



SOUTH WEDGE CLIMATE ACTION PLAN

University at Buffalo

END450: Environmental Design Workshop Fall 2021



ACKNOWLEDGMENTS

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Thank you!

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FORWARD



In the fall semester, 2021, University at Buffalo Environmental Design students conducted a semester-long research and design project on neighborhood scale climate action in the South Wedge neighborhood of Rochester, NY.

This studio explored the following prompt: The climate is changing as so too must our built environment. So often this challenge is presented at large scales, leaving individuals overwhelmed and driven to inaction. Our design question: How can designers and planners better connect solutions at scales that impact our everyday life? This group analyzed neighborhood based climate solutions that better connect individual community members with practical and targeted action items within their community. This analysis was broken down into three phases across the semester:

1. Understanding: Listening and analyzing the many complexities in the community
2. Design: Developing unique design and practical planning place based solutions
3. Action: Developing a toolkit that communicates impact, action items, timelines and resources, giving our client a series of tools and implementation techniques to utilize in the future

The South Wedge in many ways represents a typical small scale mixed use urban neighborhood, in a small historic city. Like many similar neighborhoods across the United States, this area boasts a strong sense of community and motivation for change, but often lacks resources to organize these changes. This typology represents a unique opportunity as cities begin to invest in climate adaptation strategies nationwide. The goal of this studio is to provide a framework for further work in not just the neighborhood, but for a larger network of communities tackling urban climate adaptation together. Following in this report is a summarized version of END450's efforts, a practical and hopeful approach to climate adaptation at a scale that balances community and climate.

Mary Allen

December, 2021

Rochester, NY



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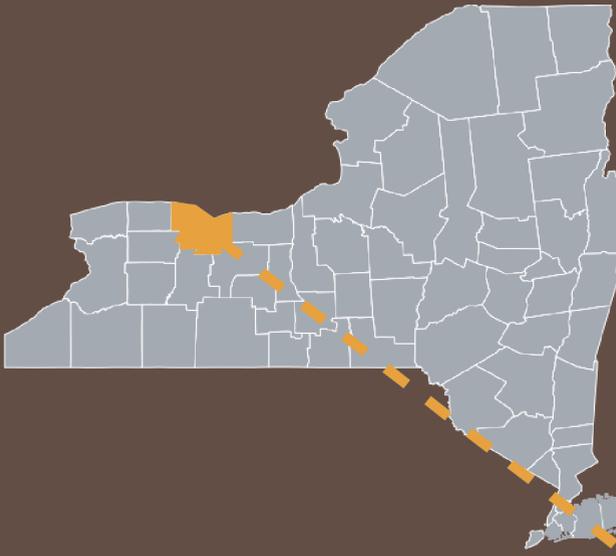
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OVERVIEW

In this text, we will give an overview of various climate issues and solutions for the South Wedge Neighborhood in Rochester, New York.

We will discuss various areas of importance including, but not limited to: Housing, Transportation, Walkability, Waste & Stormwater Management, and Economy.



New York State



Monroe County

City of Rochester



South Wedge



EXECUTIVE SUMMARY



Through the growth of the global population and technological advances, the consumption of non-renewable resources, land use, and many other factors have led to the climate crisis that is projected to create catastrophic consequences for life on Earth. “Scientists have high confidence that global temperatures will continue to rise for decades to come, largely due to greenhouse gases produced by human activities” (NASA, 2021). These changes are affecting weather patterns, the ecological system of various species, glacial ice quantity, and many other facets. The climate crisis cannot be stopped, nor reversed, therefore individuals should seek to adapt to the changing climate and mitigate further damage to the environment.

Different initiatives are already being set up in order to plan for the future of our climate and build in a direction which helps the environment, rather than damages it. While the governments of the world are busy trying to hold large polluters responsible for the worsening conditions it is up to local governmental groups and local designers to drive the importance and creation of community driven environmental mitigation through environmentally conscious design.

In our examination of the South Wedge in Rochester, New York we have identified numerous sources of pollution that contribute to this phenomenon. According to the Rochester Climate Action plan there

are 3 main contributors to emissions in Rochester and those are natural gas & electricity production, large emitters (such as industrial facilities) and on road vehicles totaling 2,800,000 MTCO_{2e} (Spaulding & Chanthalangsy 2013). In order to combat climate change at a neighborhood scale we must examine how to reduce these emissions related to housing, transportation and industry in the South Wedge.

Planners and designers hold an ethical responsibility to address and improve upon the flaws and shortcomings of the built and natural environments of the inherited world. Their solutions for the built environment should extend beyond the wants of a client and address the needs of a community in a holistic design approach. There is not one solution that can reverse the climate crisis. Many different ideas need to be considered in a variety of situations. The Climate Crisis demands that solutions offer: 1) Mitigation – ways to slow the rate of climate change, 2) Adaptation – ways of adjusting to climate change, and 3) Resiliency – preparedness for further changes in climate. This report will outline the various ways in which we believe this might be accomplished at a neighborhood scale in the South Wedge.





WELCOME TO THE SOUTH WEDGE





**INTRODUCTION:
THE SOUTH
WEDGE**



HISTORY:

The South Wedge is one of Rochester's oldest neighborhoods and finds its beginnings in the early 19th century around the year 1830. The neighborhood is conveniently situated between the Genesee River and the Erie Canal. This prime location led to its growth throughout the 19th century as the advent of industry along the river fueled the growth of the neighborhood in kind (Bero).

The South Wedge is also a neighborhood of historic significance, as Rochester was a major hub for abolitionists. Frederick Douglass lived in the South Wedge and is also buried nearby in Mt. Hope Cemetery. He was an integral part of the abolitionist movement as well as the women's suffragist movement (Knight 2021).

The current residents of the South Wedge neighborhood have inherited a unique stock of old buildings. Some of these buildings are eligible for historic tax credits through the state (Bero). Planners from the South Wedge Planning Committee have indicated to us that there are buildings aging at close to 200 years old in this area. The neighborhood character has been influenced by this old and narrow street design due to this age.

CURRENT CONDITIONS:

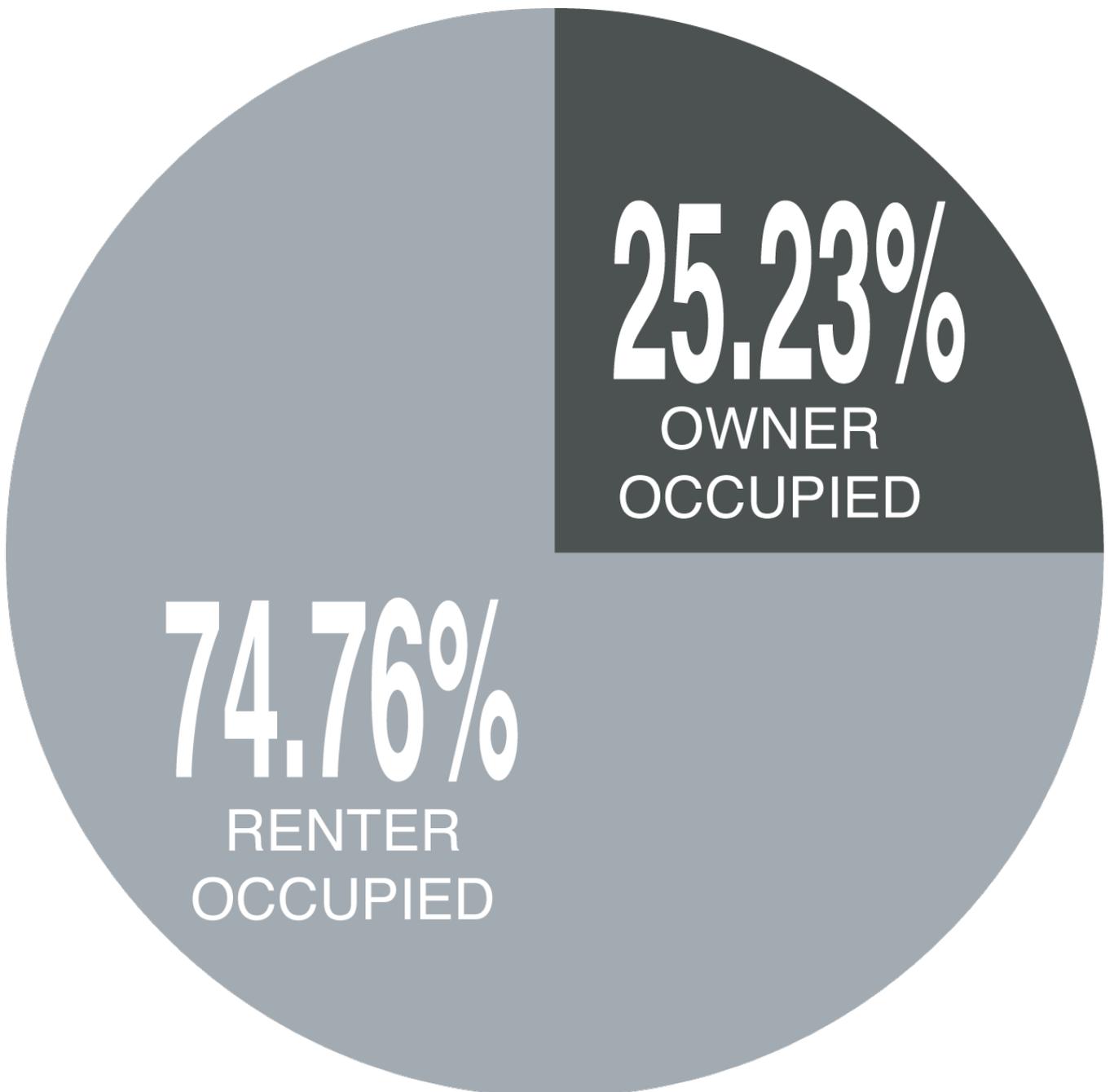
In the present day the South Wedge is now a vibrant and diverse neighborhood that is home to not only older buildings, but also high rises along the Genesee River. South Avenue would be the "Main Street" of the neighborhood and contains most of the businesses in the area. Along this stretch you can find anything from small boutiques, to restaurants and bars, to Cajun eateries and vegan bakeries (Knight 2021).

Currently, the South Wedge neighborhood is proclaimed to be the fastest-growing urban neighborhood in the state outside of New York City. Before, South Wedge lacked diversity in business, so to resolve that issue any gaps in the street, vacant lots, and empty spaces were filled, occupied, or renovated with new businesses. The construction of the "South and Hickory Place" is a prime example of the changes made in South Wedge with it being a popular mixed-use building for residence. Utilizing the Vacant lots, South Wedge has transformed them into pocket parks such as Star Alley and Nathaniel Square, which was a vacant lot populated by drug dealers. South Wedge has a number of amenities that developed a locavore culture that maintained its unique vibe and reinforced neighborhood pride.



There are organizations of interest in the community such as The South Wedge Planning Committee that meets at 224 Mount Hope Avenue and combines resources to gain a comprehensive look into what is happening around the area in local small business operations, development centers, and other climate initiatives. The Wedge

newspaper is produced by the SWPC and offers a monthly overview of current events and articles from community groups in and around South Wedge and the City of Rochester. City council updates are included to highlight recent talking points and matters addressed by the elected officials.





HOME/INCOME DEMOGRAPHICS:

- 71% rent while 29% own their homes (Social Explorer)
- Median home value: \$124,891.00 (Social Explorer)
- National home value:\$ 217, 500.00 (Social Explorer)
- Median Rent: \$824 (Social Explorer)
- National rent value; 1,062 (Social Explorer)

The median income in the neighborhood is probably in the range of \$30.8K as the majority of the residents have higher educational attainment. (Social Explorer, 2017)

SEX:

The South Wedge neighborhood is composed of roughly 51% female and 49% male. (Social Explorer, 2017)

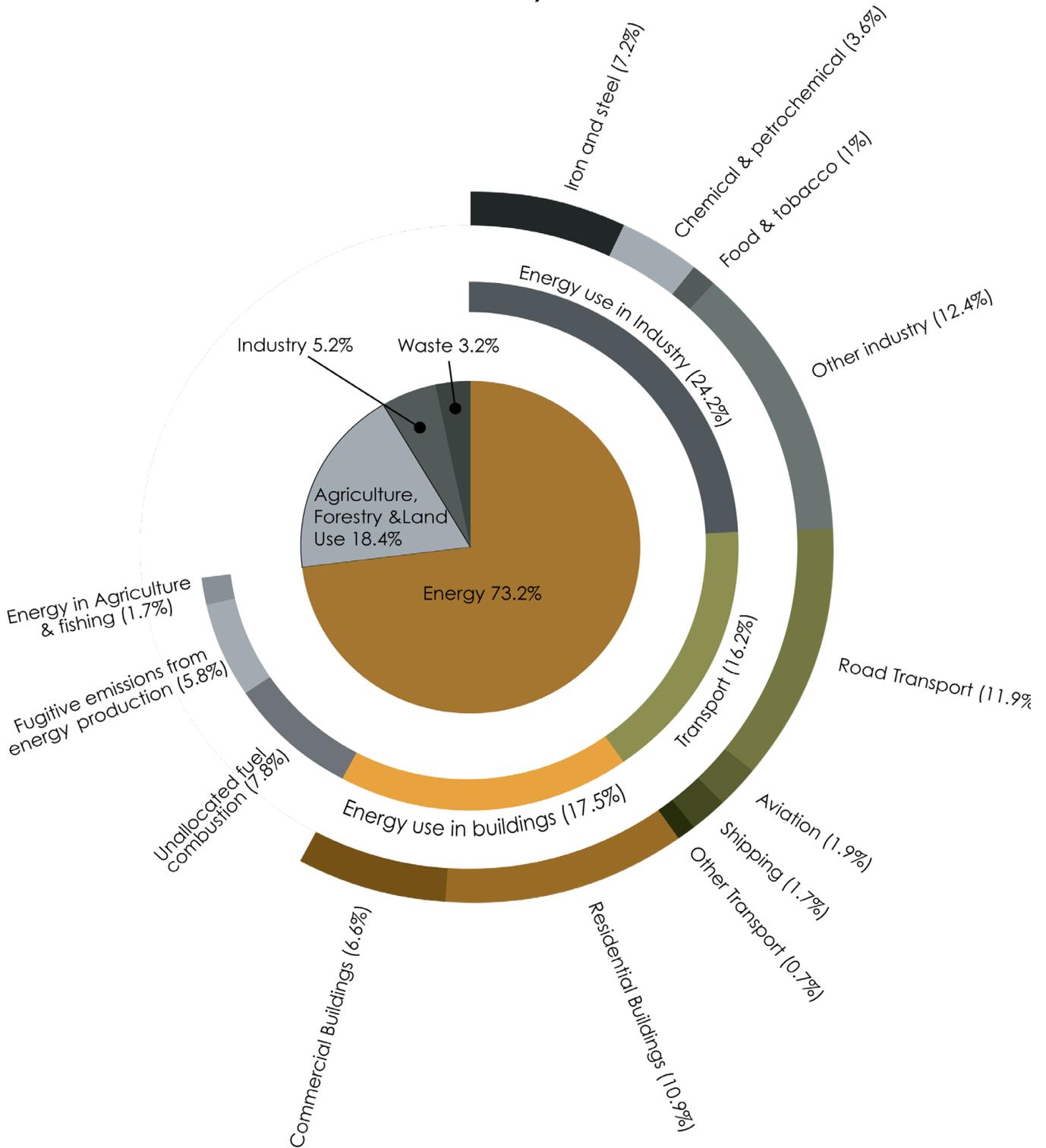
The neighborhood of South Wedge currently has a population of 3498 people and a median age of 32.6. Renters in South Wedge amount to a large portion of the housing demographic, 71% of the population rent, while only 29% own their homes. Both the median rent level and home values in South Wedge are lower than the national average throughout the US. The median of

the neighborhood's income falls between the range of \$40000 to \$50000, with a majority younger adult age range of 22-39, as well as, a majority higher educational attainment.



Worldwide Greenhouse Gas Emission

Breakdown by Sector



EMISSIONS:

Climate change is a global issue that will affect numerous cities across the planet and often unevenly. The chart featured opposite illustrates the various emissions sources found on a global scale. In the broadest sense emissions come primarily from energy (73.2%), followed by agriculture and forestry (18.4%), industry (5.2%), and then waste (3.2%). The further out we go we can see the emissions breakdowns that branch out further into primarily energy use in buildings, transport, and industry. We have structured our report to heavily examine these emissions sources in transport, housing and industry. Due to their immense contributions to climate change we believe they should be the primary target for emission reductions.





LITERATURE REVIEW



LITERATURE REVIEW:

Tackling climate change will require examination of Rochester's weaknesses in regards to climate and adaptation. The City of Rochester's Climate Vulnerability Assessment (CVA) outlines these weaknesses. The current climate crisis in Rochester can result in extreme and unprecedented impacts. As weather events such as severe floods and heat waves (to name a few) become more extreme, the city needs to adapt. It's important to contemplate what kind of new strategies Rochester will need to explore to add to what they already have to make their infrastructure more resilient.

The City of Rochester's objective within their Climate Vulnerability Assessment (CVA) is to investigate, identify & access, and prioritize for action. According to the city of Rochester, the northeast's annual temperature in the past two decades has arisen by two degrees Fahrenheit. (CVA, 2018, p. 14). Also, the data shows that in winter the temperature has elevated by 4.4 degrees in many areas across New York. Essentially, the climate will indisputably continue to rise, increasing vulnerability. Therefore, action is needed by all communities to mitigate the dangers of climate change.

Climate change is caused by numerous sources and as outlined in Rochester's Climate Action Plan those three main sources are Transportation, Housing, and Industry (Spaulding & Chanthalangsy 2013).

HOUSING:

Living within the South Wedge neighborhood costs more than the national averages, with the cost of living in the South Wedge being 5% higher than the rest of the city of Rochester on average. On top of that the while the median home value and median rent are lower than the national average the real estate prices are approximately 52% higher than the rest of the city of Rochester. This is mostly due to the highly desirable area the neighborhood is located in and the effects of outside investors wanting to profit off the properties, as mentioned by Judy Hey and Glynis Valenti who are longtime residents of the South Wedge who expressed concerns of outside Retrofitting houses with insulation: a cost-benefit

Housing is a critically important environmental factor on the health of any population, increasing evidence on the negative health effects from indoor environmental characteristics such as low indoor temperatures, inadequate ventilation, and energy related emissions. There is



relatively little research on this and as a result there is little to no firm guidance on how to improve the cost-effectiveness of public policies to improve the standards of houses and lives of the home's residents. The purpose of this study, *Retrofitting houses with insulation: a cost–benefit analysis of a randomized community trial*, was to evaluate the health, energy usage, and environmental benefits of retrofitting housing insulation and its benefits to the home's occupants. Through the process of assessing different forms of possible benefit to residents such as reducing the number of visits to GPs, general hospitalizations, days off school/ work, energy savings, and CO2 reduction. This study conducted its research in predominantly low-income communities in New Zealand with a focus on retrofitting insulation in 1350 houses, in which at least one person had symptoms of respiratory disease. The results of the study, *Retrofitting houses with insulation: a cost–benefit analysis of a randomized community trial*, is that improvements in retrofitting homes with new insulation coincided with improvements to resident health, energy savings, and reduced CO2 emissions. The benefits of reductions in greenhouse gas emission are the estimated energy savings for electricity and gas along with a reduction in the number of visits to GPs for respiratory ailments. From an environmental, energy, and public health perspective the value of improving housing

quality by retrofitting insulation is compelling. This study points to the overwhelming need to consider a wide range of benefits, including health and environmental benefits, as direct incentives when assessing the value of an intervention to improve housing quality through retrofitting housing insulation.

TRANSPORTATION:

Improving our nation's transportation network will require ingenuity and investment in order to reduce the massive emission contributions from on road vehicles in Rochester and cities across the country. The Infrastructure Bill making its way through congress has numerous improvements for America's roadways designed to increase the popularity of electric vehicles and promote more sustainable transportation. The bill has \$7.5 billion dollars set to create a national electric vehicle charging station network, and another \$7.5 billion dollars for electric mass transit improvements such as fully electric school buses or zero-carbon buses to make public transportation more sustainable. To further decarbonize the transportation sector further funding is going towards airports and rail systems.

The bill is set to invest \$66 billion dollars into transit by rail, to modernize the Northeast rail Corridor, and bring a world-class high-speed rail-based transportation service to areas outside the northeast and mid-Atlantic to reduce the amount of strain placed on the



nation’s airports. Also included in the bill is \$11 billion dollars for transportation related safety improvements, including a program to help states and localities reduce crashes and fatalities of cyclists and pedestrians, with the implementation and increased creation of pedestrian exclusive transit infrastructure. In all the bill focuses on investments and efforts to mitigate climate change, improve utility resilience, and improve the equity and safety for all roadway users. (Infrastructure Deal)

The Bicycle Master Plan Project is developed to optimize the infrastructure and service for Cycling in Rochester. According to the Bike Master Plan, “many major streets in Rochester do not have a readily apparent solution to improve bicycling accommodation, and local streets can sometimes be utilized to improve connectivity as well, so the Plan also includes broader City-wide recommendations in addition to the detailed location-specific analyses. These recommendations focus on the appropriateness of other bicycle facilities and treatments (including bike boulevards, shared lane markings, and bike parking) and changes to zoning language to promote public-private sector partnerships. No matter how well the City does with regard to improving bicycling conditions, it is equally important to encourage residents and visitors to get out and ride, so the Plan’s recommendations also include outreach and education opportunities.” (Bike Master Plan)

Improving our nation’s transportation network will require ingenuity and investment in order to reduce the massive emission contributions from on road vehicles in Rochester and cities across the country. E-bikes and e-scooters transportation initiatives are cost effective and a good source of revenue for cities and urban neighborhoods. The money generated by the program will far outweigh the cost of operations. A similar E-bike share program in Aurora and Lawrenceburg, Indiana recorded that the Ongoing costs including software usage and bike and shelter maintenance total \$8,050 annually after an initial cost of \$100,000 paid over a two-year period. Aurora and Lawrenceburg, Indiana have found that the bikes are cost-effective, decrease roadway traffic, improves business visibility, encourage the community to engage with local amenities, and provide physical fitness opportunities (Aurora and Lawrenceburg).

WALKABILITY:

Addressing walkability has almost an equal priority of climate and community impact. This topic addresses climate impact by reducing emissions, creating more green space, protecting biodiversity and reducing noise pollution; while it addresses community impact as well by improving connectivity to meet pedestrian needs, addressing pedestrian safety and creating/enhancing spaces where people will want to spend



their time. Improving walkability impacts the environment by reducing emissions, creating a need for more green space, protecting biodiversity, reducing noise pollution and more. Increasing walkability can gradually increase property values, help local businesses, create jobs and attract more people to the neighborhood, as well as help people stay connected in Rochester.

The South Wedge neighborhood in the city of Rochester has multiple access points to green space. Less than a half mile east of the South Wedge neighborhood is the Genesee River which runs directly through Rochester into Ontario Lake. The Greenway Riverway Trail (GRT) is a 24-mile long off-road trail that was built along the Genesee River. The trail is intended for walking, biking, and running. Most of the trail is accessible due to the trail being mostly paved, but narrow and steep sections are clearly marked off through various signage. The GRT can be used as a scenic walk or a way of transportation in and out of downtown Rochester. Along the trail there are many connections to the various parks throughout the city. The GRT connects to eleven parks including four parks that were built by Frederick Law Olmsted. Also, the Genesee Riverway Trail provides pedestrian access to the river so people can kayak and canoe. The trail connects to historic districts and neighborhoods within the city

of Rochester and South Wedge is one of the neighborhoods the trail is connected to. Along the trail there are various points where the sidewalk is extended from the trail all the way to the road. The various points are highlighted with a sign that says “Genesee Riverway Trail” and points to the direction of the trail.

