

Wasted Space

by
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Abstract

This paper performs a spatial analysis of Portland, Oregon, with a focus on identifying and utilizing "wasted space," such as parking lots and vacant land, as strategic opportunities to enhance the completeness of the city. The planning concept of a "complete neighborhood" is defined as a locality that offers residents access to all essential aspects of daily life within a convenient walking distance. This notion encompasses elements, such as walkability, accessibility to essential services and amenities, sustainability, and equity. The objective of this study is to provide a more precise definition of the planning concept of a complete neighborhood and explore the implications of such specificity. The research utilizes regional, town, and neighborhood centers as defined by the city of Portland as case studies. These centers are described as compact urban areas that serve as anchors for complete neighborhoods, incorporating retail stores, businesses, civic amenities, housing options, health clinics, employment centers, and public gathering places. Through these case studies, the paper investigates the potential for using wasted space to create complete, walkable neighborhoods. To help readers grasp the possible outcomes of repurposing wasted space in a socially responsible manner, the study employs architectural images to visualize the potential impact on neighborhoods throughout Portland and the United States.

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Intro

The complete walkable neighborhood provides residents with access to all their daily needs within a convenient active transportation trip. Generally, if you can access things like groceries, employment, education, healthcare, parks, and social spaces (Capasso Da Silva et al., 2019; Center for Disease Control and Prevention, 2017; City of Kirkland, n.d.; City of Portland, n.d.; McNeil, 2011; Peters, 2020; Steuteville, 2021) within 20 minutes of non car travel then, you live in a complete neighborhood. For planners, creating a complete neighborhood requires the right balance of density, land uses and infrastructure (Center for Disease Control and Prevention, 2017; Dovey & Pafka, 2020; Ferrer et al., 2015; Gunn et al., 2017; Lindelöw et al., 2014). Residents and the amenities they use in their daily live must be concentrated near each other and there must be active transportation infrastructure connecting people’s homes with amenities. Only in the last ten or so years has this idea become codified in city plans to create complete, walkable neighborhoods.

The complete neighborhood is an interesting concept with good ideas and good intentions. This paper argues the current concept is timid and it suggests that the status quo of American Urban form is already complete or nearly complete. This paper expands the concept in a way that raises the standards for convenience, access, and completeness within the “complete neighborhood.” The paper begins with an introduction to the concept as it is currently defined, followed by a critique and expansion of the ideas within the concept. From there is paper looks at underutilized and unused spaces within Portland, Oregon such as parking lots and vacant land. Portland has repealed its parking requirements for almost all new development. This now frees up significant portion of land within the city that is currently dedicated to surface parking to be used for infill development of housing and commercial space. A spatial analysis inventories the amount of land used for surface parking along with the amount of land considered vacant by Oregon Metro (2022). This research then looks at neighborhood, town and regional centers as defined by the city of Portland as case studies. Case studies are used to understand the capacity that wasted space like parking lots and vacant land offer to create complete, walkable neighborhoods within these centers. As cities create plans to be more sustainable and equitable, using wasted space to create complete neighborhoods will be essential in meeting goals and reaching desired outcomes.

The Complete, Walkable, __ Minute Neighborhood

Completeness

This section will describe the complete neighborhood in its current state, outlining the general measurements of access and the locations and services that should be convenient for residents to get to. The complete neighborhood goes by many names like the 20 minute neighborhood, 15 minute city, and aligns with multiple other planning concepts including smart growth and new urbanism. The complete neighborhood is a planning concept used to measure the level of access or walkability of an area. The idea originated in Portland with the 20 minute neighborhood in 2010 (Capasso Da Silva et al.,

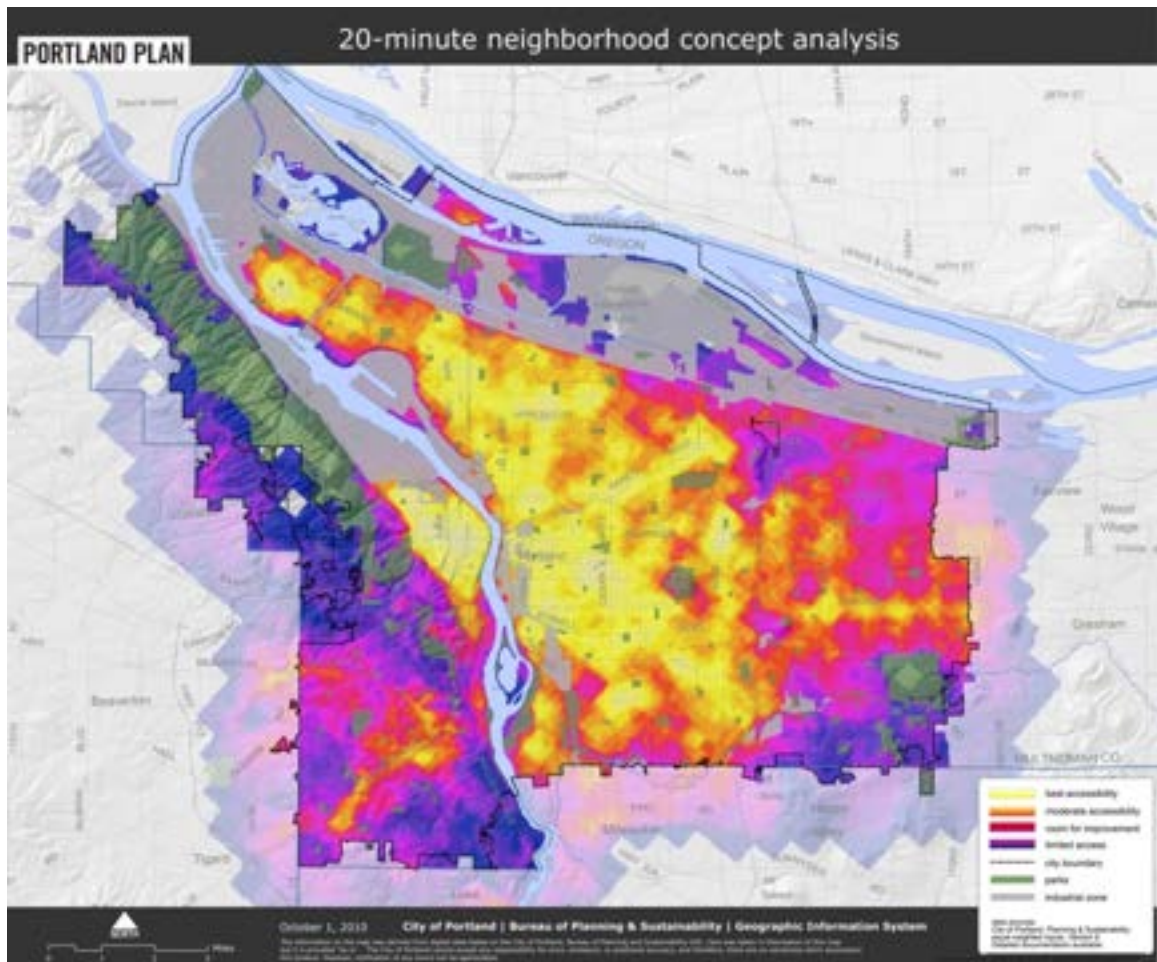


Figure 1 heat map representing completeness within the city of Portland. Credit: City of Portland

2019; McNeil, 2011; Steuteville, 2021). The concept was introduced by the planning firm, Gerding Elden. The firm states that the goal is to create a walkable environment that allows residents to reach necessary destinations by foot in 20 minutes or less. The firm adds that 20 minutes by biking or public transit is also reasonable (McNeil, 2011). Many of the complete neighborhood plans call for access to specific uses such as grocery stores, convenience stores, retail, restaurants, schools, and parks (Capasso Da Silva et al., 2019; Center for Disease Control and Prevention, 2017; City of Kirkland, n.d.; City of Portland, n.d.; McNeil, 2011; Peters, 2020; Steuteville, 2021). The complete neighborhood can be defined as a neighborhood “that allows residents to access most activities required for a good living within [] minutes of walking, biking or taking transit from their home” (Capasso Da Silva et al., 2019). This means having active transportation connections between home, work and play (Dovey & Pafka, 2020) that are practical and dignified. Complete neighborhoods intend to reduce urban sprawl and dependency on automobiles by encouraging walking, biking, or taking public transit (Capasso Da Silva et al., 2019; CBC News, 2019; City of Kirkland, n.d.; Peters, 2020; Steuteville, 2021). Although, the amount of time between home and necessary destinations in the complete neighborhood are not

based on a population's willingness to walk, bike or ride transit, but on an arbitrary amount of time deemed reasonable by a firm. Ferrer et al (2015) found that those who prefer taking their car for trips were less willing to walk 10 to 20 minutes than those who prefer active modes. If planners intend to be effective in reducing vehicle use and inducing use of active modes of transportation, proximity of destinations from home must align with the amount of time residents, particularly drivers, are willing to travel. Gunn et al (2017) studied pedestrian behavior and found that participants were not willing to walk over 10 minutes to places such as grocery stores, restaurants, and other small food retailers.

Walkability

According to Dovey and Pafka (2019), "walkability is a nebulous term that is best understood as an aspect of urban intensity that is open to interpretation." Lindelow (2014) defines walkability as "any planning related factor that affects people's propensity to walk." Dovey claims that the term walkability emerged in the 1960's in response to the urban revolution initiated by Jane Jacobs. Although Jacobs never used the term "walkability," her key principles of vital urban life aligns with the concept (Dovey & Pafka, 2020; Peters, 2020; Speck, 2012). Those researching walkability (Center for Disease Control and Prevention, 2017; Dovey & Pafka, 2020; Ferrer et al., 2015; Gunn et al., 2017; Lindelöw et al., 2014) generally focus on three main planning areas to create walkable conditions: density, land use and access. These variables are used by companies like Walkscore and ratemystreet to measure walkability (Dovey & Pafka, 2020). Dovey and Pafka refer to these variables as the Urban DMA (density, mix, access) and argue that these three variables work in synergy, "all are necessary, and none are sufficient alone." Density is a key property of walkability. It allows, or disallows, the concentration of people and places within walkable distances. It is an "interrelated assemblage of buildings, populations and street life" (Dovey & Pafka, 2020). Land use mix influences the distances between residential, commercial, industrial uses and green space. Dovey and Pafka describe land use mix as a "live, work, visit triangle," a concept that views these three variables "not as standalone functions, but in relation to each other." Access enables or constrains pedestrian activity, and without a reasonable pedestrian network the other two variables will not work. Lindelow (2014) created a hierarchy of walking needs that begins with feasibility at the top, followed by accessibility, safety, comfort and pleasurable.

Institutions such as the Center for Disease Control and Prevention (2017) recommend making changes to the built environment that support active modes of transportation to improve public health. Countries where active transportation is the primary mode of getting around the city have the lowest rates of obesity (Ferrer et al., 2015). Encouraging walking and rolling by providing the appropriate infrastructure can also address other prevalent conditions such as cardio vascular disease (Lo, 2009). Feelings and perception of safety can also be improved by creating active, walkable places (Speck, 2012). Reorganizing the space of streets in a way that reduces vehicle speeds will also help to improve safety for those on the street who are not in vehicles.

Walkable cities are also sustainable cities. Local governments across the world are adopting climate action plans to combat and reverse climate change. These plans generally call for the reduction of green house gas emissions, addressing urban heat and creating infrastructure to adapt to an increasingly extreme climate. In the United States, transportation is the largest emitter of green house gasses (EPA, 2023). Providing people with more efficient and carbon free transportation options, like walking, biking and electrified public transit, are needed for cities to reach their emissions goals.

Communities can be developed through the creation of pedestrian spaces. Creating active and vital spaces provides more opportunities for neighborhoods to connect and communities to form. The City of Kirkland, Washington claims that “pedestrian activity and local gathering places build social cohesion.” Active, walkable places are capable of connecting neighborhoods and improving quality of life. Research has found that residents living on light traffic streets have three times as many friends as those who live on busy streets (Speck, 2012).

There are significant economic benefits for residents and businesses near active transportation infrastructure. In Denver, walkable neighborhoods are valued at 150% of what sprawling neighborhoods are. New York, invested \$10 million in bike infrastructure and saw a \$130 million return in social benefit (Speck, 2012). Closer proximity results in higher economic production and businesses can benefit from an increased ability to innovate, create and share knowledge (Dovey & Pafka, 2020).

Most importantly, walkable cities are equitable cities. Those who rely on active modes of transportation most are low income people of color. Cities that have more transit options have less income inequality (Speck, 2012). Governments must ensure equitable access to active modes of transportation throughout the city.

Critique and Expansion of the Complete Neighborhood

The complete neighborhood is an interesting concept with a lot of opportunity to build upon. In this section I will critique elements of the complete neighborhood that I find to be too timid to fully accomplish the stated goals of the concept. The multiple active modes of transportation specified in the concept complicate the measurement of completeness. The current version of the complete neighborhood specifies broad categories of essential services and amenities that residents must have convenient access to. I will attempt to unpack the more specific services and amenities that are included within the broad categories. Finally, I will challenge the concept of the complete neighborhood to not just provide convenient active transportation access, but also guarantee the use the essentials described.

Convenient Access

The complete neighborhood is currently defined by the amount of time it would take an able bodied person to walk, bike or take transit to their destination. It may take a disabled person or someone who uses a mobility device longer to travel that same distance. For the remainder of this paper the terms walkable, or pedestrian are intended to describe people of all abilities including those using mobility devices. The distances covered between walking, biking and transit varies greatly. For an able-bodied person, 20

minutes of walking might be about one mile, 20 minutes of biking might be two miles, while 20 minutes on transit could be four or more miles, yet all of these modes are grouped together in the same measurement of access. Because of the significant variation of distances between modes, critics claim that the complete neighborhood is not a planning standard as much as “an open to interpretation goal” (Steuteville, 2021). To these points, the complete neighborhood claims that if a person can access their essentials within a 15 or 20 minute trip in one direction, then their neighborhood is complete (CBC News, 2019; City of Kirkland, n.d.; City of Portland, n.d.; McNeil, 2011; Peters, 2020; Steuteville, 2021). As a pedestrian myself, I do not consider a 15 or 20 minute one way trip as convenient or walkable. Measuring these as round trips, the neighborhood then becomes a 30 or 40 minute neighborhood. This proximity between home and essential destinations will not encourage walking, especially for those who drive, considering the round trip in a car may take only ten minutes. A convenient walk can be subjective and varies depending on factors like age and ability, weather, and the type of destination but is often considered to be a five to ten minute walk (Ferrer et al., 2015). For older residents or those with mobility challenges a convenient walk may be closer to three to five minutes. Measures of convenience should also consider experience driven factors like safety, comfort, and accessibility (McNeil, 2011). This relates to the quality and availability of pedestrian infrastructure like sidewalks and marked crosswalks. Additionally, roads must have calm drivers and protect pedestrians on sidewalks with physical barriers like parked cars, bollards, or walls. Even confident bike riders prefer to routes with less exposure to drivers (Broach et al., 2012). In order to effectively reduce vehicle miles traveled and get people out of their cars, walking must take less time and be more convenient and enjoyable than driving. Only then will people choose not to drive.

Services & Amenities

The current version of the complete neighborhood specifies some broad categories of amenities and services as necessary or essential. These categories include grocery stores, places of employment, schools, parks and green space, civic and community centers, healthcare and transit options (Capasso Da Silva et al., 2019; Center for Disease Control and Prevention, 2017; City of Kirkland, n.d.; City of Portland, n.d.; McNeil, 2011; Peters, 2020; Steuteville, 2021). The following section will specify in further detail what access to these broad categories means in practice and in neighborhoods.

When a neighborhood has a single grocery store, health care provider or place of worship within a convenient walking distance, that does not mean that these individual services and amenities make the neighborhood complete for all residents. In places with high proportions low income or BIPOC residents, a grocery store like whole foods will not meet the dietary or budgetary needs of all. The complete neighborhood must then require that residents are able to walk to essentials that meet their culturally specific needs. In this example, for the area to be complete, that may mean having multiple grocery stores that provide culturally appropriate ingredients for the African American, Asian, Hispanic/Latinx and conventional American or Northwest diets. The same is true for health care. If a neighborhood has an LGBTQIA+ community, to be complete may

mean having walking access to a health care provider that specializes in working with this community or one that the community feels safe and comfortable receiving care from.

The new, further defined version of the complete neighborhood aims to provide convenient walking access to civic spaces, which can include banks, post offices, libraries, city halls and other government offices. The complete neighborhood should enable residents to participate in decision making processes, engage with elected officials, and organize around topics that are important to the community. In practice this may mean having satellite government and planning offices located within each neighborhood to allow residents to be able to conveniently walk to places of civic engagement. In Oregon and other states that do mail in ballots, this means that each neighborhood has a ballot drop off that is accessible within a convenient walking distance. The complete neighborhood should provide convenient walking access to resources and opportunities that empower residents to engage in civic life and shape the future of their neighborhood. This is critical for fostering a complete and inclusive neighborhood for all.

The complete neighborhood provides education opportunities within a convenient walking distance. This requires having public schools, libraries and community learning centers located within each neighborhood. Does this mean that each neighborhood needs to have an elementary, middle and high school within its boundaries? Yes, otherwise the neighborhood is complete only for families with children of a certain age. This is also necessary when considering efforts to provide children with safe routes to school.

