ABSTRACT

Title of Thesis:	STEP INTO GREEN: REIMAGINING OUR URBANSCAPES WITH INTEGRATED GREEN SPACES
	James Renwick Long, Master of Architecture, 2023
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Communities across the country, and beyond, suffer from food insecurity due to Food Desert conditions. Food deserts persist due to lack of reasonable access to nutritious foods, often as a result of distance to the nearest grocery store or market. Minorities, impoverished areas, and otherwise marginalized peoples are particularly subject to this inadequate access to healthful foods and produce. Existing infrastructures and urban planning provide little relief, particularly for those communities that wish to become more self-reliant by establishing greenspaces devoted to urban agriculture (UA). Zoning, local regulations, costs, and access to viable soil and clean water compound the challenges that inhibit a transition from consumer (reliant) to producer (provider). While there are many factors that contribute to the commonness of Food Deserts, the following proposal shows how rethinking urban design approach can, at various scales, provide meaningful relief by way of UA to those in need of nutritious supplements to their diets.

This design scheme must be scalable, affordable, and resilient while also being applicable to a variety of build scenarios including new construction, renovation, and repurposing. As such, this proposal rethinks urban design strategies from a theoretical standpoint and exemplifies the execution of this theory in the neighborhood of Harlem Park, Baltimore, MD, that currently and historically suffers from food desert conditions. The scale of this neighborhood will allow the execution of urban planning aspects, community integration strategies, and individual household or unit-scale production to be showcased.

Many UA initiatives have proven successful across the country and will serve as a basis by which to quantify the potential impact and effectiveness of this new design proposal in terms of initial and upkeep costs, volume of produce, and sustainability.

STEP INTO GREEN:
REIMAGINING OUR URBANSCAPES WITH INTEGRATED GREEN SPACES

by

James Renwick Long

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Dedication

In memory of Brian S. Long.

Acknowledgements

In thanks to my wife, Amanda V. Long,

who held our family together through architecture school.

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Chapter 1: Food Deserts

Definition

Concern over ready access to adequate foods has been critical to humans since ancient hunter-gatherer times. The term food desert is relatively new, having been first coined in the 1990s[1]. Whereas the need for food as sustenance is universally recognized, the urban condition referred to as a food desert is more nuanced and has only recently come to the forefront of socio-economic conversations. A food desert may be measured by a number of variables or factors, but generally speaking is a reference to an urban area in which the inhabitants do not have ready or affordable access to healthful foods[2]. This often comes down to a combination of no supermarket located within walking distance (typically considered a five-minute walking distance) and no personally owned vehicle. Many modern cities and urban environments lack an aspect of walkability and well distributed supermarkets, leaving many residents reliant on personally owned vehicles or public transportation to reach said supermarket. Some efforts outside of grocery stores and supermarkets, such as food pantries or farmers' markets, help alleviate these conditions, but the availability and distribution of these ancillary supply chains is inconsistent. Rural settings vary slightly in their definition of food desert conditions due to their inherently increased

[1] Shannon, "Rethinking Food Deserts Using Mixed-Methods GIS," 85
[2] Alviola et al, "Determinants of Food Deserts," 1259

distances and lower density, but the issue continues to be prevalent in many of these settings as well.

Contributing Factors

Coupling this condition with the typical automobile-centric infrastructure and urban design philosophy results in a significant portion of city residents living within food deserts. There are other common contributing factors that further exacerbate the issue such as the only supermarket within a reasonable distance being prohibitively expensive, nearby stores selling primarily highly processed foods and little or no fresh goods, and a lack of public transportation infrastructure that provides reasonable access to appropriate supermarkets.