STORMWATER/ WASTE MANAGEMENT

The increased frequency of severe storm events and increased frequency in flooding are two primary issues affecting the South Wedge as a direct result of climate change. In this sense, measures aimed at stormwater management are methods of climate related adaptation. Increased measures to control and regulate excess stormwater will combat these issues directly and increase the overall resiliency and sustainability of multiple aspects within the urban neighborhood of the South Wedge. The installation of the different techniques of stormwater management will impact Equity, Environment, and Economy. Proper stormwater management will aid in stopping the runoff effect, preventing flooding, thus the moving of pollutants, the contamination of stormwater, and limiting damages to public and private property.

SUPPORTING CASE STUDY [1]:

The Alverno Greenfield Neighborhood of Milwaukee, WI is predominantly a College



Campus in Milwaukee, Wisconsin, the area was experiencing severe flooding issues that were increasing in frequency and cost to repair every year. An investigation into the stormwater and related runoff found that the nearby 270-home neighborhood west of the campus was the main watershed for the campus area. The newly built homes with their concrete foundations, paved streets, and yardage allocated to secondary structures like pools and sheds were taking up space that was previously able to absorb and contain stormwater runoff. Therefore, it was concluded that if proper stormwater management practices were installed on at least 25% of residential properties in the neighborhood, then the Campus' peak flow during the height of each storm would reduce by about 15%. In addition, this project would benefit the city of Greenfield, not just the campus because the city overall was also experiencing flooding problems. Such as flooding of Alverno property, basement backups, the need for a separate storm sewer, improving a local down stream's water quality, and the wanting to increase green landscape in the city.

After neighborhood canvassing and outreach, the following green infrastructure was installed in the neighborhood by Stormwater Solutions Engineering:

- 64 Rain Barrels
- 12 Rain Gardens

- 10 permeable pavement driveways

The green infrastructure that has been installed in the residential neighborhood captures a total of 11,000 gal of rainwater each event storm that would have previously stayed on the surface causing further flooding. The case study to date has been semi-successful, the goal was to implement green infrastructure on at least 25 % of the neighborhood's property which would have been a total of 45 rain barrels and 34 rain gardens, but they were only successful at implementing an additional 39 rain barrels and less than half of the rain gardens intended. The initiative and investigation which began with the Alverno College Campus, has created a new push for the promotion of the green infrastructure practices and neighborhood outreach to the greater Milwaukee area.

SUPPORTING CASE STUDY [2]:

The Southeast Clay Green Street Project Portland, OR. In April 2007, the Portland City Council approved a Green Street resolution, report, and policy change to promote and incorporate the use of Green Street facilities in public and private development. The green street facilities will remove an average of 1.6 million gallons of stormwater runoff from the combined sewer system each year. This helps the city of Portland from having to invest in massive sewer improvements and keeps the river clean by allowing water to



soak into the ground naturally. The approved Green Street resolution helped to establish the SE Clay Green Street Project. The SE Clay Green Street Project is a 12-block-long green connector from SE 12th Avenue

SUPPORTING CASE STUDY [3]:

The Cromwell Park Shoreline in Washington Cromwell Park has seen massive success in implementing and incorporating the ideas of wetlands and bioswales within a park system to stem the flooding risks from stormwater runoff in urban areas. By integrating a 1.33-acre bioretention facility and a constructed wetland, as well as enhancing natural wetlands, the park was able to capture and filter stormwater rather efficiently reducing the surface level water retention for the area. This study also explored the beneficial effects of installing permeable pavements as its inclusion further promoted soil infiltration and natural filtration of pollutants out of surface water being absorbed by the ground. The system directed runoff into the constructed wetlands that replaced open fields and was able to retain and filter one acre of water. Furthermore, because these methods considered climate change issues and the need for stormwater management, it pushed for similar improvements in other surrounding areas as well. The results identified enhancements to stormwater management and the ability to control problematic flooding issues that have

been previously raising concerns in the areas around Cromwell Park.

US CASE STUDY/ WASTE MANAGEMENT:

Nearly half of the solid waste produced globally is organic or biodegradable. Much of it ends up in landfills; there, it decomposes in the absence of oxygen and produces the greenhouse gas methane, which is up to 34 times more powerful than carbon dioxide over a century. While many landfills have some form of methane management, it is far more effective to divert organic waste to composting. Composting ranges in scale from backyard bins to industrial operations. The basic process is the same: ensuring sufficient moisture, air, and heat for soil microbes (bacteria, protozoa, and fungi) to feast on organic material. Rather than generating methane, the composting process converts organic material into stable soil carbon, while retaining water and nutrients of the original waste matter. The result is carbon sequestration as well as production of a valuable fertilizer. Human beings have long used compost to feed gardens and fields. Today, it is especially useful for managing growing urban waste streams. In 2009, San Francisco passed an ordinance that makes composting the city's food waste mandatory. Copenhagen, Denmark, has not sent organic waste to landfill in more than 25 years, reaping compost's win-win-win of cost



savings, fertilizer production, and reduced emissions.

In 2015, an estimated 38 percent of food waste was composted in the United States; 57 percent was composted in the European Union. If all lower-income countries reached the US rate and all higher-income countries achieved the EU rate, composting could avoid methane emissions from landfills equivalent to 2.1–3.1 gigatons of carbon dioxide by 2050. That total excludes additional gains from applying compost to soil. Compost facilities cost less to construct but more to operate, which is reflected in the financial results. After taking into account the annual adoption of plant-rich diets, if 50–75 percent of food waste is reduced by 2050, avoided emissions could be equal to 13.6–26.0 gigatons of carbon dioxide. Reducing waste also avoids the deforestation for additional farmland, preventing 77.1–75.1 gigatons of additional emissions. We used forecasts of regional waste estimated from farm to household. This data shows that up to 35 percent of food in high-income economies is thrown out by consumers; in low-income economies, however, relatively little is wasted at the household level. (Project Drawdown 2021)

HARRIS INTERACTIVE STUDY SPONSORED BY NWRA:

To do our part in supporting the efforts of fighting climate change, our goal is to

raise awareness in reducing the amount of food waste being produced and increase the participation of composting. (NWRA 2021) In 2014, a study sponsored by NWRA concluded 72 percent of respondents do not compost their food waste. However 68 percent of those who don't said they'd be willing to split up their organic waste into a separate bin if a community composting program was made available. And 79 percent of respondents who have gardens or yards said they would be willing to use composted materials to fertilize them. NWRA CEO Sharon H. Kneiss said the results suggest that the community and environmental benefits of composting aren't clear to many consumers. "While America's waste and recycling industry has developed innovative composting technologies, there are hurdles inhibiting such changes," Kneiss said in a statement. "Challenges include the collection and transportation of food waste and the siting of food waste composting facilities more broadly. But a far greater hurdle inhibiting an organics revolution may involve a lack of understanding by the American public about the value of such a change." Those interested in seeing a composting program in their community need to "do more than lobby your local government officials or your community waste and recycling services provider to build such a program," Kneiss said. "You need to support efforts to educate your neighbors about the value of composting



food waste.” (Smith 2014)

UCSF STUDY:

Compostable organics make up more than 35 percent of the material UCSF disposes of. If compost is simply hauled away as garbage to a landfill, it is fated for anaerobic decomposition (meaning no oxygen present), which produces significant quantities of methane gas, 23 times more potent than carbon dioxide as a greenhouse gas. In contrast, composting the same material in a well-managed compost facility is fundamentally an aerobic process, which does not produce methane. According to the Composting Council, if everyone in the United States composted all of their food waste, the impact would be equivalent to removing 7.8 million cars from the road. In addition to the greenhouse gas benefits, composting at UCSF contributes to a closed-loop system. Once collected from the campus, UCSF’s compost is transformed over a 60-day period at a compost facility in Vacaville, where it is turned into nutrient-rich compost for California vineyards and farms. (UCSF San Francisco 2015).

SUSTAINABLE BUSINESS PRACTICES:

Current businesses come in various shapes and sizes, from bars and clubs to general retail stores. There is currently no collective green pledge for businesses in

South Wedge, and any businesses with sustainable practices do it because they want to. Because the area does not currently have a collective sustainability plan, businesses that choose to incorporate green initiatives do so individually. It is more effective if all businesses in South Wedge take part in adopting green initiatives to reduce carbon emissions. To get other businesses to join, it is important to provide them with incentives for why they should adopt green initiatives. Therefore, we created the South Wedge Sustainable Business Plan, which encompasses all businesses and encourages them to take care of their community.

DODGE COUNTY COMPOST STUDY:

Dodge County was interested the long-term sustainability of source-separated organics collection services. To accomplish this they targeted three sectors: schools, commercial businesses and residents. Dodge County pre-sold 42 backyard compost bins through a cooperative sale with Olmsted County. The sale was advertised through the local Shopper newspaper. All the bins were pre-ordered and prepaid to control costs. Residents picked up the bins at the Dodge County Courthouse. A follow-up survey was mailed to the residents with a 29 percent response rate. Most of the respondents were using the bin and about half were using the bin daily. Within this project the school sector



diverted four tons of material per year. Also the school sector was able to abate four metric tons of carbon dioxide emissions. Secondly, the commercial from August 2010 to June 2011 was able to divert 41.18 tons of organic waste materials. In turn this directly also helped abate 36 metric tons of carbon dioxide. Lastly within the residential sector an estimated 22 metric tons of carbon dioxide waste was avoided due to composting.

*BEDFORD, INDIANA
COMMUNITY GARDEN STUDY,
2017:*

The Bedford Parks and Recreation Department partnered with Live Well Lawrence County to open Bedford Garden Park, a community garden. The project was supported by local agencies, a crowdfunding campaign, and an extensive network of community groups and individuals. The resulting park is now a space that produces food, brings people together, and offers activities that improve physical and mental health.



APPROACH

In order to tackle the climate issues in the South Wedge we examined the area through five different lenses. Those areas of importance were Housing, Transportation, Walkability, Waste and Stormwater management, and a Sustainable Business plan. We also utilized census data, studies, and reports examining Rochester and other areas around the U.S. in order to get background information on how to tackle climate in the South Wedge. We also utilized GIS software and conducted neighborhood “walks” digitally and in person to gain an understanding of the area.

We examined a comprehensive document on the city of Rochester; Rochester’s Climate Action Plan (Spaulding & Chanthalangsy 2013). This document provided a framework through which we were able to identify the main goals of our work. We pored over the data within this document and ascertained that there were various areas of importance. Regarding emissions the areas of import were housing, transportation, and industry as mentioned in our executive summary. The remaining areas identified that are of significance are the aforementioned Walkability of the neighborhood; impacting transport, Waste and Stormwater, and the Business Plan which addresses how tackling all of these problems might be accomplished.

After discovering the areas that we believed the most impact might be made we set to work examining them more closely. Each area was put under a microscope and researchers developed ways that we might affect change at various levels. Housing looked into ways to address the emissions from heating and other related sources. Transportation researched various alternatives to single auto use which will be outlined. Increasing walkability reduces emissions in that less trips are taken via automobile or otherwise.

Addressing walkability is a unique principle of our project because it enhances livability and reduces emissions. Finding ways to implement changes that are not overbearing was imperative in our research. Addressing issues related to the environment is difficult given that reducing emissions often implies asking people to give up liberties. Driving less might help the planet, but asking people to stop driving obviously is met with resistance. Increasing the walkability of an area is a way to reduce emissions without anyone ever knowing it was done. Changes such as these and others outlined within this report are unique ways to battle climate change subtly that not only reduce emissions, but also improve quality of life for residents. We believe this mindset is imperative when addressing climate change at a neighborhood scale.



**HOUSING/
MIXED USE**



**MICRO-
MOBILITY**



**WALKABILITY/
GREENSPACE**



**WASTE/
STORMWATER**



**SUSTAINABLE
BUSINESS PLAN**



HOUSING & MIXED USE



DEFINITIONS:

Retrofitting:

- To furnish a space with new technology, ultimately ridding it of outdated features.

Right-Sizing:

- The process of shrinking a city, due to population decline, in hopes of being able to maintain financial independence. (Hackworth, 2015)

R-2 (Medium Density Residential District)

- Single-family detached dwelling; single-family attached dwellings; two-family dwelling; family and group family day-care homes; adult family day-care homes; places of worship (excluding structures originally designed solely for residential purposes); convents and rectories; home occupations, office (building built for non-residential use). (City of Rochester, 2021)
- Prohibited conversions– conversion of any residential structure to any nonresidential use of increasing the number of residential units where the dwelling unit conversion standards are not met in the R-2 District is prohibited except as otherwise provided in this chapter. (City of Rochester, 2021)

CCD-R (Central City District– Genesee River Revitalization)

- The purpose of this subdistrict is to reestablish the Genesee River to align with Central City guidelines. It is defined by its pedestrian scale and conscientious reservation of a 30 foot wide strip of land along the river that is to remain free of infrastructure. Uses include preserving the riverfront of its existing character; promote development that will work symbolically with the needs of riverfront preservation; improving aesthetic qualities; providing adequate physical access to the waterfront; creating public access to the river’s edge; promote public activities and gatherings beside the river; and to reduce the “barrier” affect splitting the east and west sides of Rochester’s city center. (City of Rochester, 2021)

PD (Planned Development District)

- This district is defined by its aptitude for flexible development that falls in line with the various objectives of city and regional land use and development. Objectives include establishing an alternative development pattern parallel to development goals of the city; creating the framework for a transition from one development pattern to another; diversification of permitted uses while maintaining a cohesive



plan; and preserving and enhancing the characteristics that make Rochester desirable; such as open space or natural topography. (City of Rochester, 2021)

C-2 (Community Center District)

- Retail sales and services; mixed uses (not including industrial); public entertainment; limited entertainment (not including sexually oriented uses); limited adult retail stores; health clubs; office; bars, restaurants and banquet halls; single-family attached; multifamily; live-work space; bed-and-breakfast establishments; family and group care homes; adult care homes; day care centers; places of worship; convents and rectories; public and semi public uses; funeral homes and mortuaries. Special permits include amusement; animal daycare; community garages; parking lots; drive through; motels and hotels; private clubs; public utilities; homeless shelters; hospice; vehicle service stations; and second hand dealers.

O-S (Open Space District)

- The goal of these districts are to provide and protect recreational and natural spaces within Rochester’s urban environment. Permitted uses include publicly owned parks, plazas, recreational space, natural ecosystems, and other open spaces; cemeteries; botanical

gardens, arboretums, and conservatories; public marinas, boat launches, boat docks and fishing docks; and other outdoor recreational facilities for the city. Special permits can be acquired for certain recreational facilities such as outdoor theaters, commercial facilities or public facilities. (City of Rochester, 2021)

UR (Urban Renewal District)

- The U-R Urban Renewal Districts are separate and distinct areas with identified objectives, actions and land use plans for the purpose of eliminating substandard and deteriorated structures and other blighting influence in an area of the City, through demolition and subsequent redevelopment. These districts promote economic development in the City and beautification of an area in both the public and private realm and provide the City with the ability to convey property to support private development. (City of Rochester, 2021)

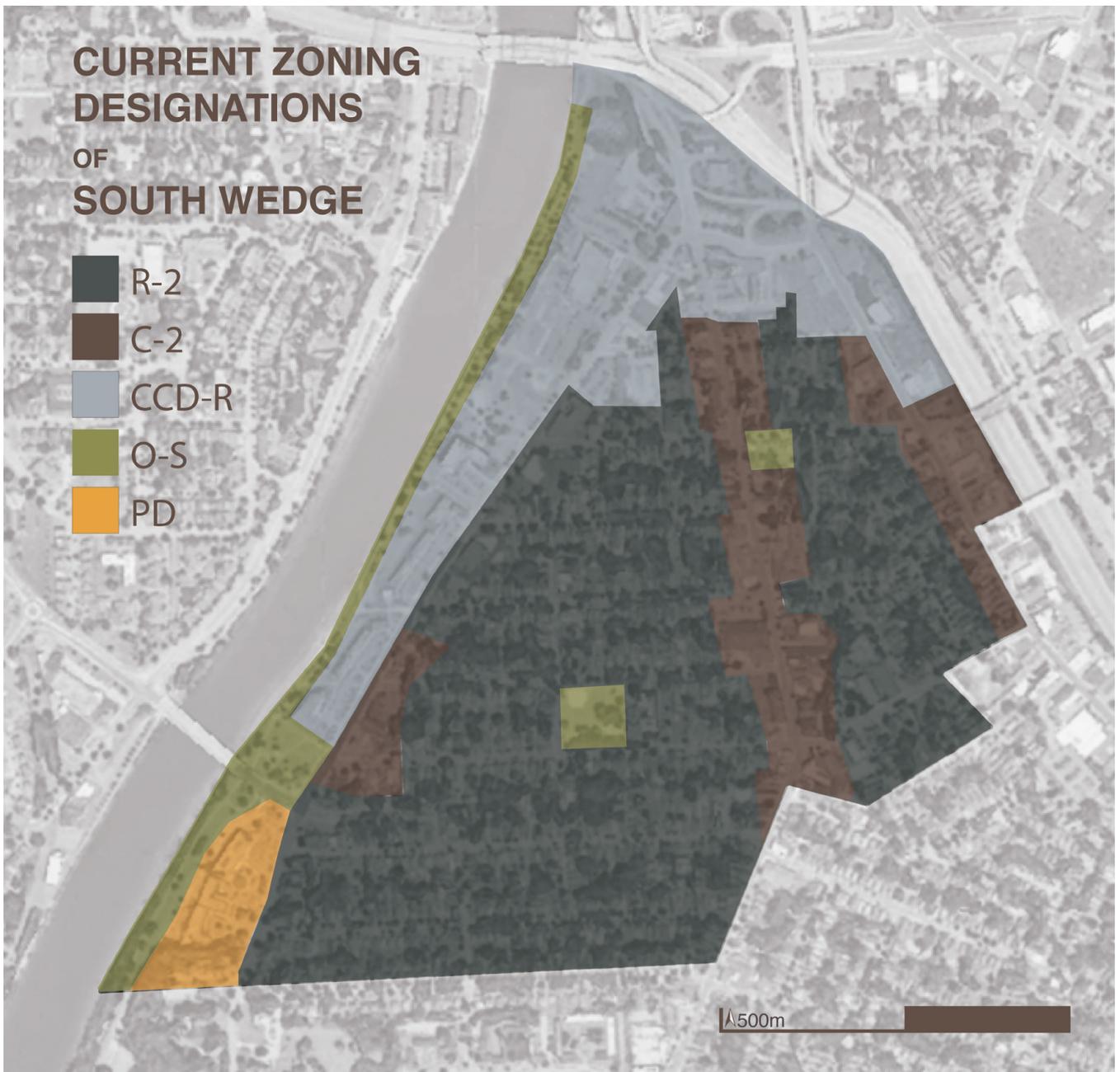
INTRODUCTION TO HOUSING & ZONING:

Housing is an integral facet of any neighborhood and shapes the urban fabric in numerous ways. In the South Wedge we are faced with any area that developed and grew well prior to the advent of automobiles. This neighborhood as a result



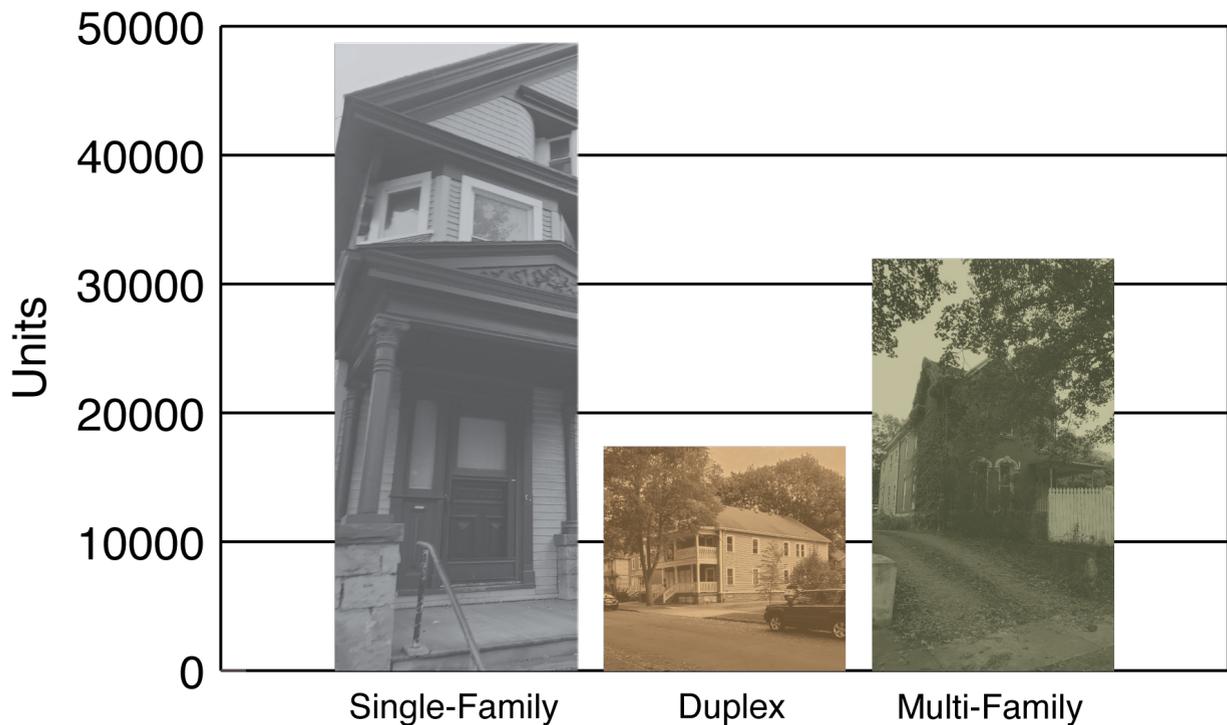
has narrow streets that resemble alleys. This type of development poses problems in the transportation sector due to the development of large automobiles spurred by suburbanization. This connection to transport is significant and other connections exist as well.

Housing plays a major role in daily life and is something that we cannot survive without. Protection from the elements and the safety of a home is necessary for human habitation; yet emissions from housing are causing the degradation of a habitable environment. Examining the ways in which we might





Housing Types



reduce these emissions related to heating and electrifying the home for comfort are important for a sustainable future.

PROBLEM STATEMENT:

The health and well being of the surrounding community relies not only on the cleanliness of the area, but the way in which the community is zoned. Our group analyzed the area of the South Wedge, realizing the way in which it was zoned. We quickly learned that the outdated infrastructure within these old homes were contributing to climate change excessively. The idea of retrofitting of the surrounding outdated housing stock

is very important for the community. Being that new efficient technologies exist, these outdated ones are more costly than they are effective. In return, this results in an increased amount of harmful byproduct which then contributes to more climate change. On top of this idea, we noticed an issue with the zoning within the south wedge. The way in which the community is zoned, dissociates the residents from the remainder of the neighborhood. We noticed the impact this could have on the health and well being of the community. This creates a neighborhood which is inaccessible to residents and short of opportunity.