The complete neighborhood provides healthcare services within a convenient walking distance. This includes, hospitals, clinics, emergency rooms, dental care, eye care, specialized treatment, and even healthcare for pets. Hospitals are unique in this discussion because many who arrive to the hospital do so via ambulance. Even in a car free future there will still be a need for emergency vehicles like fire trucks and ambulances. If emergency vehicles can arrive to a home within a five minute drive, and take someone to a hospital within a five minute drive, this will help to improve completeness and safety for residents.

The complete neighborhood does not include policing as an essential service to have convenient access to. In the complete neighborhood, residents can decide for themselves how they would like to keep the neighborhood safe, which may mean alternative and abolitionist practices of community safety and harm reduction.

The complete neighborhood provides residents with convenient walking access to social and cultural resources. This includes community centers, places of worship, parks, and cultural venues. The complete neighborhood should provide a built environment that allows for a sense of community to form through the use of shared spaces like community gardens, public plazas and other public spaces that can be used for gathering, playing, exercising, relaxing, forming community and political organizing. Although the complete neighborhood concept aims to improve equity and access for vulnerable or marginalized populations, people may still experience various forms of poverty due to larger systems and structures that produce inequality and discrimination. Because of this, the complete neighborhood should provide convenient walking access to services or mutual aid that cater to those experiencing poverty.

The complete neighborhood provides convenient walking access to a wide range of transportation options. This requires access to built infrastructure like sidewalks, protected bike lanes, bus or rail lines as well as the actual transit services. Streets need to be designed in a way that is comfortable for pedestrians to use. There should be space dedicated to protected bike lanes as well as for bus or rail. Mass transit in the complete neighborhood must be dignified, practical, clean, and safe for users. The complete neighborhood also provides access to shared mobility options like rentable bikes, scooters, and shared cars.

The complete neighborhood provides convenient walking access to jobs and other economic opportunities. This includes businesses and employers of all types which means zoning must allow for retail, hospitality, office, and non polluting manufacturing to name a few. The complete neighborhood allows residents to walk to their place of employment. Shifts to remote work will alleviate some of the pressure on neighborhoods to provide residents with walking access to jobs.

Car infrastructure often limits accessibility for those who are not in a car or who are not able to drive such as pedestrians, seniors, children, or the disabled. Cars also contribute to air pollution, noise pollution, traffic, and road violence. The complete neighborhood minimizes negative impacts of cars by providing multiple transportation options like walking cycling, public transit, micro mobility, and car and ride share. The complete neighborhood minimizes the amount of street space dedicated to cars and maximizes space for pedestrians, bikes, and public transit. It also promotes and supports carpooling, ride sharing, and vehicle sharing as a way to reduce space needed for private vehicles and to reduce vehicle miles traveled and emissions. This research proposes significant decreases in parking supply, to incentivize the use of other modes of transportation the complete neighborhood charges for on street parking. A parking benefit district can be created for the neighborhood. The money generated from parking is split between the city and the neighborhood and is used for infrastructure improvements like side walks, bulbouts at intersections, protected bike lanes, etc.

The complete neighborhood emphasizes equity and sustainability. Today, these are buzz words that have lost their meaning. But true sustainability and true equity are inherently anticapitalist notions. Sustainability seeks an alternative way of life, much different from our current linear, single use, exponential growth model that causes vast environmental destruction and loss of life. True sustainability prioritizes the environment and life over profit and economic growth. Equity seeks to address and repair the harm caused by settler colonialism, racial capitalism, patriarchy, and heteronormativity in a way that uplifts those who have been marginalized and excluded from economic, environmental, and social benefits because of their race, gender or sexuality.

Sustainability

The complete neighborhood places an emphasis on sustainability. This research argues that complete neighborhoods are designed to be resilient to the impact of climate change, including sea level rise, extreme weather, drought, and wildfire. In June of 2021 temperatures in Portland reached 116 degrees. Portland was the hottest place in the world that day. This extreme weather had impacts on transportation infrastructure as

lines that power street cars melted, and roads buckled from the heat. 60 people in the Portland area died from that heat wave (OPB, 2021). Reducing urban heat means removing asphalt and concrete wherever possible and replacing it with healthy soil for vegetation and trees that can provide shade to cool temperatures on streets and in homes.

The complete neighborhood should include water conservation measures such as rainwater harvesting, greywater recycling and low flow fixtures in all buildings. On average, over 30% of Oregon has experienced severe drought conditions for the last 23 years (OPB, 2022). To be resilient in the face of severe drought the complete neighborhood must use water more responsibly, not just in buildings but with our infrastructure as well. This again means removing impermeable asphalt and concrete surfaces wherever possible to allow water to be absorbed and stored in the ground. This ground water can feed the trees and other vegetation that provide shade and habitat for humans and non humans.

The complete neighborhood is built with sustainable materials that are locally sourced and recycled. The trees that are planted to reduce heat and increase shade can be sustainably harvested and used for the production of buildings and other products. This helps to minimize the environmental impact of construction and also encompasses a portion of the urban metabolism within the city's boundaries, more on this later. A complete neighborhood is designed and built to be energy efficient and net zero. It generates energy from solar or wind while also being efficient with how it uses energy. Buildings in the complete neighborhood use passive heating and cooling to reduce demand for electricity.

Equity

The complete neighborhood is one that provides all of life's daily essentials within a convenient walking distance. But the complete neighborhood is not just about providing convenient walking access, it's about providing an inclusive environment that supports the social, economic, and political rights of all residents. This means considering the culturally specific needs of residents as well as guaranteeing access to things like housing, healthcare, and nutritious food. A complete neighborhood is one that is inclusive and accessible to all residents, regardless of income, race, gender, and sexuality. A complete neighborhood provides safe spaces for those belonging to marginalized communities. This means providing inclusive and safe public places like streets, parks, transportation, and restrooms. By creating neighborhoods that are more livable and sustainable, the complete neighborhood aims to promote social equity, environmental justice, and public health. Uneven development and unequal distribution of environmental benefits in cities has created social and environmental problems that need to be addressed with urgency. The complete neighborhood offers a foundation to build a framework for creating more equitable and sustainable communities that prioritize the well-being of residents over profit and economic growth.

This research proposes increasing the supply of housing and commercial space by developing wasted space within neighborhoods. The housing proposed in these places should provide residents with a wide range of types and forms of housing. A complete

neighborhood provides non market, decommodified and guaranteed housing to those residents who cannot afford market rates. This type of housing will likely not be provided by for profit developers but rather by the city, regional, state or even federal government. Governments and agencies can provide housing for a range of incomes without needing to make a profit, enabling them to charge much lower rents or even providing housing for free. Governments can also create programs to help spur resident lead development within the neighborhood. In this scenario a group of soon to be neighbors pool their money together to purchase or develop a building that meets their individual and collective needs. This can be in the form of a community land trust, coop or potentially a combination of the two. This can be applied to commercial space too. Small, local businesses with limited capital should also have access to commercial space within the neighborhood, whether they can afford market rates or not.

In addition to the development of new housing and commercial space, this research also proposes improvements to active transportation infrastructure like bike, bus, and rail. These are all things that increase property values and as well as the risk of displacement for vulnerable residents. The complete neighborhood is one that protects existing residents from market forces that may increase their rent or property taxes and displace them from the area they consider to be home. If the complete neighborhood provides environmental improvements like more housing, more green space, and more amenities while within an exclusively market based political economy, those who cannot afford to be there will no doubt be excluded and displaced. Political Ecologies of Gentrification by Noah Quastel (2009) explores the political dimensions of gentrification processes and their impact on urban environments. They argue that gentrification must be understood as a political-ecological phenomenon. Quastel highlights the need to focus on political systems, power dynamics, and policies that support gentrification and that eco gentrification is a symptom of increasingly competitive neoliberal real estate markets. This has shifted the role of the state from providing social welfare to residents to providing business services and amenities (Quastel, 2009). Creating or becoming a complete neighborhood includes providing more housing, more green space, and more transportation options. All things that catalyze displacement of vulnerable local residents within market based systems of allocation. When thinking about how to prevent displacement while also increasing the supply of housing and green space within cities, it becomes clear that the market based solutions of neo liberal real estate markets will not be compatible. Providing housing and green space as commodities in a free market will always price out those who cannot afford to stay. In order to truly prevent displacement, cities must systematically ensure that housing is guaranteed throughout each neighborhood, that poverty is eradicated, and populations are no longer vulnerable to displacement but resilient in the face of change. If the complete neighborhood aims to integrate equity into its framework, marginalized neighborhoods and communities will need to be systematically protected from being displaced from areas that receive environmental improvements. The concept of the complete neighborhood can help to bring housing, transportation and environmental justice to marginalized neighborhoods that lack environmental amenities and access to daily necessities.

Equity in the complete neighborhood also includes decolonization. Decolonization addresses the historical and ongoing effects of colonization and settler colonialism on indigenous and other marginalized peoples, it addresses and repairs the ways that these communities have been excluded from the social and economic benefits of colonization and racial capitalism. Decolonization recognizes the ways in which colonialism has created racial and economic inequality, and how that inequality has shaped the built environment. Decolonization involves restoring power, control, and land back to indigenous people, which will have major implications for how land is viewed and used. This means the decommodification of land and other essentials, the stewardship of that land and a shift in economic and ecological paradigms. Decolonization can help to provide the resources and support that indigenous communities need to create neighborhoods that are inclusive, equitable and accessible. The conversion of wasted space presents an opportunity to reindigenize land within the complete neighborhood.

This further developed version of the complete neighborhood centers walking access, measures round trips and creates a density of residential and commercial uses that allow residents to reach their destination and come back home within 10 minutes. It maximizes space on streets for humans, minimizes space for cars and provides a range of shared transportation and mobility options. This new version of the complete neighborhood provides culturally appropriate and non market options for housing and commercial space, guaranteeing that any and all incomes and cultures have opportunities to live, work, play or learn in the neighborhood.

Wasted Space

Wasted

1. used or expended carelessly, extravagantly, or to no purpose.

Similar: squandered, misspent, misdirected, misused, unnecessary

Oxford dictionary

Space

1. a continuous area or expanse which is free, available, or unoccupied.
2. the dimensions of height, depth, and width within which all things exist and move.

Oxford dictionary

What does “wasted space,” the namesake of this thesis, mean? Moran & Berbarry (2020) provide a unique definition of space that is relevant to this research and critical in its essence. They define space as “subsumed, irrational, unevolved, impoverished, dangerous, ugly.” They provide this definition in the context of urban renewal and revitalization that intends to beautify blighted space and create a place, a process which often, or always, displaces the marginalized residents that call the “blighted” area home. They go on:

“Neoliberal process that label spaces as underused and undesirable and illuminate the ways that such processes of dehumanization also reify processes of settler colonial gentrification under the capitalist guise of revitalization...the dehumanizing process of settler colonial gentrification erases the reality that the places we consider our own for unmaking are just reconfigurations of stolen places that meet the unquenchable capitalist needs of settlers”

The point that Moran and Berbarry are making is that attempts by jurisdictions and private organizations to “revitalize” or “beautify” spaces and places does not address the structural processes that lead to the need for revitalization. Placemaking, urban renewal, revitalization, and beautification all “maintain [the] socioeconomic and racialized violence of the neoliberal, capitalist, and settler colonial status quo” (Moran & Berbarry, 2021).

This research aims to better understand the ways that “wasted space,” such as parking lots and vacant land can be used to improve completeness, or access to life’s essentials, within neighborhood, town and regional centers in the city of Portland. This research proposes significant changes to neighborhoods that no doubt resemble revitalization, renewal, and beautification processes. I hope to set this research apart from those structures by challenging the systems that create the need for revitalization to begin with. This research rejects the practice of moving poverty and informal settlements to less desirable and “out of sight” areas and argues that those who are experiencing poverty, houseless, living in informal settlements or “blighted” buildings should be provided dignified housing in the areas that they currently live or want to live.

Parking Lots, Vacant Land & Barriers to the Complete Neighborhood

This section discusses the qualities and circumstances that make parking lots and vacant land wasted space while also detailing the ways that these uses of land, or lack thereof work as barriers to creating a complete neighborhood. This section will also discuss the political and economic factors that contribute to these spaces remaining wasted or unused.

So, what makes parking lots and vacant land wasted space? Even-Cowley (2016) found that retail parking lots in Columbus, Ohio were 72% unoccupied during the day on average. Other research has found that parking garages in Des Moines, Iowa go 92% unused throughout the day (Peters, 2018). This suggests a significant over supply of parking. This over supply of parking combined with the under supply of housing in Portland, and throughout the United States, (and world) invites criticism of how land is being used within cities. Parking lots and asphalt surfaces produce negative externalities that affect entire communities. Providing abundant free storage for private vehicles incentivizes people to drive, which generates green house gas (GHG) emission as vehicles travel from parking space to parking space. Asphalt surfaces also contribute to urban heat, which kills over 1,300 people every year in the United States (EPA, 2021). These negative externalities affect public health and conflict with city plans to reduce urban heat, GHG emissions and paved areas. Large areas or concentrations of parking also disincentivize walking by creating a low density urban form that creates distances between destinations that are not human scale or conducive to walking.

Additionally, the United States, and especially Portland, are experiencing a housing shortage that has produced levels of homelessness never seen before. The intent of labeling parking lots and vacant land as wasted is to say that this land is not being used to the fullest potential of its current use, or its highest and best economic use, and especially not its highest social use. The valuable urban land in question can and should be converted to more socially necessary uses such as housing and spaces for essential services and amenities. Bringing housing to these areas is critical to support transportation infrastructure and the nearby amenities. Using parking lots to create complete neighborhoods will help enable walking, reduce vehicle miles traveled, and reduce greenhouse gas emissions. Additionally paved areas will be reduced which also reduces negative impacts on health and environment due to urban heat and impervious surface. In summary, the current use, or lack of use, of these wasted spaces stand in the way of creating healthy, livable, sustainable, dignified, complete neighborhoods.

Why does Wasted Space Stay Wasted?

The urban environment is shaped by complex layers of political and economic structures that result in uneven development across regions. The city of Portland eliminated parking requirements for most developments in 2016, which is key to allowing parking to be developed into other uses. Land developers and their lenders and investors are only interested in projects that produce a certain level of profit. These real estate firms look for projects with large rent gaps. The rent gap describes the gap between the potential ground rent and the actual ground rent of a real estate development project (Smith, 1996). This means the cost of purchasing and developing land must be significantly less than the value of the new development. The rent gap is best explained by looking at “blighted” areas that have experienced decades of systemic disinvestment and are now going through the process of gentrification. Because the area lacked investment for decades, buildings are in disrepair and can be purchased at relatively low cost and because the area is now desirable to consumers and businesses, developers can exploit the rent gap and make profits. This is because depreciation makes for a profitable reinvestment (Ghertner, 2014). If wasted space goes unchanged it is because the rent gap is not enough to trigger development by for profit real estate firms.

Research Design & Methodology

How much space goes underutilized, or even unused, within Portland? Wasted space presents an opportunity to strategically improve completeness and walkability within cities. Parking lots, vacant lots, and grass fields can be developed to house residents and the services and amenities they use in their daily life, including nature and agriculture.

This research looks at two things. First, it analyses the amount of wasted space throughout the city of Portland. Second, it selects five neighborhood centers as case studies to understand the potential to improve completeness, walkability, sustainability, and equity within the city. Portland, Oregon is known for being green, walkable and a leader in progressive American urbanism, but how much land is underutilized, or even unused, within the city? “Wasted space” presents an opportunity to strategically improve

completeness and walkability within cities. Parking lots and vacant lots, can be developed to house residents and the services and amenities they use in their daily life.

The aim of this research is to identify wasted space as an opportunity to strategically improve completeness within the city. The City of Portland has designated 33 neighborhood, town and regional centers within the city that are intended to be “compact urban places that anchor complete neighborhoods, featuring retail stores and businesses, civic amenities, housing options, health clinics, employment centers and parks or other public gathering places (City of Portland, 2021). This research looks at the city of Portland at two separate scales, the city as a whole and the case study centers. By using the geographic information software, QGIS, I conducted a spatial analysis of Portland that measures the area within the city’s administrative boundaries occupied by surface parking lots. Satellite images from June of 2022, provided by Google, were manually scanned and surface parking lots were drawn as polygons. I collected area and zoning information for these parking lots as well. Data for vacant land within the city was provided by Metro (2022).

The amenities measured in this analysis include frequent transit (City of Portland, 2019f), groceries stores, defined as stores that provide fresh produce (City of Portland, 2019c), farmers markets (City of Portland, 2019b), public schools (Oregon Metro, 2022c), libraries (Oregon Metro, 2022b), community centers (Oregon Metro, 2022a), Bike Town docks (City of Portland, 2019a), parks (City of Portland, 2019d) and public restrooms (City of Portland, 2022). Other data includes boundaries for neighborhood, town, and regional centers (City of Portland, 2021), streets (City of Portland, 2019e) and building footprints (Oregon Metro, 2010).

For the second, smaller scale analysis, the architectural software, Revit, was used to model case study neighborhood and town centers at scale in 3D. Existing buildings, streets, parks, parking, and vacant land are included in the 3D model. Two models are created for each case study. The first is the existing condition of the area, the second represents the potential for developing mixed use, residential and commercial/industrial buildings, connecting street networks, and improving or expanding active transit infrastructure. Both models track the area of wasted space and an estimated amount of on street and off street parking spaces. The model that represents the future potential tracks area of new ground floor commercial space, commercial/industrial space and an estimated number of residential units while also measuring the reduction in wasted space.