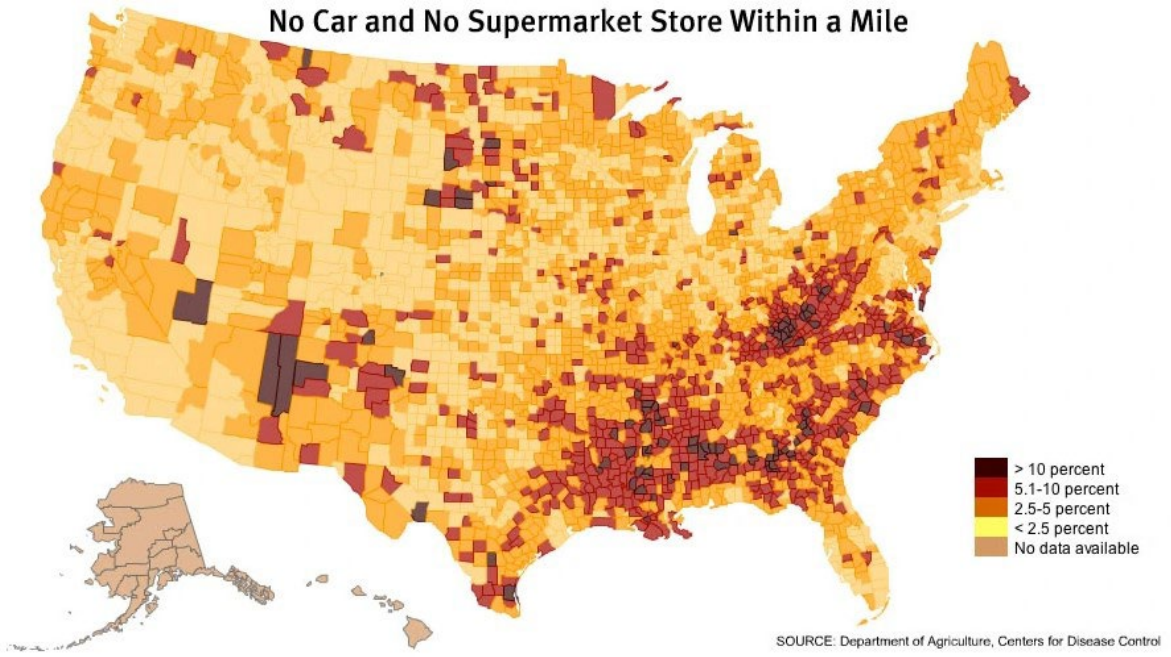


Figure 1: *U.S. Food Deserts 2018 (USDA.gov, 2018)*

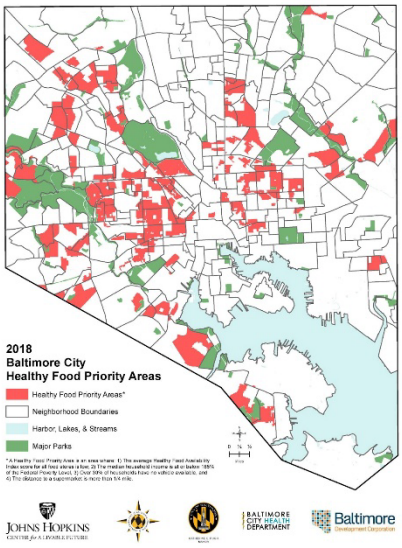
As of 2017, the United States Department of Agriculture (USDA) found that over 12% of the U.S. population, almost 40 million people, are in what is considered low-income areas and have low access to healthful foods. Half of this group of the population also lacks access to supermarkets. While many of these people live in areas that are serviced by convenience stores, these stores usually do not carry significant amounts of fresh produce and rather supply highly processed, pre-packed foods. This aspect of food availability has raised concerns over the health and well-being of these population groups[3]. Some studies have indicated a link between food insecurity and increased health risks, particularly that of diabetes. While these studies are inconclusive, there is a wide recognition that this population group suffers from lack of nutrition as a result of living under food desert conditions.[4] The population living under these conditions tends to have diets that are not rich in vitamins and other nutrients. Prolonged diets of this nature significantly increase health risks and result in susceptibility to diseases linked to malnutrition.[5] Fresh produce, which is difficult to acquire in food desert areas, are some of the best sources of many vitamins, minerals, and fibers that are key to healthful diets. Conversely, convenience stores and fast-food restaurants, which are more prevalent in food desert areas, carry foods that are more highly processed and typically high in sodium, sugars, and saturated fats, all of which increase the risk of health diseases when too frequently consumed.

[3] USDA, "Urban Agriculture"
[4] Pawlowski, "From Food Deserts to Just Deserts"
[5] Dimitri & Rogus, "Food Choices, Food Security, and Food Policy"

Conditions in Baltimore, MD

Food insecurity is, unfortunately, shown to be most prevalent in areas affected by additional socioeconomic factors, namely income inequality, poor transportation infrastructure, and racial disparities, particularly for black communities.[6] These conditions are brought about by several historical issues. One notable contributing factor was that of redlining. Conducted by the Home Owners' Loan Corporation (HOLC) during the 1930s, hundreds of cities across the U.S. were mapped using a system of color coding to indicate a perceived level of risk when granting loans. This scale ranged from the lowest risk, green, to the highest risk, red. While ostensibly these maps were created in response to practical concerns such as the condition of the homes and income levels, the end result disproportionately placed minority groups and African Americans in red zones, hence the term "redlining." This pigeonholed many of these communities and prohibited them from selling or buying, a factor that has been shown to contribute to the decline of these neighborhoods.[7] Comparing maps of modern-day Baltimore city food deserts with redlining maps, one can readily see significant overlap between the two.

[6] Dimitri & Rogus, "Food Choices, Food Security, and Food Policy"
[7] Hillier, "Spatial Analysis of Historical Redlining: A Methodological Exploration," 159.



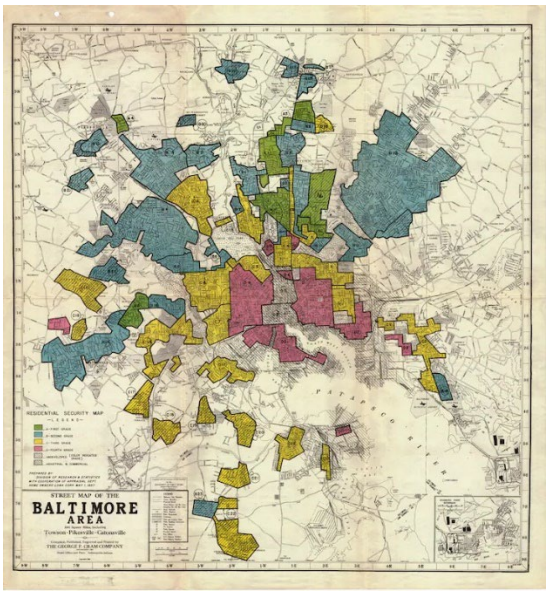


Figure 2 (left): *Baltimore, MD Healthy Food Priority Areas 2018*

Figure 3 (right): *HOLC Residential Security Map Baltimore, MD*

Recent focus on food deserts in Baltimore City has led to these areas being dubbed Healthy Food Priority Areas, a name that better describes the intent to increase availability of healthful foods in areas with limited access. Several years of tracking and analysis has allowed the Baltimore City Health Department, with the help of Johns Hopkins Center for a Livable Future, to quantify the population groups most affected by lack of healthful foods. While the total percentage of affected residents has decreased, dropping from 25% in 2015 to 23.5% 2018, over a quarter of the Black population and almost as many children live in these areas. Seniors are another population group that is disproportionately affected by food desert conditions, with almost a quarter of this population living in these areas.[8]

[8] World Population Review.

Alleviating Efforts

A significant roadblock to addressing food insecurity across the U.S. is the associated cost of establishing a new supermarket. This requires a considerable financial investment and doing so within an impoverished area is typically considered an undesirable investment by companies and investors. Federal programs intended to alleviate the issue in affected areas, such as the Supplemental Nutrition Assistance Program (SNAP), which provides financial assistance to households affected by food insecurity, are often under threat of losing funding and are not universally accepted at supermarkets, grocery stores, or markets. Access to SNAP benefits has also been inconsistent for those in need, which contributes to questionable purchasing power for potential customers, further dissuading companies from investing in these areas. Since many food desert areas overlap with relatively high crime rates, insurance costs also increase which, again, makes investors and companies reluctant to invest in a new store, even in cases where crime rate is not actually a significant factor.[9]

In addition to programs such as SNAP, there are other initiatives seeking to alleviate food desert conditions. There are federal and local incentives programs for the grocery stores and supermarkets as well as special consideration for small, local businesses. Many initiatives for local and community gardens also exist, including Baltimore's Department of Recreation & Parks running a program called Baltimore City Farms.[10] This program leases various sized garden plots for residents to grow their own produce. Plots are fenced with controlled access and the program provides

[9] Rubin and Ponsor, "Affordable Housing and Resident Health"
[10] Baltimore City Department of Recreation & Parks.

some basic tools and manures. Hands-on training and how-to manuals are also provided for those who are interested but lack the knowledge to garden. Many other community gardens exist throughout Baltimore and operate on a voluntary basis. Harlem Park School itself operates Hope Community Garden, where students and neighborhood residents can come together to learn about gardening, their produce is then sold at Waverly Market. This model of local gardens providing not only fresh produce to local markets but also providing training and community involvement has been put to good use elsewhere, too.