CURRENT HOUSING STOCK:

The South Wedge possesses a large amount of homes that were built prior to the second world war. The neighborhood is conveniently situated between the Genesee River and the Erie canal. This prime location led to its growth throughout the 19th century as the advent of industry along the river fueled the growth of the neighborhood in kind (Bero). With this, brings outdated infrastructure within these older homes. In return, this slowly degrades the surrounding environment, leading to more climate change. Currently, the youngest home was built in 1930, with the oldest being built in 1850. The South Wedge has a variety of homes being used differently. The majority of the units in the neighborhood are single family homes, nearing 50,000 units. Multi-Family units make up the second largest number, with Duplexes being the least amount.

HOUSING INFRASTRUCTURE:

One could see how the interior infrastructure of these homes could be outdated. Three quarters of the current housing stock in the South Wedge are renters. In the South Wedge, the majority of the community makes less than \$60,000 a year. Being that renters tend to use

most of their expendable income towards rent, we realized that tenants may not be in the financial standings for retrofitting their rented space. The South Wedge also possesses two unique and communal food options in the South Wedge Victory Gardens and The Abundance Food Cooperative. The South Wedge Victory Gardens encourages residents to grow their own food, promoting healthy eating and money savings. Community gardens are located on Cypress Street and Hamilton Street (SWPC). Sustainable Homes Rochester is an organization that aims to improve home energy use and efficiency through updated HVAC technologies. Grant money is available for low to moderate income households through the New York State Energy Research and Development Authority (NYSERDA).

RIGHTSIZING & PUBLIC NEED FOR HOUSING:

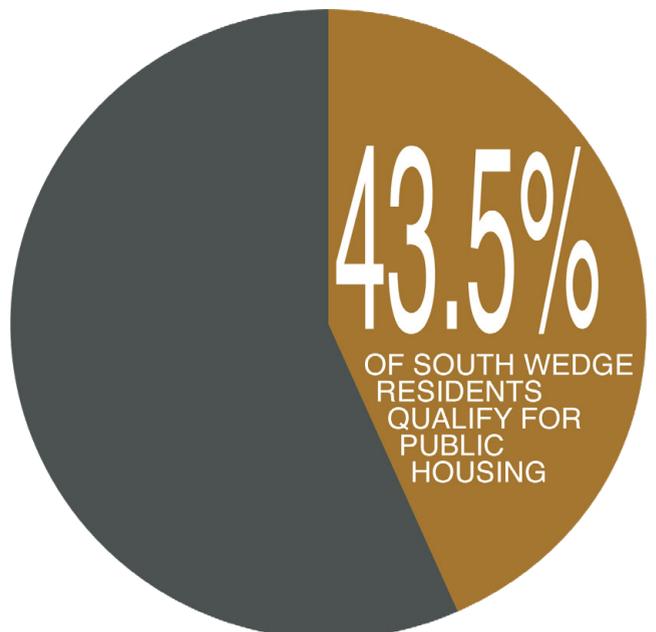
Rochester, like many Rust Belt Cities, is a shrinking city. Its population has been slowly declining over time, currently sitting at just above 200,000 as of 2020 (Social Explorer, 2019). Among other Rust Belt cities, such as Detroit, MI or Youngstown, OH, Rochester proposed efforts to ‘rightsize’ their city. Rightsizing is a method of strategic vacant property demolition and mixed-use development as a means to limit the coverage required for public utilities



particularly low-income communities of color. As vacant homes in their neighborhoods are removed, it is possible that the city will want to cease use of the public utilities in those areas. We know this is occurring in Rochester because Zoning Codes UR- Urban Renewal are present in the furthest parts of the city. Those neighborhoods include: Norton Street UR District; Ridgeway UR District; St. Joseph’s Area UR District; Washington Square UR District; Brooks Landing UR District; Erie Canal UR District; La Marketa North Clinton Avenue UR District; Mid- town UR District; Dewey-Driving Park UR District; Marketview Heights UR District. The goal of these Urban Renewal District is described in the City of Rochester General Zoning Ordinances using the same terminology commonly associated with rightsizing, namely the notion that city blight must be removed (NYHC, 2021).

(Hackworth, 2015). The method was inspired by the United States HOPE VI program in an effort to demolish vacant properties, often in already undeserved communities (Popkin, 2004). The goal is to reduce the amount of resources used in a city. People living in communities that are experiencing rightsizing lose access to things like adequate transportation and jobs as vacant properties are demolished, population decreases, and businesses are abandoned. Nevertheless, rightsizing has been shown to provide sustainable benefits by encouraging dense mixed-use development elsewhere.

The neighborhood of South Wedge is an example of a community that is being invested in rather than demolished. Although this is beneficial to more affluent residents, this may mean displacement for others,





With rightsizing comes a need for public housing. As vacant properties are torn down, people remaining in those areas will likely lose access to certain civic resources, most likely things like adequate public transportation and job opportunities. These communities are often low-income communities that are already lacking resources. Residents of these neighborhoods will be displaced because of the reduction of access to essential amenities (Hackworth, 2015). Public housing will be crucial for residents who are displaced by rightsizing and will need to be accommodate when developing mixed-use core areas. Currently, 43% of South Wedge Residents qualify for public housing—and there are likely more in Rochester, especially because of rightsizing (Social Explorer, 2019). South Wedge currently only has 3 public housing facilities (google.com/maps)—not enough units to accommodate Rochester’s low-income residents.

CURRENT ZONING:

Currently within the South Wedge, it is zoned for several different uses. These uses include, R-2 (Medium-Density Residential District), CCD-R (City Center Development– Genesee River District), PD (Planned Development District), C-2, and O-S (Open Space District). Given the way

that the neighborhood is set up, these uses have allowed for the community to become polarized. The majority of the residents are zoned between commercial districts away from the surrounding infrastructure. This causes the residents to become disconnected with the centers of attraction. This is important because it creates an accessibility issue. The residents who do not have access to adequate transportation, have limited access to the surrounding neighborhood. Furthermore, the large parks are set in a way where commercial businesses sit between them and the residents. There are two small parks located within the neighborhood, which lack the given space for the neighborhood.

SOLUTION STATEMENT & PROPOSALS:

Developing a plan for how to affect change and climate action at a neighborhood scale is critical for implementation strategies. We have researched various different ways to improve the equability and sustainability of the South Wedge. In order to enact the changes that we have proposed we need to further examine their feasibility and how easy they will be to implement so that interested parties can act. The availability of funds and the ease of implementation will be key to addressing climate change; cost is always an issue and developing a solid timeline

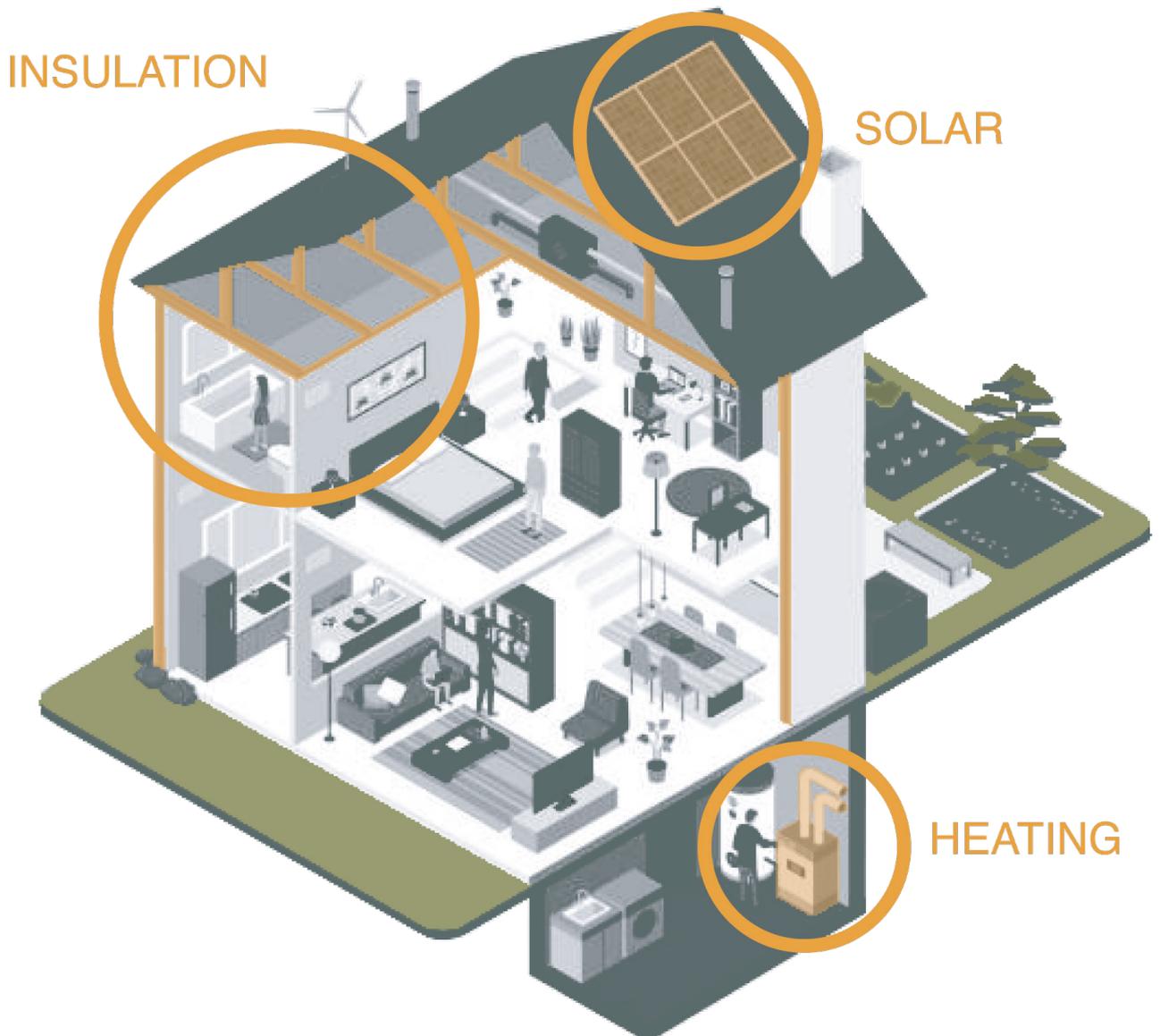


for change involves proper assessment of resources. Furthermore, ensuring that these new designs are specific to the residents needs, is something to also take into consideration. If our solutions were to not be implemented specifically for the public, then they would be virtually ineffective.

RETROFITTING:

UPDATING INSULATION:

The process of insulating a home will not only bring increased comfortability, but it will also increase the energy efficiency of the home. The result would be a much more homely environment that makes the residents happier. According to Levy, 63% of homes nationwide could be viable





candidates for such retrofits in order to save on emissions. If all prospective units were retrofitted nationwide, energy savings of 800 TBtu a year could be obtained \$5.9 million in energy savings (Levy, et al. 2003). As stated above, improving the insulation within homes has various benefits for individuals' health. Remaining warm within your home allows for comfort and happiness. If a home is poorly insulated, you may just be constantly turning up the temperature to keep up with the escaping heat. According to the study done on the implementation of insulation within homes in need of retrofitting, the benefits are within a comfortable margin than that of the non retrofitted homes. The study found that the individuals with improved insulation, missed less days of school and were in much better health (Chapman, Howden-Chapman et al. 2003). This not only has a detrimental effect on the individual's bill, but also on the health of the surrounding environment. Not only does insulation benefit the heating in one's house, but it benefits the cooling as well.

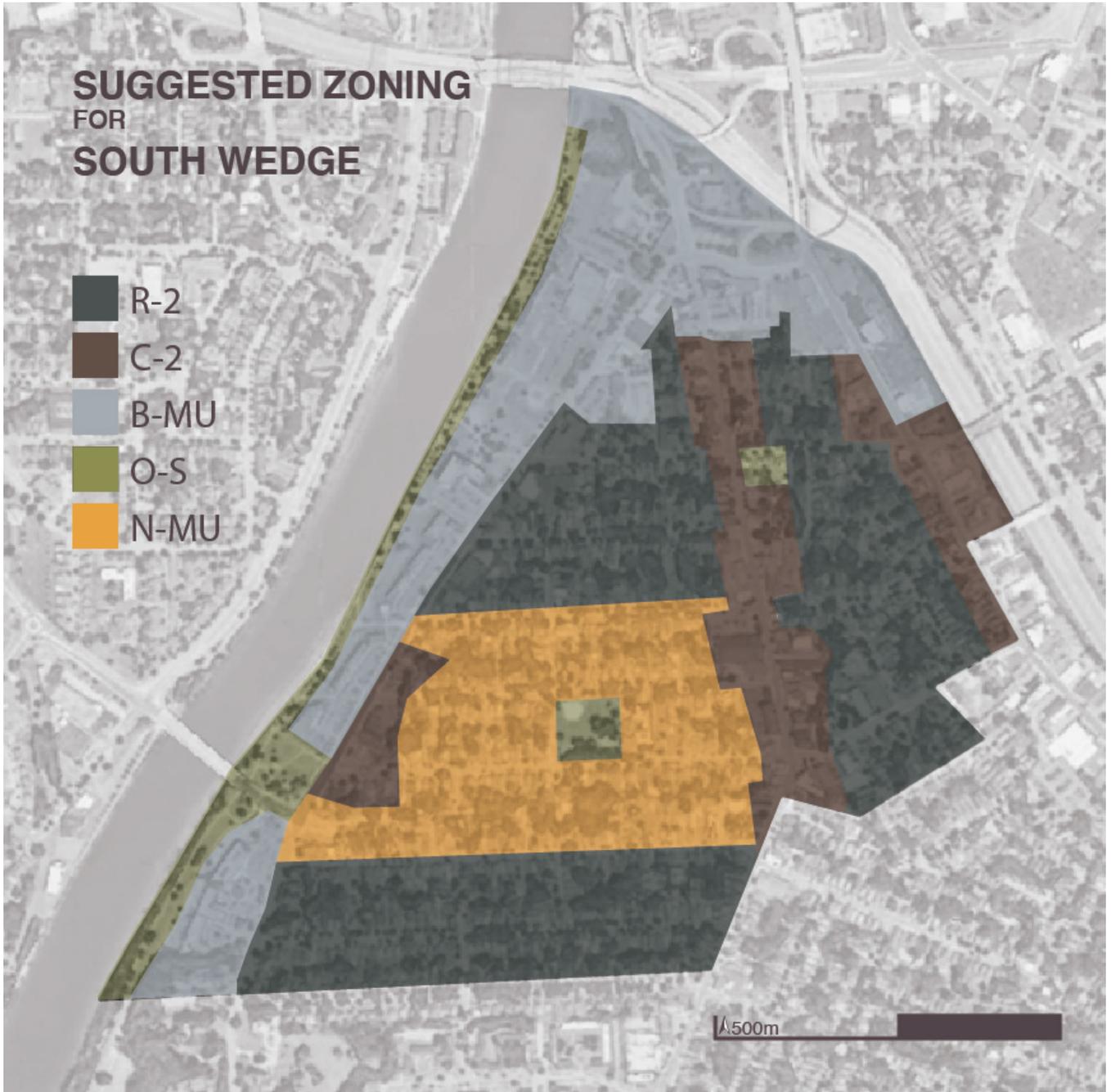
SOLAR INSTALLATION:

Solar power can be a great option when looking for a sustainable renovation that will save you money in the long run. Rooftop mounted solar panels can be applied to almost any single family home. Solar water heaters are another way to cut on heating cost, by using the solar rays of the

sun to heat up your water. In one energy comparison conducted between two homes, the energy savings was around \$410 for the resident with solar power (Levy, Nishoika, et al 2003). The sleek design of solar panels allows for a less intrusive appearance, unlike telephone poles. Not only that, but they are much cleaner for the environment than consuming energy from a power plant. A home that converts to solar can eliminate its electric bill and therefore its production method (burning fossil fuels, ie coal, natural gas, petroleum) (U.S. Energy Information Administration 2021).

HEAT PUMP CONVERSION:

Geothermal heat pumps are a unique method for heating your home, offering a higher efficiency than a furnace. Heat pumps take advantage of the Earth's latent temperature, to moderate the home's temperature. Although costly within Urban Areas, it brings considerable savings if the residents are willing to invest. Average energy savings post install can range anywhere from 31-71% and cost savings on heating and cooling ranging from 18-54% (Anderson 2010). This conversion is a more natural way of heating a home without consuming natural resources. Although this is difficult to conduct within urban areas, if shown the benefits, the neighborhood may consider it.



IMPROVE ZONING:

Based on the suggested zoning designations of the Rochester 2034, we propose that the area previously designated CCD-R (City Center District Riverfront District) and PD (Planned Development

District) become designated N-MU (Neighborhood Mixed-Use Districts). In addition, we propose zoning to allow a corridor designated B-MU (Boutique Mixed-Use Districts) within the R-2 (Medium Density Residential District). This will allow for controlled mixed-use development within



the residential neighborhood and larger mixed-use development to more commercial areas, maintaining the neighborhood scale and improving walkability. The current zoning is outdated and inflexible for the ideas that we have in mind for the Wedge. Changing the zoning code would allow for more uses of existing infrastructure in a shrinking city. Changing the zoning to allow mixed use in new areas will increase walking opportunities by increasing proximity of amenities within neighborhoods. Expanding the activities allowed in current commercial areas will allow for different development types with more uses. (City of Rochester, 2021)



In total, the insulation retrofits [alone] would save **800 TBtu** per year across 46 million homes

BENEFITS:

ECONOMY:

Higher density mixed use/mixed income neighborhoods offer lasting real estate values, strong economic resilience, and walkability contributing to great placemaking. The current zoning code for the South Wedge creates a polarizing effect on the housing stock of the area. With our group’s proposed idea for a new zoning code, it would allow for more of a mix of uses (ie, mixed use development). The purpose of this is to allow for local business to intermix with the surrounding residents. Allowing for businesses to be built alongside the current homes would allow for a quicker traveling time for residents. In particular, this will allow for all modes of transportation to efficiently access the surrounding business. Of course with increased access to business, this will enhance the local economy. Residents who have switched to retrofitting their homes will have more of an expendable income. With this newly found access, they will be able to spend their money on things other than rent. Most of all, this would allow for a more attractive neighborhood. This may lead to the area becoming a popular place to visit and shop for surrounding communities. Our hope is that this would bring further development to the surrounding area. Although this implementation may seem like



it is a substantial amount of money, this will slowly wear off as the local economy begins to develop.

EQUITY:

In order for an individual to compete at the same level as everyone else, they need to be given equal opportunity. Retrofitting one's home allows for them to have the comfort in a home that they deserve. Being that this has such a big impact on people's health, we believe that a healthier community will be rich with opportunity for everyone. Furthermore, by improving the zoning within the South Wedge, will increase the overall accessibility of the surrounding community. This will allow for not only equal employment opportunities for the surrounding households, but allow for a much closer commute. This gives the residents who are unable to use a vehicle, the opportunity to be a part of the community. This mixed use development, mixed with houses intended to reduce a carbon footprint, ultimately creates a much more livable neighborhood. As a result of this, the walkability of the area is increased.

ENVIRONMENT:

By implementing retrofitting within homes, the emissions will be reduced dramatically. The burning of fossil fuels, and other toxic energy harvesting techniques, have played a major role in the increase of climate change. More specifically this has been

detrimental in areas of high population, like urban settings. Historical neighborhoods are sometimes stuck on where they can develop which causes issues with retrofits. With the implementation of mixed use development, our group wants to ensure that this new development is clean for the environment. The newly implemented housing and businesses should run on clean energy, setting an example for future and existing development. Lastly, being that new business will be closer to the individuals, they will be less likely to drive. In return, this has a positive impact on the environment overall.

FUNDING:

The best way to try and tackle this issue as it relates to the South Wedge would be to implore those with funds to act and to assist those without. The state offers aid through programs headed by NYSERDA (NYSERDA, 2021) and organizations do exist through the state to perform this work. Advocacy and getting aid into the hands of families in need will be essential in tackling the problem of climate change with added equability benefits. Beyond simple advocacy the need to actually perform the work is critical in the fight against climate change. There is some impetus to fight for more aid from the federal government to get such work done. Performing this work is not always top of mind or affordable for families, yet



the benefits for climate and personal well being are great. The Federal Government has finally approved an infrastructure bill that will provide \$50 billion towards such efforts (Rowan, 2021). Money such as this will get hands moving and help aid neighborhoods such as the South Wedge in their retrofiting efforts.

TIMELINE:

The larger overall recommendation of retrofiting housing in the South Wedge will be a much longer and ongoing process. The proposition of retrofiting all homes in the area is a large undertaking and will require significant funding and work from contractors. Given the amount of outdated homes and the current emissions numbers we estimate

this would take at least 10 years of dedicated effort to start making appreciable differences in emissions in the Wedge. However, some of the implementations that we have proposed can be established much sooner. We believe that the solutions toward zoning and mixed use development will take the shortest period of time. Being that there is not much support for renters, we feel that creating healthy relationships between renters and owners will take a few years to develop. Of course, there are implementations which cannot be established until others have been implemented. For example, we cannot begin retrofiting for mixed use until the public has established their needs. Agreements between residents can take any amount of time, which can benefit or hinder our efforts. But, it is of great importance to listen to what





the residents need, in order to address these issues effectively. The process of waiting for the correct amount of funds can also take a considerable amount of time. However, once this is all done and the funds have been received, these implementations can be put in place. Retrofitting the newly subsidized homes, as well as the current homes, is the last step in the timeline. A project of this magnitude will take a lot of time and cooperation from the surrounding area. We strongly believe that it will be at least 10 years before these retrofitting have been completed. The savings on energy bills and allowing for more mixed use development, far outweigh the time that these implementations will take.

STAKEHOLDERS:

CURRENT & FUTURE RESIDENTS:

The residents themselves are also critical in making these climate fighting efforts a reality. It acts on the part of homeowners and landlords who own property to invest in theirs and their children's futures. The community as a whole must understand the benefits for not only themselves, but the planet and all those who will inhabit it for the foreseeable future. Not all residents may be on board with our ideas. But, if they were given the opportunity to see what these

benefits will do for them and the environment, they may choose to agree. As far as the implementation of new zoning codes and subsidized housing, ideas from the local community are essential. In doing so, this will ensure that the community is able to receive their specific needs.

LANDLORDS & BUSINESS OWNERS:

The cooperation from existing landlords will be just as vital as having the public's support. As a group, we understand that these retrofitting solutions could be a lot to start. Landlords may not be on board right away, which is entirely understandable. However, if they were to possibly see the benefits of our solutions, they would be more likely to agree. Just like some of the residents that own their own house, the renters themselves may not be financially stable enough to go about retrofitting their space. Along with the implementation of mixed use development, it is especially important to gain the support of local business owners. Our new plan proposes ideas of adding new businesses within the neighborhood. This of course will benefit all parties involved, furthering the business for the existing shop owners.

