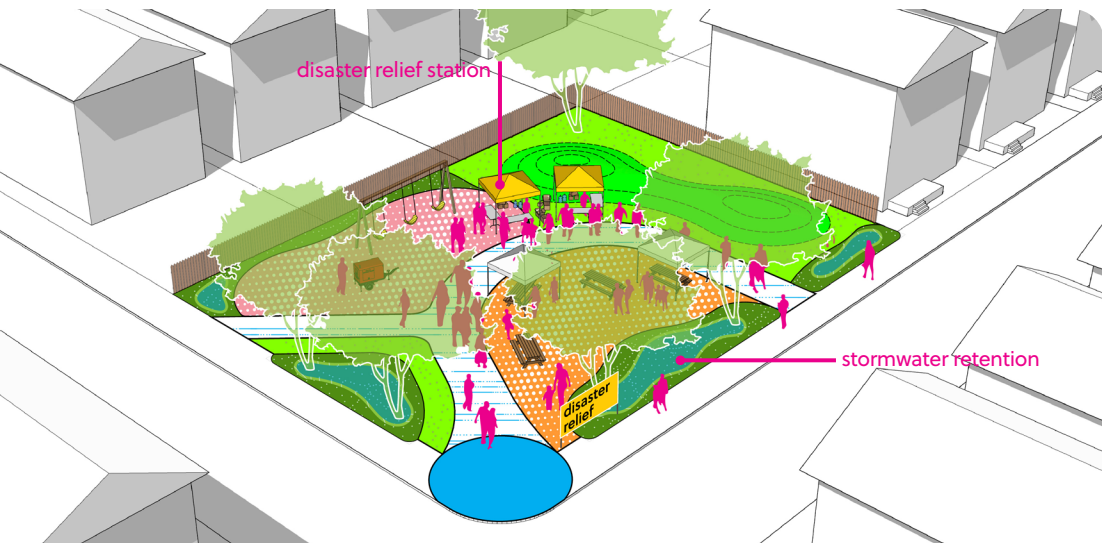
Figure 5.25 | Analysis of Potter 1 & 2 Community Garden.

Figure 5.26 | Image of Potter 1 & 2 Community Garden.

Potter 1 & 2 Community Garden

Within Upper and Lower South Providence, there are 15 community gardens which combined provide around 325+ beds for the community to use (City of Providence 2014; Southside Community Land Trust 2023). With varying ownership, these spaces vary drastically from site to site; one of the more prominent sites is the Potter (1 and 2) garden (see Figure 5.25, 5.26), which has fifty-nine beds. These gardens encourage social interactions within the community while providing fresh produce and education on gardening to the community.

Community Pocket Parks During Disaster



After a disaster, pocket pockets can be transformed into crucial hubs of information and relief. The social connections built within these parks during normal times will allow for a more cohesive response to disasters. Depending on the type of disaster, these could be stations for distributing resources and information or a place for the community to meet and grieve. Additionally, these spaces could be used for ephemeral housing for displaced individuals during recovery periods. Like how they provide varying social benefits, each pocket park typology offers a different disaster response.

Corner Pocket Parks During Disaster Events

Depending on their size, corner park typologies can service a larger portion of the community with aid after a disaster scenario (see Figure 5.27). These sites are more accessible and can handle larger crowds due to multiple points of entry/regress. With more space, these pocket parks can incorporate more trees to provide shade and bioswales to mitigate flooding.

Figure 5.27 | Corner Pocket Park During Post Disaster

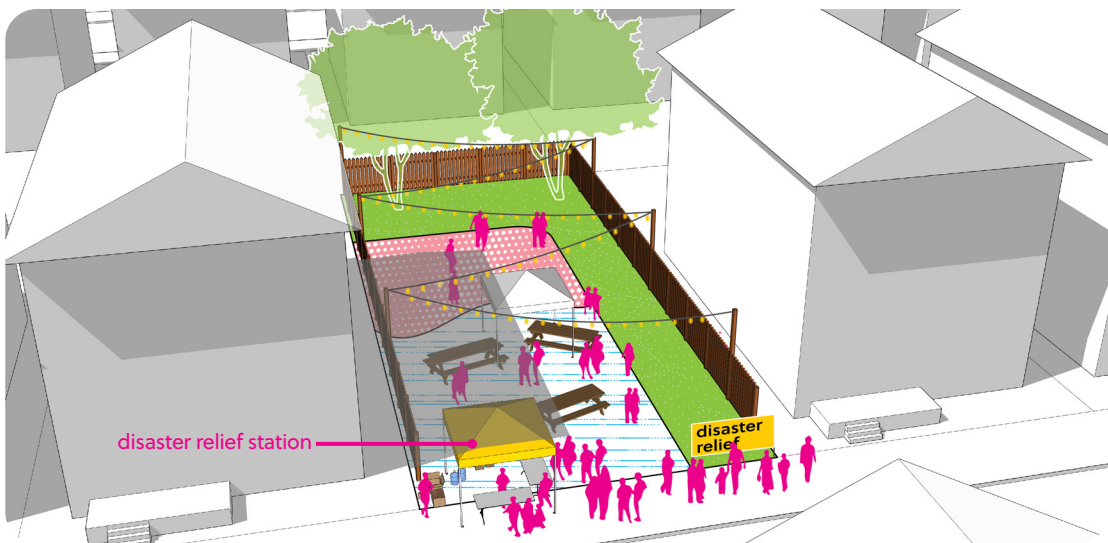
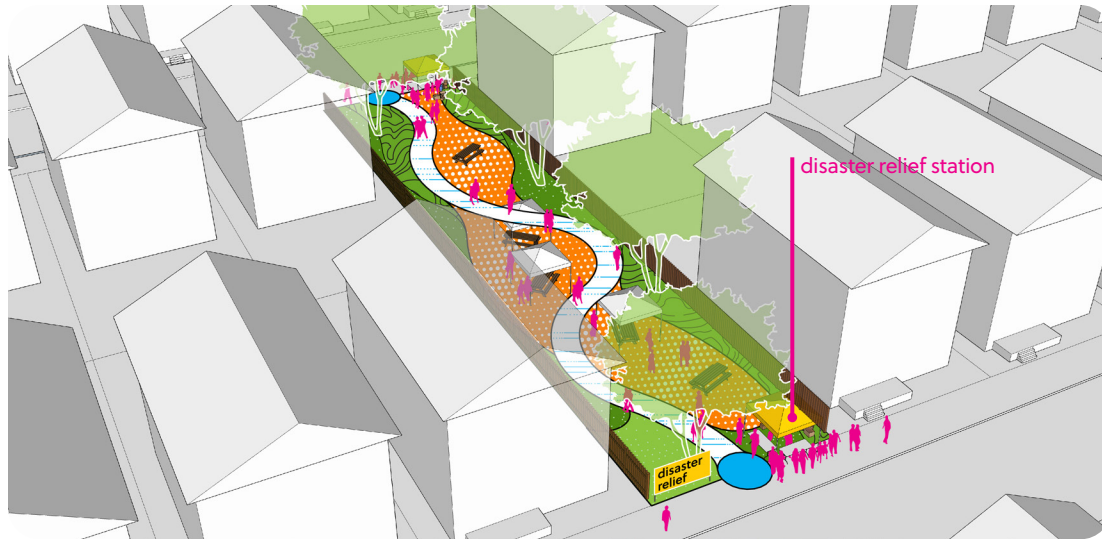


Figure 5.28 | Missing Tooth Pocket Park Post Disaster

Missing Tooth Pocket Parks During Disaster Events

The missing tooth pocket park typology should be a place for community in close proximity to gather after a disaster event. Like the pocket park typology, these can be a place for the distribution of resources and information, but to a lower degree than the corner typologies that service larger areas (see Figure 5.28). These small-scale, more isolated pocket parks are best used as a place for gathering with community to process and reflect on what has occurred and how to move forward.



Connector Pocket Parks During Disaster Events

The connector park typology falls somewhere between the previous two pocket park typologies. It is often more isolated and less accessible than a corner lot but is more accessible and can reach a wider population than the missing tooth lots. Additionally, its form allows for two entry/regress points, making these parks a good place to establish resource distribution hubs (see Figure 5.29).

Figure 5.29 | Connector Park During Post Disaster

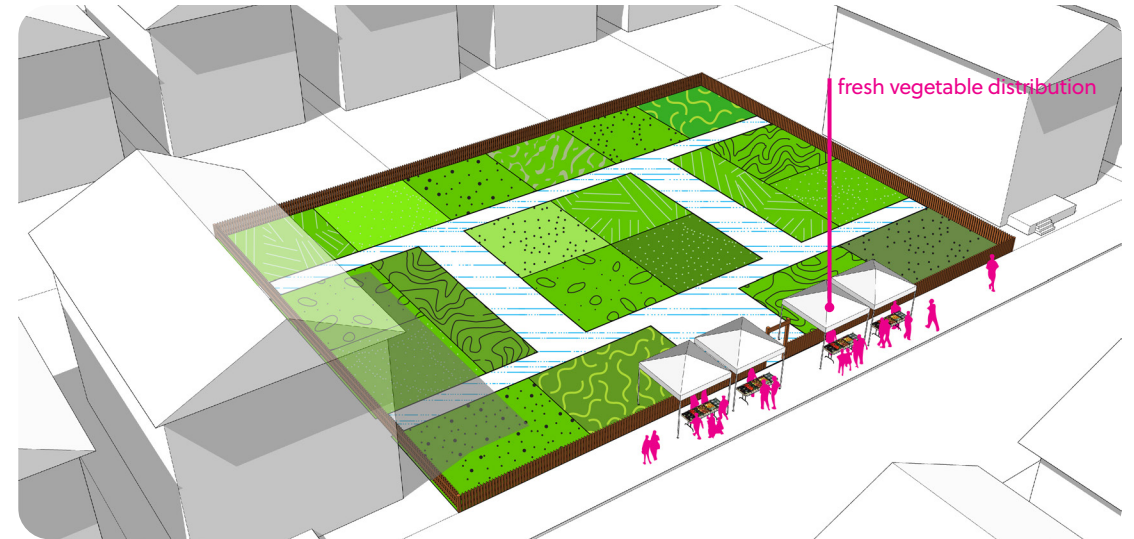
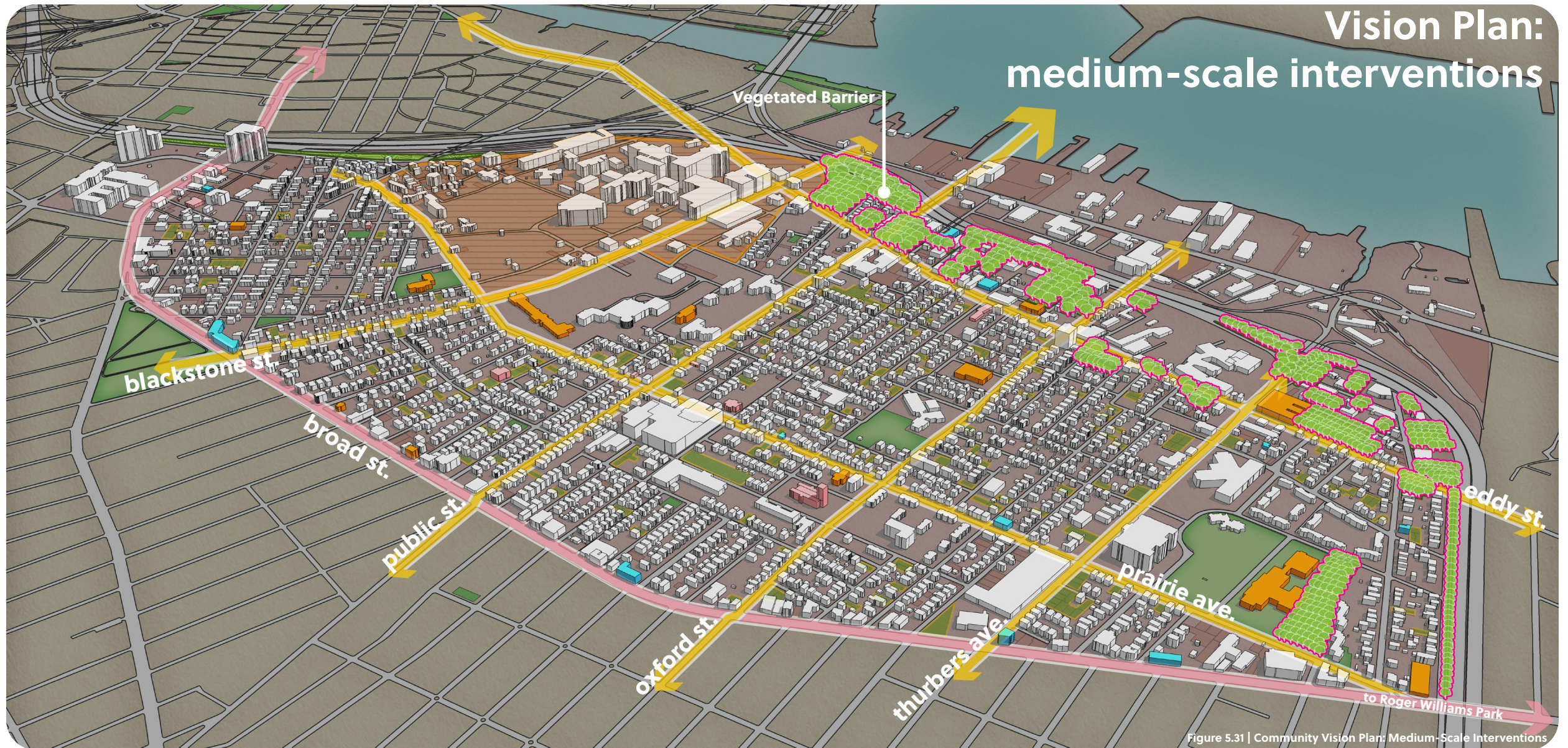


Figure 5.30 | Community Garden Post Disaster

Community Gardens During Disaster Events

Finally, the community garden typology has a far different ability. These spaces are not meant for many people to gather within. However, the groups that work in these gardens have the potential to distribute fresh produce grown within them (see Figure 5.30). Of course, this depends on seasonality and the community garden worker's ability and willingness to do this.