Brooklyn Grange, a rooftop farming business centered in New York City, is a privately run business that repurposes large rooftops into intensive green roofs for the purpose of urban agriculture. Their current three rooftop gardens produce a combined yearly output of more than 100,000 lbs. of vegetables out of over 5.5 acres. Produce is then sold on location and at various farmers markets, sold through a Community Supported Agriculture (CSA) program, and at least 30% of the total produce is donated to local residents with limited access to healthful food. The company is involved in several other services including designing and building urban greenscapes, as well as community events focused on spreading awareness and teaching urban agriculture.[11]

[11] BrooklynGrange.com

Figure 4 (left): *Brooklyn Grange rooftop farm.*

Figure 5 (right): *Brooklyn Grange rooftop market.*

While community gardens that rely on volunteer workers produce less total volume as compared to a larger enterprise like Brooklyn Grange, both have the capacity for a meaningful impact on food availability through affordability and more frequent points of sale. Both also serve as community hubs at which interested residents can receive critical knowledge and guidance on urban agriculture. Thus, areas disproportionately affected by food desert conditions have greater means by which to alleviate food insecurity.

Chapter 2: Urban Agriculture

History

The advent of agriculture is one of the landmark human developments that permitted the transition from hunter-gatherer to settler. Large, permanent establishments of humans only became possible due to large-scale agriculture and food storage. While the majority of agriculture has taken place at the periphery of large human settlements where large swathes of land allow for large volumes of production, there have also been cases throughout the history of smaller scale urban agriculture (urban-ag). While mostly supplemental in nature and not intended to replace large-scale agriculture, some notable early history examples include Machu Picchu and Persian desert towns.

The world-renowned Machu Picchu was intentionally remote and difficult to access, making mass agriculture an unwieldy source of food due to the mountainous setting. Instead, the mountainside was carved into terraces to maximize food production and make the city self-sufficient without the need to import foods along treacherous access routes. Persian desert towns had no shortage of space, but their arid climate did require a reliable source of water. Thus, Qanats were developed and built to gather water via alluvial aquifers in the surrounding region and channel it along underground aqueducts to cities. This has allowed gardens and agricultural efforts to be maintained through modern times.

More recent historical examples of urban-ag include Victory Gardens, a government effort started in several Allied nations during both World Wars to encourage communities and households to grow their own vegetables and herbs in order to alleviate reliance on mass agriculture so those resources could be sent to support war efforts. This effort peaked in the U.S. in 1943 when about 12 million victory gardens were established in cities alone, with an additional 6 million in rural and farm communities. The result: a third of all vegetables in the U.S. were grown in Victory Gardens. At least two WWII Victory Gardens remain active to this day; Back Bay Fens in Boston, MA, which has become a botanical garden, and Dowling Community Garden in Minneapolis, MN, which still serves as a vegetable garden supplying its surrounding community.

Modern Production Systems

Modern day urban-ag can be taken on in multiple forms. These various methods of lower scale farming can be used exclusively or simultaneously depending on desired production and available resources. Some of the most common production systems include outdoor in-ground farming, outdoor raised-bed farming, rooftop farming, edible landscaping, and indoor hydroponics and/or aquaponics.[12]

[12] Little et al, "From Surviving to Thriving: Strategies for Urban Farm Success," 13-14.

Figure 6 (left): Harlem Park School raised bed garden

Figure 7 (right): Detroit in-ground flower garden

Perhaps the most common of these production systems are the outdoor systems. In-ground farming requires the least amount of preparation, though care must be taken in urban settings to ensure the soil quality is sufficient and bereft of harmful toxins and pollutants. Rooftop farming is an attractive option in urban settings where land value is a prohibitive factor or where stormwater management is a critical concern as the extensive/intensive green roof types both do well to capture and slow rainwater. In either ground or rooftop settings, raised-bed farming can be another relatively simple system to establish, though that system typically is more susceptible to cold weather and therefore may inhibit crops if maximizing seasonal output is a goal. Edible landscaping is a relatively new business model for landscaping companies. Whereas traditional landscaping consists entirely of ornamental plantings, edible landscaping performs similar services for private or commercial customers but with vegetable gardens and fruit plantings. Other production systems in an outdoor setting include greenhouses and “hoop houses,” both of which help protect crops and lengthen the growing season.

Modern Day Implementation

Regardless of the system chosen for an urban-ag venture, there are several key areas of knowledge necessary for a successful production system: soil quality, soil nutrients, crop planning and rotation, water management, pest control, and harvesting. Soil quality is the first necessity for successful production. Without sufficient soil quality production will be little or none, or the resultant produce may be contaminated by toxins or pollutants, posing a health hazard. In-ground farming in an urban setting necessitates extra care in this regard, as the topsoil may be in what is termed a "brown field," an area of earth partially contaminated by previous construction or activity. Many cities have resources available to help residents gain an understanding of their soil quality and better determine if their soil needs to be tested prior to embarking on an in-ground urban garden venture. The Baltimore Office of Sustainability released a Soil Safety Policy for Food Production, last updated in 2021, that not only assists in soil testing, but also guides residents through the process of gaining a permit to launch a community garden.[13] Even in cases where the soil quality is below a minimum standard of acceptability, remediation efforts can be accomplished to bring the soil up to par, though for many such remediation may prove to be a financial hurdle. This could be a case where raised bed or rooftop gardening becomes a viable solution, as both require soil to be imported, allowing that soil quality to be controlled and avoiding a need for costly and time-consuming remediation.