LOCAL ORGANIZATIONS:

Within the South Wedge stakeholders such as Climate Solutions Accelerators,



HeatSmart Monroe, NYSERDA, amongst many other local contractors will be critical actors in this fight. Such organizations are vital in the efforts towards our project's overarching goal. Not only the funding, but their knowledge, is key in the efforts of our project. Funding through HeatSmart Monroe, will allow for our retrofits to be completed in a timely manner. As we have previously stated, not everyone will be in the financial standings to go about completing these projects on their own. HeatSmart Monroe will be there to help guide the residents through the opportunities they will have when they switch to cleaner solutions. They make the process as easy as possible, helping out individuals in any way they need. The company is trying to give everyone the opportunity to receive cleaner energy. The education that they would be able to provide to residents would be in the efforts of our project. Climate Solutions Accelerators (CSA), is an organization which helps to jump start other programs aimed towards combating climate change. CSA is responsible for the implementation of heat smart Monroe, and other similar organizations. Being that this organization is a non-profit organization, their goal is to educate and inspire organizations to combat

climate change. In return, they believe that this will create a healthier and productive neighborhood for everyone. Furthermore, they concentrate on an individual level as well, educating citizens from the local area.

CONCLUSION:

The South Wedge is just one example of a neighborhood that could be more equitable and sustainable. It is indistinguishable from many neighborhoods in Buffalo, throughout America; in an ecological sense. This neighborhood is operating in a way that is meeting the needs or wants of the present, but not the future. It is important to plan for the future as it will predict the overall continual revitalization of the community. The energy demands here and across the country need to be reigned in so that our progeny may also have prosperity. The emissions that are produced from housing in Rochester exceed what the planet can sustain and so we must explore solutions such as retrofitting in order to prevent climate change's worst outcomes. With our project, we hope to see an area rich with opportunity and strong accessibility.



MICRO-MOBILITY



DEFINITIONS:

Micro Mobility:

- A Variety of small, lightweight vehicles operating at speeds typically below 20 mph and driven by users. Micro mobility devices include bicycles, e-bikes, electric scooters, electric skateboards, shared bicycles, and electric pedal assisted bicycles.

Last Mile Connectivity:

- Referring to the beginning or end of an individual trip made primarily by public transportation. In many cases, people will use public transit if it is close enough to their destination. However, the origin or destination may be difficult or impossible to access by walking and thus requires a Micro Mobility device.

Goods and Services:

- Goods are items that are tangible such as food, cloths, or raw materials acquired by the trade of a purchasing agent such as a monetary amount. Services are referring to any work, labor, or task provided in exchange for a purchasing agent such as a monetary amount such as Landscaping, Schools, and construction to name a few examples.

Environmental Health:

- The branch of public health concerned

with all aspects of the natural and built environment affecting human health. Environmental health focuses on the natural and built environments for the benefit of human health.

Climate Change:

- Shifts in temperatures and weather patterns as a result of human activities primarily due to burning fossil fuels such as coal, oil and gas.

Emissions:

- Burning fossil fuels generates greenhouse gas emissions that are causing climate change and include carbon dioxide and methane gas. Energy production, industrial manufacturing, transportation, heating buildings, and agricultural land use are among the main emitters.

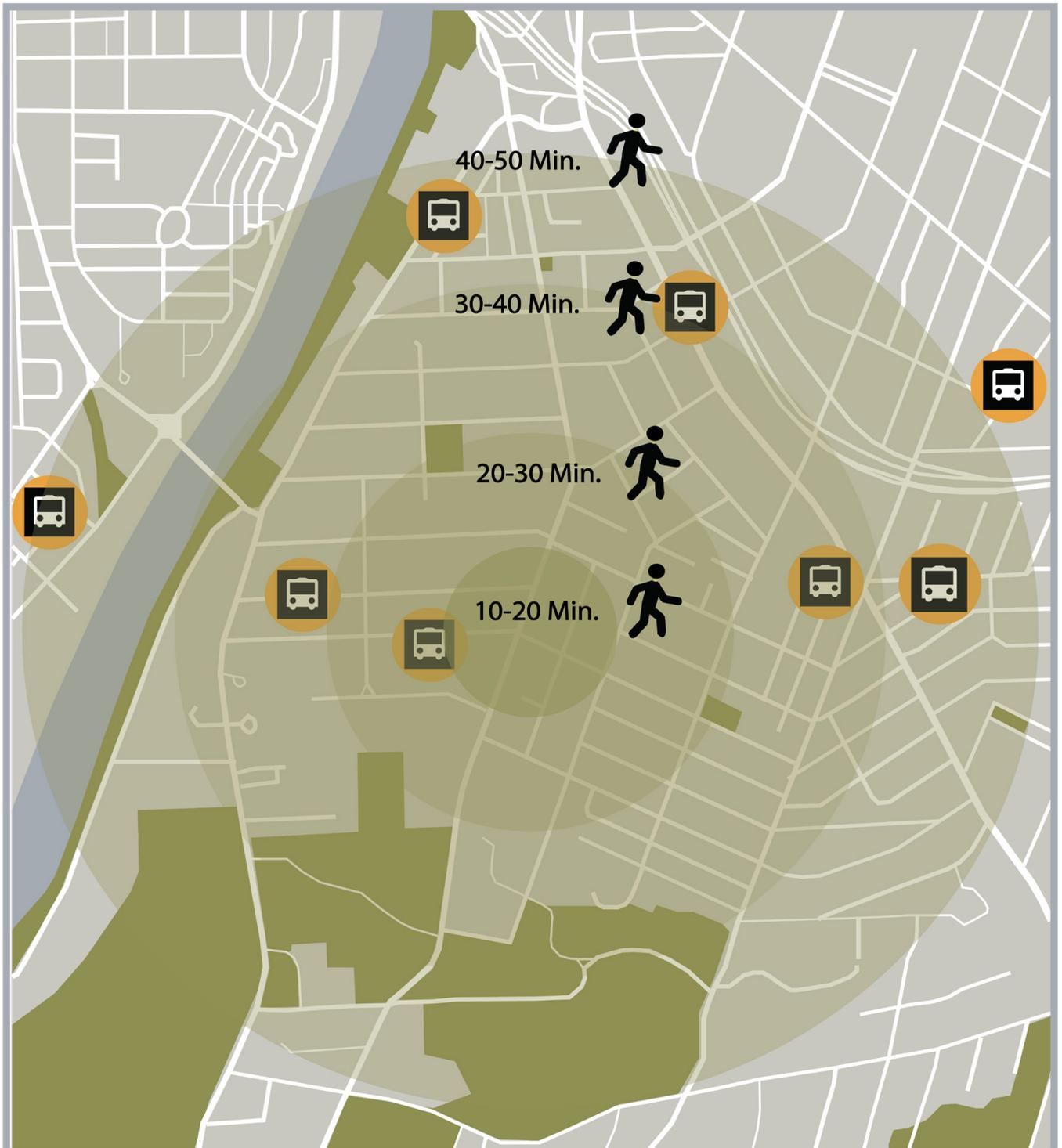
PROBLEM STATEMENT:

South Wedge has a major issue with connectivity within the neighborhood and its connection to the city of Rochester as a whole. Currently there are 3 main bus lines providing all the available public transportation for the South Wedge; 14 marketplace, 13 South Ave, and 12 South Clinton. These routes offer no connections within the neighborhood to other routes meaning that many riders must go all the way



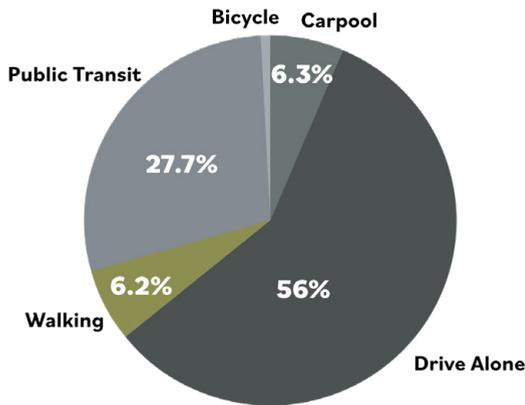
to the RTS Transit Center for a connecting route. These bus routes are the only public transportation that functions to connect the residents of the Wedge to essential services, entertainment, and employment opportunities

such as the Abundance Foods Co, University of Rochester, Paychex, Bausch + Lomb, and local small businesses. The South Wedge neighborhoods proximity to most Goods and Services is not at a walkable distance





Commuting Tendencies, Rochester, NY



Data From: US Census Bureau, Table S0801

residents of the South Wedge Neighborhood. The time needed to travel without a personal vehicle outside the neighborhood for basic necessities is almost 30min currently by bus. Increasing the need for a personal vehicle use for travel creates roadway congestion, increases greenhouse gas emissions, and limits the connectivity of the South Wedge Community. Electric scooters and Electric bikes can improve the transit connectivity to these buses, and in the overall neighborhood improving the Last mile connectivity in the neighborhood.

ORIGINAL PROBLEM STATEMENT:

The Lack of reliable and convenient public transportation within the City of Rochester, NY, presents unique challenges to the residents of the South Wedge Neighborhood. The time needed to travel without a personal vehicle outside the neighborhood for basic necessities is almost 30min currently by bus. Increasing the need for a personal vehicle use for travel creates roadway congestion, increases greenhouse gas emissions, and limits the connectivity of the South Wedge Community.

for many of the residents which increased the need for personal vehicle transportation. There is a gradual increase in average walk times to the bus stops as the bus routes travel further through the neighborhood from Bryson Street to Linden Street. One benefit is that many local businesses are located next to the 3 main bus routes which make them more accessible by bus transit. Unfortunately, with the walk times increasing further down the neighborhood, it may be difficult for individuals to walk to another local business that is not along the current bus route. The Lack of reliable and convenient public transportation within the City of Rochester, NY, presents unique challenges to the



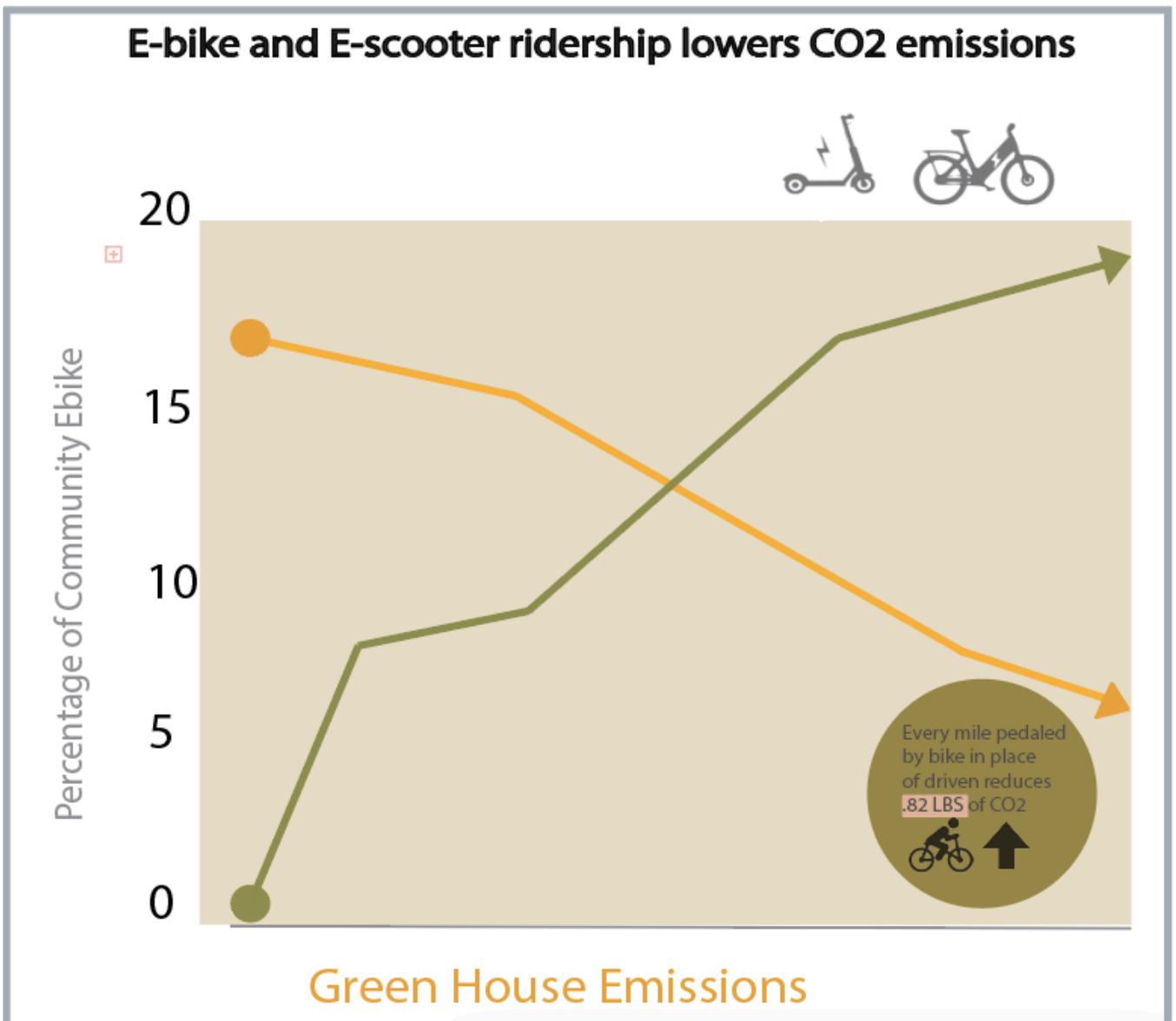
SOLUTION STATEMENT:

Implementation of publicly accessible E-Bikes and E-Scooters within the South wedge neighborhood we aim to increase connectivity within the city of Rochester, NY, making travel times quicker, reduce roadway congestion freeing up space needed for parking, and cut down on emissions that negatively contribute to climate change.

BENEFITS:

ENVIRONMENTAL:

On average, the carbon footprint of one E-scooter over its life cycle was just over 200 grams of CO₂ per passenger mile. According to NC State's findings, about 50 percent of e-scooter pollution has to do with the materials and processes used to manufacture the devices. A 2019 study from





the Transportation Research and Education Center found that a 15% increase in E-bike use across the U.S. could reduce 11% of transportation-related CO2 emissions and would replace 72% of car miles that would have been traveled for strictly practical purposes. Most urban trips are less than 5 kilometers, a short enough distance that it can be traveled by e-bikes and e-scooters in roughly the same amount of time as personal vehicles. Replacing cars presents significant climate benefits, if the mode share for E-bikes rises to 11%, we could see a 7% decrease in CO2 emissions from the urban transport sector by 2030. The reduction in vehicle usage from the implementation of E-bikes and E-scooters has some passive environmental benefits for the South Wedge as well, these benefits include a reduction in Noise pollution, a reduction in pedestrian related accidents, and a decrease in nocturnal light pollution. A reduction in multiple forms of pollution coupled with an increase in community exercise promoting a healthy lifestyle.

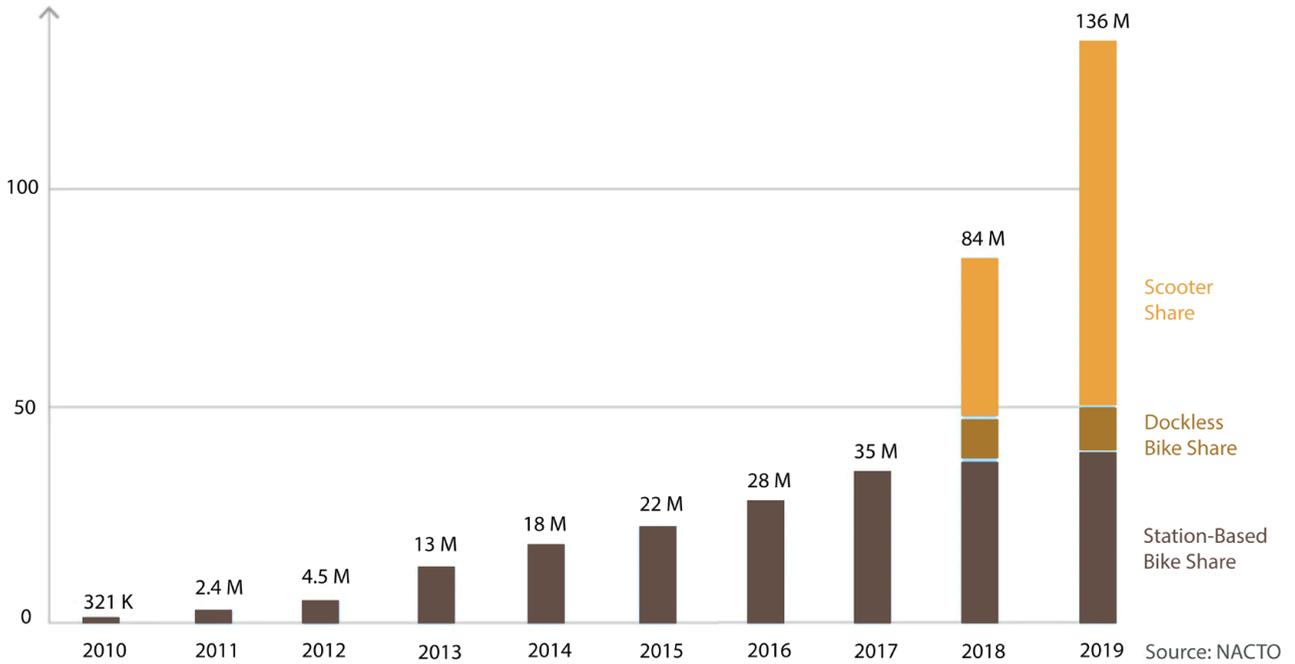
Electric scooters and dock-less bicycles do not only have health benefits, but they also have a positive environmental impact. With a small electric motor and a deck on which a single rider stands, stand-up scooters are designed to transport rider's short distances around urban settings. Rideshare companies are introducing fleets of these vehicles into urban areas, allowing

participants to rent the scooters for short periods of time. With Dock-less bicycles and walking having a 0% emission rate, Dock-less bicycles are the most environmentally friendly way to travel, next to walking of course. In the city of Rochester, Electric Scooters are a perfect solution to aid with traveling needs. Since the range of Electric Scooters is rather limited, they are especially useful for short distances. For example, while commuting to work, instead of dealing with the constant stress of traffic and the extra time it takes to commute to work due to traffic, you can take an Electric Scooter to work, if you work only a few miles away from where you live. This means less time you spend traveling and more time you get to spend doing what you would like too. Another advantage that Electric Scooters have over vehicles, is that they are much cheaper. Electric Scooters cost a fraction of what a car costs, you also don't have to spend a fortune on maintenance like you would on an automobile. Something else that should be mentioned about the positive aspect of an Electric Scooter is not having to worry about parking, in downtown Rochester it can be hard to find parking spaces sometimes, especially during prime hours.

Dock-less bicycles have been around for some time, but lately they have rapidly been gaining popularity. The benefits of Dock-less bicycles are very similar to Electric Scooters. Like Electric Scooters, Dock-less



Popularity of E-Scooter and Dockless Bike Share



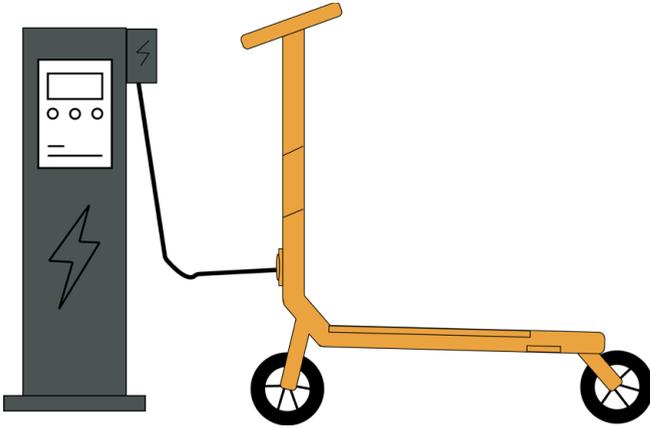
51% of riders have a total household income of less than \$75,000/year

The cost per mile is less than 5 cents for an e-bike versus 71 cents for a car

E-bikes energy consumption is equivalent to 1,000 mph

bicycles reduce motorized trips, depending on the city, between 17% and 45% of total bike share miles traveled replaced motorized miles traveled. The number of docked bikeshare systems nearly doubled from 2015 to 2019 (from 65 to 103) then declined from 103 in 2019 to 66 in 2021 as many docked bikeshare systems closed permanently following a temporary suspension of operations due to COVID-19. Dockless bike

share and e-scooter systems expanded coverage, first appearing in the U.S. in 2017. As of June 2021, there are 60 dockless bike share systems and 214 E-scooter systems (not counting systems limited to college or employer campuses). From the graphs below, you can see the rapid growth and gain in popularity of both electric scooters and dock-less bicycles over the past couple of years.



EQUITY:

E-bikes and E-scooters will improve the access to transportation in the neighborhood as well as give the residents these services at a sustainable price. These bike-sharing programs will help with several inequalities related to transportation. There is a common pattern of placing e-scooter/bike stations in downtowns and tourist destinations to maximize ridership; however, areas/communities without a lot of transportation options lack bike/e-scooter stations and are further neglected (“Realizing equity in bike and E-scooter”). We find that the same problem has occurred with South Wedge and Rochester as a whole. Currently, Rochester has a bike-sharing program called HOPR, with their mobile app one can rent an e-bike for their use. Unfortunately, this kind of service is not easily accessible as the bike docking stations (pick-up point) are not within a walking distance of South Wedge. Having a similar program in this neighborhood will

reduce the financial burdens on the residents as well as lowering automobile dependency. In addition, this is helpful to residents who use public transportation during off-peak hours (Fedorowicz et al., 2020, p. 11). It also enables first- and last-mile service to residents.