The medium-scale interventions seek to improve the environmental quality, accessibility, and image within the community through a green barrier between Interstate 95 and the community as well as streetscape improve-

ment projects (see Figure 5.31). To improve physical connections, this plan recommends streetscape improvements to enhance accessibility and image, creating better connections within the community, to the rest of the city,

and to the waterfront. The streetscape incorporates bioswales and street trees to mitigate environmental justice issues and improve disaster resilience. Additionally, the green barrier is intended to help prevent poor air quality

from the highway and industrial waterfront. These improvements are meant to create a healthier, more attractive living environment that is more capable of fostering social interactions within the community.

Vegetated Barrier

One of the most significant physical barriers preventing a better-connected South Providence is Interstate 95. Over two miles of the highway run along three sides of this community, significantly impacting accessibility, air quality, and the quality of the physical environment. In Providence, Interstate 95 was built in the 1950s and 1960s, causing major displacement and severing it from downtown (Eastern Roads n.d.; Joukowsky Institute n.d.). In 2001, a traffic count study determined the annual average daily traffic (AADT) on Interstate 95 through South Providence is around 190,000 — which would be about 132 cars per minute, assuming consistent traffic throughout the entire day (Eastern Roads n.d.; Rhode Island Geographic Information System 2001). As expected, this causes significant environmental justice issues. Among them, noise and air pollution are the most prominent. Though the highway acts as a major barrier and is responsible for various health concerns, it does act as a flood barrier for many parts of South Providence. To mitigate these issues, this vision plan recommends the implementation of a green barrier. Plant mass can help to soften the noise levels while improving the air quality. The increase of tree canopy cover in South Providence can greatly reduce this issue.

Typologies

This vision plan breaks the relationship between South Providence and Interstate 95 into three typologies: *vegetated berm*, *adjacent street*, and *elevated highway* (see Figure 5.32).



Figure 5.32 | Interstate 95 Relationship Typologies

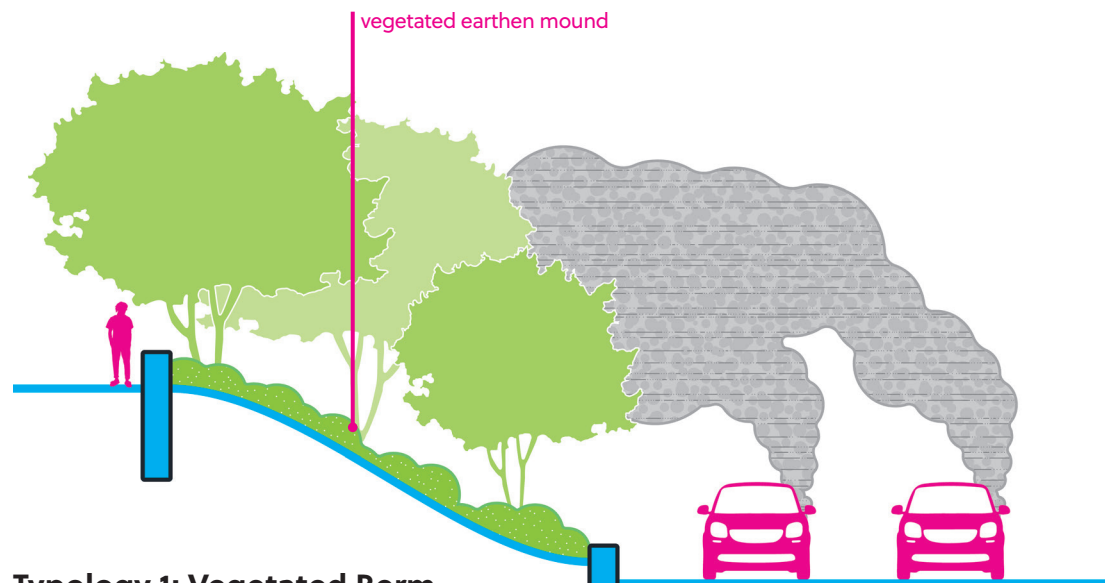


Figure 5.33 | Typology 1: Vegetated Berm



Figure 5.34 | Typology 1 Locations

Typology 1: Vegetated Berm

Vegetated berms greatly reduce the noise levels while improving the air quality, making them a useful tool for South Providence (see Figure 5.33). Additionally, these implementations can improve the image of the neighborhood from within and by people looking in from the highway (Washington State Department of Transportation 2024). Vegetated berms can be implemented where the highway is already sunken with a berm or where adjacent space allows for the construction of one (see Figure 5.34). However, due to Interstate 95's history of cutting through the previously developed South Providence neighborhood, much of the adjacent land houses structures making the implementation of berms more difficult. These berms should be densely vegetated with trees and shrubs to maximize their impact.



Figure 5.35 | Improved Vegetated Berm along I-95



Figure 5.36 | Existing Conditions of I-95 Near Thurbers Ave.

Interstate 95 near Thurbers Avenue

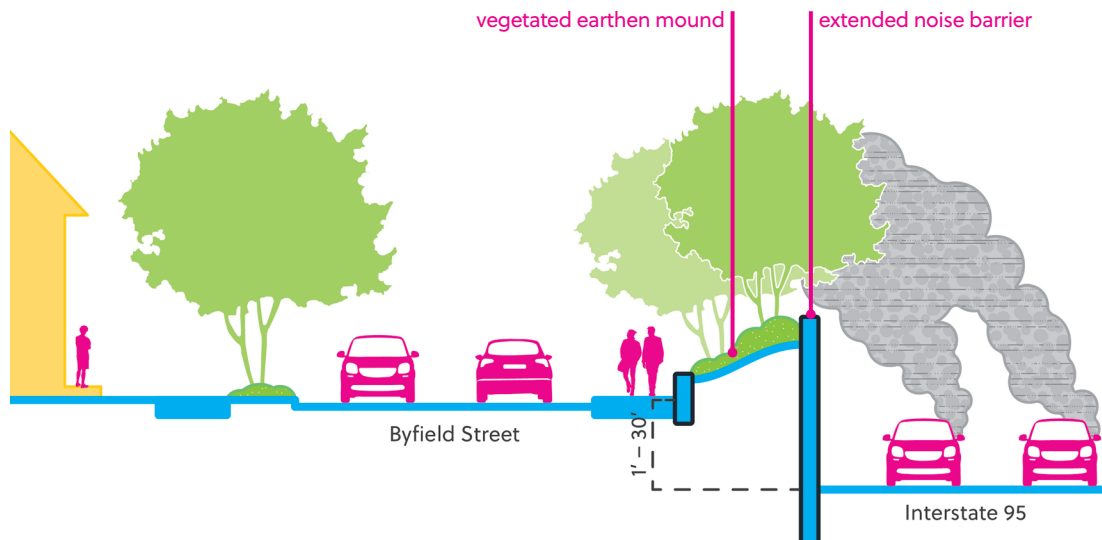


Figure 5.37 | Typology 2: Adjacent Streetscape Diagram



Figure 5.38 | Typology 2 Location

Typology 2: Adjacent Streetscape

At the south end of the neighborhood, Byfield Street runs parallel to Interstate 95 (see Figure 5.38). This street is lined with houses that face directly out to the highway. On either end, Byfield Street is about thirty feet above the highway; however, in the center, it gets to only one foot above the highway. This creates a highly unpleasant zone in South Providence. By reducing lane widths, a landscape vegetated landscape berm and sound wall can be implemented to reduce noise levels and mitigate air pollution (see Figure 5.37).

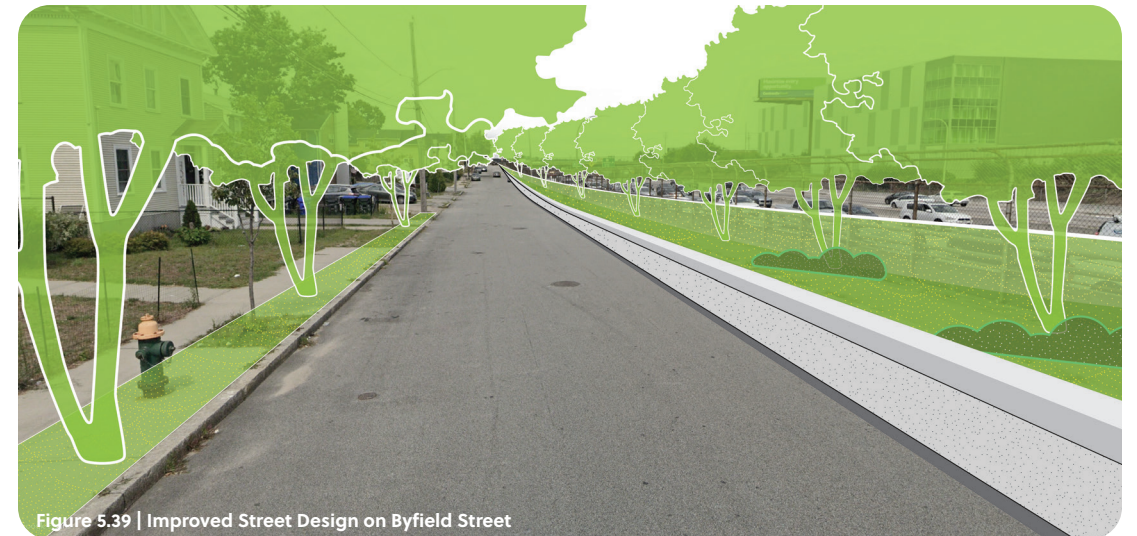


Figure 5.39 | Improved Street Design on Byfield Street



Figure 5.40 | Existing Condition of Byfield Street

Byfield Street Improvements

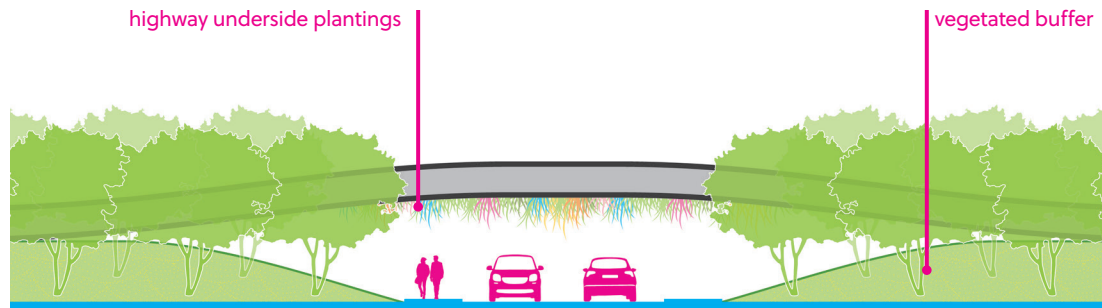


Figure 5.41 | Typology 3: Elevated Highways

Typology 3: Elevated Highway

The third condition is where the highway is elevated above the neighborhood; either as a flyover highway or where the land sits above the neighborhood (see Figure 5.42). With these, it is important to increase tree and shrub planting around the highway. With flyovers, this vision plan incorporates plantings on the underside of the highways. Again, this would help to decrease noise levels while improving the air quality (see Figure 5.41).