To determine if wasted space is feasible to develop, this research divides the parking area or vacant land into 50 foot by 100 foot lots, a standard size lot in the City of Portland. Wasted space that cannot fit this size lot within its boundary are deemed not feasible for development. Buildings that are proposed on feasible lots conform to existing zoning and land use laws that regulate floor area ratio, setbacks, height, and uses. This research proposes ground floor commercial space in all scenarios where this is allowed with housing on the floors above. The number of residential units is calculated by dividing the gross new residential area by 1000 square feet per unit. The potential population is calculated by multiplying the number of housing units by 2.26, the average number of people per household throughout Portland (U.S. Census, 2021).

Because these centers are intended to be walkable and not dependent on private vehicles to get around, this proposal intends to reconnect street networks and create human scale, walkable blocks. As a result, these proposals create blocks that are as close to 250 feet by 250 feet to centerline of road as possible, similar to the blocks within downtown and inner southeast Portland. Along with small blocks this research proposes bulb outs at all intersections within the boundary, marked cross walks at all intersections and improved or expanded active transportation including protected bike lanes, and dedicated space on roads for light rail or bus.

Positionality

As this research creates and proposes a vision for the future of Portland Communities, I find it necessary to state my position. I applied to the Masters of Urban Studies program at Portland State because I am fascinated by the invisible forces that shape our physical world. I first realized this fascination while working for a small architecture firm, designing buildings, and getting permits for various developments in Central Oregon. I quickly realized that some building codes or land use regulations tend to make projects less human centered and generally prioritize the storage of cars. Sometimes these regulations completely prevent development, a tactic that is often viewed as intentional to inflate property values within the jurisdiction. Before joining the program, I had worked at multiple architecture firms on a variety of housing projects throughout the country. Consistently, across all jurisdictions the most frustrating, project ruining regulation was parking requirements. These costly mandates reduce the amount of housing a developer can provide, and simultaneously increase the cost of it by providing free parking to all residents. Whether residents use this parking or not the price of “free” parking for all is bundled into their rent. The city of Portland has repealed their parking mandates for residential developments with 30 units or less and those that are within 1000 feet of transit. The abolition of parking mandates enables multiple square miles of parking lot within the city to be developed for other uses. Over the last few years many cities within the United States have followed suit by repealing their costly parking mandates.

Since beginning the Urban Studies, program I have been viewing economic, political, and urban theory through the lens of design. I’m fascinated by the potential to solve problems that design has to offer, especially when it comes to increasing access to housing and creating human (and other life) centered cities. As someone who practices architecture and proposes visions for the future for entire communities, I am challenged to create visions that are inclusive of all identities. How can I create a vision of a place that people who come from identities different than mine can see themselves in? In this research, I can only suggest what’s possible and attempt to inspire a community to further develop the vision.

I am a pedestrian, bike commuter and public transit user that does not own a car. As a biker and pedestrian, I often experience the violence that occurs against those who are not in cars on our roads and right of ways. This violence is enabled through planning policies at multiple scales and through the design of roads and cars. This research intends to visually convey the design elements necessary to reduce this violence that results from

car centric planning in American cities. I belong to a generation most known for likely never being able to afford to purchase a home (I'm a millennial, did I even have to say it?). I experience this as an extremely cost burdened renter that has little sense of housing security and no ability to compete in the current housing market. This research intends to convey the untapped potential to provide abundant access to housing to the point that costs are significantly reduced into an "affordable" range.

Overall, my interest in this research comes from my belief that creating abundant housing and an urban typology that does not require a car is necessary for cities, states, and countries to be resilient in the face of climate change while also having public health and safety, economic development, and humanitarian benefits. Especially when access to these essentials are guaranteed to anyone in need and existing, marginalized communities are leading the visioning process.

Results: Wasted Space in Portland

The citywide analysis finds that 24% of Portland, or 34.2 square miles of the city, is wasted space. Surface parking lots take up 27.6 square miles of land within the city's boundary. The remaining 6.7 square miles is vacant land. 19% of the total area of the city is dedicated to the usually free, off street, temporary storage of private vehicles. The median parking lot in Portland is 14,000 square feet, or about three standard lots. The mean parking lot is significantly bigger at 55,000 square feet, which equates to 11 standard lots, or about one and a half city blocks. That means the typical surface parking lot in Portland has around 30 to 120 parking spaces. Citywide there is space for 1.69 million cars to park off street, which amounts to 2.6 off street parking spaces per person. This estimate does not include the number of parking spaces provided on streets, in garages, in residential driveways or in parking structures within the city.

Looking at the land use of these parking lots, we see that the heavy industrial zones, IH and IG2, account for 50.4% of all parking and asphalt area. In total, industrial land uses (EG1, EG2, EX, IG1, IG2, IH) make up 60.2% of all parking and asphalt surface. 15.8% of total parking lots are zoned for residential uses (RMP, R20, R10, R7, R5, R2.5, RM1, RM2, RM3, RM4), 13.8% are zoned for mixed use (CM1, CM2, CM3, CR, CX), 8.9% are zoned as open space and 1.4% are zoned for commercial use (CL, CL1, CL2). According to GIS data from Metro (2022), there is 6.7 square miles of vacant land within the city of Portland. This accounts for about 5% of land within the city. Like parking, industrial zoned land represents the highest share of vacant land at 53.8%, followed by residential at 27.1%, mixed use at 7.1% and commercial at 1.8%. In total, the city of Portland has 10.5 square miles of wasted space that allows for residential and or commercial uses. 30% of parking lots and 34% of vacant land are zoned to allow housing or mixed use buildings.