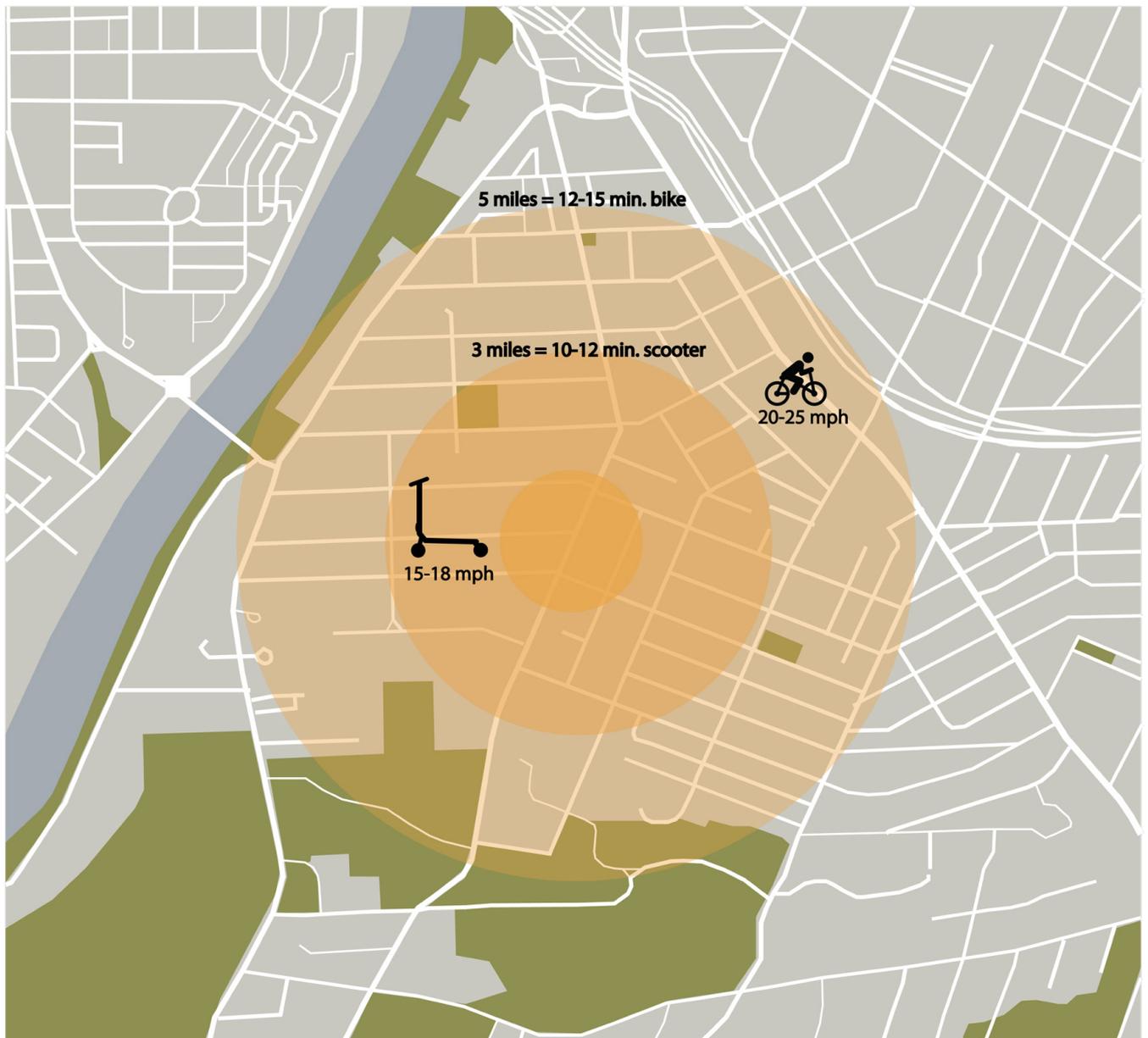
Through the Late Shift pilot program, Pinellas Suncoast Transit Authority offers transportation-disadvantaged riders free rides with TNC partners when buses don’t run (Fedorowicz et al., 2020, p. 11). This is just one way this program can assist in equity. Considering South Wedge is a low-income area, bike-sharing programs that accept cash payments for membership fees and use will be beneficial. The common means of arranging transportation for shared groups depend on mobile apps linked to credit cards, which creates barriers for users without smartphones or bank accounts. About 60% of households’ incomes are below \$30,000 (according to Social Explorer) (Household Income in 2019, n.d.). Among Americans who earn less than \$30k, three in ten do not have smartphones, and seven in ten do not have bank accounts. The Capital Bikeshare program in Arlington County, Virginia, is one example of a company that has addressed this issue by offering cash payment options (Fedorowicz et al., 2020, p. 11).



ECONOMY:

The average American spends about \$9,122/year, \$0.60/mile, owning and operating a personal vehicle. Memberships for E-bike and E-scooter sharing costs the average individual less than \$100, which is a much lower price. Using E-bikes and E-scooters requires less power than a car, thus providing a more affordable option for

everyone in denser areas by increasing connectivity and solving the first- and last-mile mobility. The Initial investment of the plan to increase the ability for residents of an urban neighborhood to transport themselves using E-bikes and E-scooters far outweighs the continuing costs to keep the program running. The South Wedge community would be faced with an initial





Cost per E-bike of about \$1,000 and an initial Cost per E-scooter of about \$700.

The main cost for the residents of the South Wedge will be the charging stations which will conservatively cost them about \$10,000 to construct permanently and about \$3,000 for the temporary units. Costs from operations and charging are far lower than this, with \$1 to unlock a 5 min time frame and 15 cents per additional minute of usage, each bicycle is equipped with Bluetooth lock that opens through a mobile phone app after payment. The money generated by the program will far outweigh the cost of operations. A similar E-bike share program in Aurora and Lawrenceburg, Indiana recorded that the Ongoing costs including software usage and bike and shelter maintenance total \$8,050 annually after an initial cost of \$100,000 paid over a two-year period. Aurora and Lawrenceburg, Indiana have found that the bikes are cost-effective, decrease roadway traffic, improves business visibility, encourage the community to engage with local amenities, and provide physical fitness opportunities (Aurora and Lawrenceburg).

There are several economic benefits for both E-bike and E-scooter share systems that will help the South Wedge neighborhood, as well as the city of Rochester be less dependent on vehicles:

- Save time and alleviate congestion
- Policies and Infrastructure

- Stimulates Local Commerce
- Return on investment
- Access to Local Businesses and Job Opportunities

According to NATCO, protected bike lanes move 3 times more people per hour. By supporting non-auto modes of transportation can lead to a boost in business and including bicycle infrastructure can increase local business revenue. E-bikes and E-scooters create additional foot traffic in front of local businesses and create more demand.

The South Wedge neighborhood and the greater Rochester area can improve cycling infrastructure by taking a page out of what New York City is doing. By creating better bicycle infrastructure, NYC has increased local retail and business demand on 8th and 9th Avenue. Creating protected bike lanes on 8th and 9th Avenue in NYC has shown to have a 49% increase in retail sales, compared to only a 3% increase within the borough. E-bike and E-scooter sharing is the lowest cost-per-mile mode of transportation available. They provide communities and universities with a return on investment, as well as personal savings that adds up. Having access to local businesses and job opportunities allows riders to afford to live within cities. Micro Mobility can help access approximately 100,000 more jobs with the inclusion of public transit.



TOOL KIT TIMELINE:

The overall completion of this project would take approximately 3 years with the possibility for expansion into other surrounding neighborhoods in Rochester

such as Park Avenue, Cobbs Hill, or the 19th Ward. During the first year the city of Rochester combined with community representatives from the South Wedge will conduct an in-depth analysis of pedestrian traffic patterns and needed improvements





to pave the way for the program. This stage of the plan is centered on understanding where the areas with the greatest need for micro mobility public transportation are. In the second year the program begins to get off the ground and the implementation of the program starts with temporary docking stations placed at pre- assigned locations, as determined in year one. In this second year the GPS units will record all usage data including pickup and drop off locations to see if users are over saturating one area and or under saturating another with the E-bikes and E-scooters. During this same period, using input from community organizers, in order to increase community awareness and support the project will seek to start marketing to pedestrians and local businesses. The marketing campaign is aimed at stressing the faster travel times, environmental benefits, and increasing pedestrian street traffic for local businesses. In year three, using all the data gathered from the previous two years, this is when the first permanent E-bike and E-scooter storage charging stations will be constructed in the wedge at locations that best serve the community. All the revenue generated by the program will be reinvested back into the program for improvements and expansion. During this time in order to increase usership the project would begin to offer incentives like reduced rider costs to promote the usage at destinations like Schools, festivals, city tourism locations and

more. As the project continues to expand and change to meet the demands of the riders continued GPS data and community input will allow for changes and relocation of the E-bikes and E-scooters on a as needed basis, with the knowledge that same process from years 1-3 can be implemented in other city neighborhoods to expand the program.

FUNDING:

The primary funding sources for this Micro Mobility project within the South Wedge would come from the U.S. Department of Transportation. The Department provides grants to help build and maintain efficient, accessible, and convenient transportation systems across America. Specifically, this program would try to take advantage of a RAISE Discretionary Grant (U.S. Secretary of Transportation), where funding is evaluated based on criteria such as safety, environmental sustainability, quality of life, and innovation. The maximum grant award is \$25 million, and the grant amount cannot exceed more than \$100 million in a single State. The RAISE program is highly competitive with only 680 projects funded out of over 9700 applications each year. Keeping that in mind another area that looks like a promising funding source is the remaining COVID-19 relief funding awarded to the state of New York that has yet to be used. Recently New York state received over \$140 million dollars in relief funding that needs to be



spent, in July 2020 Monroe County Executive Adam Bello announced that Monroe County is allocating up to \$2 million in CARES Act funding to support the JumpstARTS program. While this project is not related to Micro Mobility it does show that new initiatives are being considered and funded so there is hope the state will offer funding for this connectivity program. Any remaining funding for longer term needs will have to come from Local investors including local businesses, local programs like Reconnect Rochester, and community support groups like the South Wedge Planning Committee. These smaller funding options will provide all necessary funding to keep the program alive for years accounting for things like routine repairs and winterization processes. With the combination of both large national funding sources and smaller local funders this program becomes more feasible and its potential to help the residents of the South Wedge increases with each new opportunity.

STAKEHOLDERS:

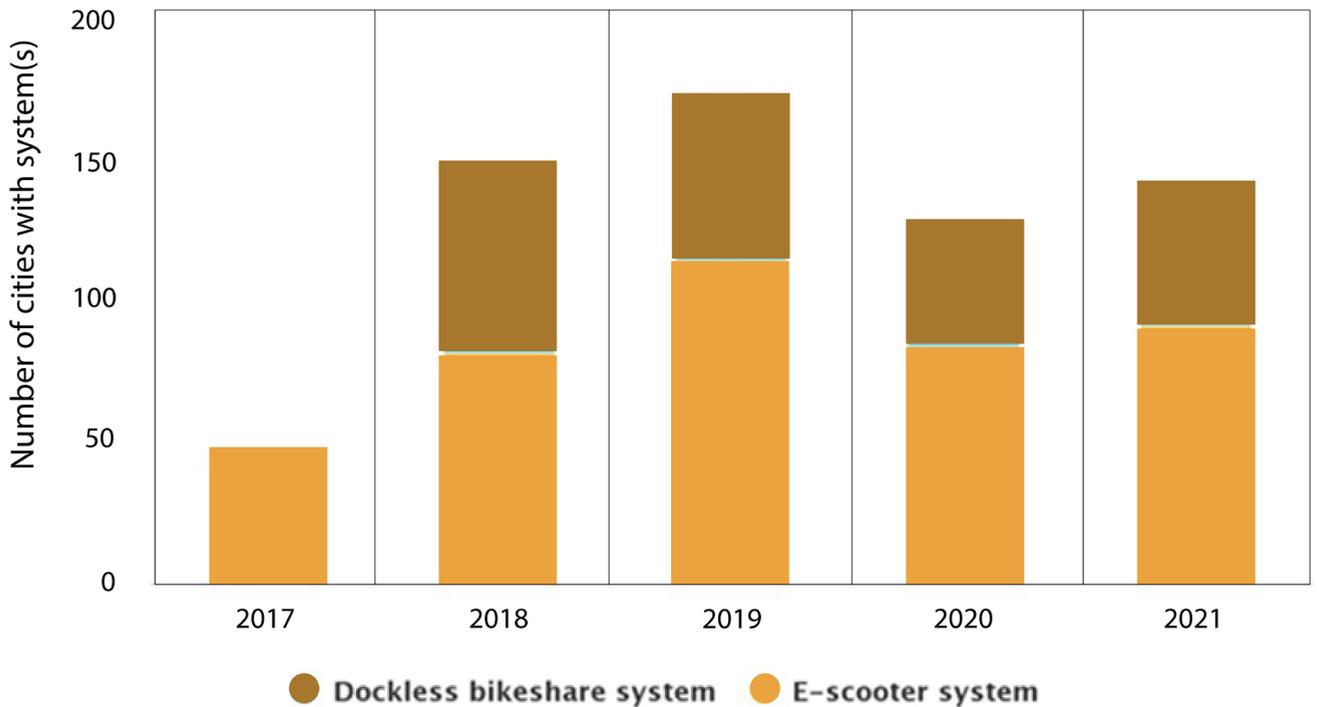
The people with the most to gain from this program are first and foremost the residents of the South Wedge and the surrounding city of Rochester. Residents will be able to have a reliable source of transportation allowing them to travel to and from places much easier, increasing available opportunities for employment, resources, and education. The children of the South Wedge will also

have an alternative to busing with those E-bike and E-scooter programs alleviating the problem Rochester is currently facing with a lack of bus drivers. Local businesses will also see a benefit from the program's implementation through increased visibility and foot traffic combined with a larger pool of possible employees. A majority of people who use the E-Scooters and E-Bikes use them to commute to work in order to beat traffic, E bikes can transport people between 6-7 miles equivalent to walking 5-45 min. In order to make this plan as feasible as possible winterization efforts can be made to allow for E-bikes to be a reliable transportation option in the winter months. Replacing the rear tire with a larger deeper tread wheel, and adding winter snow skies to the front forks will allow the E-bikes to help residents to work, school, and businesses even in snowy conditions. The final Stakeholders are Local and possibly state politicians who can use this program to increase tourism to the area for important events and festivals, like the lilac festival, but also the South Wedge can be an example to other cities across the nation that environmentally conscious transportation can be both efficient and fast.

Stakeholders help provide a more vibrant and equitable community. They include, but are not limited to residents, local businesses, and local institutions. Through the efforts of Reconnect Rochester, they aim to connect the community and the transportation



Cities Served by Dockless Bikeshare or e-Scooter System(s) by Year



network for all to get around. They are a non-profit organization that leads by example. Residents use E-bikes and E-scooters to deliver grub hubs and other delivery services. They also own local businesses and use them to commute to work, while beating traffic. Local institutions can serve as stakeholders, such as public spaces, schools, and colleges). Within these spaces, citizens use E-bikes and E-scooters to get around the vast areas. These stakeholders can be reimbursed with discounts on promoting and using these share systems.

CONCLUSION:

We aim to have this program help workers, elderly residents, families, and children by providing an alternative form of public transportation. We also hope to have this program be used by college students, tourists, and the public increasing the amount of money generated by this program in order to re-invest it back into the program, all while lowering transportation emissions and helping to stem the ongoing problem of Climate Change.



BACKGROUND:

Mobility issues in cities are not a new problem, for communities' inadequacies in transportation have reshaped and redefined neighborhoods for decades. Rather it be the construction of highways and expressways reshaping existing neighborhoods, to increasing usage of personal automobiles pushing goods and services further away from urban centers. These communities may vary economically, geographically, and demographically but they each rely on the same thing, connectivity. The ability for residents of an urban neighborhood to transport themselves to the surrounding area is fundamental for urban life. Being able to utilize efficient, reliable, and cost-effective transportation is essential for access to goods and services, socialization, and education. Sufficient mobility is critical to the quality of life, health, and environmental wellness of an urban community. The South Wedge community of Rochester, New York is a prime example of a community in need of micro-mobility improvements that can better serve the community and combat the negative effects of climate change.





WALKABILITY & GREENSPACE



DEFINITIONS:

Walkability:

- The way in which the built environment supports pedestrian activity and usage.

Sustainable design:

- Determined by a focused reduction in environmental impacts which also minimize waste and promote healthier environments for people and the planet.

Connectivity:

- Having the quality of freely moving throughout a system of streets, paths, etc. without significant barriers to safety and mobility.

Greenspace:

- Areas within the built environment that provide a sense of nature, often including trees, shrubs, grass, soil, and water.

PROBLEM:

Carbon emissions from vehicles are one of the leading causes of climate change. South Wedge in Rochester, NY is heavily vehicle dependent. There are barriers to pedestrian safety and walkability. Connectivity and accessibility to greenspace contributes to lack of pedestrian activity as in South Wedge, as well as more vehicular use.

Observations of the South Wedge neighborhood reveal that the Mount Hope Avenue corridor is lacking features for pedestrian safety and can be improved upon. Members of the community agree that there are barriers to pedestrian safety and connectivity when focusing on this particular roadway. Firstly, the Genesee Riverway Trail is a highly used trail by residents in the South Wedge. The trail runs along the Genesee River from Highland Park all the way up to Ontario Lake. One of the biggest problems found while walking around the neighborhood was trying to access the Riverway Trail. There are only three entrances to the trail from Mount Hope Avenue. One entrance is on the corner of Averill Avenue, the second entrance is the corner of Hickory Street, and the last entrance is located on Ford Street. Two of the entrances have crosswalks while the other one does not. The biggest problem noticed with accessing the trail was safety. Many people drive pretty fast down Mount





Hope Avenue which is a fairly busy street. It is extremely hard to cross the street in order to get to the trail on any point of the road, but the three entrances. The crosswalk on the corner of Averill and Mt. Hope is seen as the main entrance to the park. It is clear to see that the entrance is not clearly labeled meaning someone who isn't familiar with the area would have no idea there is a trail along the river. The second entrance, which posed a lot of safety issues, is on the corner of Ford Street and Mount Hope. This entrance was easily the most unsafe to use for a various number of reasons. Firstly, the corner of Ford Street and Mount Hope is extremely busy because people are crossing the bridge over the Genesee River. Secondly, the crosswalks that do exist force pedestrians to go in the middle of the intersection which is not very safe or walkable. One of the images shows the intersection and crosswalks on Ford Street in order to access the Riverway Trail.

The Ford Street intersection is extremely busy and fairly unsafe to cross. The entrances to the Genesee Riverway Trail was not the only weakness within the neighborhood. Multiple streets were surveyed to get a better understanding of the sidewalks in the area. It was observed that sidewalks were in poor condition making walking on them difficult. Pieces of the sidewalk were coming out of the ground leaving areas very easy to trip and fall on. The sidewalks would not be accessible by wheelchair because it would be almost impossible to push a wheelchair along the sidewalks. Based on the images, it is clear to see that the biggest weakness in walkability within the South Wedge neighborhood is safety. In order for people to drive less and walk more, they have to feel safe wherever they are walking to. When addressing walkability; safety, connectivity and accessibility are important to account for.





SOLUTION STATEMENT & PROPOSALS:

Small changes to the built environment and daily activities can have an immense and lasting effect on South Wedge. Proposing sustainable solutions and programs with the goal of reducing existing automobile-dependent systems and encouraging non-motorized transportation will reduce carbon emissions and create a more sustainable future. As walkability in the neighborhood increases, the demand for car parking and car infrastructure decreases, and the need for traffic-free spaces increases. By focusing on walkability, a reduction in vehicle emissions will decrease air pollution as more people choose non-motorized transportation alternatives. As more people choose to walk or bike to their destinations, there will be an increased demand for areas that support those choices including the need for more greenspace. Infrastructure

for non-motorized transport requires far less space and maintenance and in turn can help protect biodiversity by reducing the physical space needed for roadways, offering a reduction of paved areas and allowing more space for plants and trees. Non-motorized transportation choices also aid in reducing noise pollution caused by vehicular traffic. Finally, walkability in a neighborhood increases the likelihood that residents and visitors will choose non-motorized transportation and encourages healthy behaviors that benefit individuals and the environment.

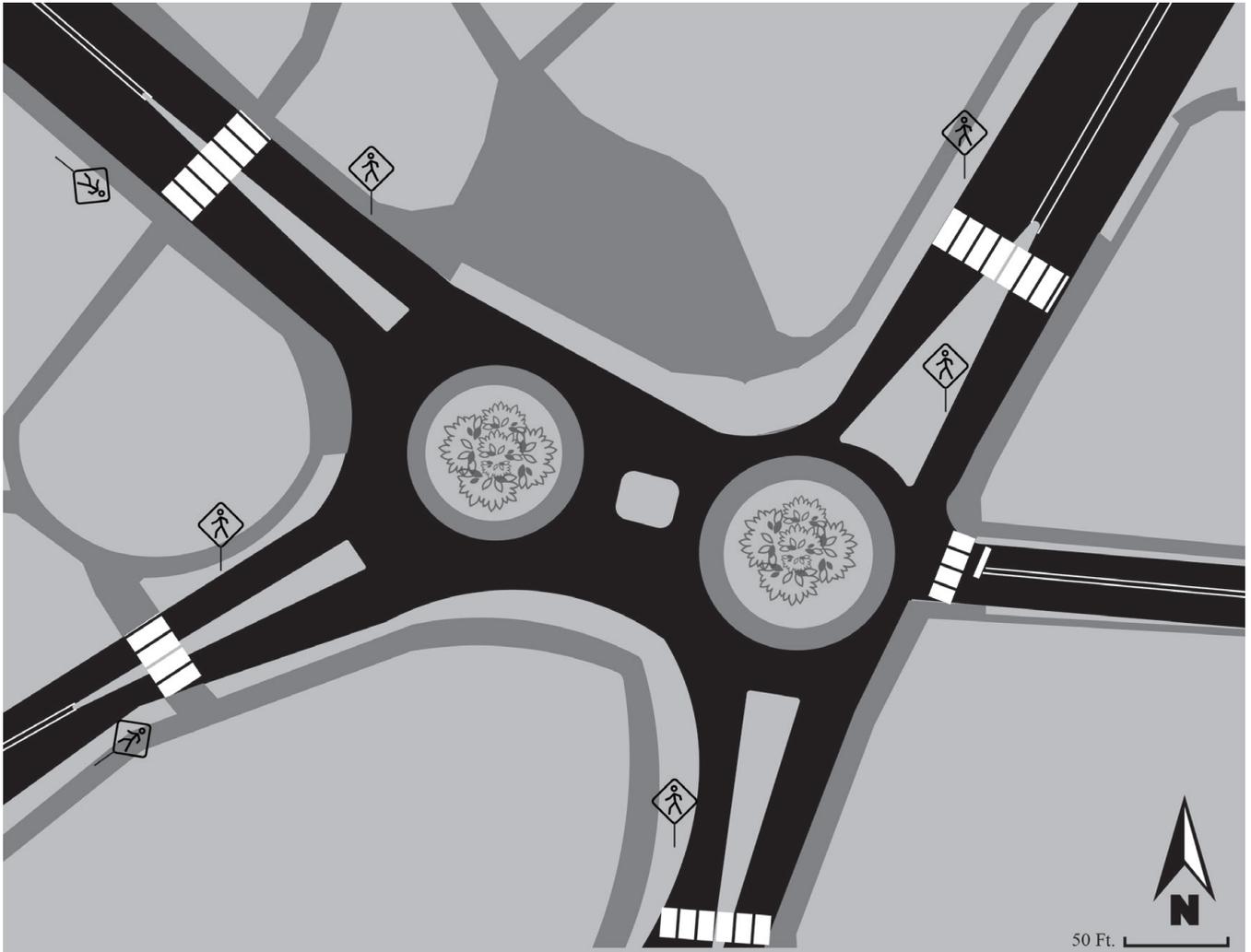




PARKWAY SYSTEM:

Networks and connectivity can be improved by taking inspiration from Olmsted-style Parkways. This in part helps to link historic and modern greenspace throughout the neighborhood while building on the existing culturally important resources. Following this proven example of walkable spaces, we can utilize passive elements to aid in traffic calming and enhance greenspace connectivity through corridors of plantings and pedestrian-friendly walkways.