Figure 5.42 | Typology 3 Location



Figure 5.43 | Improved Conditions of Blackstone St. Near I-95



Figure 5.44 | Existing Conditions of Blackstone St. Near I-95

I-95 + Blackstone St. Improvements

Streetscape Improvements

The most prevalent street typology in South Providence is the residential streets; these are also the most well-connected to the community’s day-to-day lives. Unfortunately, the current residential streetscape conditions have little greenspace and tree canopy coverage. Increased suburbanization during the 1950s — driven by the popularization of automobiles — led to the widening of roads and the loss of the existing tree-lined streets of South Providence. Additionally, driveways, garages, and parking lots removed even more of the already limited greenspace. (City of Providence n.d.) South Providence currently comprises seventy-nine percent impervious land cover (see Figure 5.45) (Data adapted from Rhode Island Geographic Information System 2020) and only fourteen-point-seven percent canopy coverage (O’Neil-Dunne and Safavi 2021). Implementing greenspaces into the streetscape can help tackle these issues by increasing the pervious surface and providing stormwater storage while also increasing the tree canopy. Additionally, the improved image of the streets can improve the sense of community and contribute to its sociality. This vision plan identifies six crucial corridors for accessibility in South Providence to direct improvements toward. From Broad Street to the Providence River, there is Blackstone Street, Public Street, Oxford Street, and Thurbers Avenue. Running north and south between Interstate 95 are Eddy Street and Prairie Avenue; additionally, Broad Street is identified as an important corridor, possibly the most important connector between South Province and the rest of the city, but has recently been renovated, so it will

include for the streetscape improvements. These streets were selected for their accessibility, important connections, and reach through the community. Together, they can create a strong network through the community promoting accessibility, safety, and disaster resilience.

Design Guidelines

New streetscape design should be focused on providing street trees and ecological services (see Figure 5.46). Implementing a series of bioswales along the roads can collect and store stormwater, slowly cleansing and releasing it back to the coast. This would help mitigate inland flooding that currently occurs in South Providence due to its outdated stormwater management and high percentage of impervious land cover (see Figure 5.45). Implementing landscaping between the roads and sidewalks also works as a barrier providing protection to pedestrians. This, with the improved image of the street, will create a stronger sense of safety along these streets (see Figure 5.47). Finally, wayfinding improvements along these streets and others should be implemented to create a more navigable community and direct people to amenities and resources (see Figure 5.48). This can have an increased value during severe disaster events that may require evacuation.

Streetscape Typologies

This vision plan identifies and provides designs for three typologies of streetscapes: *residential streets*, *intersections*, and *underpasses*.



Figure 5.45 | Impervious Surface Coverage

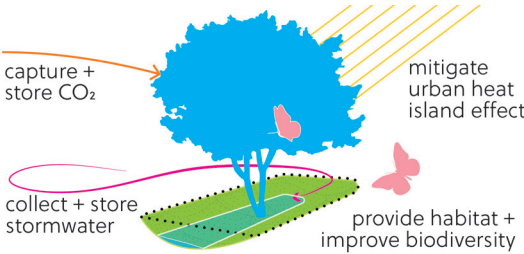


Figure 5.46 | Ecological Services



Figure 5.47 | Image + Safety

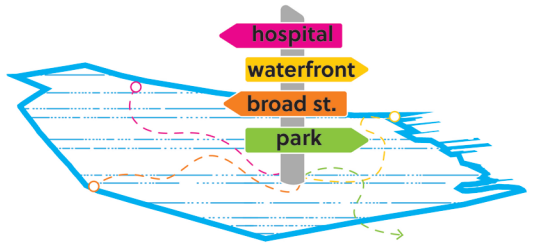


Figure 5.48 | Wayfinding

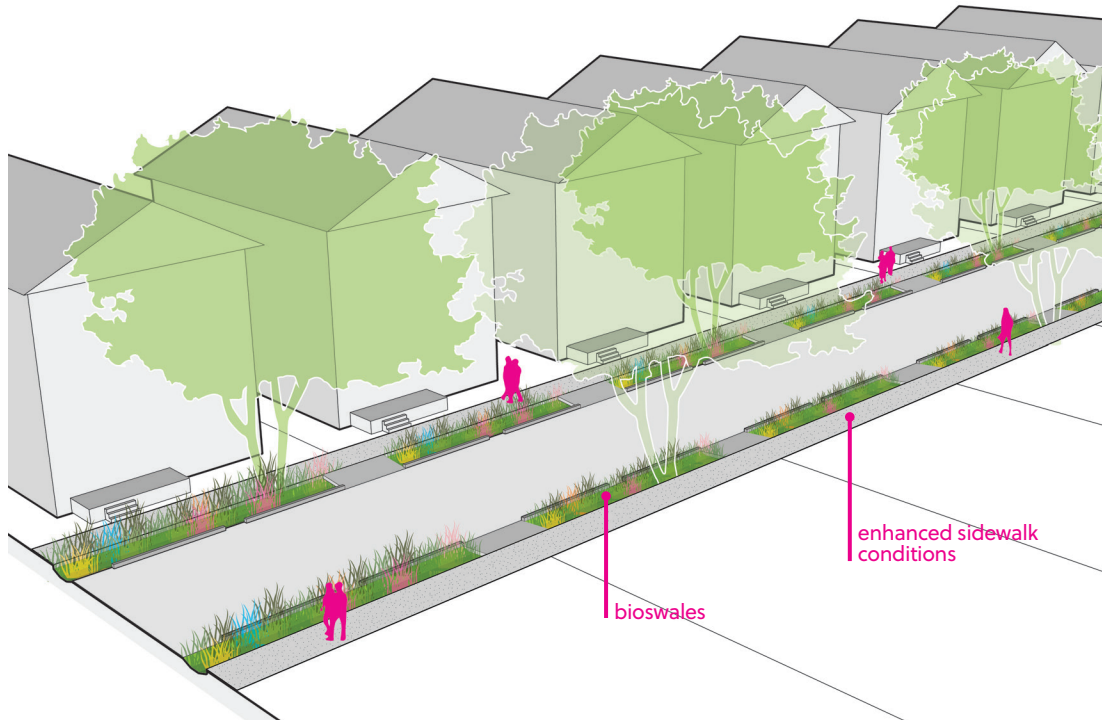


Figure 5.49 | Streetscape Typology 1: Residential Street

Typology 1: Residential Street

The streetscape improvements aim to provide a safer, cleaner image while promoting healthy living and social connections (see Figure 5.49). Currently, the street widths are around thirty feet; accommodating two lanes of traffic with street parking on either side. Though these street widths are convenient for travel and parking, they leave most streets in South Providence with no lawn space between the homes, sidewalks, and roads — a somewhat lifeless image. Incorporating bioswale between the sidewalks and drives provides many benefits. First, it improves the appearance of the streets which can support a better image within the neighborhood. Second, these bioswales collect, store, cleanse, and slowly release

stormwater to the Providence River. Many parts of the neighborhood endure flooding after heavy rain events, an issue that can be mitigated by decreasing impervious surfaces. By sacrificing four feet of road and two feet of paved sidewalks, a street could add a six-foot bioswale on either side. Within South Providence, there are 33.26 miles of roads; these bioswales along all of them would produce 24.2 acres of bioswales in South Providence. This still leaves room for six-foot sidewalks on either side with two eleven-foot drive lanes. Additionally, these planting beds can improve biodiversity and increase tree canopy coverage.



Figure 5.50 | Improved Streetscape Along Public Street



Figure 5.51 | Existing Conditions Along Public Street

Public Street

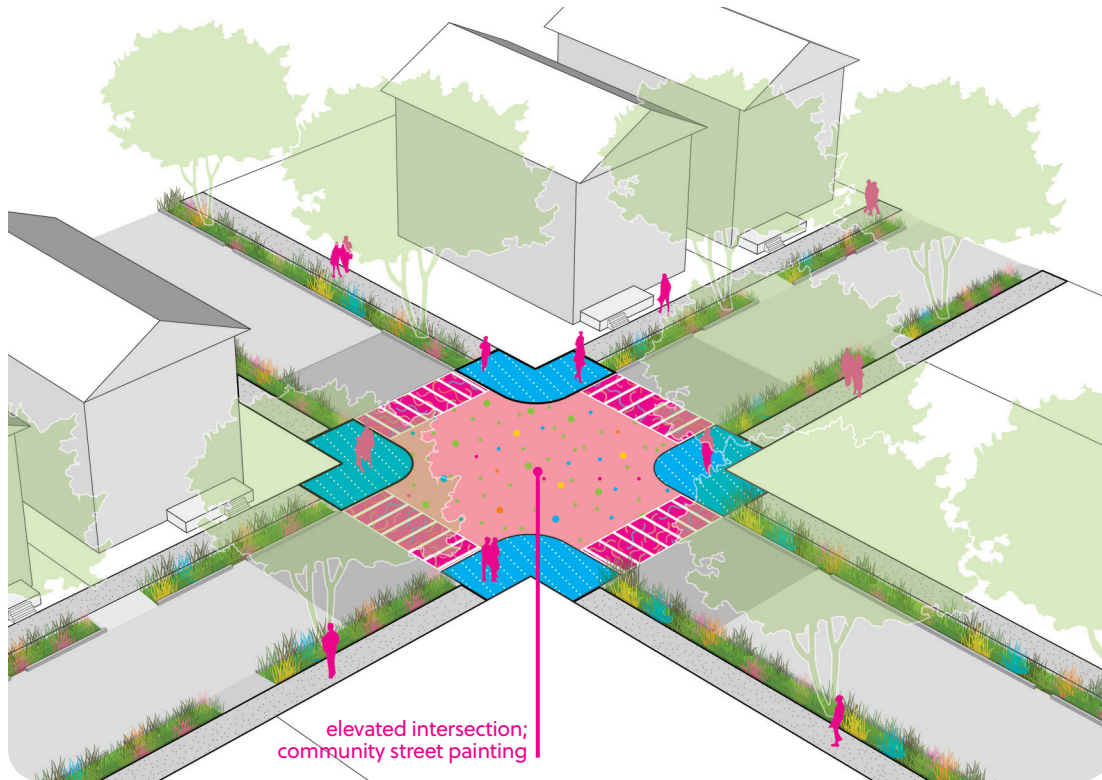


Figure 5.52 | Streetscape Typology 2: Intersections

Typology 2: Intersection

Intersections are important places within a community. They are more accessible and visible and have the potential to foster social interactions. Pedestrian road crossings are more common at street intersections; these areas should prioritize safety. This proposal recommends design that promotes higher driver awareness and reduces speed at intersections. This is done by raising the intersection to the sidewalk level and with road paintings (see Figure 5.52).



Figure 5.53 | Improved Intersection Design at Prairie Ave. & Sayles St.



Figure 5.54 | Image of the Walking School Bus Path.