[13] BaltimoreSustainability.org

Once a garden is laid out with quality soil or an alternative growing medium, nutrient management becomes an important aspect of the soil to monitor and maintain. There are many contributing factors to soil nutrition, and the desired levels of nutrient composition can vary depending on selected crops and climate. Poorly maintained nutrient levels will inhibit production and affect produce quality, and so developing a nutrient management plan is a helpful practice. This plan looks at local climate conditions to determine the best frequency at which to test soil nutrient levels so that growers can make informed decisions on the care of their soil. Certain municipalities will even require a formal nutrient management plan if the urban farm sells more than a certain value of crops during a year; In Maryland, that value is set at $2,500.[14]

Now that soils and growing medium have been sorted, crop planning must be accomplished to maximize output while ensuring future seasons continue to benefit from good soil health and, therefore, consistently productive harvests. Planning also involves determining target volumes of specific produce, so that if tomatoes are in high demand for a grower or their intended consumers then an appropriate number of plantings support that production goal while fitting into the overall distribution of plantings. Any effective crop plan will also incorporate crop rotation. This means that an initial crop plan will be organized by planting families, of which there are eleven total. A few of the more common family plantings include legumes, nightshades, brassicas, and allium, which include peas, tomatoes, broccoli, and onions, respectively. Organizing these families in distinct groups allows a grower to rotate

[14] Maryland Department of Agriculture.

families from plot to plot each year. Thus, if a farm consists of four families of plantings each family will use a specific plot only once every four years. Different planting families interact with soil in unique ways, for example some draw greater nitrogen from the soil while others draw more nitrogen from the air. Crop rotation keeps the soil balanced and healthy by preventing any single planting family from draining certain nutrients year after year.[15]

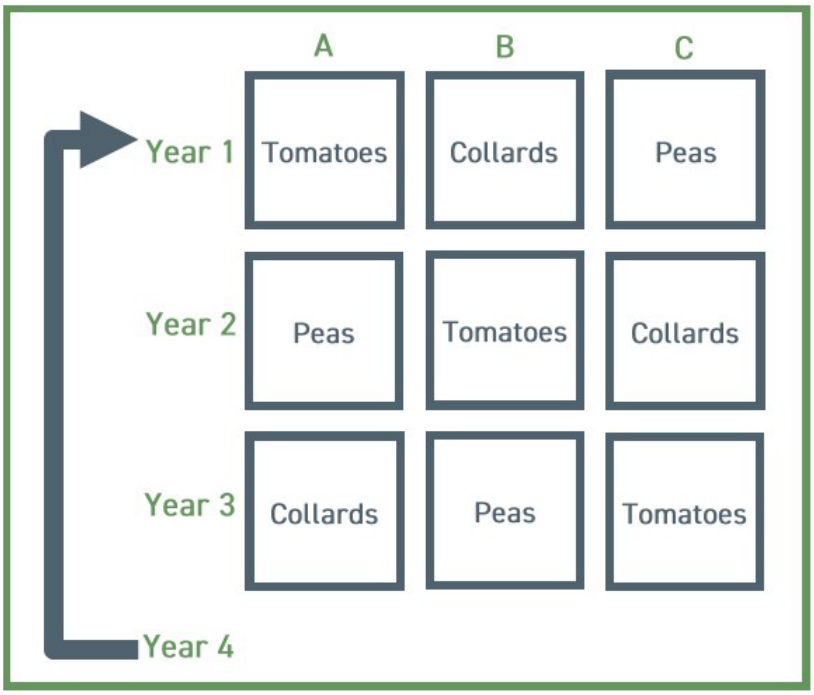


Figure 8: Three year crop rotation scheme (Little et al, 2019)

Regular operation of any production system also requires water and pest management. In terms of water management, while naturally occurring precipitation is an important factor, any farm will require more water than rainfall alone can provide. While municipal water supplies are typically sufficient in this regard, the

[15] Little et al, "From Surviving to Thriving: Strategies for Urban Farm Success."

added cost of that water usage can be prohibitive and at larger scales could impact water availability. Rainwater collection is one method to alleviate these costs, especially in cases where a large roof captures significant rainfall which can be channeled into collection systems. The key here is that the water quality needs to be monitored and, if necessary, treated or filtered to avoid introducing pollutants to the growing medium. Pest management typically follows a more rote approach to prevention, management, and learning.[16] Crop rotation also assists in this endeavor as pests tend to gravitate towards specific plant families, rotating the planting families helps mitigate repeat infestations. Using native plant species helps develop a more symbiotic relationship between plantings and local insect species and using a variety of trapping methods or plant coverings can further mitigate risks associated with pests.

Lastly, harvesting is a specific science related to each planting. Some plants, such as leafy greens, are usually best harvested in the morning so that they can be transferred to storage without wilting. Regardless of the specifics of harvesting methods, food safety must be closely monitored, especially in the case where produce is being sent to a market for sale. Many plant-borne diseases are not transmissible to humans, but improper handling and care could infect a harvested good with concerning diseases such as E. Coli or Salmonella.

Production systems are typically executed in an urban environment in one of three general business models: private gardens, community gardens, or commercial gardens. Private gardens are small-scale and usually located on the personal property

[16] Little et al, "From Surviving to Thriving: Strategies for Urban Farm Success," 26-27.

of a townhome or other single-family lot. Smaller systems using indoor hydroponics can serve units with insufficient land space or vertical gardens can be implemented in even smaller spaces such as apartment balconies. However, these systems typically have lower total production, making them more supplemental in nature. Private gardens usually have the capacity to produce a significant portion of a household's vegetable needs for a year, with a 200-400 square foot garden producing enough for at least one person for the entire year.[17] The typical townhouse lot size in Baltimore is approximately 16' by 60' which totals nearly 1,000 square feet. If only half of that lot has consistent direct sunlight, then there is about 500 square feet of gardening space to provide a significant portion of the households' fresh produce needs.

[17] Little et al, "From Surviving to Thriving: Strategies for Urban Farm Success."