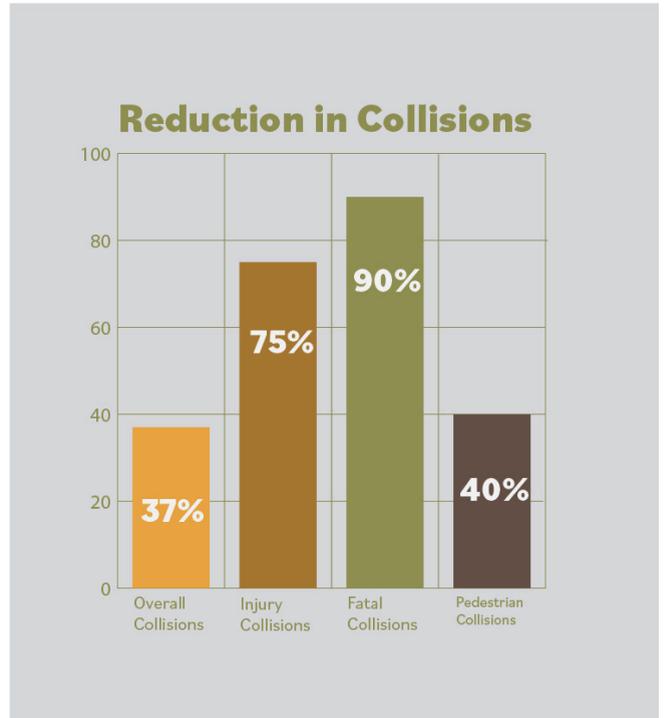
DOUBLE ROUND-ABOUT:

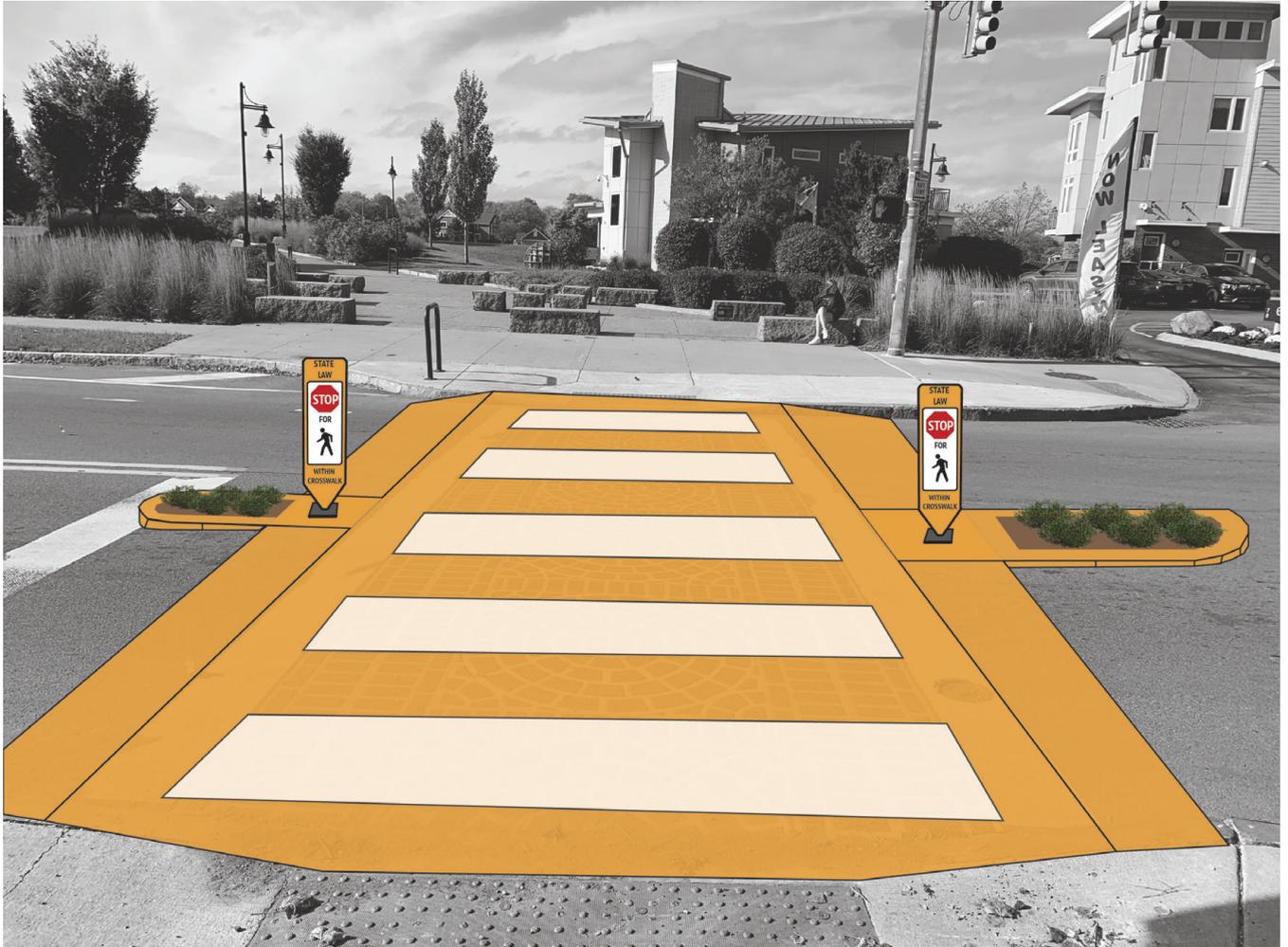
A double roundabout implementation at the Ford Street and Mount Hope Avenue intersection will help address traffic calming in that area. Being so close to entrances to the Genesee Gateway Park and the Genesee Riverway Trail, it is important to provide a safer walking condition to help promote walking and calm that area.



CROSSWALKS & REFUGE ISLAND

Crosswalks and Refuge Islands also provide another element of safety for pedestrians. The raised crosswalk proposals will act as a speedbump to reduce traffic speeds and make drivers more aware of pedestrians. Wider crosswalks also add to pedestrian visibility when crossing streets and can assist in reducing pedestrian-vehicle collisions.





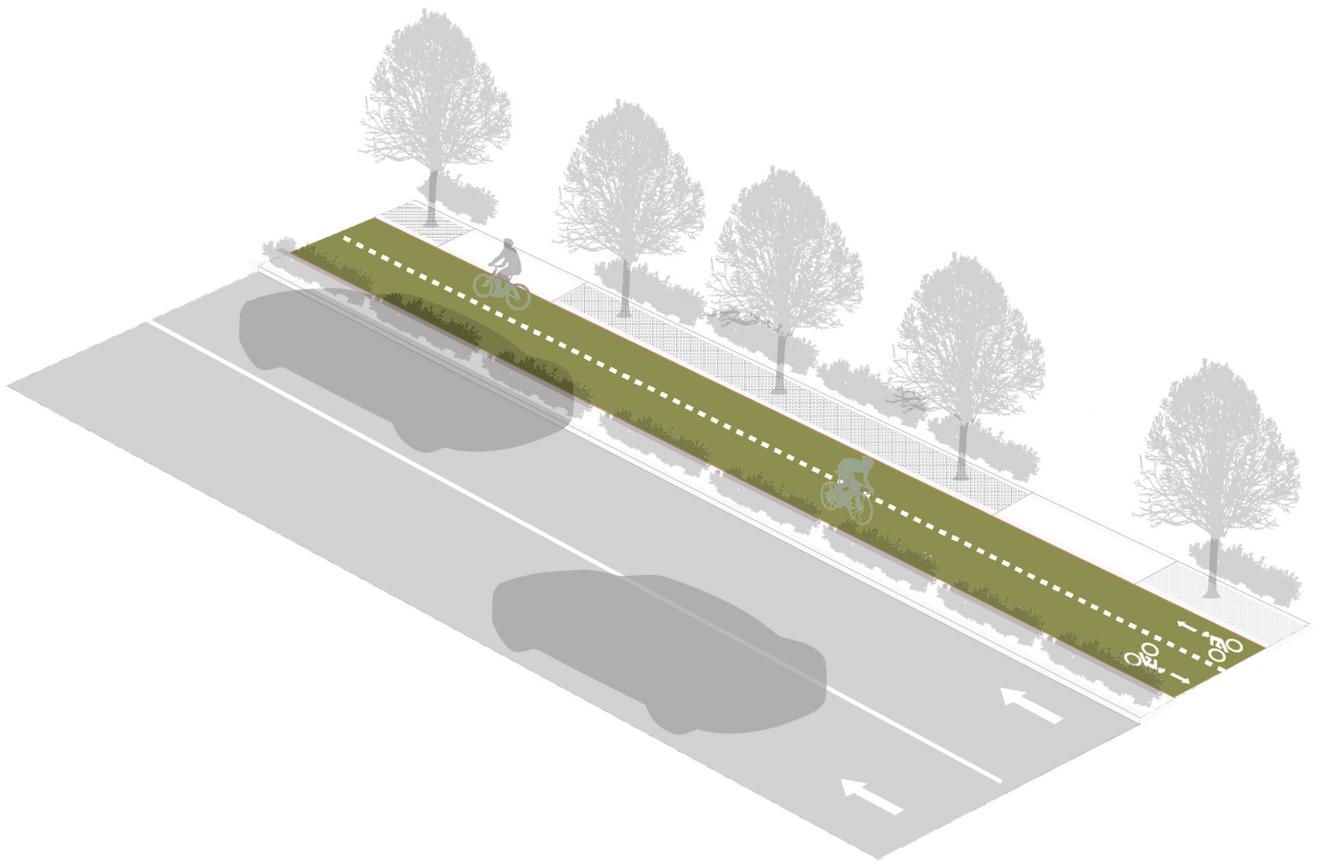
Safety Benefits

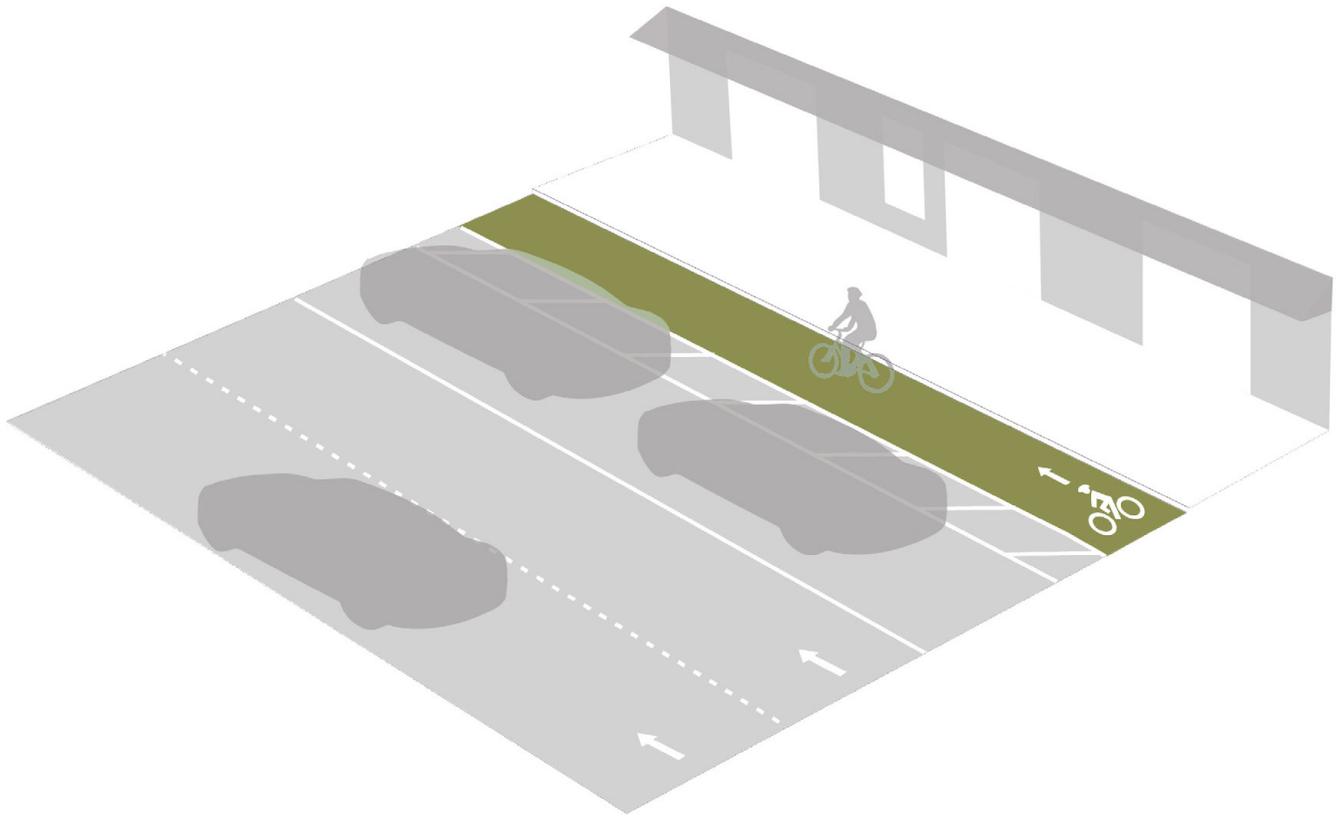


**Pedestrian Refuge
Island**

56%

**Reduction in Pedestrian
Crashes**





BIKE LANES:

Infrastructure improvements will again contribute to the safety of pedestrians as well as prioritize other modes of transport. The separation of travel lanes will help reduce traffic congestion and aid in safety



WORKSHOP & SIGNAGE:

Neighborhood walkability can be encouraged through wayfinding, signage and walking workshops. These will all be

forms of education for the members of the community as well as outreach opportunities for residents to contribute to discussions and planning for the future of the neighborhood.





BENEFITS:

Increasing walkability through and around the South Wedge neighborhood will have many positive effects on the neighborhood. Through the lens of equity, it helps with accessibility and connectivity for many different people in South Wedge throughout the neighborhood and other locations in Rochester. This allows for more people to have access within and around the community. There are multiple economic benefits to these implementations as well. The main benefits associated with the proposals include reducing emissions by cutting down on the amount of trips by vehicles. Improving the connectivity within the community also creates a need for more greenspace and pedestrian networks. This protects biodiversity by reducing the need for roadways, encouraging plantings for noise reduction and air purification. These proposals can also have a positive effect on the economy within this neighborhood. Increased walkability can help raise property values, helps connectivity to local businesses, creates jobs for maintenance and upkeep, and attracts more people to the neighborhood.



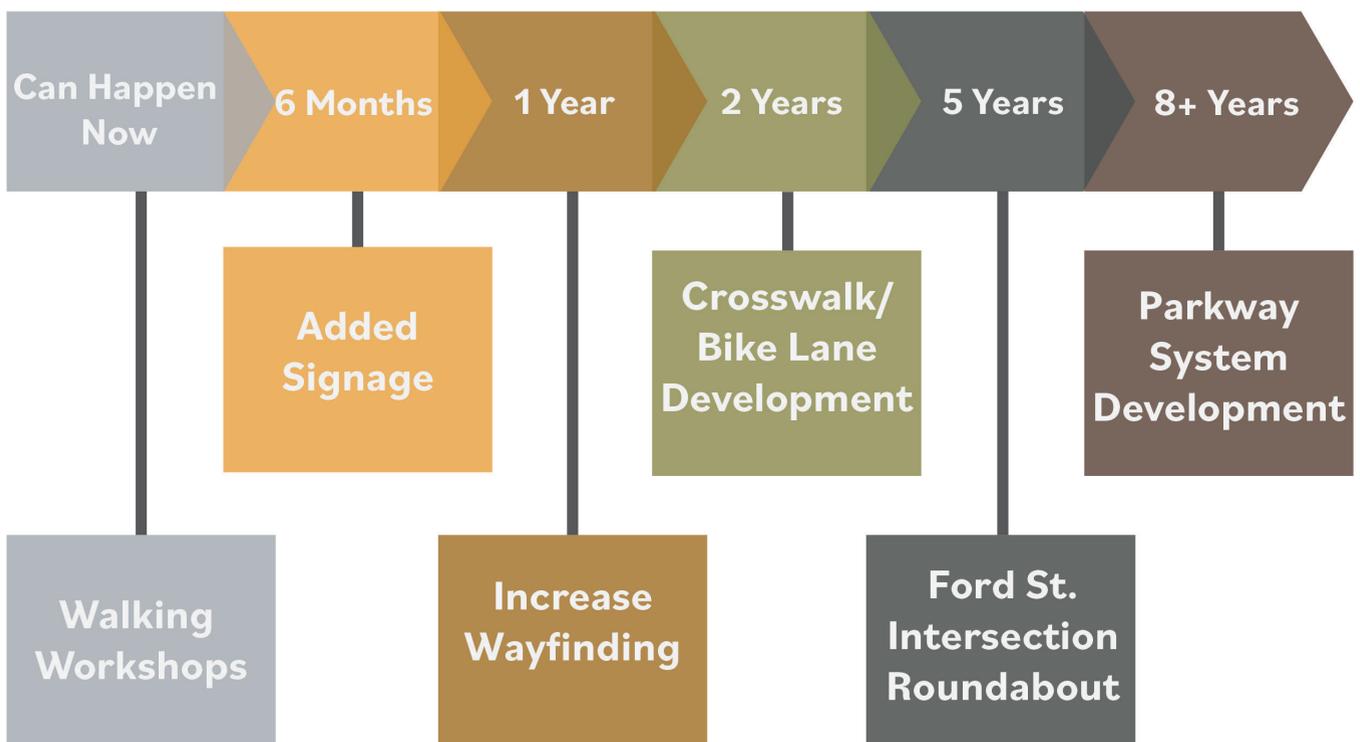
TIMELINE:

The proposals range from a short term to long term timeline. Signage and walking workshops are very short term solutions which can be implemented nearly immediately. Bike lanes and crosswalks are more medium term design solutions. These can be implemented in phases as well making it slightly more of a gradual process. Finally, the roundabout and the parkway system design solution would be long term on the timeline. This is due to getting permissions, organizing funding and the overall planning of these implementations.

FUNDING:

The Department of Transportation (DOT) will be important when getting resources and funding. Reconnect Rochester will be another helpful organization as they want to support transportation choices to create a more dynamic community. The City of Rochester Department of Environmental Resources is also another option to address funding and gaining resources. The South Wedge Planning Committee is a great group to look for resources. Finally, local businesses to sponsor small implementations (signage) would be a great option for funding.

South Wedge Walks Timeline





STAKEHOLDERS:

South Wedge residents and community block groups including the South Wedge Planning Committee and Volunteers. “The South Wedge Planning Committee serves residents, businesses, and visitors of the South Wedge. We are a reliable resource for anyone visiting, living, or working in the South Wedge.”

ROC the Riverway partners. “Revitalizing the Genesee River corridor will help fuel our local economy. ROC the Riverway will serve as a major asset in attracting new jobs and solidifying our identity as a vibrant waterfront community. Cities around the world have discovered the power of great public spaces, bicycle/pedestrian-focused infrastructure, and water-oriented development in attracting employers and the next generation workforce.”

Highland Park Conservancy (Rochester’s Olmsted Parks) “The mission of the Highland Park Conservancy, a 501(c)(3) non-profit membership organization, is to advocate for, and participate in, the preservation, restoration and enhancement of the entire Highland Park with its world class arboretum, its historic Olmsted design and its other amenities, by increasing the public’s appreciation for, and active engagement with, its absolute uniqueness.”

“The Landmark Society of Western New York, Inc., is one of the nation’s oldest and most active historic preservation organizations. It is a not-for-profit membership organization dedicated to helping our region’s communities preserve and capitalize on their rich architectural, historical, and cultural heritage. The Landmark Society’s service area covers nine counties in western New York centered on the City of Rochester. Our mission is to protect the unique architectural heritage of our region and promote preservation and planning practices that foster healthy, livable, and sustainable communities.”

“Reconnect Rochester is a 501(c)3, non-profit organization made up of ordinary citizens who believe we can do extraordinary things together. We roll up our sleeves and lead by example. Our Mission: Whether by bus, by rail, on bike, or on foot, Reconnect Rochester champions transportation choices that enable a more vibrant and equitable community. Our Vision: We envision a community connected by a robust transportation network that makes it easy for everyone—regardless of physical or economic ability—to get around.”

CONCLUSION:

The concepts proposed for improving walkability focus mainly on the Mt. Hope



Avenue corridor in South Wedge and offers solutions that can be applied to other streets within the neighborhood and in the greater city starting at the community-scale and building up to large-scale municipal projects. The context of this project uses the inspiration of parkway systems and regional connectivity through placemaking to enhance and create walkable networks using existing streets. The individual design elements outlined can be adapted to fit localized contexts and are meant to be a guide for scalable projects and city-wide implementation. South Wedge is a unique neighborhood in Western New York, as access is restricted on three sides by both natural and man-made features. Many cities across Western New York deal with similar issues and can benefit from these concepts and proposals as well.





WASTE & STORMWATER



WASTE:

DEFINITIONS:

Food scraps:

- Parts of food items that are typically discarded rather than eaten: peels, rinds, cores, eggshells, seeds, pits, bones, coffee grounds and paper filters, loose-leaf tea & paper tea bags, and fats/oils/grease.

Solid waste:

- Any garbage, refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material, resulting from personal, industrial, commercial operations and from community activities.

Compost:

- Decayed organic material used as a plant fertilizer.

Gigaton:

- A gigaton represents a billion times more mass than a metric ton.

PROBLEM STATEMENT:

To combat the amount of food waste being produced globally today, composting techniques would be the right answer however not everyone is aware of it and

many communities are not as involved or managed efficiently, for example the South Wedge, Rochester, NY. The lack of free compost programs has influenced people to hesitate and become not involved with the process of composting. There are multiple programs available to the public however it can come off as inconvenient and difficult.

In 2015, an estimated 38 percent of food waste was composted in the United States; 57 percent was composted in the European Union. If all lower-income countries reached the US rate and all higher-income countries achieved the EU rate, composting could avoid methane emissions from landfills equivalent to 2.1–3.1 gigatons of carbon dioxide by 2050. That total excludes additional gains from applying compost to soil. Compost facilities cost less to construct but more to operate. Today, it is especially useful for managing growing urban waste streams. In 2009, San Francisco passed an ordinance that makes composting the city's food waste mandatory. Copenhagen, Denmark, has not sent organic waste to landfill in more than 25 years, reaping composts' win-win-win of cost savings, fertilizer production, and reduced emissions.

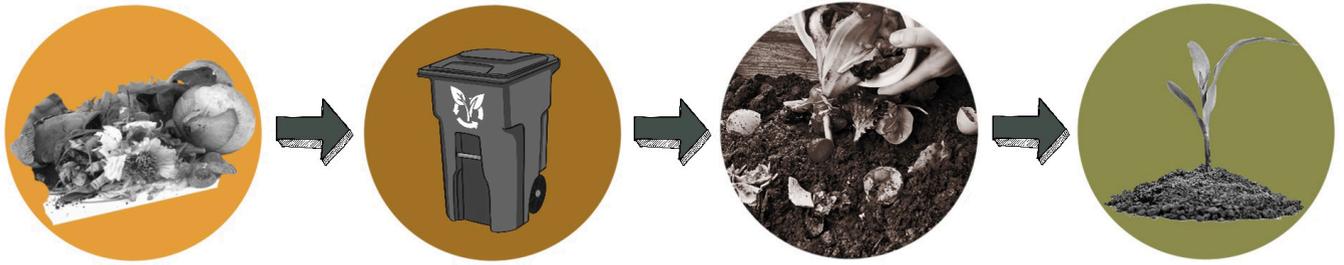
There are only 2 compost collection sites and only 2 public community gardens located in South Wedge. Current compost programs offered are ROC City Compost which is a pilot program that will provide research



for a possible Citywide implementation. Its current pick up sites are Cobbs Hill park and Genesee Valley park. This is free to join however signups are unfortunately closed. Another program available is the Impact Earth Composting, first started in July 2014, with a paid subscription anyone can use its facilities. Its pick up site is the Abundance Food Co-op. There are two types of services

offered, Residential Services that can pick up compost from the Curbside. All that is needed is to sign up, whether it is the Bi-Weekly Service at \$16/mo if paid monthly or \$177 (\$14.75/mo) if paid annually. The Weekly Service is at \$25/mo if paid monthly or \$264 (\$22/mo) if paid annually. If located in a Market you just need to find a location and Cost per swap is \$5 but the Required bucket





deposit is \$10. The other type is Commercial Services, simply sign up, the Cost per swap is 32-gal starting at \$10, 64-gal starting at \$15, and 96-gal starting at \$20.