Intersection of Prairie Avenue & Sayles Street

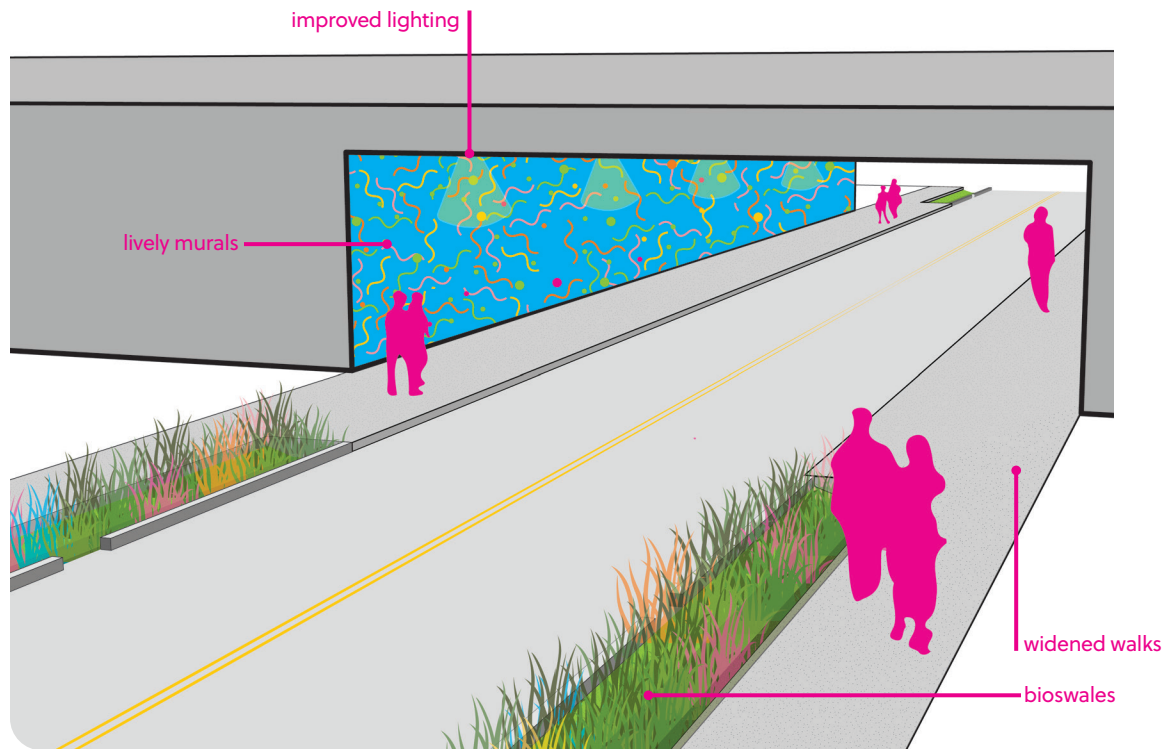


Figure 5.55 | Streetscape Typology 3: Highway Underpass

Typology 3: Highway Underpass

Highways create significant barriers to accessibility, limiting access from one side to the other to just a handful of points. In South Providence, a neighborhood divided by over two miles of Interstate 95, there are only eleven crossing points, ten of which support pedestrian crossings. Five of these are underpasses, which create long (around one hundred fifty feet), dark, unwelcoming passages under the highway. Focusing on improving the pedestrian experience under Interstate 95 is

an important part of improving the sense of safety and accessibility in South Providence. The underpasses are at Eddy Street, Blackstone Street, Public Street, O’Connell Street, and Oxford Street. This proposal suggests better lighting, wider pedestrian sidewalks, and the implementation of community art on the tunnel walls to help create a more pleasant experience and an improved sense of safety (see Figure 5.55).



Figure 5.56 | Improved Underpass Design at Oxford St. Underpass

I-95 Underpass on Oxford Street



Figure 5.57 | Existing Conditions of Oxford St. Underpass

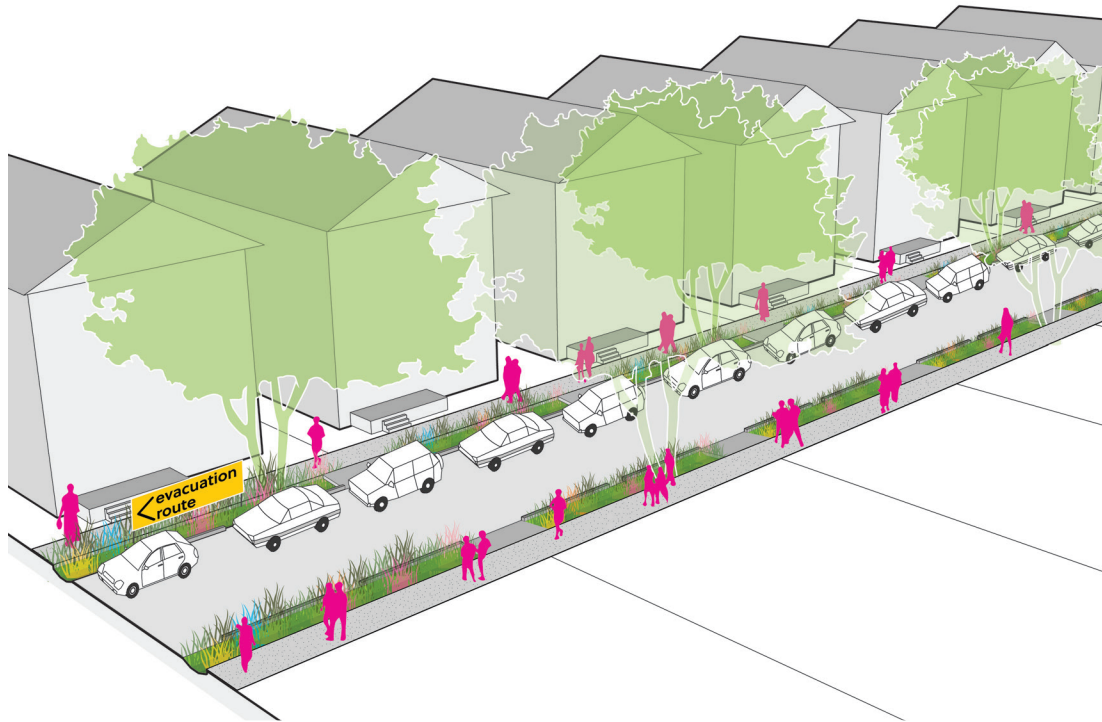


Figure 5.58 | Disaster evacuation along residential street

Residential Street During Disaster

Establishing these corridors with improved accessibility becomes increasingly essential during disaster events. Depending on the type of disaster and its severity, evacuation could become necessary. If this happens, well-defined and easily navigable routes should be incorporated. Wayfinding signage should also be incorporated to help keep an evacuation running smoothly and efficiently (see Figure 5.58).

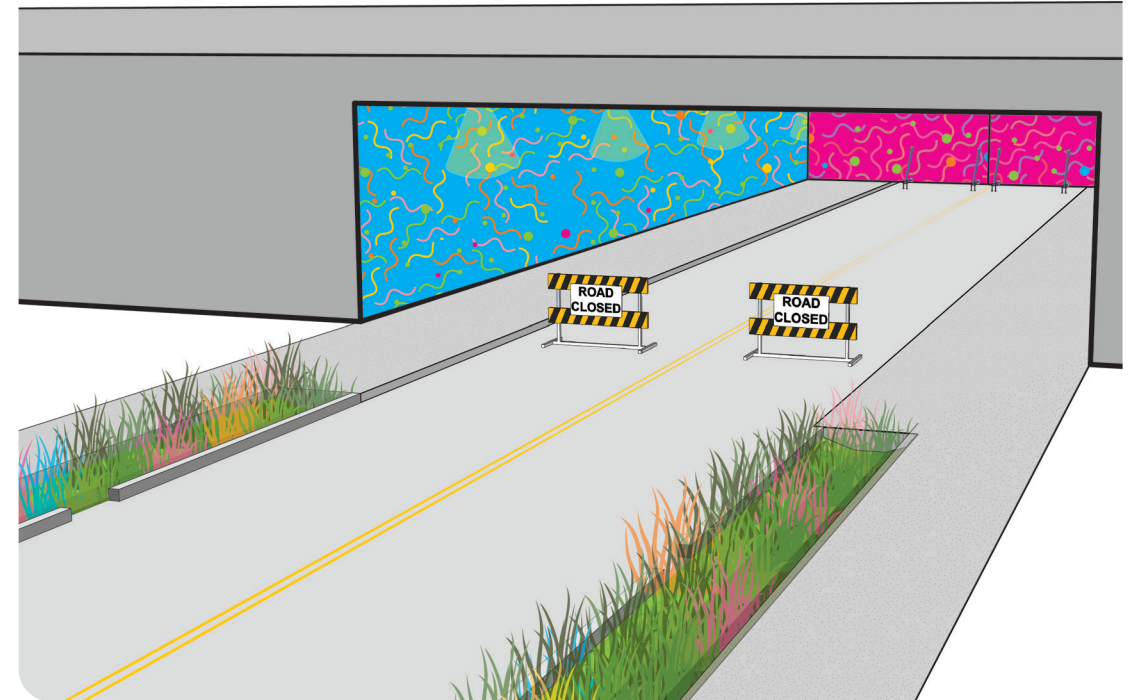


Figure 5.59 | Tunnel closure + flood barrier

Highway Underpass During Disaster

The highway is positioned on a bluff and acts as a flood barrier for many parts of Providence. Currently, floodgates at underpasses create a high level of protection for the communities north of South Providence, to complete the fortification from major flooding, hinged flood barriers at the underpasses of Eddy Street, Blackstone Street, Public Street, O'Connell Street, and Oxford Street are important (see Figure 5.59). Without these, gates protecting other parts of Providence may only make flooding worse in South Providence.



Figure 5.60 | Community Vision Plan: Large-Scale Interventions

Finally, large-scale improvements involve strengthening culture and sociality by reinforcing or creating strong social hubs (see Figure 5.60). These hubs can become anchors of sociality and culture within a community, supporting social connections and improving the sense of community. Strengthening cul-

tural aspects of the community will contribute to a larger community identity. These hubs respond to economic barriers by generating economically active areas for small businesses and providing jobs and housing within the neighborhood. Anti-displacement protections and a mutually beneficial barrier between the

South Providence community and the Rhode Island Hospital help to minimize the threat of gentrification. Additionally, it contributes positively to the image of South Providence by establishing a strong social, economic, and cultural anchor. And finally, it responds

to political barriers by undoing past wrongs to create a more connected community. In response to environmental and image barriers, it proposes the creation or expansion of green-spaces in a currently vacant, unproductive lot.

Social hubs

Social hubs are clusters of social infrastructure sites that support social and economic activity. The variety of social infrastructure sites support a range of activities and are able to attract many people for a variety of different reasons. Each site leverages its proximity to the others to improve its sociality. It's this triangulation of activities and people that allows social hubs to act as anchors within a community. (Kent et al. 2022; Projects for Public Space 2022) These places should support the community's culture to enforce its places within South Providence and create an area that is attractive to them. For example, incorporating Dominican-style restaurants or cafes would support the existing resident's culture. Seeing as South Providence's residents are nearly 70% Hispanic, many with Dominican heritage. Incorporating housing within or near these hubs improves their accessibility to social interactions and helps to create a strong community around these hubs.

Design Guidelines

To enhance and create these social hubs within the community, it is important to focus on creating inclusive, welcoming, and social spaces. Having a range of businesses that attract different people is important (see Figure 5.61), but the success of a social hub has more to do with their relationships outward. Designing the sidewalks to allow businesses to overflow or extend outwards, weaving with the exterior environment is crucial. Double-loaded sidewalks provide the space for this extension while accommodating seating areas and a

walking path (see Figure 5.63). These create a welcoming and lively atmosphere and can greatly enhance businesses and social connections. Pockets of seating or other forms of gathering spaces are also important; they provide spaces, disconnected from a business, that all feel welcome to use. They can be great places to meet up with someone or stop to rest from running errands. For these social hubs to be successful, it is helpful for there to be a focal point — a place or component that activity revolves around. These focal points can come in many forms, e.g., historic monuments, murals, water fountains, or the façade of buildings, but should contribute value to the space (see Figure 5.63).

Social Hubs

This plan identifies three hubs to be focused on within South Providence. The first and most defined is the Southside Gateway at 500 Broad Street. The second, which is existing but could be better defined, is a cluster of social infrastructure sites near the South Providence Library at the intersection of Prairie Avenue and Sayles Street. Finally, the third redefines the barrier between South Providence and the Road Island Hospital by incorporating housing and social infrastructure sites. Additionally, at Public Street and Allens Avenue, a new hub is under construction and anticipated to be completed in the Fall of 2024. This space provides public access to the waterfront and creates strong public space outside of a 19th-century building that currently sits vacant but is desired to be converted into third spaces focused on creating a social environment (CIVIC Inc. 2022).