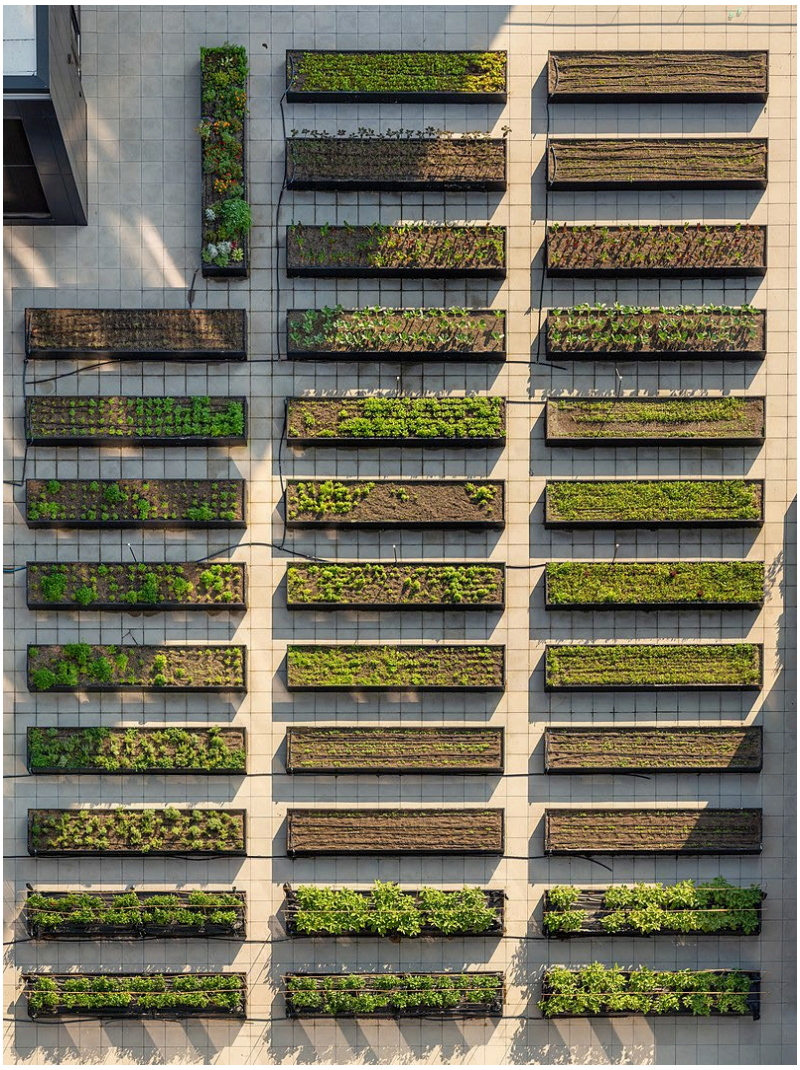


Figure 9: Project Eats rooftop farm NYC

Community gardens take several forms ranging from semi-private neighborhood gardens to fully public community gardens serving larger sections of the urban population. In either case, they usually occupy public grounds that have been permitted for farming and can easily reach sizes of over 3,000 square feet, depending on the capacity of the growers and the total available land. Many of these community gardens, especially those run by not-for-profits or local schools, provide

hands-on training and classes to educate residents about urban agriculture. This community and education aspect of these gardens is a key aspect of promoting urban agriculture as many who might be interested in the practice will first need the knowledge and skill to successfully execute their own gardens.

Commercial gardens are usually run by a business that sells their produce at local markets. Many of these companies, such as Brooklyn Grange, target their services in urban areas that have high rates of food insecurity. They also tend to have educational programs and seminars to help interested neighbors begin their own gardening ventures. While most other urban garden types operate on a voluntary basis, these commercial gardens provide jobs to the local community and have much higher production capacities that can positively impact food insecurity at a grander scale than a smaller community garden.

Chapter 3: Landscape Urbanism

Overview

Broadly speaking, landscape urbanism is an urban design philosophy that seeks to marry large scale landscaped spaces with an urban context in a way that prioritizes the public spaces and simultaneously strengthens the underlying systems that weave an urban-scape together. This effort strives to reconnect inhabitants of more dense urban areas with "natural" environments that in traditional modern cities are relegated to parks and more self-contained green spaces. Landscape urbanism devotes far larger swathes of land to greened public spaces while also treating architectural projects with an attention to how they connect to these green spaces, ensuring that the field condition, landscaping, has precedence over the object, building.[18]

[18] Gary, "Landscape Urbanism: Definitions & Trajectory."

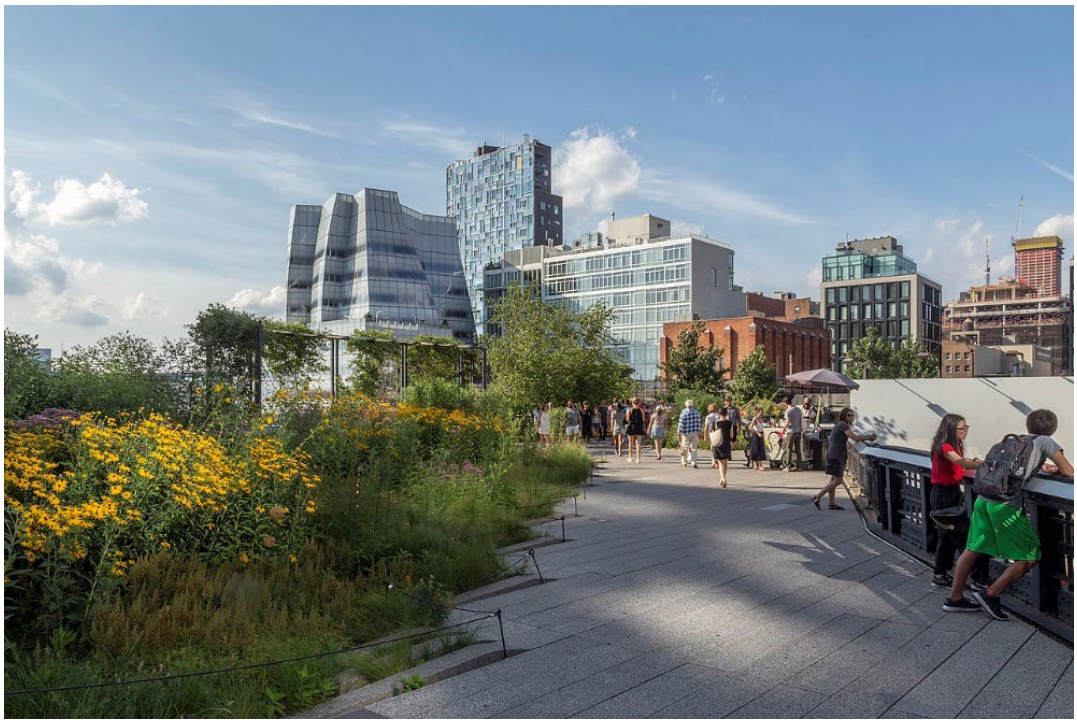


Figure 10: *The High Line by James Corner/Field Operations, NYC*

Among the many goals of landscape urbanism, there is an intent to promote sustainable urbanism, especially in the cases of stormwater management and environmental stewardship. Large areas of landscaping can greatly increase permeable surfaces within an urban-scape. Designing these landscapes with stormwater runoff features such as bioswales and terracing can further help capture and slow greater quantities of stormwater runoff. Devoting so much space to landscaping also allows for the inclusion of gardens and edible landscaping, particularly in cities like Detroit and Baltimore where rampant vacancies persist.[19]

STOSS is a landscape and urban planning firm that specializes in Landscape Urbanism. Their project 11th Street Bridge Park in Washington, D.C. exemplifies the

[19] Gary, "Landscape Urbanism: Definitions & Trajectory."

aspects of landscape urbanism that seek to increase connectivity within an urban-scape while expanding greenspaces. The bridge design serves to provide a major pedestrian route across the Anacostia River and incorporates programmatic areas to serve as gathering spots, public event spaces, and environmental education.