SOLUTION STATEMENT & PROPOSALS:

Within the South Wedge neighborhood of Rochester, New York, there remains an opportunity to implement a community compost program to solve the issue of food waste in local landfills while also providing for the community by means of the results of composting to produce compost soil for agricultural purposes. By implementing at least two more collection sites to the ROC City Compost Program or creating a more localized neighborhood scale composting program while additionally offering free compost informative classes for community members, we hope to provide incentive for home gardening practices or community gardens within the neighborhood. Providing compost to both individuals as well as these community gardens.

BENEFITS:

The impacts of a composting project on the environment, equity, and economy of the local community have a large impact on the community as a whole. Environmental impacts include not only the reduction and diversion of solid waste from municipal landfills, but also a reduction in emissions as well. Food waste left in landfills will produce large amounts of methane gas released into the air. Additionally, reducing the loads of garbage trucks within the community reduces emissions produced by these vehicles. Impacts on equity include the enabling of more residents to have home gardens and have better access to healthy food options as they would be grown directly within the community. Additionally, the creation of more local community gardens allows for more green space within the area. Finally, the impacts on the local economy follow a similar fashion to those mentioned prior. Impacts include, providing soil to local farmers, allowing businesses to invest and sponsor a local project, and allowing residents to save money by providing a local municipal service for composting rather than costly third-party



options.

TIMELINE:

Composting must be practiced by everyone from the community, otherwise the impact is not significant enough. However, problems of community composting in South Wedge at this moment are the lack of participants, the lack of collection sites available in the community, and the lack of understanding by community members about composting. Therefore, we have four solutions to combat the problems that South Wedge is having.

The problems are as follows: (i) to make free classes about composting for the community members. (ii) to make a reward system for people who participate in composting. (iii) to provide volunteering opportunities for students. (iv) to implement more collection sites around the community. All four implementations can be accomplished within a span of one year. The one that can be implemented immediately is (i) to make free classes about composting for the community members. This is a class about teaching the community members how to either start composting at home or participate in the composting program the city of Rochester is conducting (ROC city compost). One person from the ROC city compost can be the instructor for this teaching program so that it can happen

right away. (ii) to make a reward system for people who participate in composting can be done in around 3 months. We take this implementation seriously, because we believe that motivation is something we can push community members to participate in composting. It takes around 3 months to implement because we need to make partnerships with the local markets and grocery stores for this rewarding system. Next, (iii) to provide volunteering opportunities for students takes around 5-6 months to implement. This is a solution to make younger generations realize the impact of climate change and the importance of environmental protection. In this system, students are imposed a minimum requirement for graduation. For example, a student needs to participate in a total of 10 hours of volunteering service to be eligible to graduate. We believe that making composting one of the volunteering services for students is a way to keep up the environmental protection realization in the future. It takes around 5-6 months to implement it because we want every school in South Wedge to be on the same page about this system. Lastly, (iv) to implement more collection sites around the community is what is estimated to be taking one year. As of now, there are only two composting collection sites in South Wedge. We believe that the lack of collection sites demotivate people to



participate in composting. Therefore, we are looking for adding 11 more possible collection sites around the South Wedge community in one year.

All four implementations about composting are relatively short-term compared to other developments such as implementations of stormwater and walkability infrastructure. After all the systems are implemented, we believe that the participants for composting within South Wedge will grow significantly and range from young generations to the elderlies.

FUNDING:

Funding for a composting program may come from several sources. Since the program would be an extension of the ROC City Compost Program, municipal funding would be available. Additionally, New York State Department of Environmental Conservation (NYSDEC) provides a municipal waste reduction and recycling program which provides a funding match to cities within the state that implement municipal recycling options. Funding is done through a 50% match in funding from the state. However, the funds are only covered under direct costs and not overhead costs associated, creating a need for other means of funding as well. Playing off Rochester's community pride, local businesses may provide funding through sponsorships to help

fund the program and account for costs not covered under the state's funding program.

STAKEHOLDERS:

Stakeholders within the program may include local residents, local farmers, the South Wedge Planning Board, local waste management businesses, and other local businesses. Key aspects for applying this project to other neighborhoods would include the need for the program to be widely accessible as well as providing classes and community education on why composting matters and the impact it can have on not only the climate but also the community as a whole.

STORMWATER:

DEFINITIONS:

Stormwater Management:

- The effort to reduce runoff of rainwater or melted snow into streets, lawns and other sites, and the improvement of water quality.

Green Infrastructure:

- An approach to water management that protects, restores, or mimics the natural water cycle. It is effective, economical, and enhances community safety and quality of life.



Permeable Pavement:

- Paving material that absorbs water or allows water to infiltrate through the paving material.

Rain Barrel:

- Barrels used to collect and contain rainwater, decreasing the total amount of runoff water.

Bioswales:

- A long channeled depression or trench that receives rainwater runoff. Provides an alternative to storm sewers. Often used to convey water to a rain garden.

Rain Garden:

- A garden of native shrubs, perennials, and flowers planted in a small depression. Designed to temporarily hold and soak

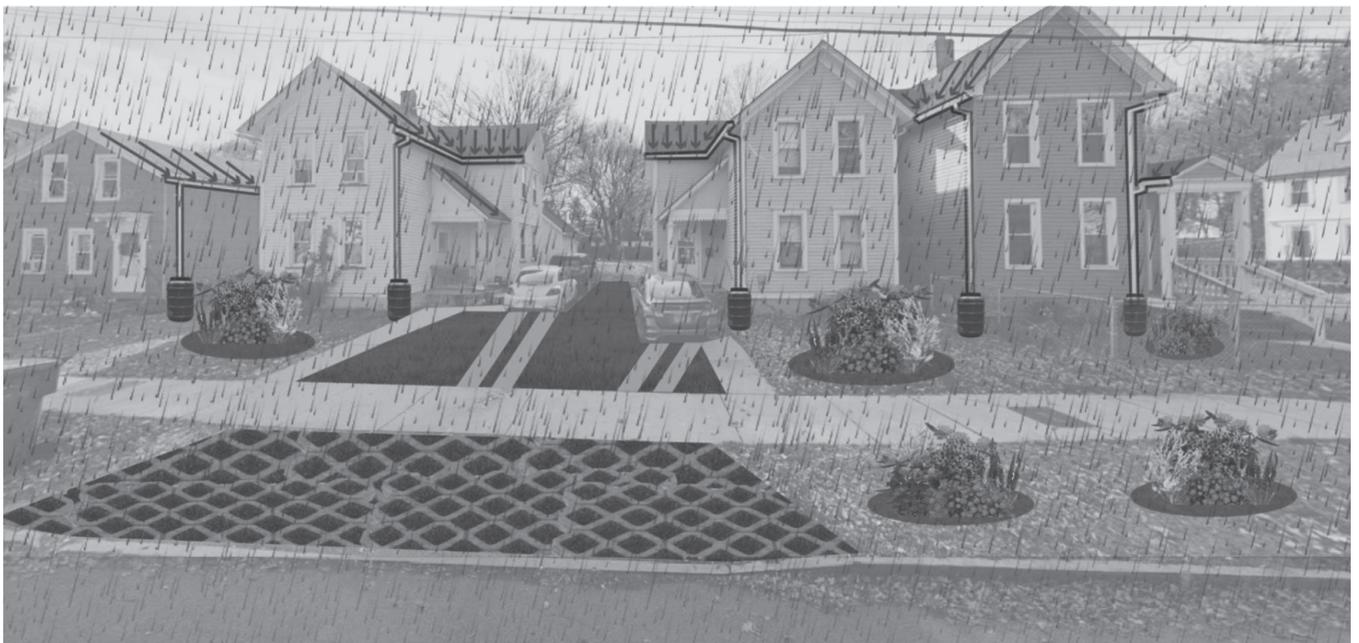
in rainwater runoff that flows from roofs, driveways, patios, or lawns.

PROBLEM STATEMENT:

Due to climate change, rainfall intensity and frequency has greatly been affected. Concrete and asphalts are not convenient for stormwater management.

How can South Wedge adapt its infrastructure to manage stormwater and prevent flooding at different urban settings?

According to the Responding to Climate in NYS Synthesis Report the WNYS region plus the Great Lakes Plain have the highest revenue for agriculture in the state; it has quite low rainfall levels yet is at risk of increased summer drought. In addition it states crops of high value may need irrigation but better conditions for





grapes to grow is expected. According to the Responding to Climate in NYS Synthesis Report precipitation is expected to increase to 5% in 2020s, 10% in 2050s, 15% in 2080s. Furthermore it states that the precipitation will not be spread uniformly throughout a given year, and it will fall more in the form of heavy downpours. It also states heavier precipitation will fall during the winter season as rain. Reduced precipitation levels will occur during late summer and early fall.

According to Hedges and Company, there are about 286.9 million registered vehicles in the United States. Requirements for parking lots and spaces were created for development projects in order to accommodate that growing amount, and many feared it could hurt the local economy if these were not provided. There is no quantitative data on the amount of parking lots in the United States, but many suggest that there are as much as eight billion parking spaces, which equals to eight available parking spaces for every single car. In 2017, Buffalo became the first U.S. city to remove minimum parking requirements across its city. The use of land for parking lots is a result of the development of cities with a focus on heavy vehicle usage. Through the creation of parking lots, stormwater is unable to permeate the dense asphalt pavements, therefore runoff is controlled by a drainage and/or sewage system. An overflow, or flooding, which can be more prominent due to



climate change, can lead toxic pollutants into local waters. Repurposing unused parking lots, or reimagining its development can help aid in reducing potential flooding, as well as, runoffs carrying toxic pollutants to our waters. It will also require a change in cities' transportation infrastructure to further combat and adapt to the changing climate.



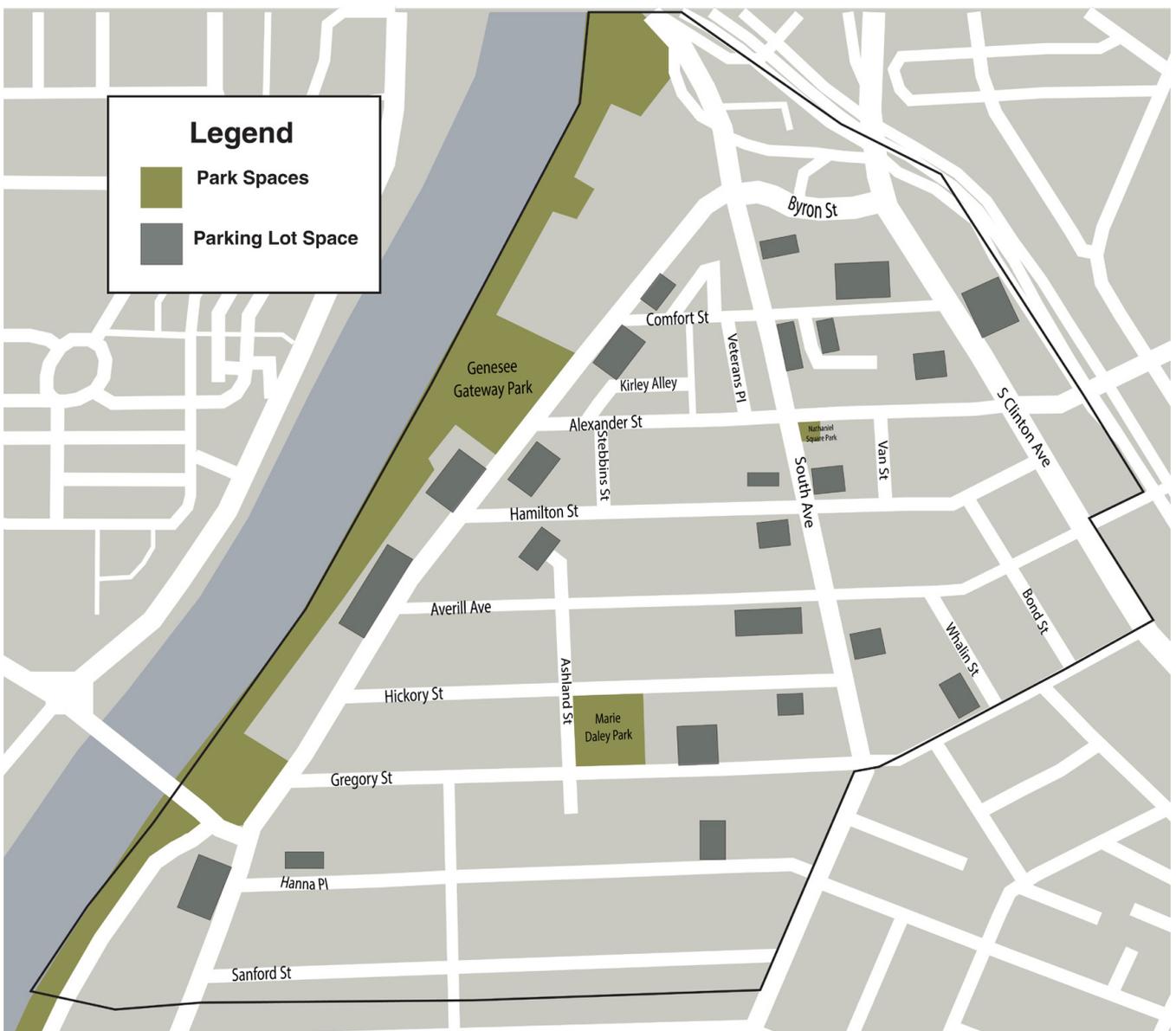
SOLUTION STATEMENT:

To combat climate change, and specifically, the increase in rainfall, we are working on solutions to limit the damages of potential flooding and runoff due to the heavy usage of asphalt at four different urban settings; residential streets, commercial streets, parking lots, and the Genesee Riverway Trail. Solutions incorporate ideas

such as permeable pavements, rain gardens, rain barrels, constructed wetlands and more.

BENEFITS:

Proper stormwater management will aid in stopping the runoff effect, preventing flooding, thus the moving of pollutants, the contamination of stormwater, and limiting damages to public and private property.





Therefore **Equity** will be impacted by improving public health for all, improving local water quality for all, and protecting everyone's properties in the South Wedge neighborhood. The implementation of rain gardens, bio-retention, bioswales, wetlands, green driveways, and green streets, all increase local green space and green landscape in the neighborhood. Therefore the additional green features impact the **Environment** by improving existing greenspace, improving air quality, increasing local biodiversity, lowering the local urban heat island effect, retaining rainwater, conserving water for drought seasons, and trapping CO₂ from the atmosphere. Collectively, methods such as permeable pavement that absorb and retain stormwater can impact the **Economy** and aid in saving time and money in flood damages, storm drain fees, and installation costs. Since

Permeable pavement has a longer lifespan than concrete repair, maintenance will cost less. There'll be a reduction in fertilizer since rain gardens require less than continental lawns and less maintenance. Since wetlands filter and clean water, the cost of drinking water treatment is reduced.

TIMELINE:

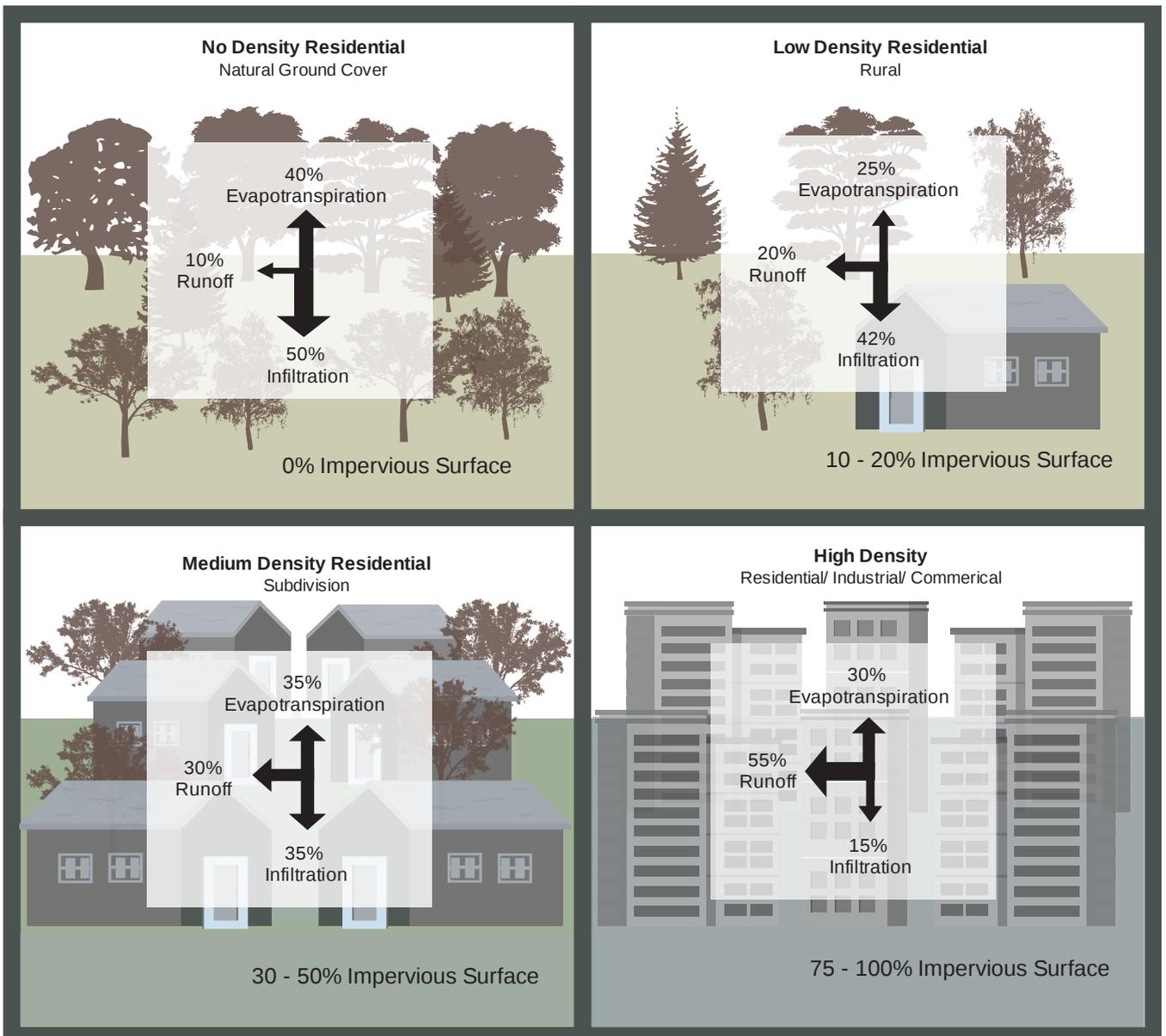
The installation time of techniques to mitigate stormwater will vary depending on the scale it will be implemented at, and testing will be beneficial to be able to produce an efficient solution.

The following section will include actions and implementation that can be taken immediately to six months and will be considered short-term. Advertisement of stormwater management solutions



to residents, businesses, and local government is a starting point for testing and construction. The idea is to promote the benefits of stormwater management including cost mitigation aimed towards residents and businesses and the provision of potential rebates. The first implementation of techniques for stormwater management within a **residential street** that will test its

effectiveness and capabilities for further development, and set a baseline for future implementation across the neighborhood of South Wedge. It aims to gather community support to be further implemented along other residential streets. The test will include the implementation of rain barrels for rain water collection, rain gardens to limit runoff and hold water, and permeable pavers that





consist of grass pavers. The introduction of green spaces among **commercial streets** will help reduce and mitigate runoff in the area. It also seeks to expand the sidewalk.

An implementation of permeable pavement for stormwater management for a single **parking lot** will test its effectiveness and capabilities for further development, and set a baseline for future implementation across the parking lots and spaces of South Wedge. It aims to be an example for other parking lots as well as an advertisement to the concept of permeable parking pavements across the city of Rochester.

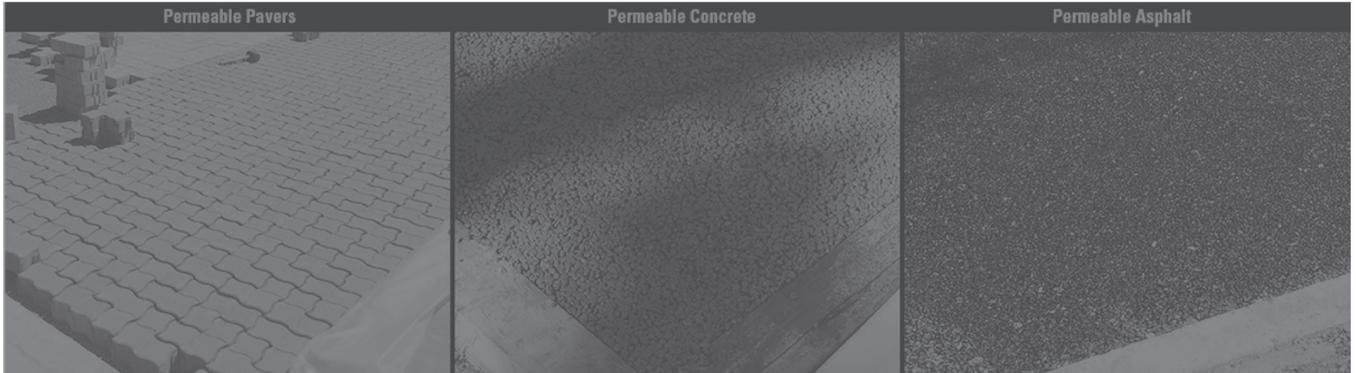
The test consists of implementing different pavement types to determine which is most suitable for the area, determining methods for maintenance, determining the feasibility of the concept to be further implemented across the city of Rochester, and excavating and installing permeable pavement (a month of construction). To limit the runoff towards the Genesee River, the **parks** will have to have some form of runoff mitigation in order to limit the occurrence of flooding and limit polluted water to contaminate the river.

The test will include the implementation of wetlands along the trail, rock walls to the rims of the riverside, vegetation and permeable pavement, and bioswales for stormwater retention and filtration.

The following implementation will take more than one year and will be considered



long term. The first is the implementation of the proposed designs onto the neighborhood at a larger scale (i.e. the remaining residential streets, parking lots, commercial streets, parks). The second is maintenance of permeable pavement will be required, therefore an established schedule will have



to be proposed and set in order to arrange a route across the neighborhood. Next is the tracking of data post-implementation of proposals on the neighborhood to conclude its effect on the Genesee River, and its ability on run-off and flooding prevention. Lastly, results will begin to emerge as a base example for other neighborhoods in Monroe county to gain interest for implementation.

FUNDING:

The Stormwater Coalition of Monroe County consists of 29 municipal members working together to meet state and federal stormwater regulations. The group has a wide range of programs and projects that they execute. Firstly, Construction & Post-construction Site Runoff Control they apply assists in developing, implementing, and enforcing a plan or program that controls activities of new development and redevelopment projects or ongoing construction projects. They distribute educational materials and outreach activities that inform the public about the impacts of polluted stormwater runoff can have on

water quality through Public Education and Outreach. They provide opportunities for citizens to participate in the development, implementation, review, and revision of the stormwater management program such as establishing public hearings and encouraging citizens to participate in the stormwater program process through public participation and involvement. They apply pollution prevention and good housekeeping by developing and implementing a program to prevent or reduce pollutant runoff from municipal operations. Lastly, through development and implementation, the group is able to enforce a plan to detect and eliminate illicit discharges.