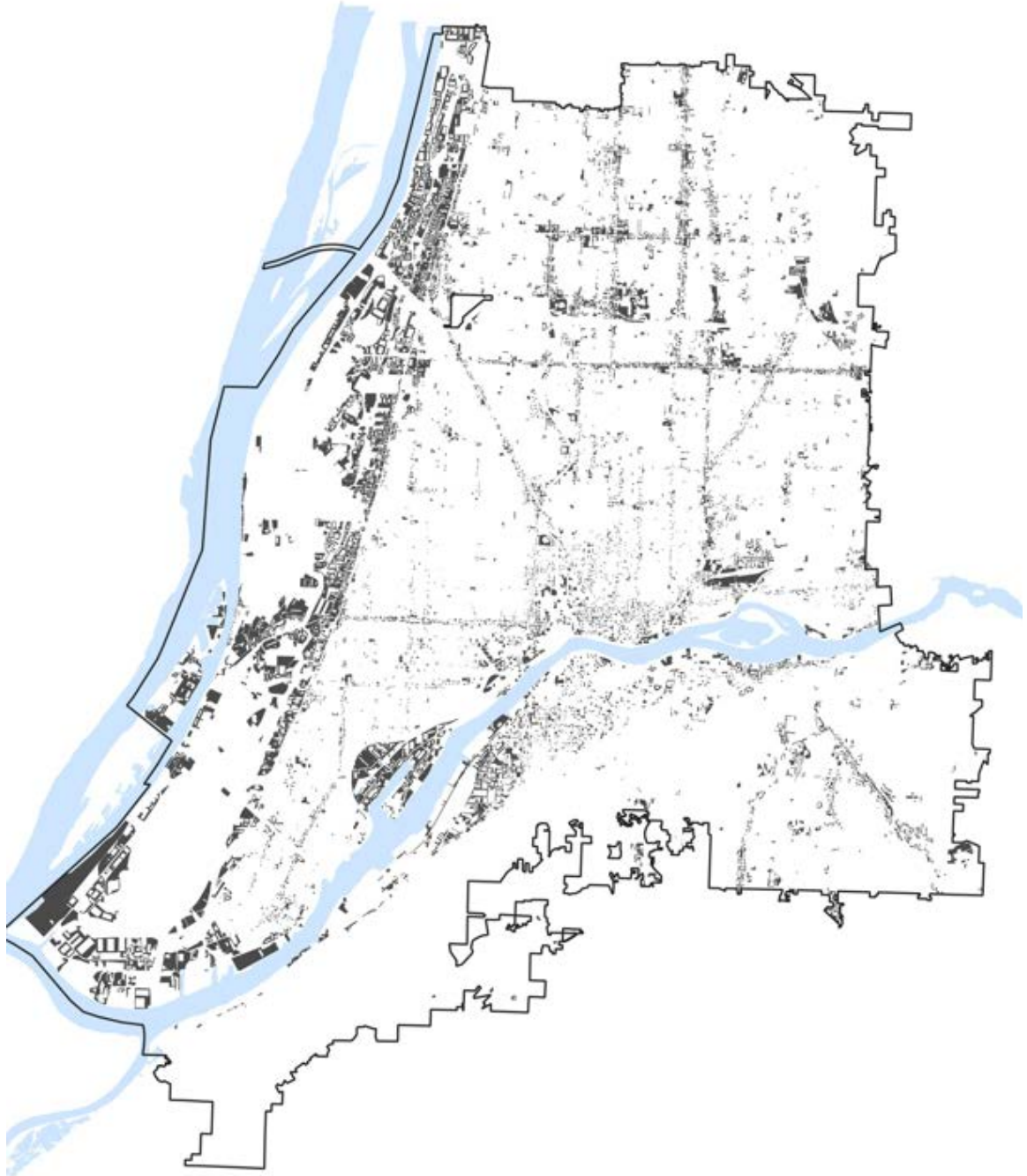


Figure 2 area within the city of Portland occupied by surface parking lots

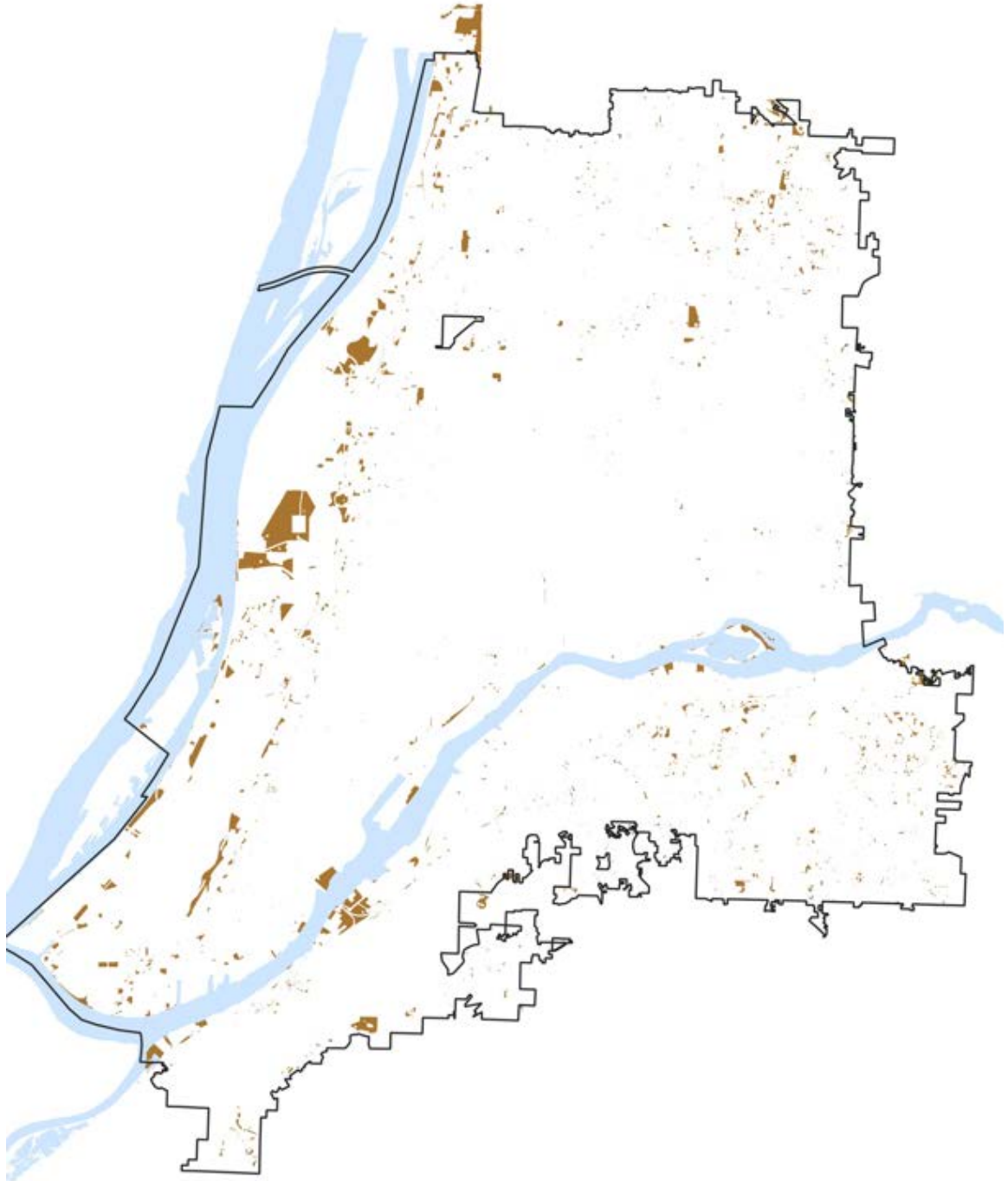


Figure 3 vacant land within the city of Portland

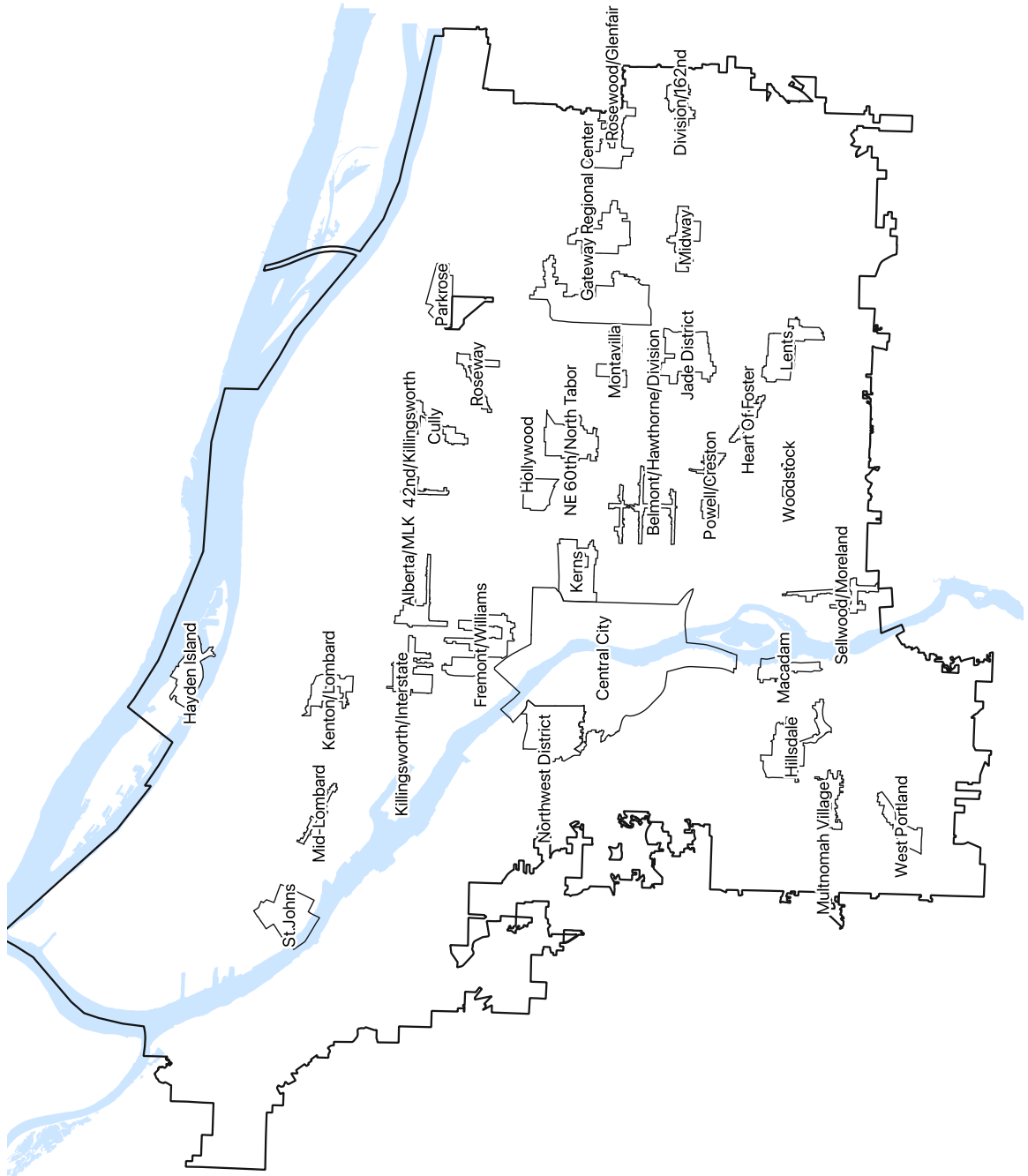


Figure 4 regional, town and neighborhood centers in Portland

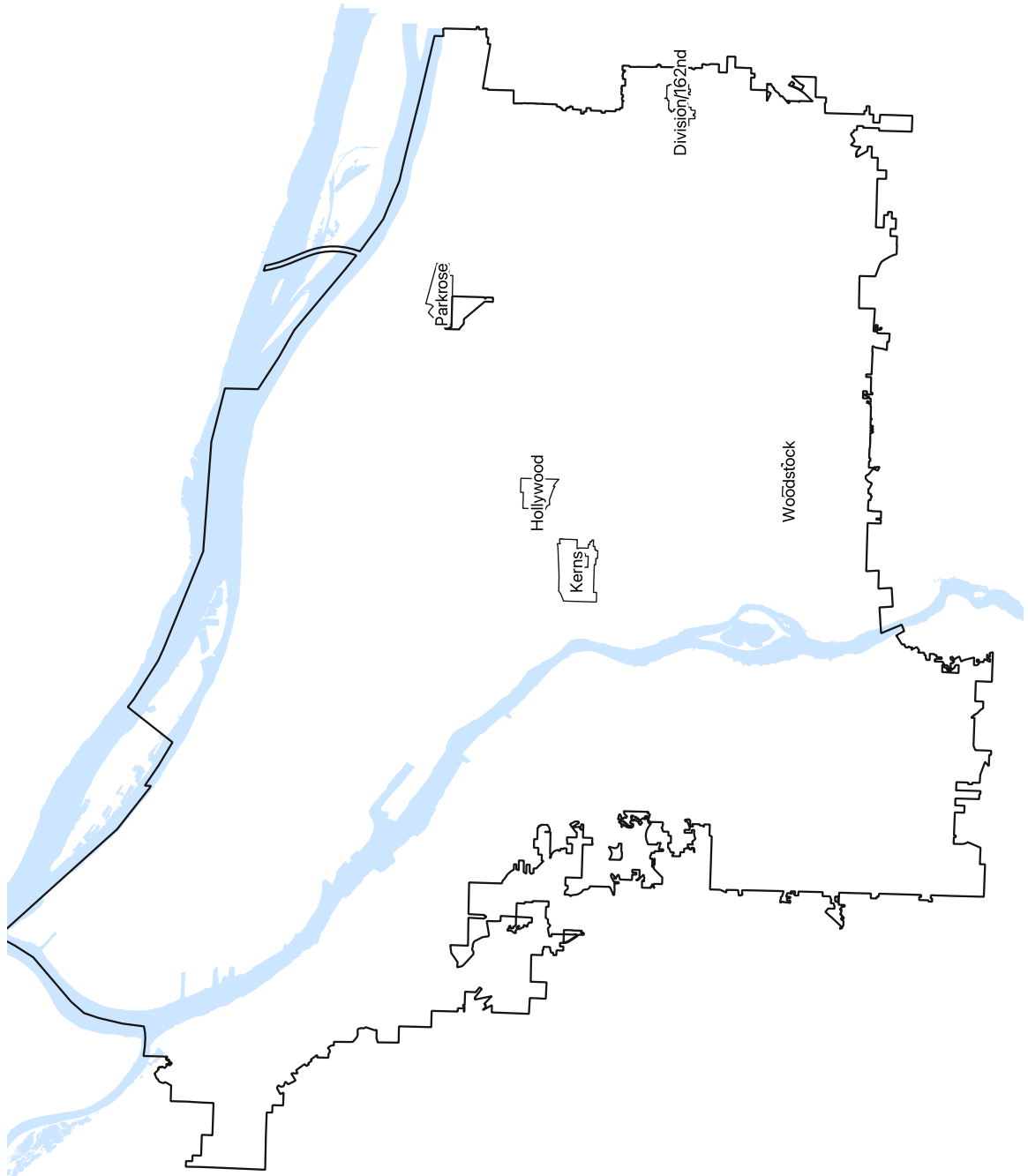


Figure 5 town and neighborhood centers chosen as case studies for this research

Neighborhood, Town & Regional Centers

To gain a clear understanding of the potential that wasted space offers to create complete, walkable neighborhoods within Portland, this research looks at five case studies. Case study areas are defined by the city as neighborhood, town, or regional centers. The city of Portland describes centers as “compact urban places that anchor complete neighborhoods, featuring retail stores and businesses, civic amenities, housing options, health clinics, employment centers and parks or other public gathering places” (City of Portland, 2021). There are 33 of these centers throughout the city. The proportion of wasted space within the centers ranges from 7% (Killingsworth/Interstate Town Center) to 66% (Hayden Island Neighborhood Center), but the median is 23%. Centers are generally between 10% and 36% wasted space.

Amenities measured within center boundaries include land that allows commercial uses, grocery stores that sell produce, farmers markets, community gardens, elementary schools, middle schools, high schools, public libraries, community centers, parks, public restrooms, frequent transit stops, transit centers, roads with bike lanes, greenways, bike town docks, bike town service area, and hospitals. These amenities are unevenly distributed throughout the centers and the city. The median center has a combination of 29 of the above amenities within its boundaries, typically the majority of which are frequent transit stops. Across all the centers, frequent transit stops account for 60% of all amenities within their boundaries. Density of amenities within the centers range from 9 amenities per square mile (Macadam Neighborhood Center) to 306 per square mile (Belmont/Hawthorne/Division Town Center). The typical center has about 80 amenities per square mile.

Case studies were picked to represent areas with low, typical, and high proportions of wasted space and density of amenities within their boundary. As mentioned above the typical amount of wasted space within a center ranges from 10% to 36% with extremes ranging from 7% to 66%. Density of amenities within the centers is generally about 80 amenities per square mile but ranges from 9 to 306 per square mile. This research chose to avoid outliers and extremes in an attempt to convey what’s possible within a typical Portland neighborhood.

Case Studies

Across all case studies, an average of 58% of parking lots were deemed feasible to develop. This reduction of parking lot results in an average of a 35% decrease in total parking supply within the centers, bringing the ratio of parking down from 3.1 spaces per person to about half a parking space per person, or one per household. Keep in mind that this research does not include residential driveways, garages, or parking structures, so there is realistically still more than one parking space per household within these areas. Throughout the centers, 86% of vacant land was deemed feasible to develop. Creating mixed use and residential buildings on this wasted space allows for an average population increase of 234% across the case studies.



Figure 6 satellite image of the Division/162nd Neighborhood Center. Credit Google, City of Portland 2021

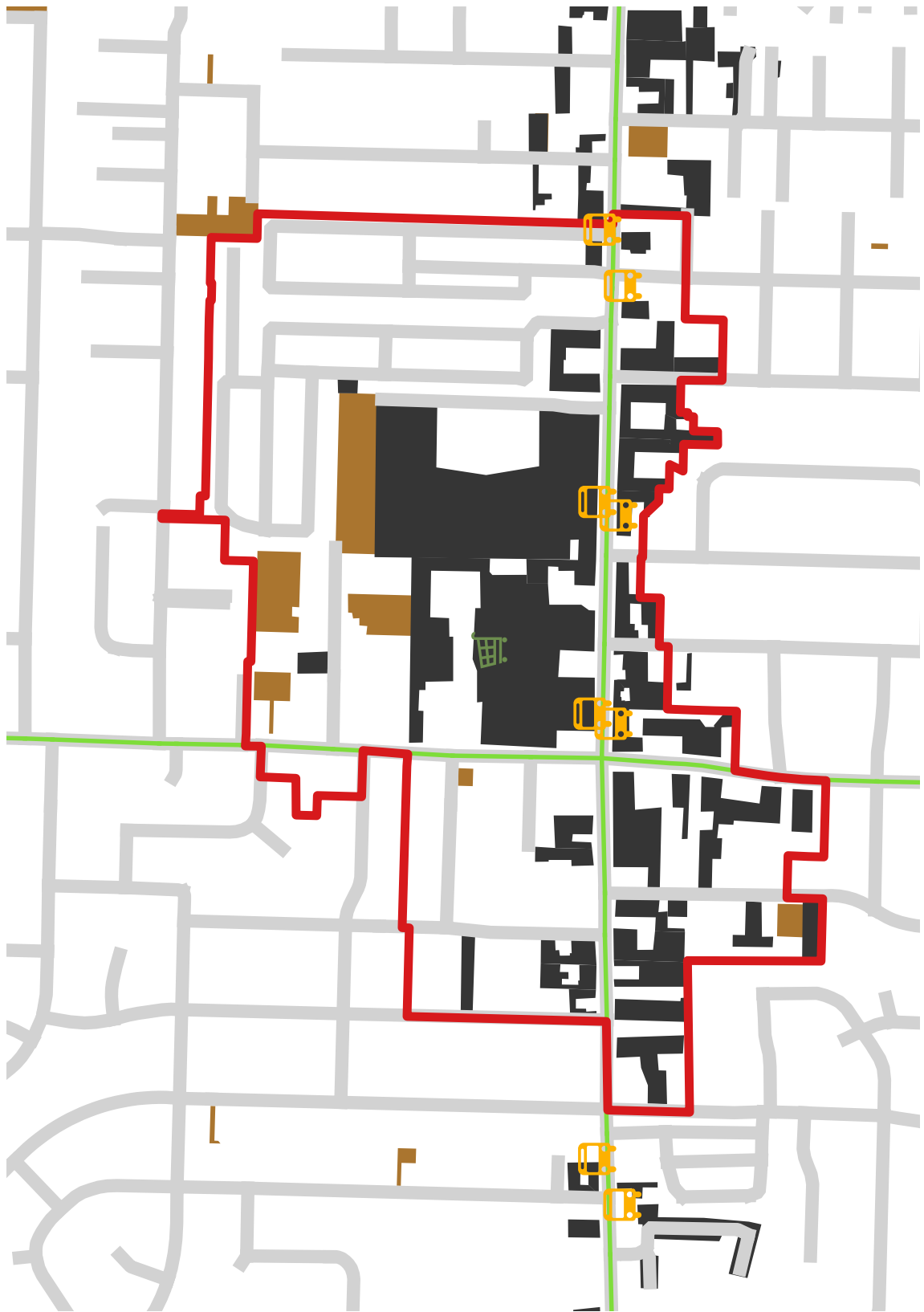


Figure 7 wasted space and amenities within the Division 162nd Neighborhood Boundary

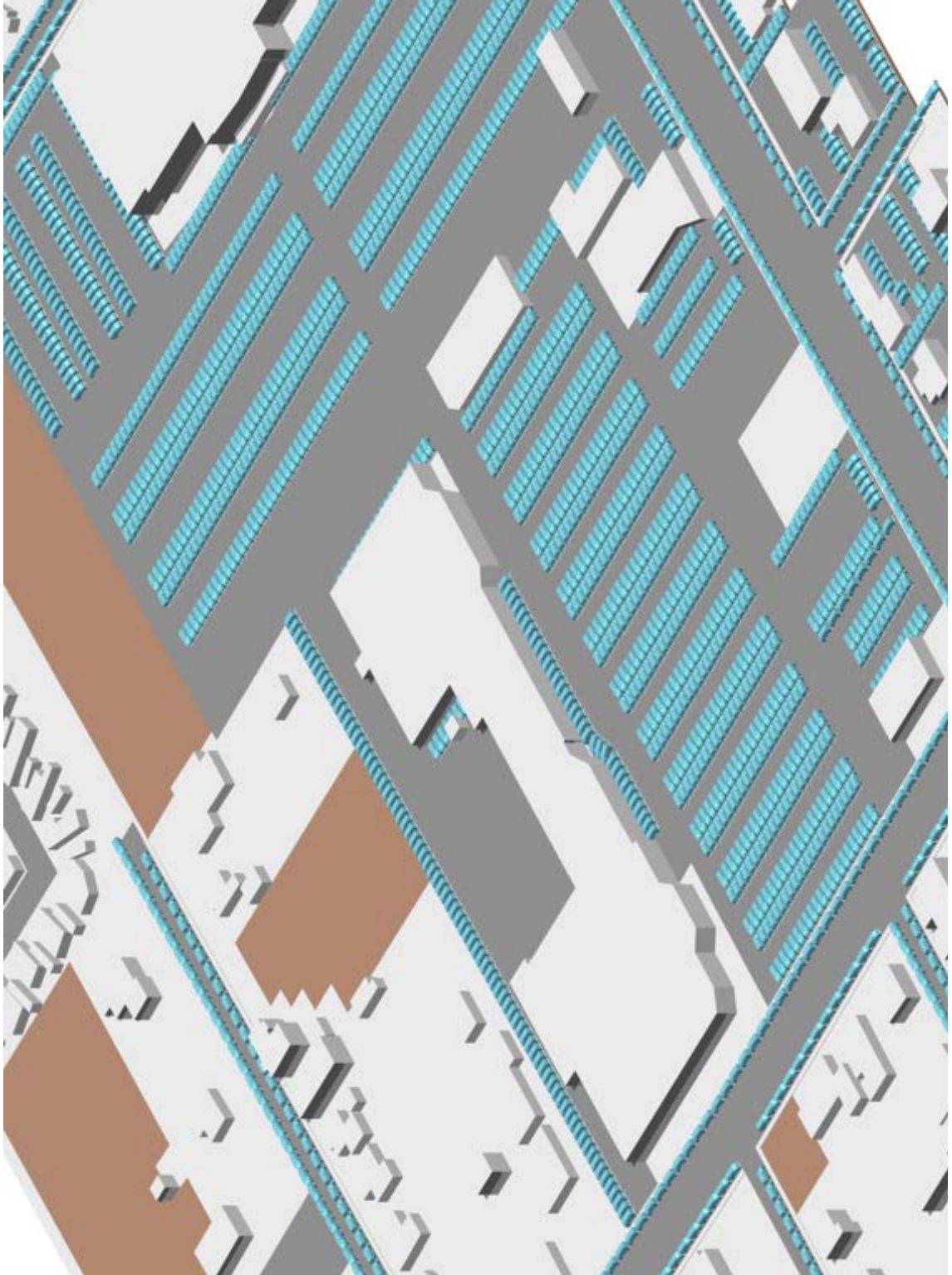


Figure 8 diagram representing the existing conditions within the Division/162nd Neighborhood Center

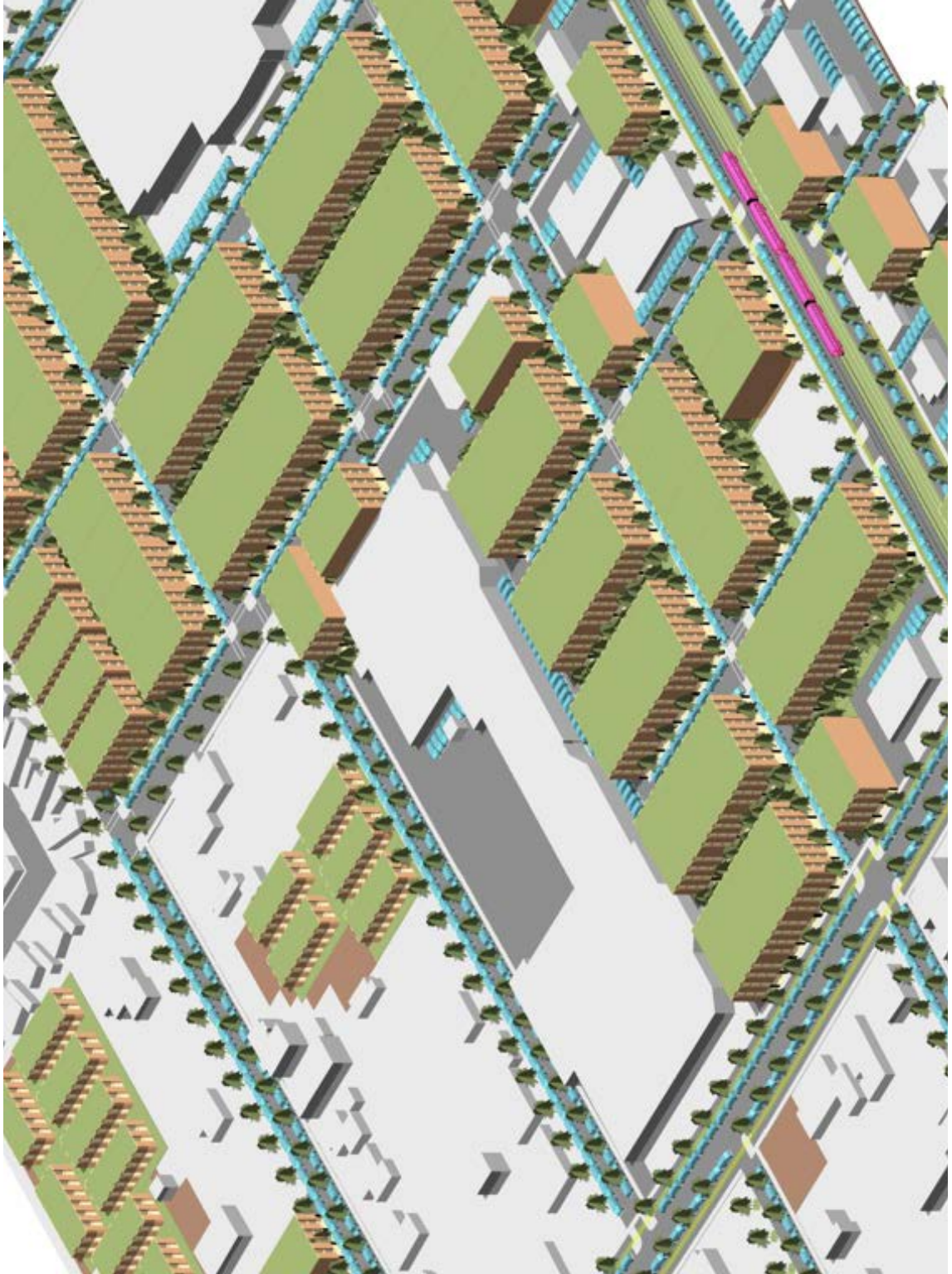


Figure 9 diagram representing the potential to complete the Division/162nd Neighborhood Center

Division/162nd Neighborhood Center

The Division/162nd neighborhood is located in east Portland, near the border of Gresham. Of the case studies it is the farthest from the city center and was chosen because it has a high (31%) proportion of wasted space and a low density of amenities (57/sqmi). The center covers an area of 114 acres, 31% of which is wasted space. 27% of the neighborhood center is surface parking lot, and 4% is vacant land. The center has one grocery store, six frequent transit stops, land zoned to allow commercial uses and two roads with bike lanes. Walkscore.com gives the area a walkscore of 79, transit score of 44 and bike score of 84. The center has an estimated population of 1500 residents and the highest proportion of people of color out of the case studies. Specifically, the center has the highest proportions of Hispanic/Latinx and Asian residents.