Figure 11: *STOSS 11th Street Bridge Park, Washington, D.C.*

Relatable Aspects

STOSS has also drafted a landscape urbanism master plan for Detroit City, named Future Detroit. This master plan capitalizes on the extensive vacant lots and buildings to weave a large network of greenspaces throughout the city. These spaces beautify the city while providing better and more varied connections for residents. There was also a focus on better linking social, economic, and ecological systems

throughout the city via greenspaces and new infrastructure. Expansive landscaping is also crafted to capitalize on existing natural processes to improve air and water quality for inhabitants and nurture local ecosystems.[20]

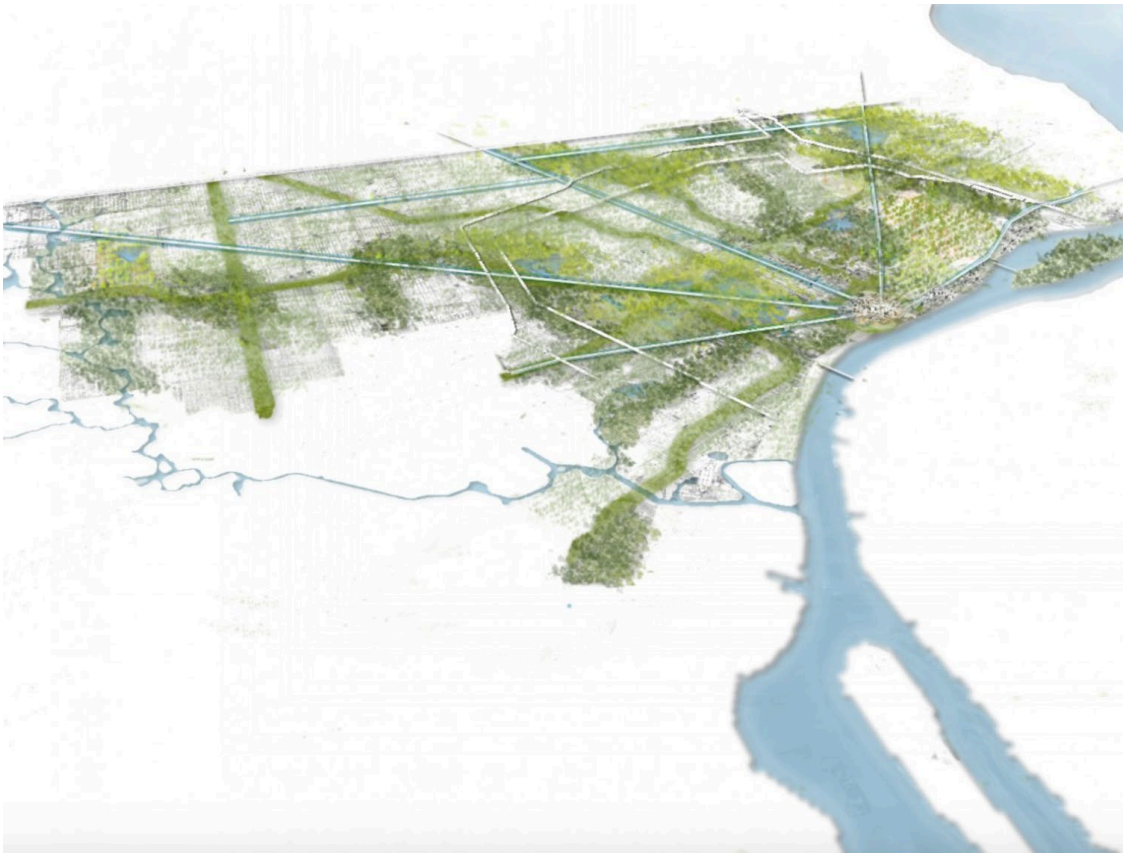


Figure 12: *STOSS Future Detroit aerial*

Additional benefits from this master plan include the extensive amount of land that can readily be converted into gardens. Some of these gardens are remedial in nature, where soil conditions are of poor quality. Instead of being used for production, these plots recognize polluted soils and will, over time, naturally remove toxins and pollutants thereby making the soil viable for agricultural practices and reducing

[20] STOSS, "Designing Landscapes and Social Space that Foster Resilience, Vitality, and Equity."

health risks to residents. Garden designated in areas without a need for remediation have been planned out as a network that works in tandem with a network of markets and grocery stores, ensuring that both production and distribution work together to minimize or eliminate food insecurity in the city.[21]

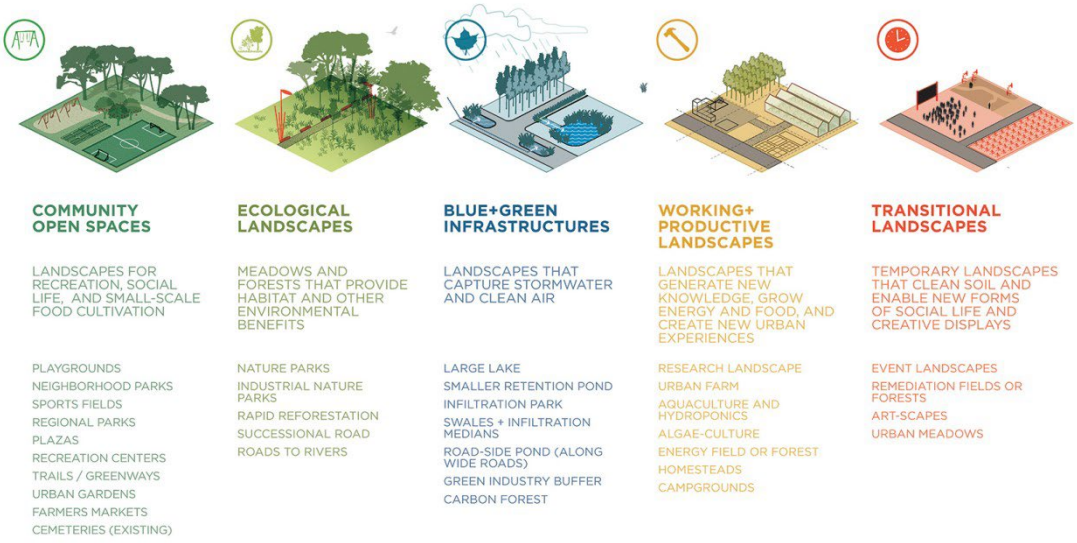


Figure 13: *STOSS Future Detroit infographic*

[21] STOSS, "Designing Landscapes and Social Space that Foster Resilience, Vitality, and Equity."