The Community Impact Grants provide funding for projects that address environmental and public health threats in low-income and minority communities, such as a large number of regulated facilities, contaminated sites, noise, air, and water pollution, health problems, and a lack of green space and waterfront access. With \$4.1 million available, organizations can apply to receive up to \$100,000 in funding.



STAKEHOLDERS:

Stormwater Solution LLC - A women-owned Business Enterprise established in 2003. They operate in the Environmental Consultant business/industry within the Engineering, Accounting, Research, and Management Services sector. One of their tasks includes providing innovative consulting services to the design and construction industries to ensure compliance with State and Federal stormwater regulations. They uphold qualified construction site inspection for erosion and sedimentation.

Trimline Landscape Management - One of the most respected landscape maintenance companies in Rochester NY, as well as the surrounding Western NY region for over 20 years. Using the best equipment and well-trained staff in the WNY region, Trimline offers a full range of lawn and landscape services. They have a majority if not all of the necessary licenses to improve or maintain landscape such as licenses for fertilization, weed control, pest control, etc.

Monroe County Department of Environmental Services - An organization that focuses on advanced wastewater and solid waste management in Rochester. Their mission is to control the sheer magnitude of industrial and residential solid waste and wastewater generated by our society demands a coordinated, comprehensive, and forward-looking approach. They established

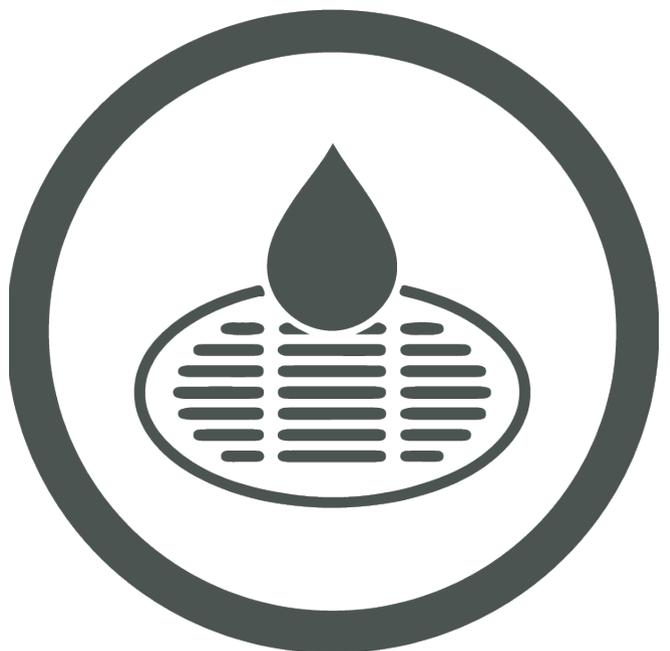
a program called the “Combined Sewer Overflow Abatement program” (CSOAP) which utilizes the underground wastewater tunnel system to improve the quality of Rochester area waters by virtually eliminating the 60-70 annual sewer overflows.

CONCLUSION:

Stormwater and waste management solutions will have real impacts on the South Wedge neighborhood as it attempts to combat climate change impacts on a neighborhood scale. While both approaches address differing aspects of climate change being increased rates of rainfall and how to mitigate this, and also a means of diverting organic materials such as food scraps from local landfills with steadily increasing pressure to remove pollutants, both solutions offer the neighborhood accessible mitigation efforts. Stormwater management provides a solution that gives the neighborhood the means to address increasing rainfalls and the flooding and damages to infrastructure and buildings that occurs as a result by implementing permeable pavements, rain gardens, rain barrels, and constructed wetlands to divert this water from asphalt or to utilize it as a resource. This solution aims to improve existing greenspace, improve air quality, and many other aspects of the environment including lowering the urban heat island effect. Waste management



and composting addresses the need for a community led composting service to divert a large portion of solid waste from local landfills and provide incentive for local residents to participate. The program aims to improve on existing projects while also better serving the residents of the South Wedge. An added impact is the creation of compost soil to be utilized by local farmers either in community gardens or by the general public in home gardens to address food desert problems within the area. Both these solutions prove to have a real impact on climate change, allowing the neighborhood to better mitigate these issues and both offering to create a greener neighborhood in the process.





SUSTAINABLE BUSINESS PLAN



PROBLEM STATEMENT:

The city of Rochester has developed an overarching Climate Action Plan to tackle climate change. However, there are ways that specific demographics can aid in the fight. More specifically, the neighborhood of South Wedge can make the first step by having the local businesses pledge to reduce their carbon footprint. Because the area does not currently have a collective sustainability plan, businesses that choose to incorporate green initiatives do so individually. It is more effective if all businesses in South Wedge take part in adopting green initiatives to reduce carbon emissions. Therefore, we created the South Wedge Sustainable Business Plan, which encompasses all businesses and encourages them to take care of their community.

Current businesses come in various shapes and sizes, from bars and clubs to general retail stores. There is currently no collective green pledge for businesses in South Wedge, and any businesses with sustainable practices do it because they want to. To get other businesses to join, it is important to provide them with incentives for why they should adopt green initiatives. The first reason is that sustainability is a growing concern. People are becoming more environmentally conscious, particularly millennials and gen Z, which are increasingly making up a majority of consumers.

Therefore it would be good for businesses to be more sustainable because they can cater to customers. This is also something that would give their brand a better image, and it is something they can include in their advertisements.

The last incentive is cost savings. Businesses can save money in the long run if they employ the outlined strategies, particularly energy use optimization and renewable energy. Currently, community gardens and recycling centers do exist in the neighborhood. However, adding more community gardens and composting centers in South Wedge will increase access to such green infrastructure as well as increase the likelihood of community members utilizing them.

SOLUTION STATEMENT:

Our plan is to have all South Wedge businesses pledge to be more green. To get them to do so, we created a framework that outlines the types of strategies businesses can use to reduce their carbon footprint. The plan also includes how community education can help grow awareness of the climate issue as well as incentives for business owners to employ the strategies. We will then apply our plan to specific businesses/buildings in South Wedge as well as demonstrate the estimated savings if such changes are adopted.



DESIGN PROPOSAL:

Encouraging businesses to recycle and compost when they can is one of the goals that we want to pursue. An idea we had is to set up a partnership between food businesses and community gardens so that businesses can donate their compost. Businesses are not very likely to drop off

their own compost, so there could be a pickup service where businesses leave their compost out to be picked up and delivered to the community gardens. This would make it easier for them and maybe they would be more likely to participate.

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We propose adding a community garden to the Genesee Gateway Park. This location is near businesses, houses, and apartment buildings, so both businesses and residents can utilize it. We also added composting facilities to all community gardens, including the proposed community garden at the park. It would be good to have more composting centers in the area so it would be easier for businesses to donate their compost. We also added two recycling centers, which would be recycling machines where you can get money back. The two locations we chose are Abundance Co-op and 999 Market. We chose these two locations because they are grocery stores in the neighborhood, and another idea would be to partner with them so that people can get discounts on their grocery purchases if they recycle. For example, if someone were to recycle 10 water bottles, they would get 50 cents off their purchase at Abundance. By creating infrastructures like recycling centers, community gardens, and composting



centers, people will have more accessibility to these things and become more accustomed, making it more likely for the community to use these centers.

The second part of our Sustainable Business Plan is the implementation of green initiatives in South Wedge local businesses. In order to understand the business makeup of the neighborhood, we collected data on the types of businesses there were as well as the scale of the businesses. A majority of the businesses are self-owned and range from a small to medium scale. As a result, different green initiatives would need to be applied to different sized businesses.

Firstly, there are general green initiatives that could be applied to all types of businesses regardless of scale. These include simple conservation strategies such as turning off lights and water when not in use, switching to more energy-efficient lights, using automatic faucets, and having digital receipts be the default option rather than paper receipts. Additional methods include



having recycling bins and using paper instead of plastic.

In order to give more individualized recommendations for green initiatives, the plan is applied to three types of businesses found in the area, which include retail and service, food service, and corporate.

For retail and service, we first analyzed the 999 Market and have proposed a plethora of green initiatives that can minimize 999 Market's carbon footprint. Above all else we recommend that 999 Market should utilize compostable materials for straws and utensils as this would avert a lot of waste that would end up in landfills. Secondly, it is critical that 999 Market buy items in bulk and avoid tossing its ugly produce. To avoid tossing ugly produce we recommend that it employ technology such as an app that can tell customers which produce are near the sell-by date, and offer discounted prices. This would minimize food waste and generate

more cost savings. Also, in our plan we would encourage 999 Market to sell its compost to the local community or foster its own compost center. This will promote sustainable energy use and get the community involved. Lastly, it should sell local produce, as it would greatly benefit local farmers and the surrounding community.

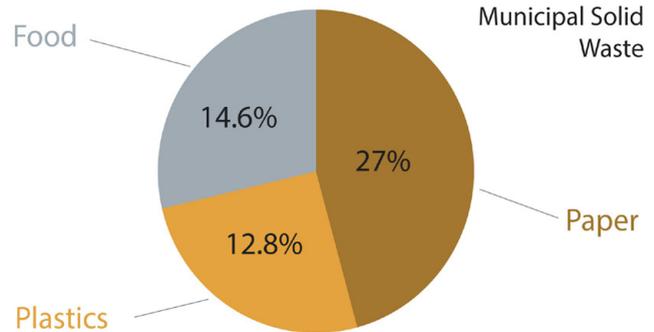
We also laid out a number of strategies for D&B Auto Service that can minimize their emissions. First and foremost, D&B should utilize floor sealants that prevent chemicals from leaking into the concrete by sealing floors with acrylics. This goes hand-in-hand with decreasing the need for harmful liquid cleaners and utilizing more "Environmentally Preferred" cleaners and oils that are bio-based. It is also important for D&B to also encourage and inform their customers that there are other alternatives besides conventional oils. In addition, it is pivotal for D&B to practice ethical disposal of harmful cleaners by employing waste oil heaters to eliminate the need for third-party disposal companies. Along with that, we recommend AC refrigerant recycling and reclamation, which allows for selling of recovered refrigerant gases to an outside refrigerant company. Lastly, a great way to minimize costs and energy is to use refillable containers rather than single-use containers.

As for food services, we focused





Rochester 2013
Municipal Solid
Waste



on John's Tex Mex and Boulder Coffee Company. A major goal we have for both businesses is to utilize locally sourced ingredients if they do not already. For John's Tex Mex, they seem to already use paper takeout containers, but we recommend that they switch from plastic to compostable materials for takeout utensils as well. Another idea is to offer a discount if people bring their own reusable container to pack up leftovers, or charge customers extra for takeout containers. This would encourage customers to bring their own reusable Tupperware to restaurants and discourage the number of single-use takeout containers used. Lastly, the restaurant can consider switching up the menu and offering seasonal products. Eating seasonally is yet another small way to reduce carbon emissions because out-of-season produce travels a long way to reach grocery stores. By eating what is naturally in season at the moment, you are not contributing to long-distance transport of such food.

For Boulder Coffee Company, we recommend compostable cups to replace plastic-lined paper cups, and paper or compostable straws to replace plastic ones. We also suggest that plastic stirrers no longer be offered. Instead, they can offer dry spaghetti, which is a great compostable alternative. Similar to our recommendation for John's Tex Mex, we also suggest that Boulder Coffee offer customers a discount if they

bring a reusable thermos or charge extra for takeout cups. Lastly, Boulder Coffee should use organic fair trade coffee beans if they do not already, as this type of coffee is better for farmers as well as the environment.

The last type of business we focused on is corporate businesses, and the first one we chose is Postler and Jaeckle Corporate, which is a mechanical contracting firm that focuses on HVAC and plumbing, fabrication, installation and maintenance, and construction work. We suggest strategies such as employing solar thermal energy to drive air conditioning, using lubricant wisely to reduce friction and waste, and using floor systems that seal the floor to prevent chemical fluids from soaking into the ground. In addition, we suggest that they recycle waste such as steel, as it can be endlessly recycled and reused. Additional suggestions include using fewer disposable plastic bottles, installing water foundations and water coolers for employees, changing out vending machines that provide drinks



in plastic bottles, and installing green walls inside offices to purify the air. It is important for employees to be active in the fight against climate change too, so employees should be educated on how to be more personally sustainable. This can start with something as simple as targeting mode of transportation to work. Employers can set up carpooling for employees to reduce carbon emissions.

The second corporate business is Masline Electronics, which deals with household appliances, electrical and electronic goods, and the wholesale industry. Sustainable initiatives include sustainable electronic packaging such as mushroom packaging, where mycelium can serve as a natural glue for electronics. Other sustainable materials include GEAMI, which is a recyclable alternative to bubble wrap, and green cell foam, which is made from corn. Lastly, we recommend they recycle paper packaging and shipping boxes as well as electronic waste.

Our last corporate business is PrintRoc, which is a commercial printing company. Sustainable strategies include utilizing sustainable packaging and installing solar panels to drive equipment. They can also use vegetable-based inks as an alternative to petroleum-based inks. Additional sustainable initiatives include using organic neutralizing solutions and filters to prevent

contaminating local groundwater and soil. The last recommendation is to use eco-friendly printers that recycle scrap paper into newsprint, which requires much less energy, water, and chemical treatments compared to recycling into white paper.

BENEFITS:

EQUITY:

Under the South Wedge Sustainable Business Plan, residents will have equal access to locally grown foods at community gardens as well as green infrastructure like recycling centers. A coalition among all businesses in South Wedge will create a sense of inclusivity as well as foster a space to help others if needed. Because making the switch to more sustainable materials for supplies such as take-out containers is more expensive, it is important to prioritize funding for smaller businesses that may have a more difficult time with making more expensive changes. The creation of community gardens and recycling centers can improve equity in South Wedge by creating a space that improves community access to naturally grown foods as well as providing food for those in need. The installation of new green infrastructure can equalize access to recycling facilities local residents previously did not have access to.



ENVIRONMENT:

Throughout the South Wedge Sustainable Business Plan, the environment is of the utmost importance. At its essence, our plan sets out to promote positive changes that can be implemented in South Wedge to tackle the climate crisis. In order to accomplish this goal, businesses must implement sustainable changes, which will in turn lower emissions and minimize carbon footprint. The inclusion of community gardens in South Wedge will promote sustainable agriculture that can have inherent benefits to the community. It is also proven that community gardens reduce food transportation costs, reduce water runoff, and improve the overall local ecology. It is also important to note that community gardens strengthen the sense of community, which in turn encourages residents to support greener ways of living.

Along with community gardens, the plan for composting centers will also impact the environment in positive ways. Composting

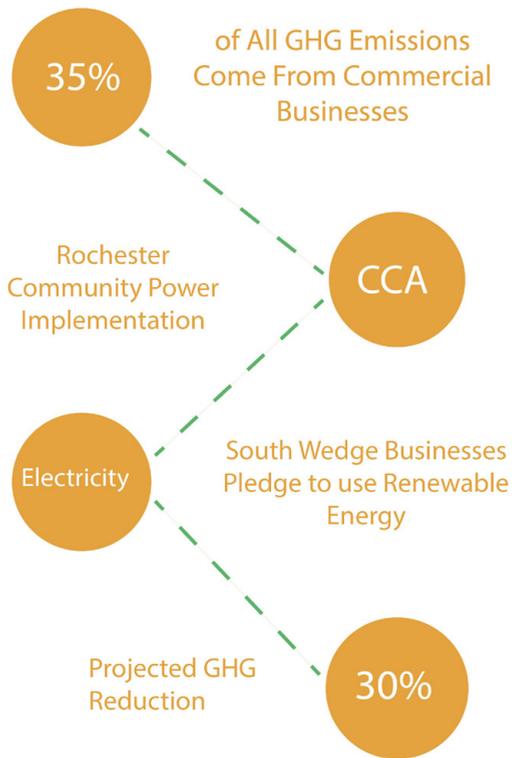
enriches the soil for future farming and reduces the need for chemical fertilizers. Alongside community engagement strategies, the plan also includes renewable energy, recycling, and energy efficiency upgrades that businesses in South Wedge can employ to reduce their emissions.

ECONOMY:

The South Wedge Sustainable Business Plan provides the opportunity for businesses to cater to a new customer base with a focus on operating in a more green fashion, possibly increasing the business district's economy. Research shows that "88% of companies found that companies that adhered to social or environmental standards showed better operational performance, and 80% of studies showed a positive effect on stock price performance" (Choi, 2017). Creating an environmentally-friendly brand image can be beneficial as well as developing a customer base that may draw in outside foot traffic.

TIMELINE:

The first aim of action is to introduce the plan to all businesses in South Wedge. Because some businesses are part of the Business Association of the South Wedge Area (BASWA), it will be easier to connect with some business owners. As for the rest, volunteers would need to go door-to-door



to introduce the plan to business owners. It would also be useful to do a preliminary survey with business owners to see how many are interested in joining the pledge as well as see why a business owner may not want to join. After all business owners are aware of the plan, an educational community workshop can be scheduled where interested owners can learn more about the South Wedge Sustainable Business Plan and specific changes their business can adopt. A business owner can volunteer to use their workplace for the workshop location, and it can occur after work hours or on weekends. This series of actions would take approximately one month, depending on the number of volunteers to conduct door-to-door

introductions.

BASWA office looks to be permanently closed, but there can be online informational workshops for the time being. Another option is to find a business owner to agree to using their space after-hours to host a workshop, and volunteers can print fliers and hang in the neighborhood to advertise as well as go door-to-door to encourage workshop attendance. A significant portion of our proposed green initiatives can be implemented relatively quickly as most of them apply to small-medium-sized businesses and involve daily energy consumption habits and switching to compostable or recyclable materials. However, businesses would need to continue using whatever existing supplies they have until they order such sustainable supplies, and some may need funding to make this change. Larger-scale changes such as the switch to solar energy would be long-term because corporate businesses would need to acquire funding for this expensive investment.

FUNDING:

Our plan is to apply for government grants for funding. There are numerous grants that exist to serve projects like this. For example, Community Impact Grants is a New York State grant in which \$4.1 million in government grants are available for community-based organizations to



fully or partially fund projects that address environmental justice. In addition, the Office of Energy and Sustainability (OES) looks for ways to adopt more sustainable practices through conserving and restoring natural resources, creating a safer and healthier and greener community. OES grants and incentives to energy and sustainability projects that align with these goals. Finally, we would seek out funding from the Community Foundation, which has offered \$547 million in grants since 1972. It focuses on two main goals: creating an equitable community and strengthening the region's vitality. The South Wedge Sustainable Business Plan will focus on the sub-goal of advancing environmental justice and sustainability.



STAKEHOLDERS:

Our main stakeholder is the Business Association of the South Wedge Area (BASWA), which is a non-profit association founded in 2003 that consists of owners and residents from South Wedge. They aim to improve the South Wedge commercial district. The service area is located primarily on the commercial strips of South Avenue from Byron Street to Highland Avenue, Mt. Hope Avenue from Byron Street to Highland Avenue, S. Clinton Avenue from Byron Street to Gregory Street, and Gregory Street. All of the businesses listed in our framework are located within their service area.

Secondly, we want to work with local businesses in South Wedge. The local businesses that have an impact on the local environment and infrastructures are considered stakeholders. These stakeholders are often the internal stakeholders, such as employees, managers, owners, etc., as well as the South Wedge Planning Committee (SWPC), which is a non-profit neighborhood association that encourages a commercially viable urban village. It is also a partnership of neighbors and entrepreneurs working together. Lastly, local residents are crucial stakeholders in our Sustainable Business Plan. The South Wedge community is made up of the residents who live in this area where these businesses are located. The neighbors to these businesses are concerned



with the local environment, and these businesses have an impact on jobs and the local economy.

CONCLUSION:

This plan is developed for businesses and stakeholders to evaluate and find alternatives for making the local environment more sustainable. The neighborhood is influenced by this plan since local businesses have impacts on jobs and local environment.

This plan is crucial to mitigate and reduce energy consumption and carbon emission of the built environment in one specific neighborhood. As a neighborhood-scale plan, the process of applying the green initiatives is embedded in a built environment, which requires stakeholder collaboration settled in our plan to achieve the sustainability goals. For example, the collaboration with BASWA is essential in connecting with businesses in order to share our plan with the business owners in South Wedge. Our plan also focuses on the Three E's, the impact on equity, environment, and economy. While improving the economic and environmental conditions of South Wedge, this plan also impacts equity through the creation of community gardens and recycling centers. The goal of the South Wedge Sustainable Business Plan is to alleviate the effects of climate change by encouraging businesses in the South Wedge area to adopt green initiatives.





CONCLUSION

Climate change is a major issue that will affect all neighborhoods of Rochester, The South Wedge is no exception to this and mitigating climate change here will be important to this neighborhood's continued success in the future. Through the growth of the global population and technological advances, the consumption of non-renewable resources, land use, and many other factors these contributing elements have led to the climate crisis that is projected to create catastrophic consequences for life on Earth. Different initiatives are already being set up in other cities across the globe in order to plan for the future of our climate and build in a direction which helps the environment, rather than damages it. While the governments of the world are busy trying to hold large polluters responsible for the worsening conditions, it is up to local governmental groups and local designers to drive the importance and creation of community driven environmental mitigation through environmentally conscious design. Planners and designers hold an ethical responsibility to address and improve upon the flaws and shortcomings of the built and natural environments of the inherited world. Although the impact may not be as severe here as in other parts of the world, the neighborhood still has a responsibility to reduce its carbon footprint. The changes outlined in this report will require significant time and investment, but we believe they are worth the efforts. These changes will not only reduce emissions, but also improve the quality of life for residents in the neighborhood. Thanks are in order to all of the students and University at Buffalo staff who have made the compiling of this report a reality. Without the combined efforts of all of the students of END450 this report would not have been possible. We would like to thank Climate Solutions Accelerator and the South Wedge Planning Committee in particular for the information that they provided to us all. The insights provided by these various organizations helped to form the backbone of this action plan. We hope that our suggestions, as outlined throughout this action plan, can help these organizations to improve an already wonderful neighborhood and make it the envy of other areas in regard to climate change mitigation.



**HOUSING/
MIXED USE**



**MICRO-
MOBILITY**



**WALKABILITY/
GREENSPACE**



**WASTE/
STORMWATER**



**SUSTAINABLE
BUSINESS PLAN**

Timeline

The proposals outlined in this action plan range from a short term to long term and have variations in the length of completion. Located in the “Can Happen Now” section of the timeline are climate mitigation solutions that can be implemented with relative ease, little funding, and minimal community inconvenience. Measures like community workshops, analysis of pedestrians, and the initial purchase of rain barrels are uncomplicated community engagement efforts that serve to engage the South Wedge community in subtle ways focusing on voluntary interest. Looking forward into the future of the South Wedge and its community driven climate mitigation efforts we see that longer term proposals that take active community effort by both public and private parties. The installation of signage and planting of rain gardens, construction of new crosswalks and a roundabout, the purchase of E-bikes and E-scooters and installation of charging stations, and the retrofitting of homes with more sustainable energy saving measures are all more invasive and costly to the South Wedge community. Each of these long-term proposals outlined in this action plan require more than six months to complete, but are designed to go far beyond this timeframe becoming more popular in surrounding neighborhoods. As each of these climate mitigation proposals gains support the South Wedge neighborhood will stand as an example to the greater city of Rochester, and even the rest of the country, as a vibrant community focused on bettering the lives of its residents through climate mitigation strategies.

Project Timeline







Thank you!

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