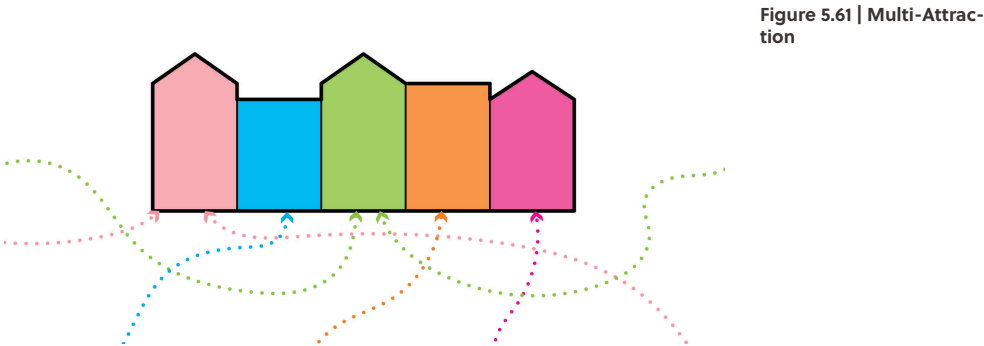


Figure 5.61 | Multi-Attraction

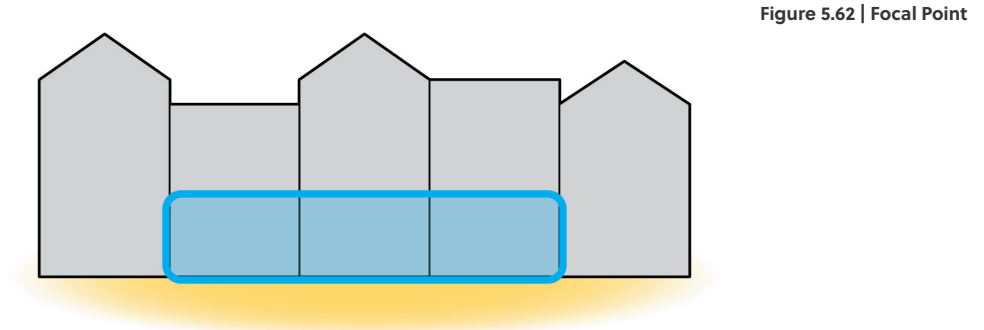


Figure 5.62 | Focal Point

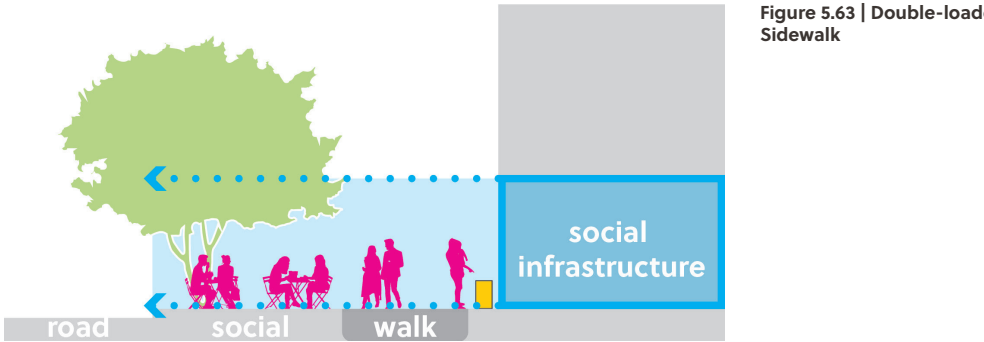
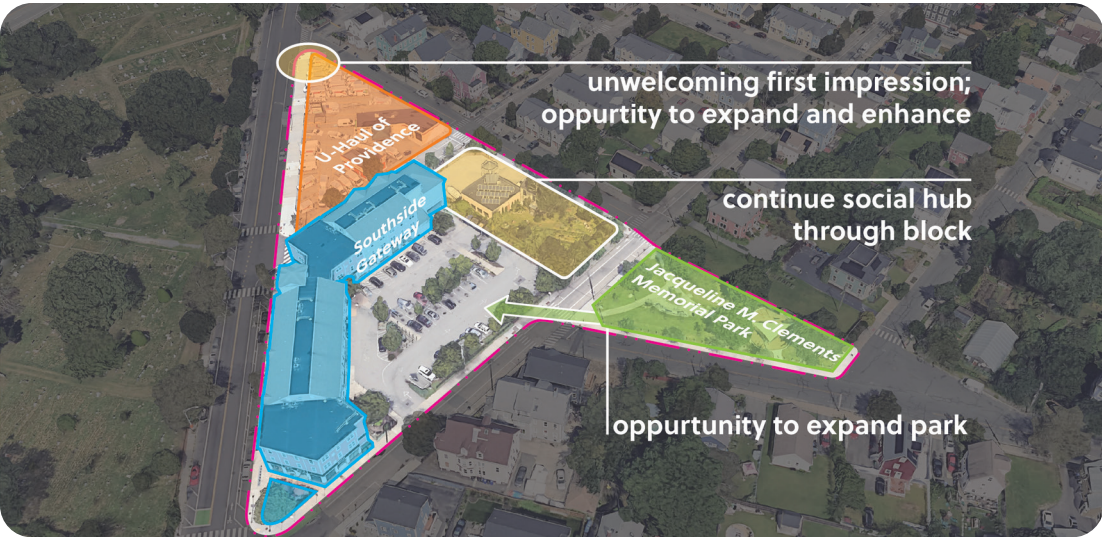


Figure 5.63 | Double-loaded Sidewalk

Southside Gateway Social Hub



Background

The Southside Gateway Social Hub builds off the Southside Gateway mixed-use development. This 2008 project was completed by SWAP (Stop Wasting Abandoned Property). SWAP is a non-profit community development organization focused on revitalizing urban environments and strengthening communities in Providence (SWAP n.d.). This development contributes to their goal by providing housing units while creating an active retail first floor that connects out to the sidewalk. The Southside Gateway was named in recognition of its adjacency to Trinity Square, marking the start of South Providence (see Figure 5.64). The site's position on Broad Street and near Trinity Square makes it an important place within the community. Additionally, this site is well connected to the Jacqueline M. Clements Memorial Park. To the north of the mixed-use development and most visible from Broad Street is a U-Haul rental lot. Using this lot with valuable connections for vehicle storage detracts from the significance of the site and poorly reflects on the neighborhood's image.

Figure 5.64 | Analysis of Southside Gateway

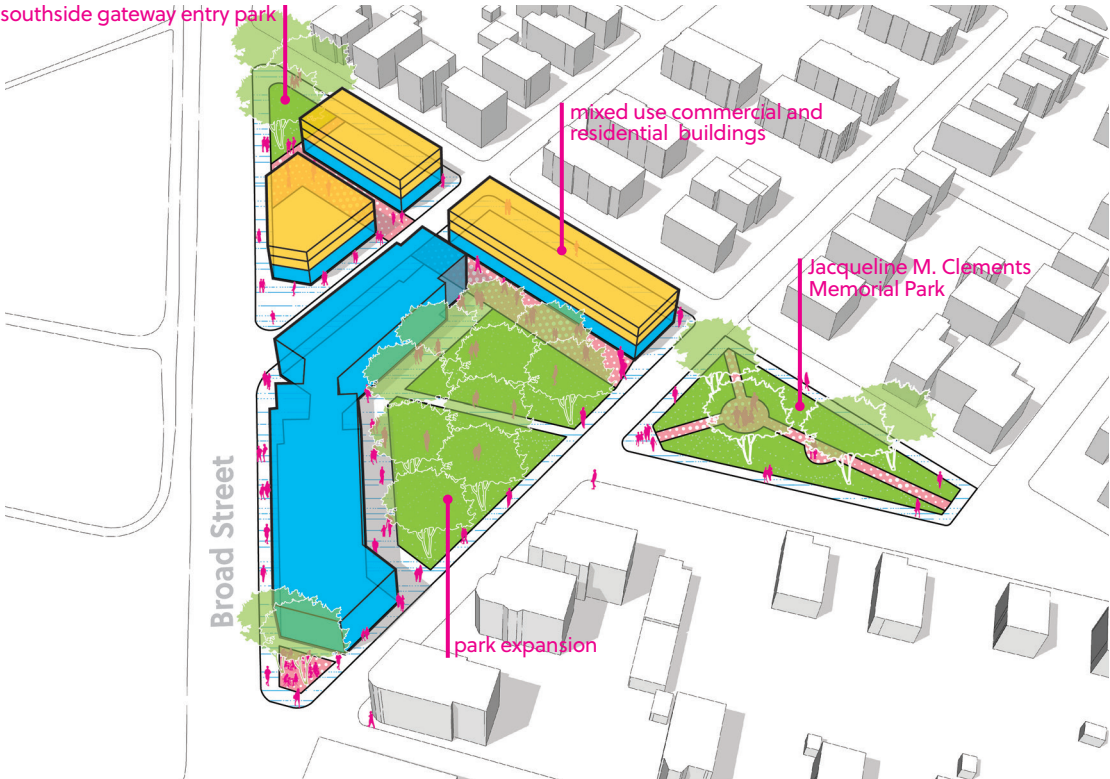
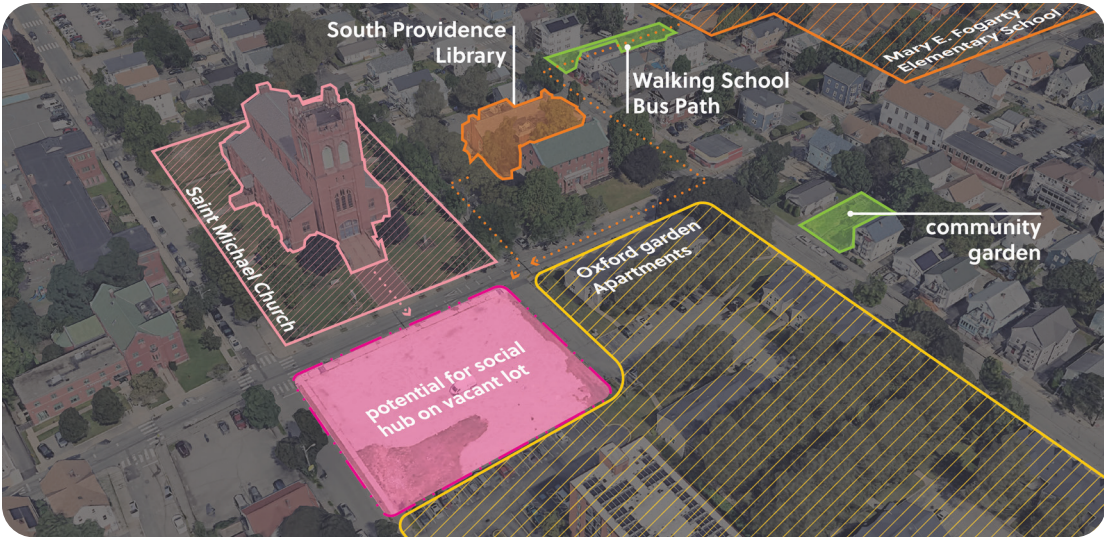


Figure 5.65 | Southside Gateway Social Hub

Design

By expanding upon the existing mixed-used development and strengthening its relationship with Trinity Square and Jacqueline M. Clements Memorial Park, this site can strengthen its claim as the *Southside Gateway* and increase its capacity as a social hub (see Figure 5.65). This proposal expands the hub through the rest of the block and through the block to the north currently housing the U-Haul rentals. With the addition of three mixed-use buildings, more social sites can be established, drawing more people to the social hub. In extension from the Jacqueline M. Clements Memorial Park, a new greenspace is created, surrounded on three sides by storefronts. This space can be used for events or for sitting, gathering, etc. An axis between the original block leads to the claimed block, Broad Street, and Trinity Square, terminating at a second and smaller greenspace.

Lower South Providence Social Hub



Background

Near the center of Lower South Providence, there is a cluster of social infrastructure sites (see Figure 5.66). Unlike the Southside Gateway, these do not currently act as a social hub. Looking at how these sites can be reorganized to create a mutually beneficial social hub that contributes higher value to the community is the goal of the Lower South Providence Social Hub. Some sites, like the Saint Michael Church, South Providence Library, and Mary E. Fogarty Elementary School are not moveable, but other smaller sites within the community, such as Southside Smoothie and Mi Casa, could benefit from being a part of a larger social hub. A vacant lot between the Saint Michael Church and the Oxford Garden Apartment complex has the potential to create this social anchor within Lower South Providence.