Chapter 4: Title of Chapter 4

Overview

Whereas Landscape Urbanism places heavy emphasis first on the integration of large-scale public green spaces, New Urbanism first focuses on walkability, place-making, and mixed-use development. The intent of this philosophy is to make urban environments where residents are always within walking distance of various services and destinations. This avoids large areas devoted solely to residential typologies or others that are entirely comprised of businesses or retail. Instead, these various uses are thoughtfully mixed to reduce commuting and the need for motor vehicle transportation.[22]

Other aspects of this planning include buildings engaging with the street and improving pedestrian experiences by propagating retail frontage and wide sidewalks with well-established buffers against vehicular routes.

[22] Steutville, "25 Great Ideas of New Urbanism."

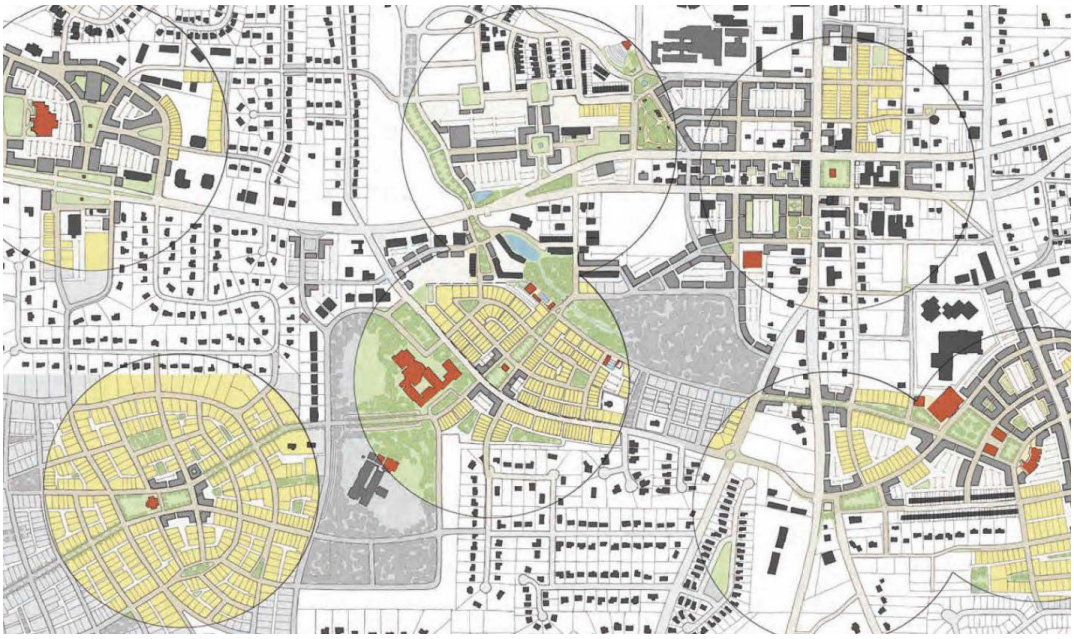


Figure 14: Congress for New Urbanism "ped shed" and the 5-minute walk (CNU.org, 2021)

Placemaking in a new urbanism scheme doesn't just look at large public gathering spaces, but also the smaller more intimate spaces including streets and porches. These spaces are crafted to be experiential at a human-scale, without overbearing towers or too-narrow alleys. Access to the sun and sky are carefully considered and well-defined edges make navigation through the environment feel intentional. Large spaces are oriented and buffered in ways that prevent wind tunnel effects and are versatile in their potential programmatic uses.[23]

[23] Steutville, "25 Great Ideas of New Urbanism."

Figure 15: TBG Partners The GRID, walkability & placemaking (thefield.asla.org, 2020)

New Urbanism also examines urban design problems at various scales. The Charter for New Urbanism lists these scales as: the region: metropolis, city and town; the neighborhood, district, and corridor; and the block, street, and building. These classifications help in determining the relationship between new urbanism and public policy and development practices. Sub-categories within these scales cover everything from sustainability, and environmental stewardship to affordability and diversity. Other aspects that respond to more specific needs are the call to design urban spaces that are both safe and accessible while also providing a sense of openness. Vehicles are still accommodated, but emphasis is placed on multimodal transportation. Pedestrians and bicyclists are considered as important as the

automobile and public transportation is implemented from the onset, not as an afterthought.[24]

Relatable Aspects

Seaside Florida is one of the foremost, early examples of planning with New Urbanism. While not without its shortcomings, such as a lack of affordability and inclusivity, this coastal town still exemplifies many of the strengths of new urbanism.

Figure 16 (left): Seaside, FL aerial view.

Figure 17 (right): Seaside, FL town center map.

Here, walkability is paramount. Streets lack defined curbs and streetside parking is denoted only by a change in material. There are, in fact, only a few sidewalks outside the main drags. All these design decisions work together to promote walking over the automobile. Limited parking further emphasizes that once you have arrived in Seaside, the car stays put until you need to leave town, otherwise everything you need or want is within easy walking distance. Other paths and

[24] Congress for the New Urbanism, "What is New Urbanism?"

landscaping have been modeled after the local natural environments, with gravel pathways and pine mulching, in order to replicate the existing and natural stormwater infiltration into the ground.[25]

Figure 18: Seaside typical residential street (strongtowns.org, 2022)

While New Urbanism thoughtfully addresses a slew of urban design challenges and issues, there is less focus on establishing or supporting urban agriculture efforts. Landscape Urbanism tends to, at the very least, provide the necessary open space if not overtly establishing areas for urban agricultural development. New Urbanism, however, has some of those same key aspects that play a role such as intentional placemaking and environmental stewardship. These could be expanded to incorporate a greater emphasis on adaptable green spaces that could,

[25] Zeren, "Reflections on Seaside."

when the need arises, be transformed into urban farms while still fitting within the overall design intent of the urban-scape.