This study estimates that there are about 4,000 parking spaces within the center boundary, 3,000 off street and 1,000 on street. Without considering residential garages, driveways, or commercial parking garages there is about 2.6 parking spaces per person in the neighborhood center. The case study found that 47% of parking lots in the neighborhood center could be developed into mixed use, residential and commercial buildings. This reduces total parking supply by 44%, down to about 2,200 parking spaces within the center's boundary.

The center has five acres of vacant land, 78% of which meet the criteria to be developed. Between vacant land and parking lots, and without destroying or modifying any existing buildings, the center could provide around 440,000 square feet of ground floor commercial space and 1,600 units of housing. The ground floor commercial space can be used to house amenities missing from the area such as elementary, middle and high schools, libraries, health care providers, community centers, civic centers, etc. The residential development could provide homes to about 3,700 people, bringing the population to 5,200, an increase of 246%. This brings population density to about 29,300 people per square mile and the parking space to person ratio down to 0.5 parking spaces per person, or about one per household. This development and creation of new streets reduces wasted space within the Division/162nd neighborhood center down from 31% to 10%.

Density and mix are important for encouraging walking but there are also infrastructure changes that can, and in many cases, need to be implemented to improve road safety and to further encourage walking. This research proposes extending MAX service to the center via Division St or creating dedicated bus lanes. Additionally, Division and 162nd have room for bike lanes protected by car parking. All intersections have bulb out curbs and marked crossings. All streets within the boundaries are lined with trees, benches, garbage cans, public restrooms. The Division/162nd neighborhood center has the potential to add 1,600 housing units and almost half a million square feet of commercial space for essential services. This development would allow for more than triple the current population to live within the center. Converting the large parking lots within the

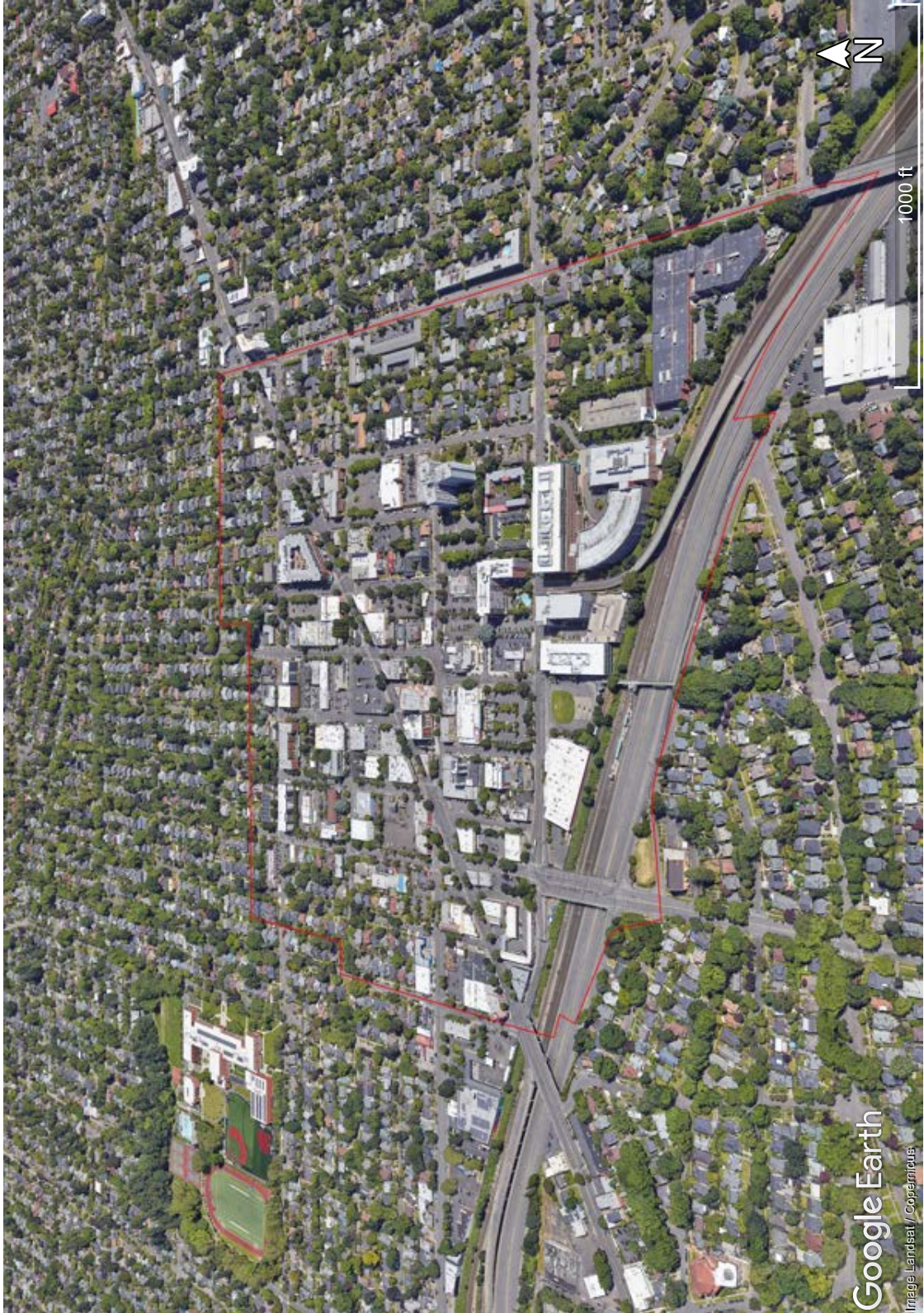


Figure 10 satellite image of the Hollywood Town Center. Credit Google, City of Portland 2021

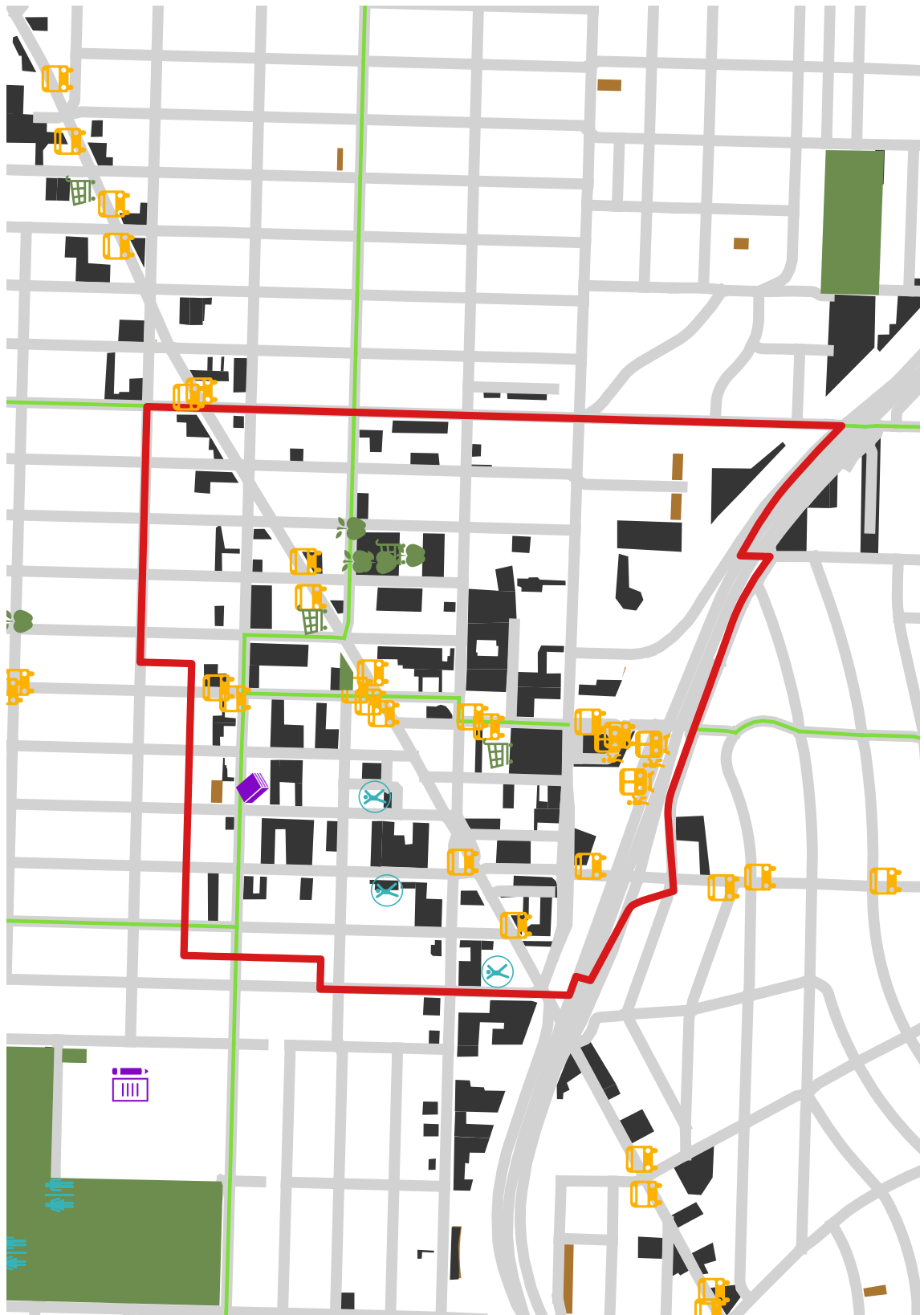


Figure 11 wasted space and amenities within the Hollywood Town Center

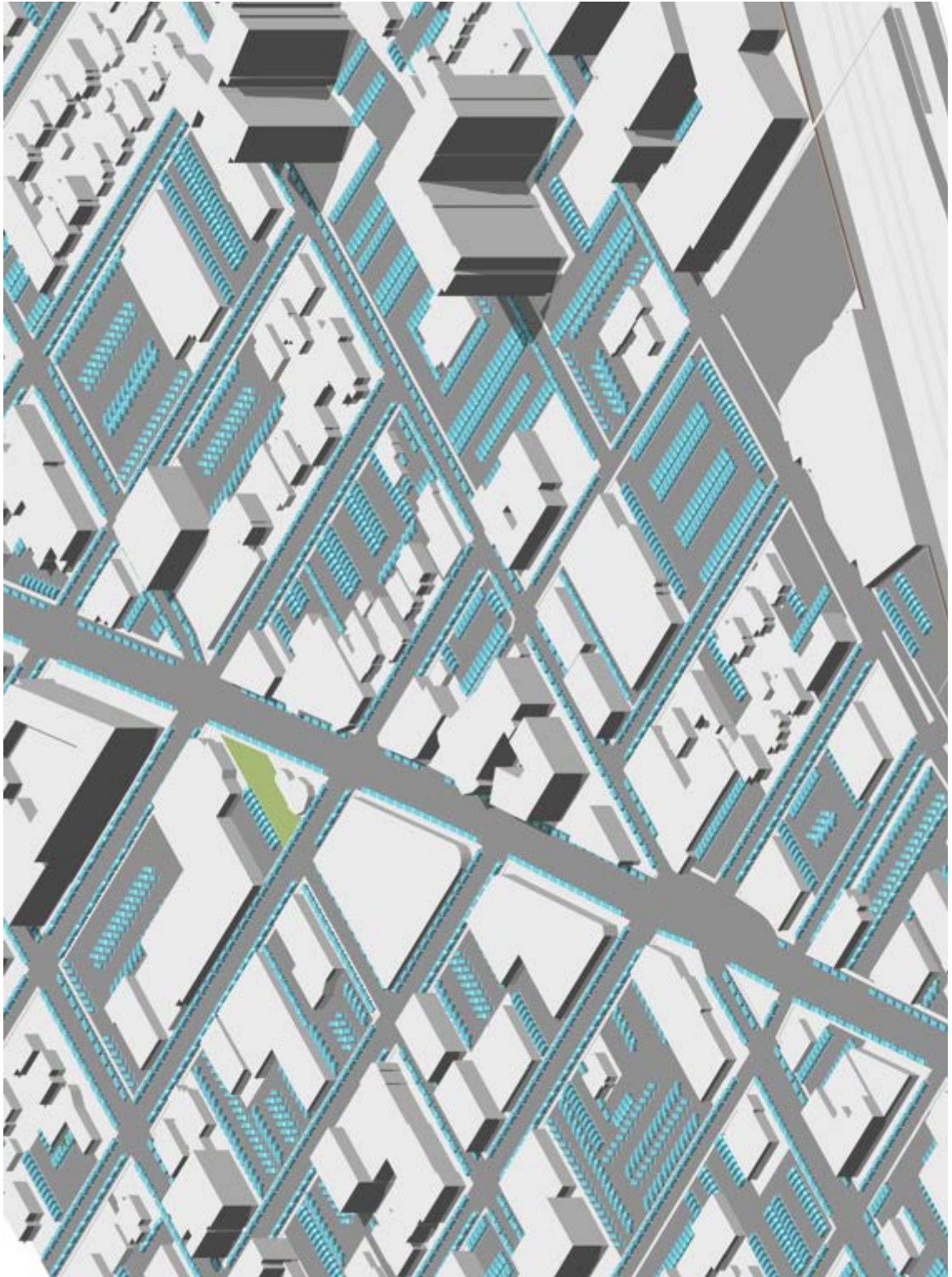


Figure 12 diagram representing the existing conditions within the Hollywood Town Center

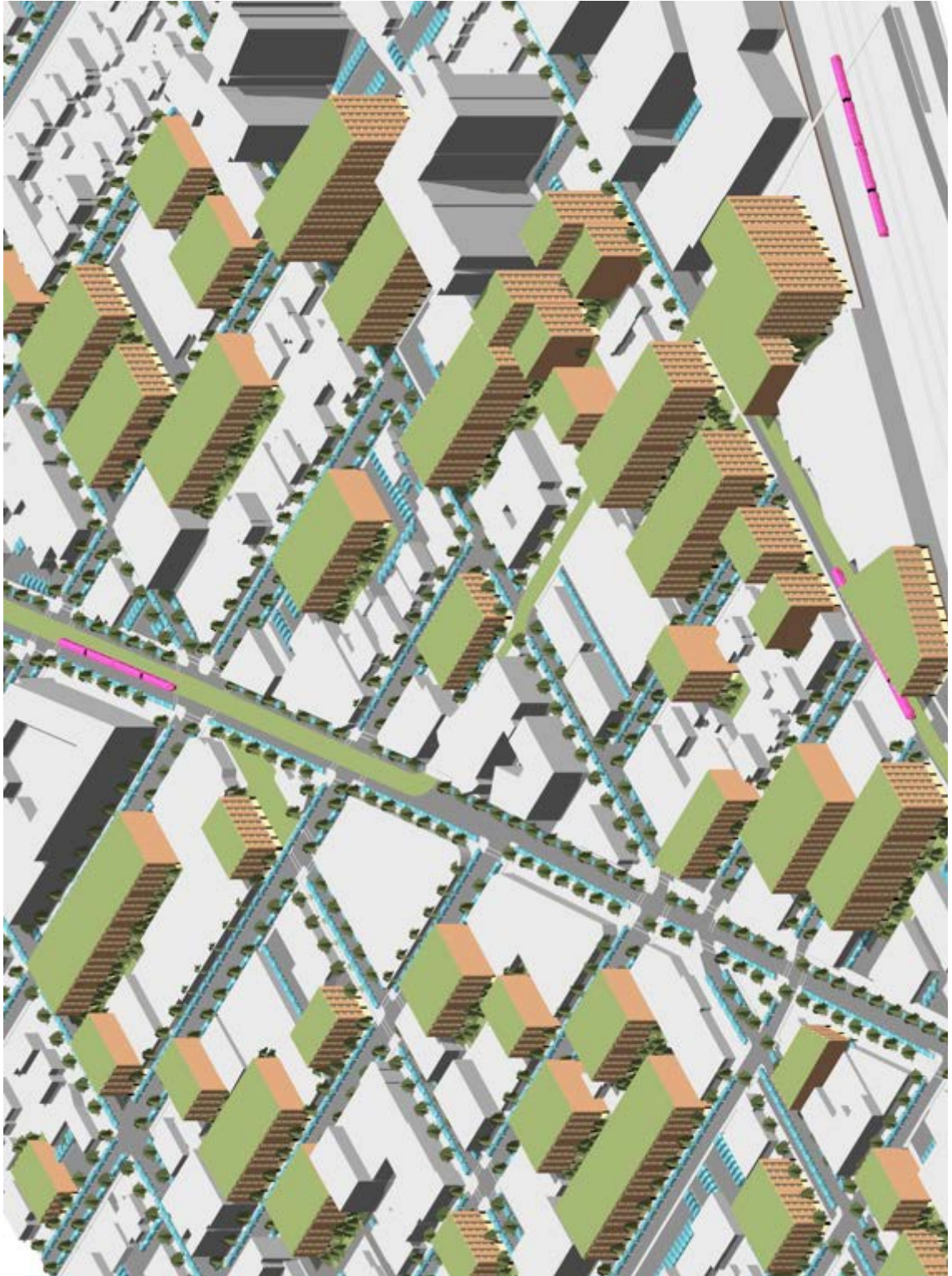


Figure 13 diagram representing the potential to complete the Hollywood Town Center

area to mixed use development with small, walkable blocks will create a walkable downtown area for residents on the edge of the city's boundary.