Figure 5.66 | Analysis of Lower South Providence Social Hub

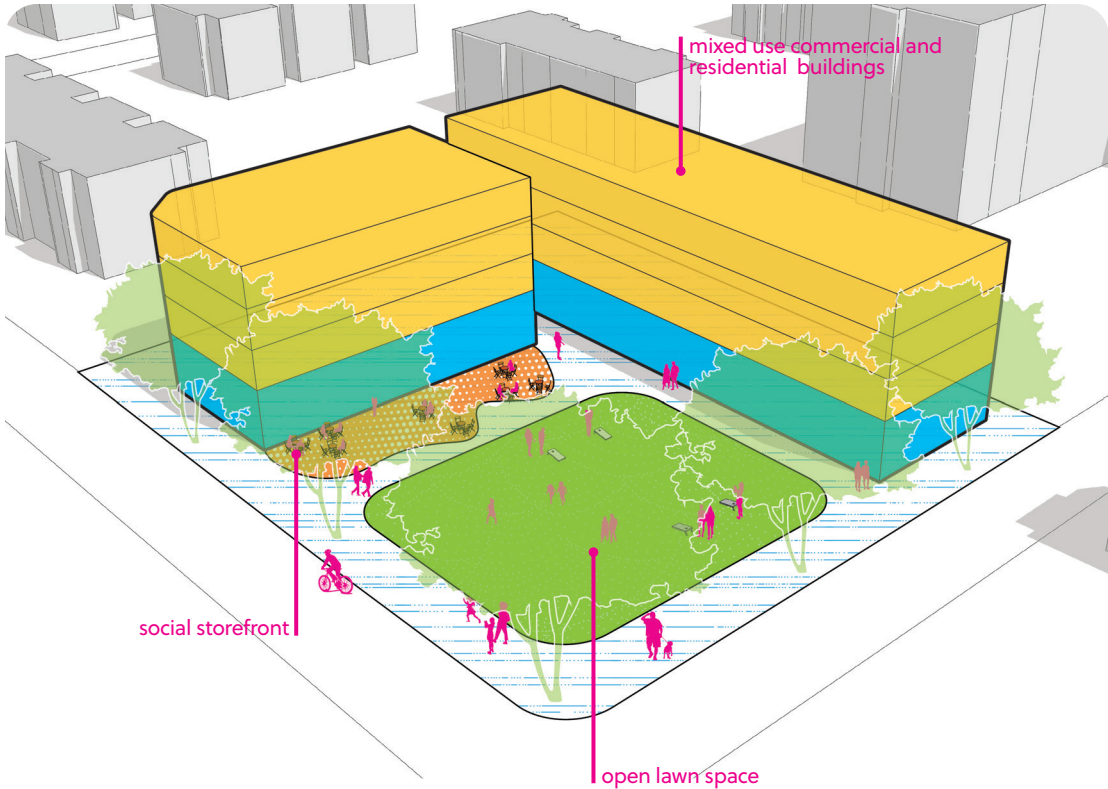


Figure 5.67 | Lower South Providence Social Hub

Design

The Lower South Providence Social Hub’s design centers an open greenspace between two mixed-used buildings, leaving it open to the street corner of Oxford Street and Gordon Avenue (see Figure 5.67). The two mixed-use buildings support retail on the first floor and housing above. The retail space should be prioritized towards existing third spaces nearby in Lower South Providence but have space for new businesses to move in as well. In addition to benefitting from each other, the businesses would benefit from the housing above, proximity to the Oxford Garden Apartments, and additional traffic from the church and library. The greenspace is intentionally left open to allow for a range of community events, such as movie nights, live music, event overflow from Saint Michael Church, etc. It can also serve as an open space for community members to use for games or relaxation.

Willard Social Hub

For many years, Willard Avenue was a thriving cultural and commercial street in South Providence; its intersection with Gay Street (see Figure 5.69) was the social epicenter of the community (Rhode Island Jewish Historical Association 1976). In 1954, the Providence Redevelopment Agency (PRA) conducted its first official redevelopment project, the Willard Center Redevelopment. In addition to severing Willard Avenue and several other streets, this project removed many businesses and displaced around 200 families (Youngs n.d.). This example is just one of many displaying how South Providence has historically been treated poorly.

This example is relevant for two reasons: One, it shows the vulnerability to displacement that residents face when they don't have strong control over the community; and two, it discusses the historic importance and downfall of Willard Avenue. Today, the once bustling Gay Street-Willard Avenue intersection is a parking lot surrounded by more parking and a large vacant lot that once housed a school building that was part of the Willard Center redevelopment project in 1954. The two streets no longer connect.

This project looks at restoring this intersection as a social and cultural epicenter while developing a shared, mutually beneficial boundary between the Rhode Island Hospital and the South Providence community. In addition, the extension of the Davey Lopes Recreation Center greenspace across Prairie Avenue connects park space to this new hub and greatly increases the amount of green-space and pervious surface. To create this boundary, the removal of surface parking will

be required. Currently, a large portion of the Rhode Island Hospital's 60-acre campus is made up of surface parking (see Figure 5.68). Though necessary for the functioning of the Hospital, this large swath of impervious land cover contributes poorly to the environmental quality and disaster resilience of South Providence. Additionally, "the hospital emitted 53,595 metric tons of carbon dioxide, 27 metric tons carbon dioxide equivalent of methane, and 36 metric tons equivalent of nitrous oxide," making it the ninth-highest emitter of climate emissions in Rhode Island (Smith 2023). This project proposes structure parking be used to offset the removal of the 8.4 acres of parking, or 949 parking spaces. These should be incorporated with more productive structures to properly activate the space, addressing the future land needs and value. Additionally, an improved parking layout could be utilized to create a higher parking density than currently exists. This surface parking should be phased out, creating more productive space for the hospital and community.

This proposal includes mixed-use, residential, and institutional buildings that would support the hospital's growing needs (see Figure 5.70). It establishes a strong boundary between the community and the hospital to protect them from future expansions and encourage density rather than continued sprawling. These developments would be able to provide many housing units at a range of costs, but mostly low-income housing units to contribute to the community's needs. Additionally, many retail spaces would be capable of accommodating many new businesses or allowing others within the community to move or grow into a second location.



Figure 5.68 | Current Conditions of Willard Avenue.
Currently, Willard Avenue is disconnected and characterized by hospital parking lots.



Figure 5.69 | Historic Conditions of Willard Avenue.
Historically, Willard Avenue was the cultural epicenter of South Providence.

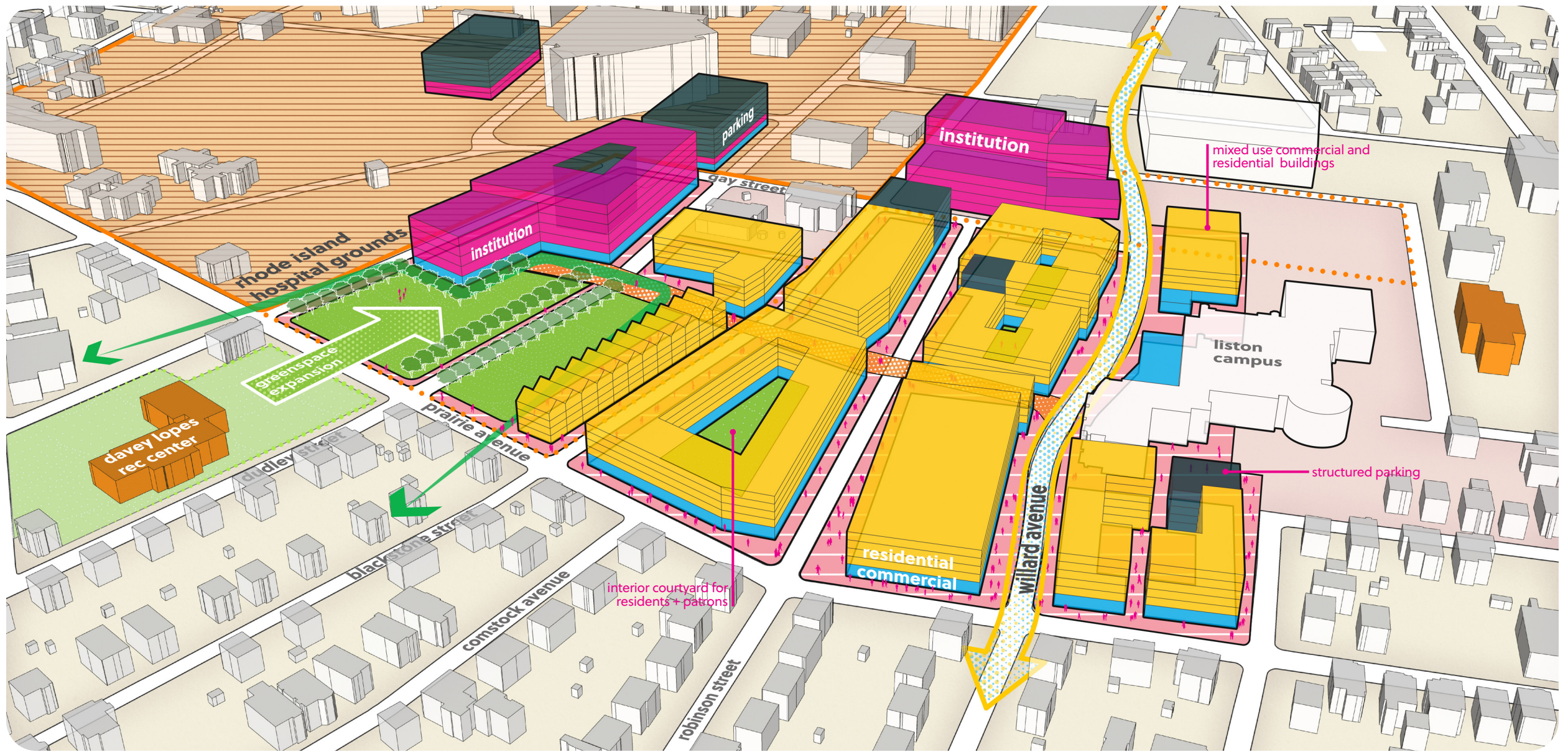
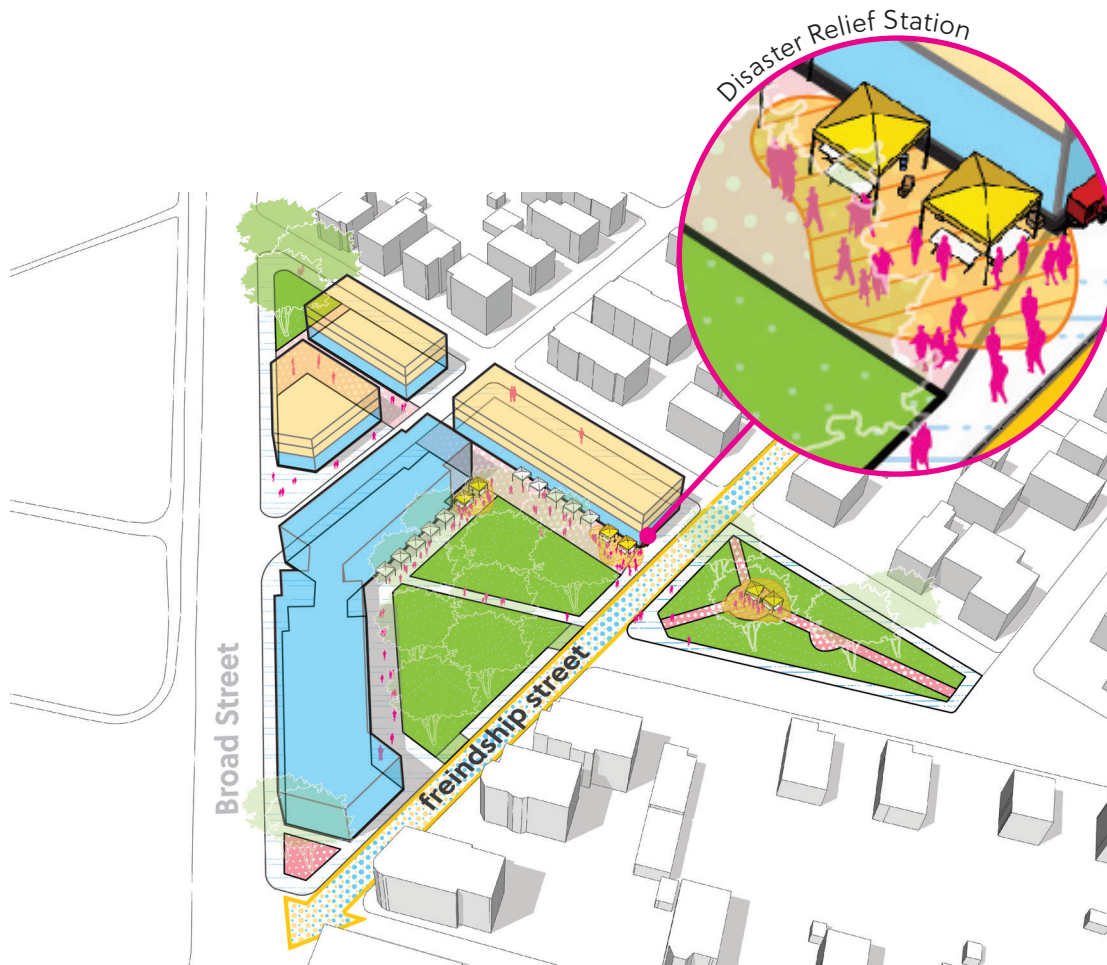


Figure 5.70 | Willard Social Hub

Social Hubs During Disaster Events

Social hubs have a high potential for providing support during disaster events. In normal times, they are places to gather and socialize, making them well-known locations within the community that are designed to accommodate many people. Because of this, they are ideal places to establish larger disaster relief stations capable of distributing resources and information to the community. Additionally, these hubs each have large areas of open space and building space which could be converted into ephemeral housing for displaced community members during disaster recovery time. This is important so the community is able to stay connected during these times of rapid change and can help ensure that those who were here before are not pushed out of their community. These Hubs are distributed across the neighborhood and situated in easily accessible locations to make accessing aid easy for all parts of the community.