Hollywood Town Center

The Hollywood town center is located in North East Portland along Sandy Blvd and Interstate 84. The streets are laid out like a downtown which can easily be leveraged to improve pedestrian accessibility and completeness within the center. Hollywood has an area of 127 acres and is composed of a typical amount of wasted space (24%) and a high density of amenities, 142 per square mile. 24% of the center is surface parking lot and 0.3% is vacant land. The Hollywood Town Center is also recognized by Oregon Metro and has been labeled as a "station community" which describes "areas of development centered around a light-rail or high-capacity-transit station that feature a variety of shops and services that will remain accessible to bicyclists, pedestrians and transit users as well as cars" (Oregon Metro, 2022d). The center has three grocery stores (Whole Foods, Grocery Outlet, Trader Joe's), one farmers' market, three CSA pick up locations, one library, 16 frequent transit stops, three community centers, commercially zoned properties, one park, two streets with bike lanes and one greenway. Walkscore.com considers the center a walker's and biker's paradise with excellent transit. There is an estimated population of 1,800 residents within the boundary. The area has the highest share of white residents (79%) along with the highest share of residents that identify as multiple races/ethnicities (8%) of the case studies.

There is 22 acres of parking lot within the Hollywood Town Center which provide an estimated 2,000 off street parking spaces. Including on street parking there is a total of 4,300 parking spots. This research finds that 62% of off street parking area within the center could be developed into mixed use and residential buildings. This reduces total parking supply in the center by 34%, down to 2,800 parking spaces. The parking lots used for development can provide 438,000 square feet of ground floor commercial space that can be used by schools, healthcare providers, gyms, restaurants, etc. Additionally, these developments could provide about 2,200 units of housing, which means homes for up to 4,900 people. The reduction in parking supply and increase in population brings the parking space to person ratio down to about one space per household, not including the multiple parking structures and residential driveways within the center. This proposal results in a reduction of wasted space from 24% of the center down to 7%. Infrastructure updates include adding bulb out curbs at all intersections and marking all cross walks. This case study proposes reducing Sandy Boulevard to two vehicles lanes and adding Max Lines or dedicated bus only lanes. There is potential to develop the transit center into dense housing and commercial space as well. Parking lots in the Hollywood Town Center have the capacity to provide enough housing to almost quadruple the population. The abundant frequent transit options, multiple sources for groceries and multiple community centers make the Hollywood center a place that could handle the increase in population while becoming even more of a destination within Portland.

Kerns Neighborhood Center

The Kerns neighborhood is closer to downtown than any other case study. It is also the geographically largest of the case studies. It covers 308 acres and has a



Figure 14 satellite image of the Kerns Neighborhood Center. Credit Google, City of Portland 2021



Figure 15 wasted space and amenities within the Kerns Neighborhood Center

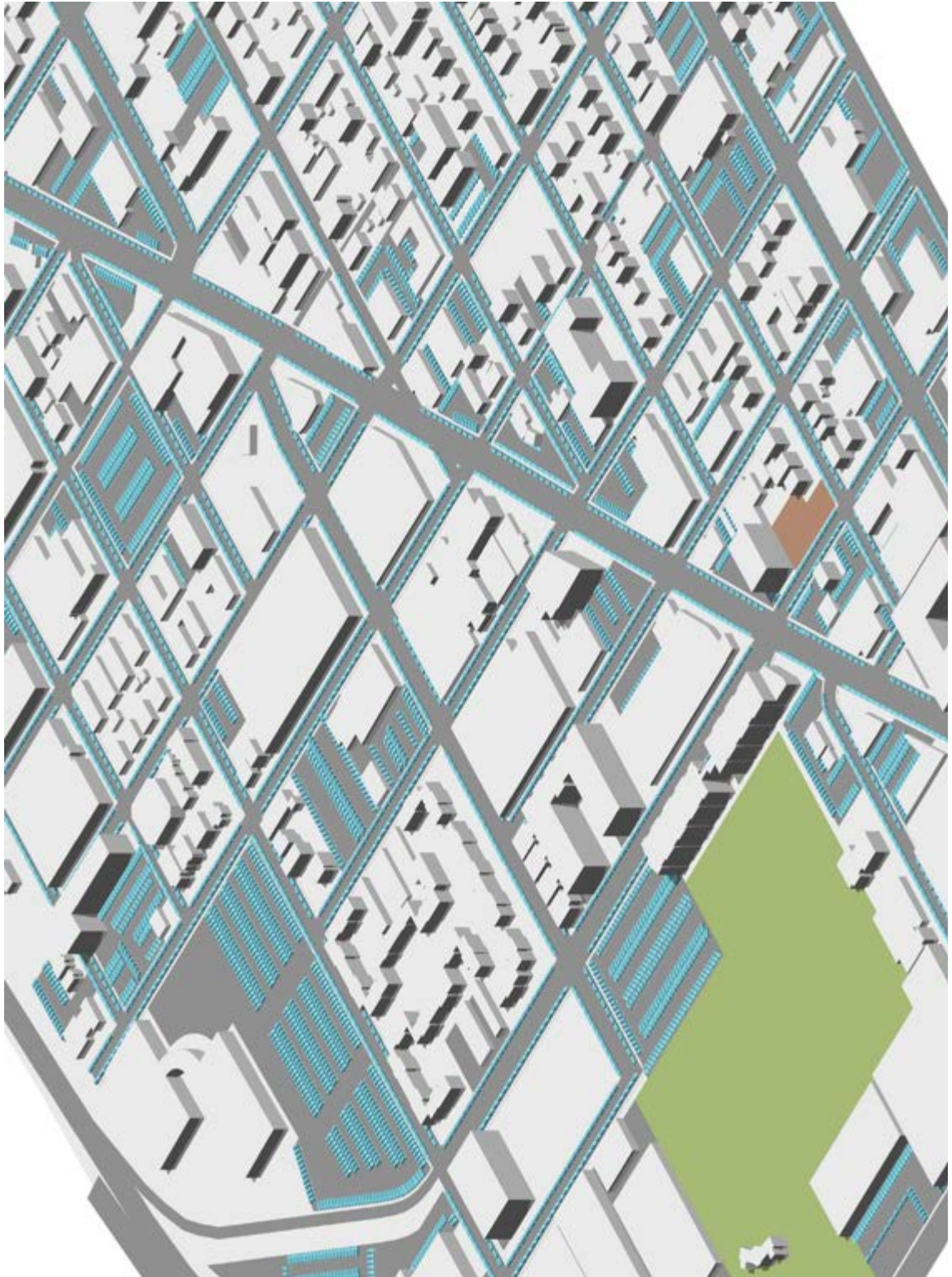


Figure 16 diagram representing the existing conditions within the Kerns Neighborhood Center

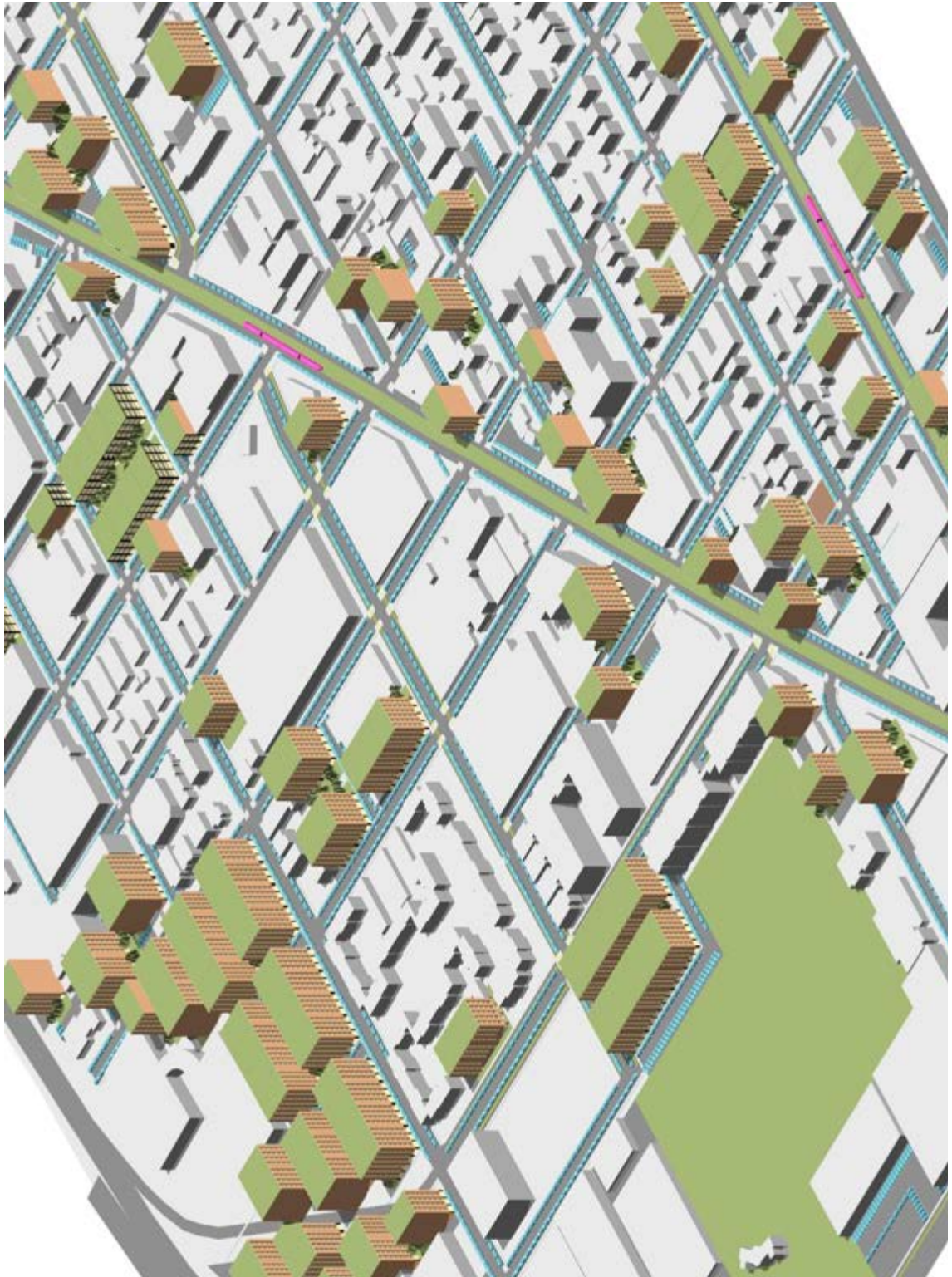


Figure 17 diagram representing the potential to complete the Kerns Neighborhood Center

population of roughly 5,800 people. This center represents a low proportion of wasted space (13%) and a typical density of amenities (69/sqmi), which is somewhat surprising given its proximity to downtown. The area is 13% wasted space, mostly parking lot, as well as 0.3% vacant land. Within the center there is one grocery store, four CSA pick up locations, one high school, 14 frequent transit stops, two parks, one public restroom, three streets with bike lanes, three bike town docks, and two greenways. Of the 5,800 residents, the majority (76%) are white, and the center has a relatively high portion (7%) of residents that identify with multiple races or ethnicities.

The neighborhood center has roughly 4,200 off street parking spaces occupying 40 acres of land. There are 10,300 spots for cars to park within the boundary when including on street parking. The parking space to resident ratio is the lowest of all centers in the study at 1.8 parking spaces per person, likely because it is located near the city center. But again, this analysis does not account for the parking garages or underground parking that exist within the neighborhood. This study suggests that 65% of parking lots and 92% of vacant land within the center can be developed into mixed use, residential, commercial, or industrial buildings. This reduces parking supply in the area by 31%, down to 7,200 total spaces. These new developments could provide 751,000 square feet of ground floor commercial space, 213,000 square feet of new commercial/industrial space and about 4,400 housing units. The commercial space can be used to house additional grocery stores, elementary schools, middle schools, community centers, libraries, etc. The new housing could provide homes for 9,900 people, increasing the population by 170% to over 15,000. This is the smallest population increase of the case studies. Like the other centers, this brings the parking space to person ratio down to one per household without including parking structures, residential driveways, or garages. This proposal reduces the amount of wasted space from 13% of total area within the Kerns Neighborhood Center down to 4%.

To improve walking infrastructure this research proposes bulb outs and marked cross walks at all intersections. Vehicle lanes on Sandy and Burnside are reduced to one lane each direction, and MAX lines or dedicated bus lanes are added. Glisan St. and NE 16th have space to add bike lanes protected by parking. Developing parking lots and vacant land into mixed use development could provide the capacity to more than double the population of the center. The 751,000 square feet ground floor commercial space is enough room for roughly 250 new restaurants.

Parkrose Neighborhood Center

The Parkrose neighborhood center covers 181 acres in East Portland. Parkrose is located along Interstate 205 and Sandy Blvd. There is a large industrial area to the north of the center separated by a freight rail. This center represents a typical amount of wasted space (22%) and a very low density of amenities, 9 per square mile. The area is 22% wasted space, 21% parking and 1% vacant land. The center has two grocery stores, five frequent transit stops, one street with a bike lane and is within the bike town service area. There are about 1,600 residents within the neighborhood center. The Parkrose neighborhood center has a high proportion of people of color (45%) and the highest percentage of Black population (9%) of all the case studies.

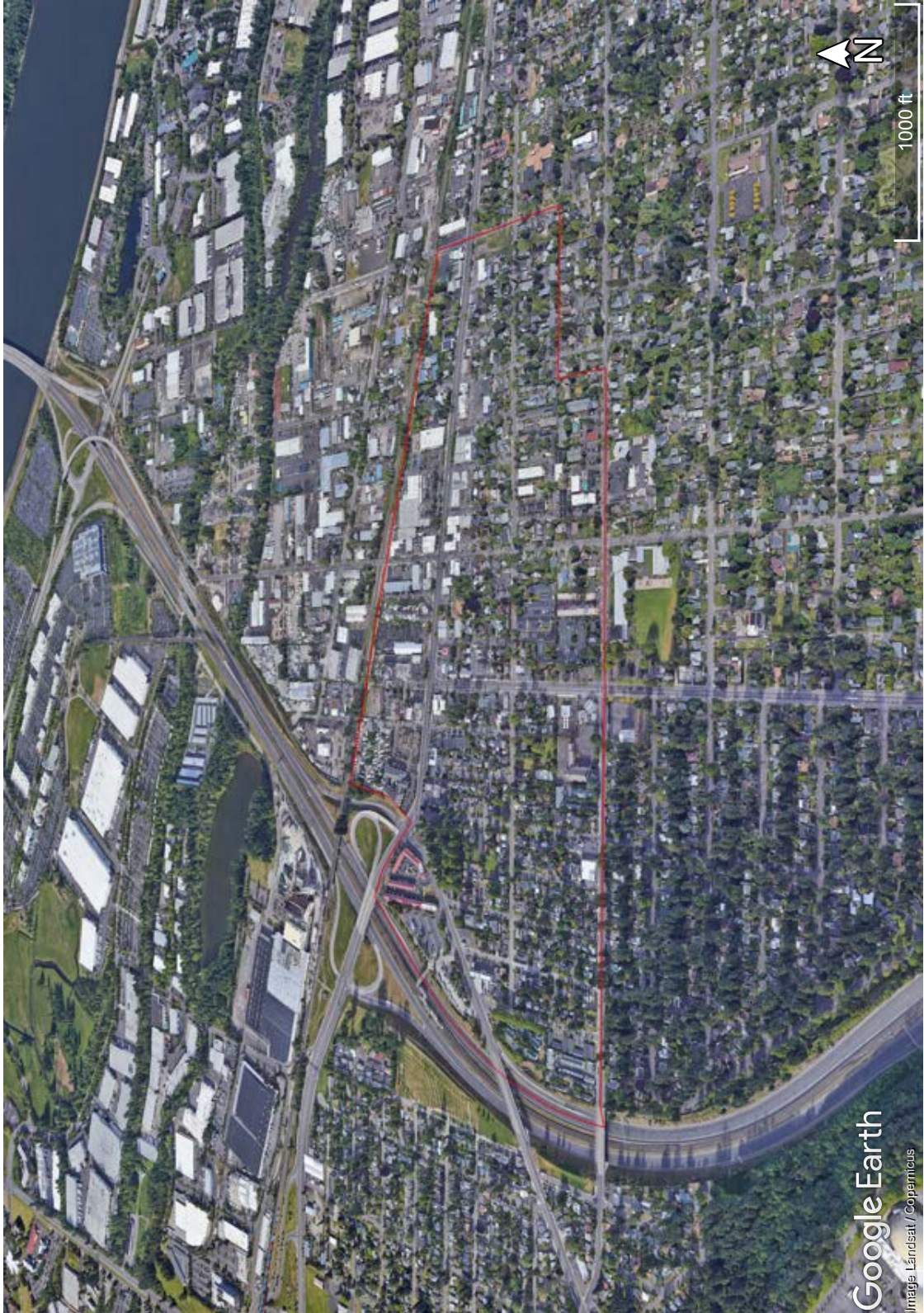


Figure 18 satellite image of the Parkrose Neighborhood Center. Credit Google, City of Portland 2021



Figure 19 wasted space and amenities within the Parkrose Neighborhood Center

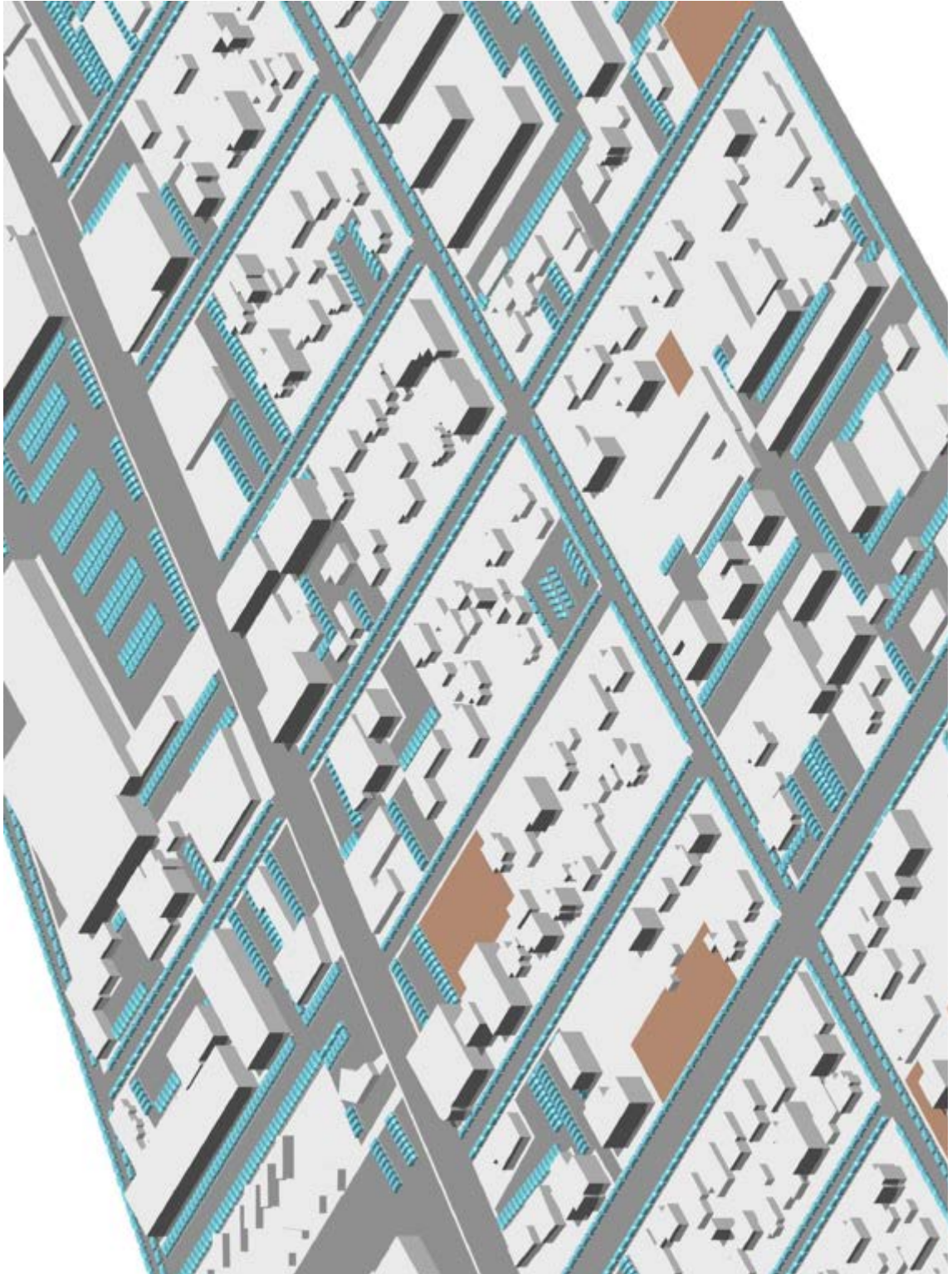


Figure 20 diagram representing the existing conditions within the Parkrose Neighborhood Center

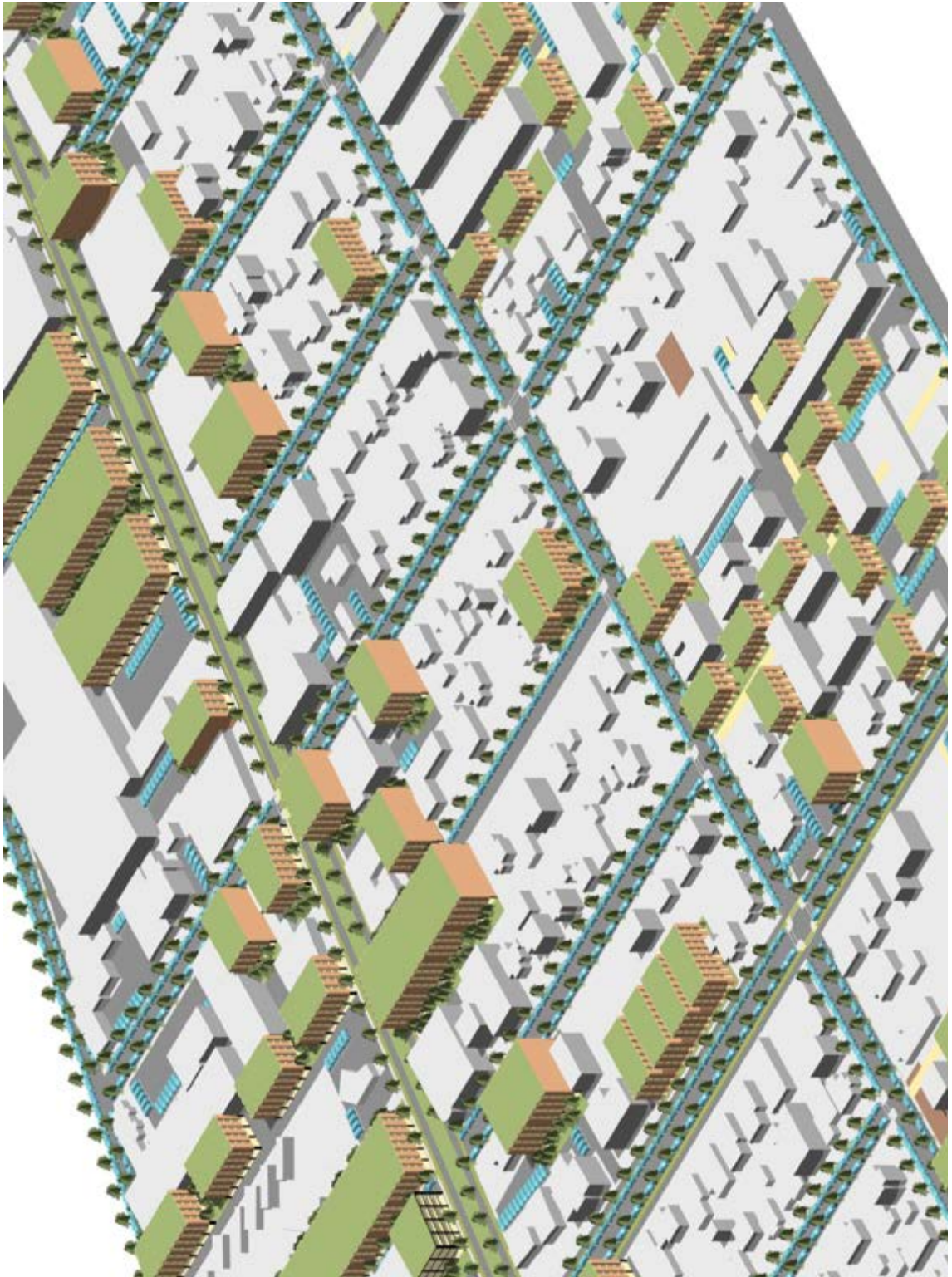


Figure 21 diagram representing the potential to complete the Parkrose Neighborhood Center

The Parkrose center has 37 acres of parking that supplies about 3,300 off street parking spaces. Total parking spaces within the boundary amount to 5,500, or about 3.4 parking spaces per resident, or 7.5 per household, the second highest of the case studies. 53% of the parking area in this center is considered feasible for development. Developing on this parking area will reduce total parking supply within the center by 38% and leaves 17 acres of off street parking intact. 88% of vacant land is feasible to develop. The development possible on parking lots and vacant land within the center could provide up to 501,000 square feet of ground floor commercial space and about 2,400 housing units. The Parkrose center could also provide 129,000 square feet of space that can be occupied by commercial or industrial uses. The housing possible could provide homes to 5,400 people, increasing the population to 7,000. This is the second highest population increase of the case studies at 333%. This increase in housing lowers the parking space to person ratio to one parking space per household, down from 7.5. Total wasted space is reduced from 23% to 9%. Utilizing wasted space within the Parkrose neighborhood center could provide enough housing to more than quadruple the population. The ground floor retail space possible provide enough room for about 43 new restaurants or businesses.

Woodstock Neighborhood Center

The Woodstock neighborhood center is the smallest of all the case studies covering only 55 acres of land in southeast Portland. It also has the smallest population of any case study. Woodstock Blvd is the main street running through the area, with a main intersection at 52nd ave. The center is 22% parking, and 4% vacant land. Woodstock represents typical amount of wasted space (26%) and a very low density of amenities at 17 per square mile. Even with the limited amount of people and amenities, the center is an active area with two grocery stores, one library, six frequent transit stops, one public restroom and six streets with bike lanes. There is an estimated population of 575 residents, 74% of which are white, the remainder of the population is an almost equal mix of Asian, Hispanic/Latinx or multi racial.

The Woodstock center has 12 acres of off street parking and a total of 2,400 parking spaces within its boundary. This amounts to roughly 4.2 parking spaces per resident, or 9.5 per household, the highest of the case studies. This research suggests that 73% of off street parking area can be used to create mixed use and residential buildings, the highest of the case studies. 100% of vacant land is feasible to develop, also higher than any other case study. Between parking lots and vacant land, the Woodstock center could provide 263,000 square feet of ground floor commercial space and 1,200 new housing units. These new housing units could provide homes to roughly 2,600 people. That's a population increase of 461%, the highest of all the case studies. As with the other case studies, the parking space to person ratio is down to about 1 per household or 0.5 per person. This reduces the amount of wasted space in the center from 26% down to 4%. Woodstock Boulevard and 52nd Ave could both be reduced to two vehicle lanes with no median and have bike lanes on each side that are protected by parked vehicles. The development of parking lots and vacant land within the center could increase the population by five times and provide enough commercial space for almost 90 new restaurants or other businesses.

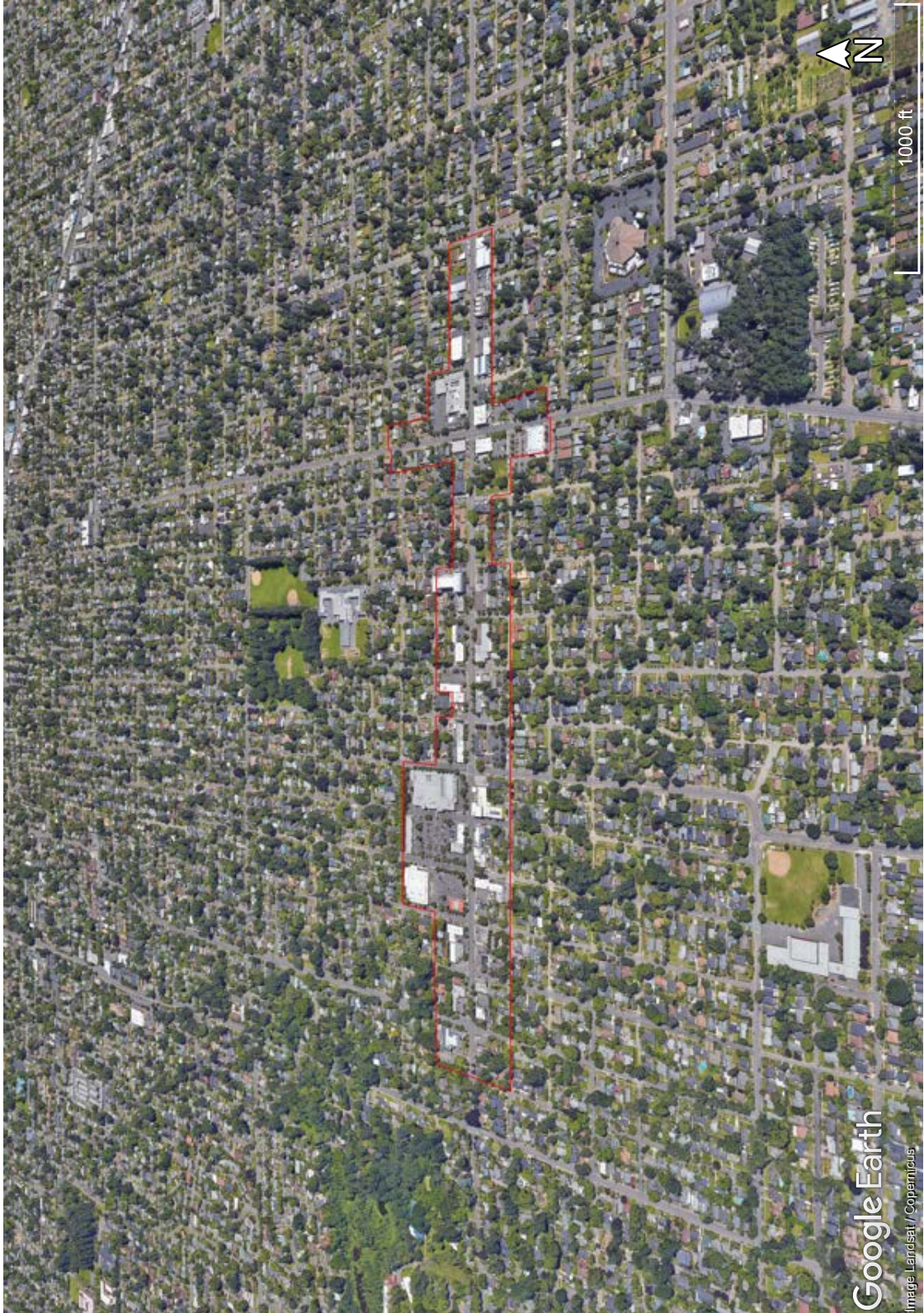


Figure 22 satellite image of the Woodstock Neighborhood Center. Credit Google, City of Portland 2021