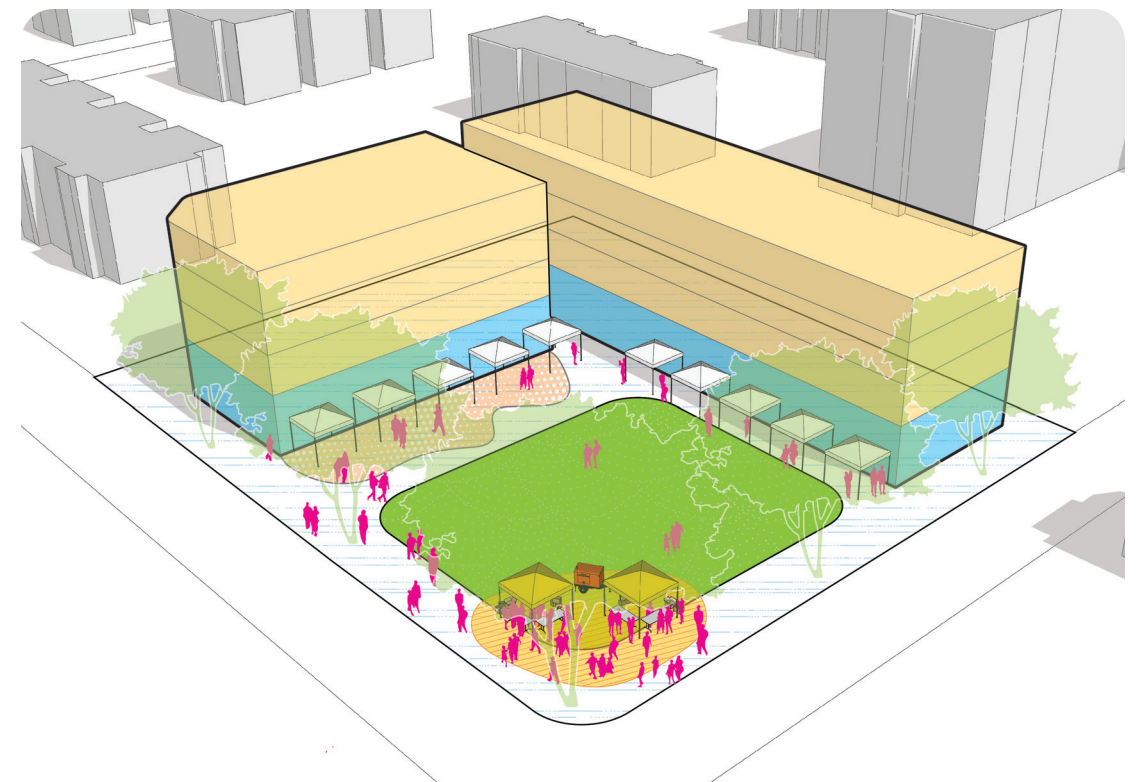


Southside Gateway Social Hub During Disaster Events

Utilizing the arrangement of buildings, the Southside Gateway Social Hub is capable of creating a semi-enclosed disaster relief station (see Figure 5.71). Its position along Broad Street in Upper South Providence allows it to service much of the Upper South Providence community as well as parts of the Elmwood community on the other side of Broad Street. Additionally, cutting through this social hub is Friendship Street which connects the hub to

downtown via a bridge going over Interstate 95. This connection, as well as its connection to Broad Street, makes the hub very accessible. In case of flooding-related disaster events, this social hub is the furthest from the waterfront making it less likely to be inundated by flooding. The wide sidewalks and open space incorporated with this social hub can be used for setting up tents and resource distribution tables providing necessary services to the community.

Figure 5.71 | Southside Gateway Social Hub Post Disaster Event



Lower South Providence Social Hub During Disaster Events

The Lower South Providence Social Hub is deeply embedded in the Lower South Providence Community allowing it to service this community very well (see Figure 5.72). Similarly to the Southside Gateway Social Hub, the arrangement of buildings helps to create enclosure around open space that can

be utilized for disaster relief tents. Due to its size, this hub will be less able to service fewer people than the Southside Gateway; however, its proximity to Saint Michael Church could be leveraged to provide more space for gathering and resource distribution.

Figure 5.72 | Lower South Providence Social Hub Post Disaster Event

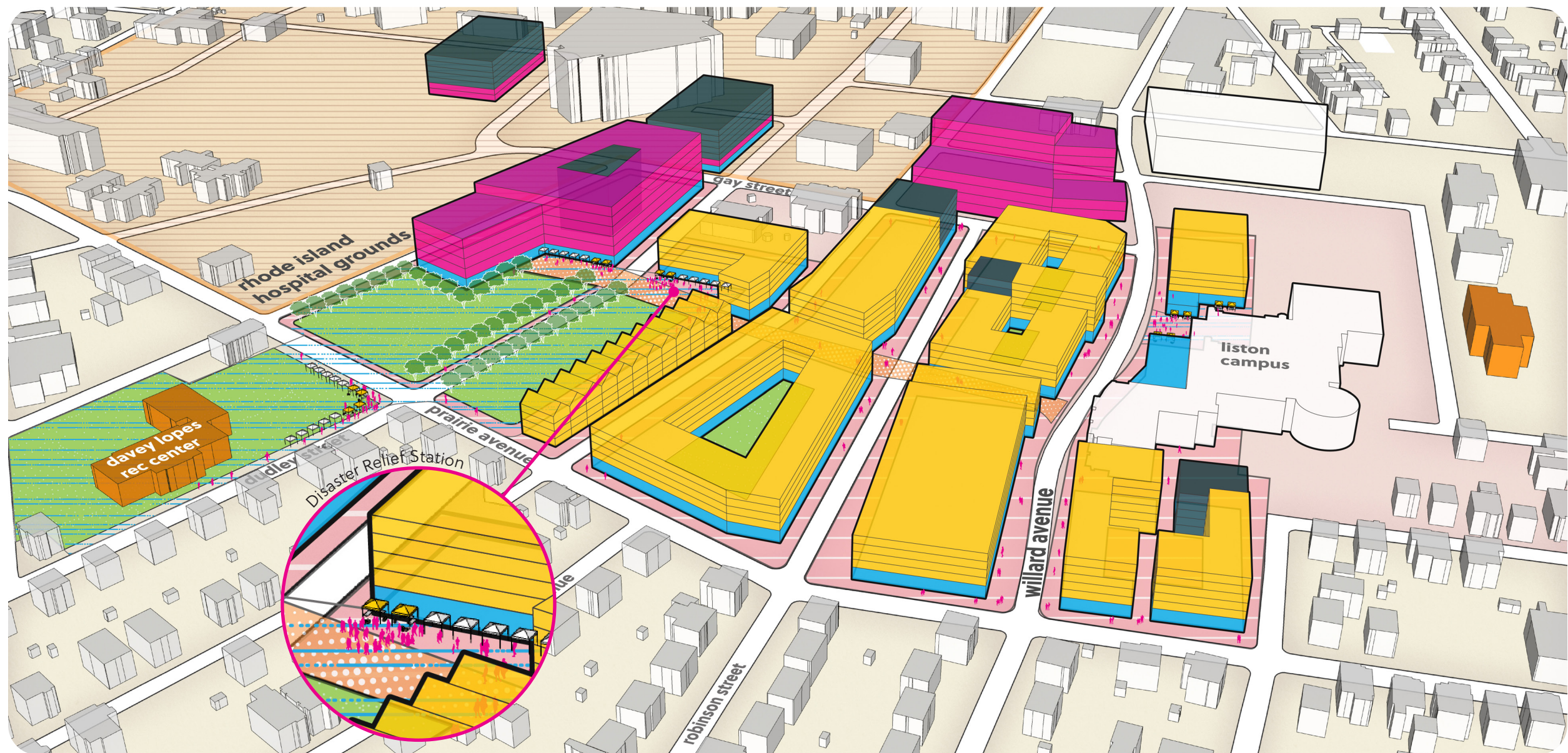


Figure 5.73 | Willard Social Hub Post Disaster Event

Willard Social Hub During Disaster Events

The Willard Social Hub is closely associated with the Road Island Hospital, Davey Lopes Recreation Center, and the Rhode Island Community College's Liston Campus. These connections make this social hub highly acces-

sible to resources and support from these locations. Additionally, the green space in this hub provides open space for disaster relief. Like the other social hubs, the Willard Social Hub would be a very well-known location

within the community and has a high capacity for people allowing it to service a very large number of individuals during times of need (see Figure 5.73). The hospital's parking area could also be utilized for larger disaster relief needs.

Summary of Vision Plan

The intention of this vision plan is to encourage thought and discussion on how South Providence can improve its disaster resilience by building a more socially connected community. It addresses the identified challenges by seeking to break barriers withholding a more social, coherent community. It discusses the value of community organizations, proposing the conversion of vacant lots into productive community pocket parks, street improvements, and the development of social hubs to act as anchors for the community. This vision plan can act as a starting place, but future community developments should incorporate more in-depth community engagement at a broad scale and also a narrow one to target specific pocket parks.

This vision plan addresses community disaster resilience through a series of design interventions. Importantly, improved community disaster resilience, though the primary goal of this project, is just the side effect of a more socially cohesive and connected South Providence community. The proposed design interventions seek to eliminate or mitigate barriers to a well-connected community to improve social connections and the sense of community. The result is a healthier, more vibrant, and thriving community capable of handling changes that come with the future, whether that be disaster events or future developments. Disaster event or not, this vision plan's vitality remains.

Much of the community is currently at risk of being displaced; a threat that only worsens by addressing barriers to creating a healthier, more socially-inducive living environment. Whether the community wants it or not, redevelopment is already occurring in South Providence. It is important that the South Providence community organize a strong unified voice to express their position early in this process. Community members can create a more stable renting market by establishing strong anti-displacement zoning and ordinances. This is a good start for protecting the community; however, a more aggressive stance may be required. Increasing community ownership, oversight, and management of developable land in South Providence will improve the community's control over development. In addition, it is important to identify and embrace significant cultural and historic components of the neighborhood. Disaster events also pose a threat to this community. As this research discusses, this vision plan's attempt to improve sociality within the community will result in a more resilient community. At the intersection of these two issues is disaster gentrification. If the community is not properly protected and a severe disaster event impacts it, it will be easy for large amounts of the neighborhood to be bought up by outside parties, taking power away from the existing community. The best approach to community resilience is through a socially unified South Providence.

06

Conclusion

final thoughts + discussion

Summary of Key Results

Guided by the results of the research conducted to answer the first two research questions, this project aimed to create a research-informed report capable of guiding community members, designers, and policymakers in improving community resilience by removing barriers to social infrastructures in South Providence. The research concluded that barriers to social sites were a driving factor withholding a more socially connected and disaster-resilient South Providence community. Of these barriers, the most restrictive to this community were economic, environmental, image, and political. This informed the answering of the third and final research question through research-informed design of intervention typologies that sought to mitigate or remove the barriers. These interventions included improved community programming, the conversion of vacant lots into pocket parks, a vegetated barrier separating the community from Interstate 95, streetscape improvements, and finally, suggested improvements and the creation of social hubs. These interventions were broken into three scales, small, medium, and large, to create a community vision plan focused on improving sociality, cohesion, and disaster resilience in the South Providence community. The interventions were designed to maximize their social capacity, improve connectivity and networks between social infrastructure sites in the community, mitigate disasters, and benefit the community during times of recovery. Though the end goal of the vision plan is a more disaster-resilient community, this is primarily achieved through the building and strengthening of social networks within the community that are critical to a community’s ability to survive and overcome times of change.

Limitations

Several factors limited this study, the most prevalent of which was the timeframe. This project was conducted over a seven-month period, including the project and research design, conducting the research, and synthesizing the results into the vision plan and this report. Due to the time constraints and study area size, recruitment for interviewing faced many challenges, resulting in very few participants. Furthermore, due to this limited sample size and the research’s reliance on the opinions and perceptions of individual participants, it is exposed to bias and may not accurately represent the entirety of the study area’s population, affecting the accuracy and generalizability of the research results. With this said, the research results aligned well with the existing body of work used to support this project.