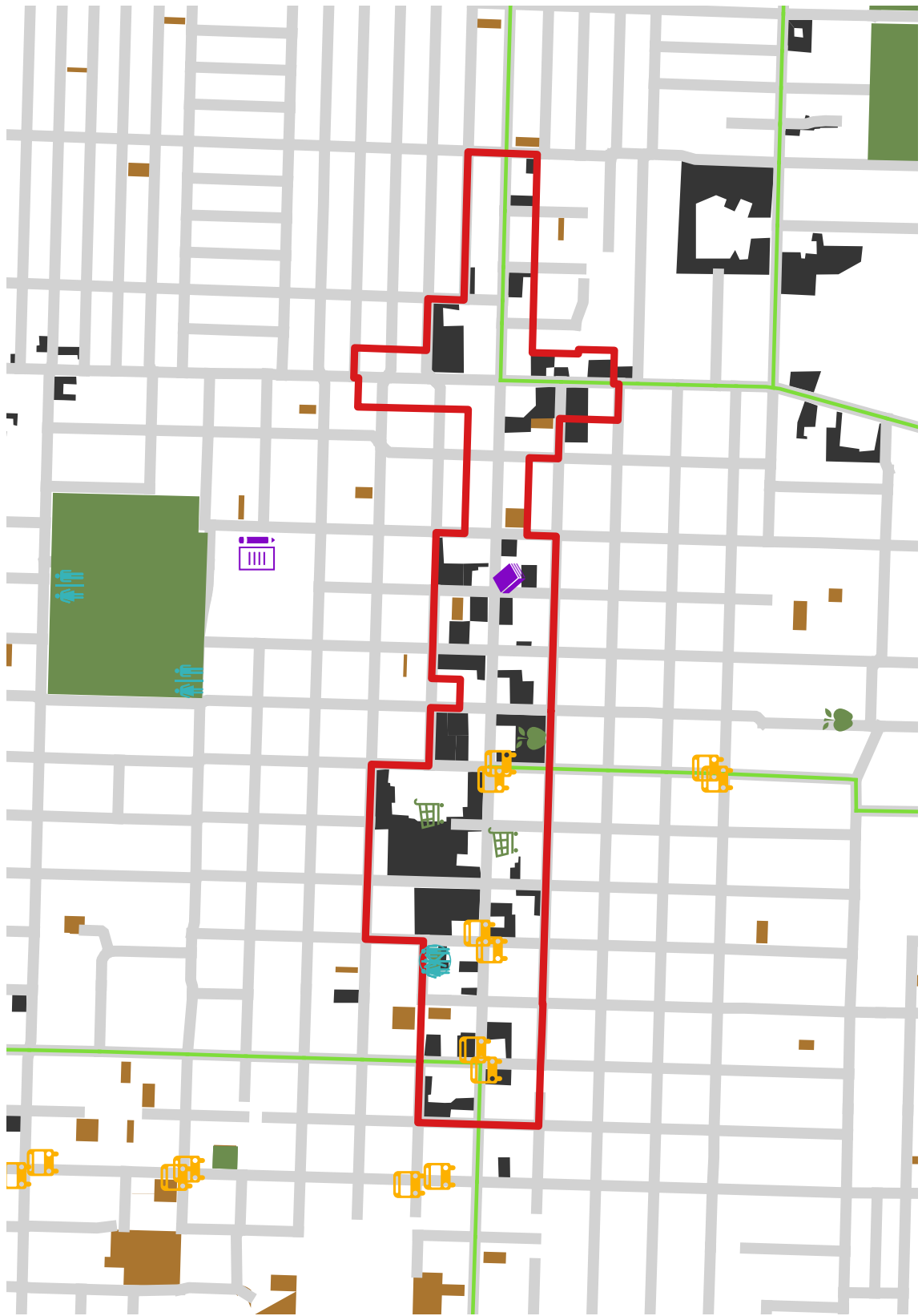


Figure 23 wasted space and amenities within the Woodstock Neighborhood Center

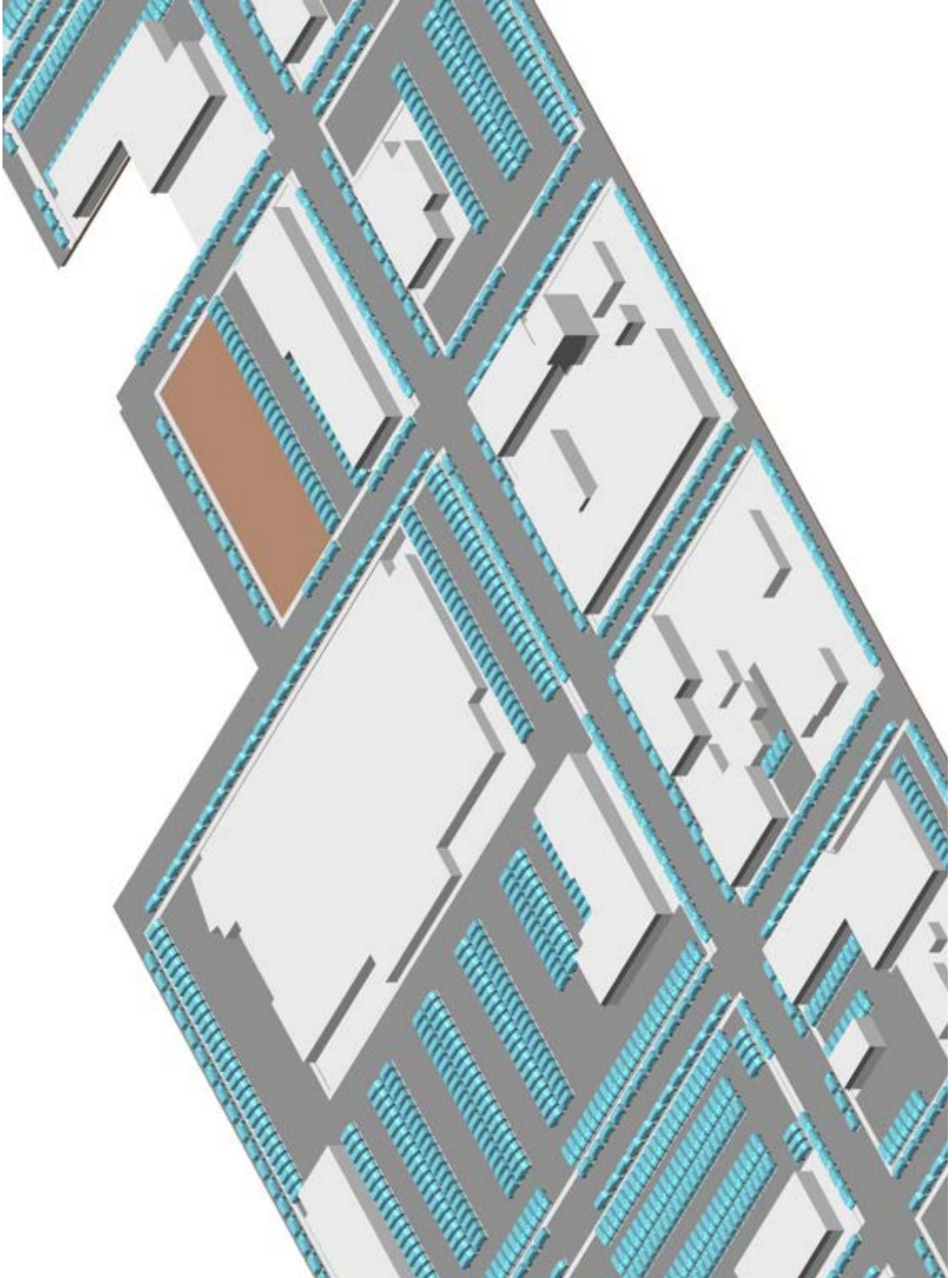


Figure 24 diagram representing the existing conditions within the Woodstock Neighborhood Center

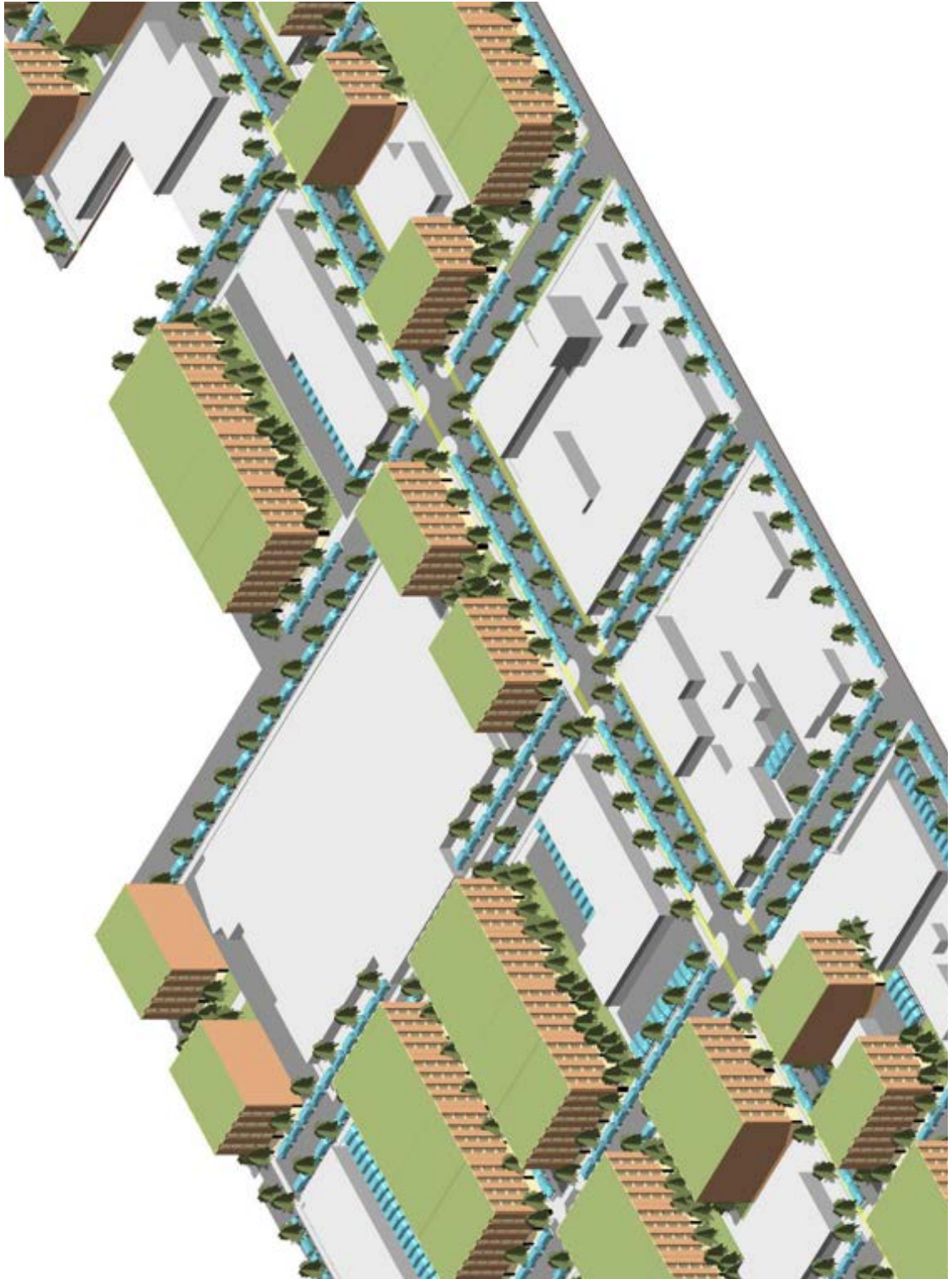


Figure 25 diagram representing the potential to complete the Woodstock Neighborhood Center

Conclusion

These case studies and their images help us to understand the opportunities and potential to improve completeness via infill development within the City of Portland. By projecting the average figures from the case studies across the city we can begin to understand the untapped capacity for improving access to housing, active transportation, and culturally appropriate daily essentials. The city of Portland has 10.5 square miles of wasted space zoned to allow housing and commercial space for life's daily essentials. Overall, 30% of parking lots and 34% of vacant lots are zoned to allow housing or mixed use buildings. Across the city, surface parking area could provide 64.9 million square feet of ground floor commercial space, room for about 20,000 restaurants, and roughly 322,000 housing units. Vacant land has the potential to provide 10.7 million square feet of ground floor commercial space, enough space for 3,700 restaurants and 72,000 units of housing. Without destroying or modifying any existing buildings, this currently wasted space presents the city of Portland with an opportunity to house an additional 890,000 residents in the city. This number of new residents would more than double the city's population and increase the state's population by 21%. Adding close to one million new residents would give Portland a population density similar to that of Chicago, about 12,000 people per square mile. Overall, the total development proposed on parking lots occupies only 18% of total off street parking area throughout the city. That means that just 18% of the city's surface parking area can house about 727,000 people. The situation is similar for vacant land. The development proposed on vacant land in this research occupies only 12% of total vacant land in Portland, which could house 163,000 people. The complete neighborhood needs a concentration of people to support the amenities and active transportation infrastructure in the area. Turning parking lots and vacant land into housing and ground floor commercial space is necessary to create the proper density to support the services and amenities in the area.

Implications, Next Steps, Dreams

It is not just buildings being proposed but transportation infrastructure as well. Some of these existing parking lots occupy multiple blocks of valuable urban land. These proposals suggest creating a complete street network whenever possible. This improves connectivity and allows all modes of mobility and transportation to reach places more easily. These proposals include reducing vehicle lanes and replacing them with protected bike infrastructure or dedicated bus or rail lanes. This is because the complete neighborhood minimizes space for cars and maximizes space for humans. Removing private vehicle storage will require the city to provide other, dignified ways to get to and from these centers. Dignified transportation means that it works for people that value their time, it's clean, and it's safe. In Portland, public transit is often used as a dry and warm place to sleep for those experiencing houselessness or housing insecurity. Providing an abundance of housing for all income levels throughout the city will help to reduce the amount of people using transit as shelter by providing them with an actual house.

Making free, off street parking less abundant is good for cities. This forces drivers to park their vehicles on the street, where cities can charge dynamic pricing based on demand. Each neighborhood center could be designated as a parking benefit district,

meaning that a portion, usually 50%, of money generated from on street parking will be spent on infrastructure improvements within the district. This is a win for the city and residents of the centers. This is also a win for owners of off street parking lots, with the overall supply of parking reduced, and with the city charging for on street parking, this presents an opportunity for parking lot owners to charge for their parking as well. This is part of the process of unbundling the cost of free parking from basically all goods and services.

The complete neighborhood is sustainable, and when it comes to the production of food and energy within the case studies, this research found that on average, the new roofs proposed in this research could create enough room for solar panels to provide electricity to 24% of total residents. While if using new roofs for gardens, these centers could provide food for 6% of residents. These numbers only account for the new buildings proposed, if all existing buildings provided solar panels on their roof, the center could provide electricity for a higher percentage of residents.

This new development doesn't produce nearly enough food or energy to be self sustaining. For the complete neighborhood to be truly sustainable it must capture its metabolism within its boundaries. Urban metabolism is defined as the materials and goods needed to sustain a neighborhood's residents at home, at work and at play (Heynen et al., 2005). This means, the complete neighborhood is a one that needs to produce all, or most of the materials and energy it consumes. The complete neighborhood accounts for the ecological "footprint" of its consumption within its boundary. The environmental footprint of a city or neighborhood "represents the amount of biologically productive surface needed to sustainably maintain a human society given its living standards" (Barles, 2010). As of now, that footprint is segmented and distributed throughout the globe, concealing the damage caused by consumption in faraway lands. For a neighborhood or city to be self sufficient, alternative social, political, economic, and ecological paradigms must be adopted. There are three alternative paradigms we can look at to accomplish this: dematerialization, degrowth, and steady state (Broto et al., 2012). Dematerialization seeks to improve efficiency in production, consumption, and waste systems. This appears to be the first step that needs to be taken in order to reduce the footprint of a neighborhood and its residents. Dematerialization calls for the improved efficiency of capitalist production and does not challenge the political and economic status quo. The second step appears to be degrowth, which is the intentional and equitable shrinking of production and consumption to improve sustainability. Intentionally shrinking production and consumption will mean the end of all polluting and toxic manufacturing. This includes plastics, oil, gas, mining, pipelines, factory farms, etc. Because degrowth incorporates equity into its framework, there will also be intentional growth in certain areas like housing production and access to healthcare, particularly in neighborhoods that currently lack these. Improving access to things like housing and healthcare means guaranteeing access to them regardless of income. Finally, when levels of production and consumption have reached a point that can be sustained, steady state economy can be implemented. A steady state economy is one that maintains a steady capacity of production and consumption, rather than pursuing exponential growth. This means that after dematerialization and degrowth, production and consumption levels will

reach a balance that sustains the population's needs. This level of consumption can be maintained in perpetuity (Broto et al., 2012).

When it comes to the manufacturing of goods within the centers, all of the case studies allow limited industrial uses. Depending on the industrial use, it's possible that portions of the ground floor retail proposed here could be used for manufacturing of goods that residents in the center will use. Bringing manufacturing and agriculture to these currently wasted spaces will enable residents to have walking access to a variety of employment opportunities while also capturing a portion of the urban metabolism within the center. A major barrier to capturing the entire metabolism within a city or neighborhood is the large average carbon foot print of American consumers. This research found that on average, these case studies could offset 0.3% of resident footprints. For each case study there will need to be an additional 50,000 acres of solar panels, farms, and forest outside of the neighborhood boundary to provide electricity and food to residents while absorbing the emissions they produce. For neighborhood centers to be truly self sustaining, an almost 100% decrease in consumption and emissions will be necessary.

Along with these physical changes within the built environment, structural and systemic changes must occur as well. Governments and institutions must step in and provide for the people that the free market excludes. The complete neighborhood guarantees access to housing, healthcare, and other culturally appropriate necessities. As a result, government will need to step up and become developers and providers of housing and commercial space. Governments have the capacity to create things without the need for profit, which can keep costs for consumers low while simultaneously increasing competition within the market of for profit developers. The complete neighborhood is free of tents on side walks, not because those people have been displaced to out of sight areas that dominant classes deem undesirable but because the systematic and structural causes of houselessness have been addressed and everyone has access to dignified housing and healthcare. Providing guaranteed housing doesn't just benefit the people who experience houseless and housing insecurity, it's good for everyone.

The neighborhood and structural changes proposed in this research are just the first step in the long process of creating sustainable and equitable communities. This research focuses exclusively on new development but investing in existing residents and buildings is necessary as well. The complete neighborhood can provide programs to install solar panels on existing homes, retrofit them to be more energy efficient or install sustainable landscaping in their yard. By continuing to divest from cars, cities can begin to use not just parking lots for different uses but highways as well. These spaces can be converted into a combination of infrastructure for active transportation, parks, agriculture, or forest for all residents to enjoy.

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