Future Research

Despite these limitations, this research is still important for its contribution to the body of work and potential to positively affect the study area’s community and communities that face similar issues. The report explored the impact that the design of social places has on disaster resilience and included examples of how this can be done. It will target communities, cities, designers, and others interested in building stronger, better-connected, and disaster-resilient communities. Future research could benefit from focusing on a spatial analysis of social infrastructure sites within a community and performing a network analysis to better understand how physical barriers restrict a community’s sociality. This could look at a wider range of social infrastructure typologies and in more depth for their contribution to building social networks and providing disaster resilience benefits. Ultimately, future research should search to strengthen the understanding of how social infrastructure improves community cohesion and disaster resilience and how these sites can be maximized within a community.

References + Appendices

giving credit where credit is due

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Image References

Chapter 1

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Figure 1.2 Jennings, Caleb. 2024. *Increasingly Prevalent and Intense Disasters*. Digital Image.

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Figure 1.3 Jennings, Caleb. 2024. *Resilience*. Digital Image.

Chapter 2

Figure 2.1 Jennings, Caleb. 2024. *Literature map*. Digital diagram.

Figure 2.2 Jennings, Caleb. 2023. *Relationships between individuals*. Digital Image.

Figure 2.3 Jennings, Caleb. 2023. *Relationships between groups*. Digital Image.

Figure 2.4 Jennings, Caleb. 2023. *External Relationships*. Digital Image.

Figure 2.5 Jennings, Caleb. 2023. *Connecting social infrastructure to disaster resilience*. Digital Image.

Chapter 3

Figure 3.1 Jennings, Caleb. 2024. *State Scale — Rhode Island*. Digital Image.

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Figure 5.46 Jennings, Caleb. 2024. *Road Typology: Street*. Digital Image.

Figure 5.47 Jennings, Caleb. 2024. *Road Typology Example: Street*. Digital Image.

- Google Maps. 2019. *Publics Street, Providence, RI*. Google Street View Image. Accessed March 11, 2024. <https://www.google.com/maps/@41.8052721,-71.4161676,3a,90y,258.76h,92.37t/data=!3m6!1e1!3m4!1sCxooxlAUfe1lEmGNrrgBaw!2e0!7i16384!8i8192?entry=ttu>

www.google.com/maps/@41.8052721,-71.4161676,3a,90y,258.76h,92.37t/data=!3m6!1e1!3m4!1sCxooxlAUfe1lEmGNrrgBaw!2e0!7i16384!8i8192?entry=ttu

Figure 5.48 Google Maps. 2019. *Publics Street, Providence, RI*. Google Street View Image. Accessed March 11, 2024. <https://www.google.com/maps/@41.8052721,-71.4161676,3a,90y,258.76h,92.37t/data=!3m6!1e1!3m4!1sCxooxlAUfe1lEmGNrrgBaw!2e0!7i16384!8i8192?entry=ttu>

Figure 5.49 Jennings, Caleb. 2024. *Road Typology: Intersection*. Digital Image.

Figure 5.50 Jennings, Caleb. 2024. *Road Typology Example: Intersection*. Digital Image.

- Google Maps. 2021. *Prairie Avenue and Sayles Street Intersection, Providence, RI*. Google Street View Image. Accessed March 11, 2024. <https://www.google.com/maps/@41.8027628,-71.4136181,3a,90y,181.33h,88.71t/data=!3m7!1e1!3m5!1sQxqfMzSml-v7wrotR6z4pIQ!2e0!5s20210601T000000!7i16384!8i8192?entry=ttu>

Figure 5.51 Google Maps. 2021. *Prairie Avenue and Sayles Street Intersection, Providence, RI*. Google Street View Image. Accessed March 11, 2024. <https://www.google.com/maps/@41.8027628,-71.4136181,3a,90y,181.33h,88.71t/data=!3m7!1e1!3m5!1sQxqfMzSml-v7wrotR6z4pIQ!2e0!5s20210601T000000!7i16384!8i8192?entry=ttu>

qfMzSmlv7wrotR6z4pIQ!2e0!5s20210601T000000!7i16384!8i8192?entry=ttu

Figure 5.52 Jennings, Caleb. 2024. *Road Typology: Underpass*. Digital Image.

Figure 5.53 Jennings, Caleb. 2024. *Road Typology Example: Underpass*. Digital Image.

- Google Maps. 2012. *Interstate 95 Underpass, Oxford Street, Providence, RI*. Google Street View Image. Accessed March 11, 2024. <https://www.google.com/maps/@41.8037197,-71.403596,3a,75y,250.99h,90.37t/data=!3m7!1e1!3m5!1sCs65FTSZNJ-D8uPF-oxscug!2e0!5s20120801T000000!7i13312!8i6656?entry=ttu>

Figure 5.54 Google Maps. 2012. *Interstate 95 Underpass, Oxford Street, Providence, RI*. Google Street View Image. Accessed March 11, 2024. <https://www.google.com/maps/@41.8037197,-71.403596,3a,75y,250.99h,90.37t/data=!3m7!1e1!3m5!1sCs65FTSZNJ-D8uPF-oxscug!2e0!5s20120801T000000!7i13312!8i6656?entry=ttu>

Figure 5.55 Google Maps. 2019. *Interstate 95 Underpass, Oxford Street, Providence, RI*. Google Street View Image. Accessed February 20, 2024. <https://www.google.com/maps/@41.8088172,-71.4111785,3a,90y,107.37h,95.44t/data=!3m6!1e1!3m4!1s8Di30Wp45zQ7yO->

HA93ATGg!2e0!7i16384!8i8192?entry=ttu

Figure 5.56 Jennings, Caleb. 2024. *Vision Plan: Phase 3*. Digital image.

Figure 5.57 Jennings, Caleb. 2024. *Social Hub Design: Multi-Attractions*. Digital image.

Figure 5.58 Jennings, Caleb. 2024. *Social Hub Design: Focal Point*. Digital image.

Figure 5.59 Jennings, Caleb. 2024. *Social Hub Design: Double-loaded Sidewalks*. Digital image.

Figure 5.60 Jennings, Caleb. 2024. *Analysis of Southside Gateway*. Digital image.

- Google Earth 2023. *Aerial Image of Southside Gateway, Providence, RI*. Accessed March 17, 2024. <https://earth.google.com/web/@41.80927268,71.42011616,229.15326719a,13.44452721d,35y,-4.55829844h,42.37248267t,0r/data=OgMKATA>

Figure 5.61 Jennings, Caleb. 2024. *Southside Gateway Social Hub*. Digital image.

Figure 5.62 Jennings, Caleb. 2024. *Analysis of Lower South Providence Social Hub Site*. Digital image.

- Google Earth 2023. *Aerial Image of Oxford Street and Gordan Avenue, Providence, RI*. Accessed March 17, 2024. <https://earth.google.com/>

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Figure 5.63 Jennings, Caleb. 2024. *Lower South Providence Social Hub*. Digital image.

Figure 5.64 Google Maps. 2019. *Willard Avenue, Providence, RI*. Google Street View Image. Accessed February 20, 2024. <https://www.google.com/maps/@41.8088172,-71.4111785,3a,90y,103.61h,95.2t/data=!3m6!1e1!3m4!1s8Di30Wp45zQ7yO-HA93ATGg!2e0!7i16384!8i8192?entry=ttu>

Figure 5.65 1948. *Untitled photograph of Willard Avenue*. Digital copy of photograph. Retrieved February 20, 2024 from: https://provlbdigital.org/islandora/object/VM013_WC1358

Figure 5.66 Jennings, Caleb. 2024. *Willard Avenue Social Hub*. Digital image.

Figure 5.67 Jennings, Caleb. 2024. *Social Hubs During Disaster Event: Southside Gateway Social Hub*. Digital image.

Figure 5.68 Jennings, Caleb. 2024. *Social Hubs During Disaster Event: Lower South Providence Social Hub*. Digital image.

Figure 5.69 Jennings, Caleb. 2024. *Social Hubs During Disaster Event: Willard Social Hub*. Digital image.

Glossary

Disaster	Definition
<i>Disaster</i>	major disruptions to the normal functions of a community
<i>Social Infrastructure</i>	places that encourage social interactions
<i>Social Networks</i>	connections between people and groups of people
<i>Community Resilience</i>	a community's ability to adapt to, withstand, and recover from a disruption

Appendix A — IRB Approval Form



TO: Hyung Kim
 Landscape Archit & Comm Plan
 Manhattan, KS 66506

Proposal Number: IRB-11856

FROM: Lisa Rubin, Chair
 Committee on Research Involving Human Subjects

DATE: 09/29/2023

RE: Proposal Entitled, “Designing Social Infrastructure for Community Disaster Resilience.”

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written – and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, **45 CFR §104(d), category:Exempt Category 2 Subsection ii.**

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

Electronically signed by Lisa Rubin on 09/29/2023 10:00 PM ET

Appendix B — Informed Consent Script + Interview Questions

Designing Social Infrastructure for Community Disaster Resilience

Research Information

Hello, thank you for taking the time to talk with me today. My name is Caleb Jennings, and I am a graduate student in the landscape architecture program at Kansas State University.

This interview is part of my master’s research which is investigating the design of social infrastructure for community disaster resilience. The end-product will be a report including research informed designed social infrastructure typologies seeking to improve social networks and disaster resilience within a community.

This will be a semi-structured interview; it will be guided by prepared open-ended questions but may include impromptu questions as needed. This interview will be audio recorded for later reference, in addition, I will be taking notes throughout the interview.

Due to the nature of this research, some questions may relate to previous or future disasters and seek to examine participants’ personal experiences. With that said, no questions are mandatory. If you wish not to answer any question, say so, and we will move past it.

This interview is anticipated to last 25-30 minutes. Participation is completely voluntary, if at any point you wish to withdraw from the interview, let me know.

All information collected will be confidentially stored and only be accessible to the research team. Confidentiality will be kept, and any identifying information will be excluded from the research report. The collected information will not be used or distributed to future research outside of this project.

Do you have any concerns or questions regarding these statements?

Verbal Consent

Before we begin the interview, do you agree to participate in this research? (be sure to record response)

Contact Information

Graduate Researcher: Caleb Jennings | calebjennings00@ksu.edu | 785.633.3842
Principal Investigator: Hyung Jin Kim | hyungjin@k-state.edu | 785.532.2439
K-State IRB Contact: Lisa Rubin | 785.532.3224

Interview Questions

Questions for Prominent Community Members/Leaders

Community Networks

- How would you describe the social connection of residents in this community?
- Is there collaboration between different community groups? If so, in what way do they collaborate?
- Would you say there is a general sense of community in this area?
 - Where is it the strongest?
 - Where is it the weakest?
- How would you describe South Providence?
- What’s successful or unsuccessful about this community?
- Do you feel like you belong to this community?

Social Infrastructure

First, introduce a short definition and examples about the Social Infrastructure, then ask the following questions:

- Do you feel there is enough social infrastructure in this community?
- Which social infrastructures do you find yourself using the most?
 - Which do you feel are used the most for community activities?
- What social infrastructure do you wish to see more of?
- How well maintained are social infrastructures in this area? Do you feel like they are neglected by the city?
- Do you feel that the social infrastructure distribution in Providence as a whole is equitable?
- How can this social infrastructure be improved, for any particular infrastructure and/or as a whole?
- What kind of new social infrastructure types you would like to see in this community for disaster resilience?

Disaster Vulnerability

- Do you feel that this area is vulnerable to natural disaster events?
- During disaster events, how have/do you expect social relationships in the community to change?
- How do community groups react to disaster events?
- Who are the most vulnerable people, or group, to the effects of disaster events in this community?
- What kind of social infrastructure would be most crucial to vulnerable communities?

Questions for Local Professionals

Community Networks

- How would you describe the social connection of residents in this community?
- What (if anything) has the city done to improve community networks and sociality?
- What would you say are the best methods for improving community networks in this area?
- Would you say there is a general sense of community in this area?
 - Where is it the strongest?
 - Where is it the weakest?
- How would you describe South Providence?
 - What's good or bad about this community?
 - Do you feel like you belong to this community?

Social Infrastructure

Introduce group to Social Infrastructure, give common examples.

- Do you feel there is enough social infrastructure in this area?
- Do you believe the existing social infrastructure is prevalent enough to make a robust network?
- How well maintained are social infrastructures in this area? Do you feel like they are neglected by the city?
- Do you feel that the social infrastructure distribution in Providence as a whole is equitable?

- How can this social infrastructure be improved, for any particular infrastructure and/or as a whole?
- What kind of new or existing social infrastructure types you would like to see/see more of in this community for disaster resilience?

Disaster Vulnerability

- Do you feel that this area is vulnerable to disaster events?
- During disaster events, how has/do you expect the community to interact?
- What would you like to see done in Providence to improve disaster resilience?
- Who are the most vulnerable people, or group, to the effects of disaster events in this community?
- What kind of social infrastructure would be most crucial to vulnerable communities?