Chapter 5: Livability & Issues of Sustainability

Hydrology & Stormwater Management

In the endeavor towards integrated urban green spaces there are several other related areas that can be directly or indirectly impacted by thoughtfully incorporating these new green spaces. From a viewpoint of environmental stewardship are the matters of hydrology and stormwater management. These issues are interrelated and respond to natural and built topography in the urban setting as well as permeable and impervious surfaces in that same area. Increasing permeable surfaces alone can help with runoff, with soil and substrates working together to catch and slow rainwater runoff before releasing it into stormwater systems or letting it permeate deeper into the earth.

Figure 19: Point Defiance, D.C. stormwater management terraces (ecology.wa.gov, 2020)

Simple green spaces such as parklands can contribute to this effort, but in urban areas that have less open space to spare there becomes a need for more compact systems. Bioswales and natural riverbeds are two methods widely used. A bioswale can be as compact as a three-foot-wide buffer between vehicular and pedestrian traffic along a street. Typical bioswales are constructed using a soil and/or mulch growing medium, gravel substrate, and then a drainage system either to stormwater systems or into the earth below. Plantings in these bioswales are chosen to help prevent erosion and act to further improve the bioswales capacity to catch and slow water infiltration while beautifying the streetscape. Some bioswales also support trees, which naturally help control rainwater penetration with their root systems and canopies.

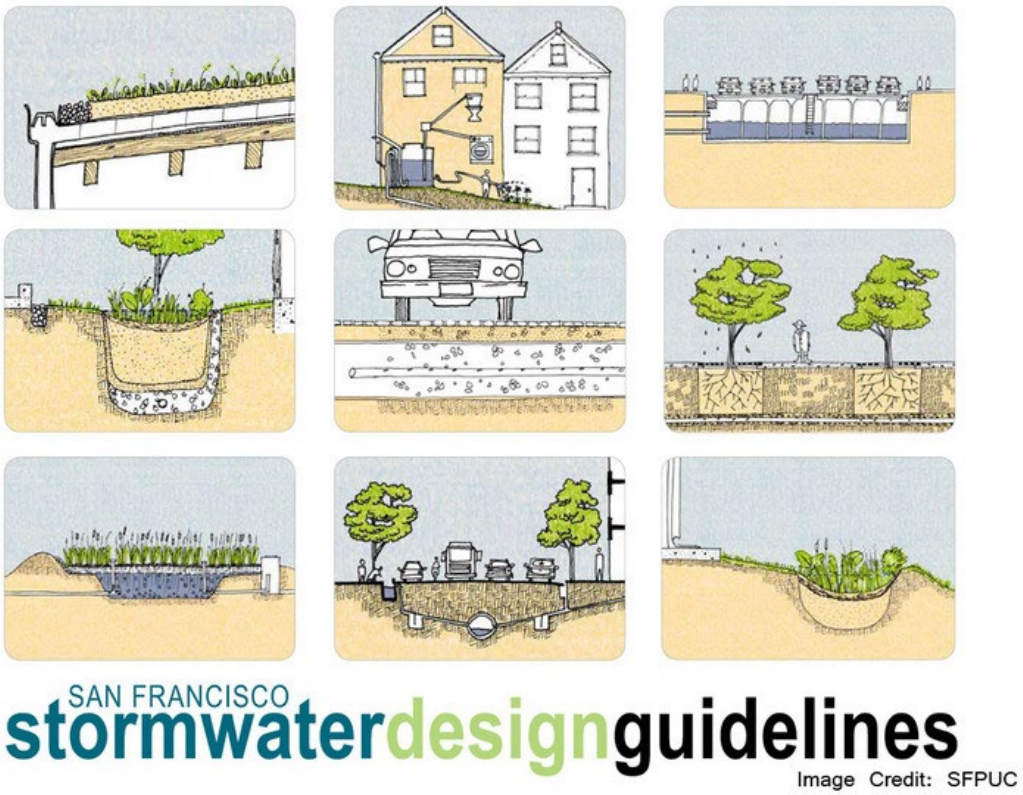


Figure 20: San Francisco stormwater management methods (greencitiescalifornia.org, 2010)

These stormwater management principles also influence street design. Streets account for a large amount of an urban environment's impervious surfaces, and they also tend to act as catches for rainwater runoff shed from the vertical surfaces of larger mid-rise and high-rise buildings. Designing streets with incorporated green spaces, particularly bioswales, helps remove runoff from vehicle and pedestrian surfaces while also slowing its infiltration and alleviating the deluge with which many cities' stormwater systems have difficulty coping.

Mixed-use Development

Much of the land-use throughout Baltimore is determined by historic top-down planning strategies. Residential areas and commercial areas mix to a limited degree, and mixed-income developments are relatively new and not yet commonplace. These aspects of the city's makeup contribute to large areas of residences that are too far from jobs and other city services to be appropriate for low-income households that do not have consistent access to a personally owned vehicle. Distances are too great for walking to be reasonable. This leaves many of these residents reliant on public transport, which itself has greater distances to cover and large pockets of vacancy to navigate.

Mixed-use development strategies allow for a more consistent distribution of retail and commercial land-use across an urban environment. There are still main avenues or pockets of higher density for certain programmatic uses, but there is no longer a strict division and separation of land-uses.

Density & Walkability

Over recent years, many cities across the US have seen a slow but steady emigration of people. During the height of the COVID pandemic this trend became more pronounced, and many cites that have been struggling with economic downturns continue to lose population. This has led to issues of vacancy and a need to de-densify. On the other hand, a recognized aspect of a "successful" and livable city is that the urban fabric is planned with a certain level of density, mixed development, and multi-mode transportation infrastructure that promotes a "walkable city." Low-density results in the built environment being more spread out and tends to promote

vehicular traffic due to significantly increase distances that exceed comfortable walking ranges.[26]

Baltimore is no exception to these issues. Continued economic downturn, lasting impacts of redlining and other discriminatory policies, and lack of mixed-use development. These factors all contribute to large swathes of the residential areas suffering from significant vacant lots and buildings and a very low population density.

Affordability

While many of the hard-hit areas in Baltimore are relatively affordable, many such residential buildings are 50 or more years old, were not well built, and those that have been vacant are in varying states of severe disrepair. This may create a vacuum in which new affordable housing could be developed, there is also the risk of gentrification. These conditions risk prioritizing economic growth at the expense of the existing communities and residents, who make up what's left of the local culture and have already suffered unduly from discriminatory policies over the years.

The breadth of these issues may not be central to Step into Green, but a new vision for urban planning and development must take these into account. The *what* is being accomplished must also consider the *how* it impacts all these ancillary issues.

[26] Talen, "Prospects for walkable, mixed-income neighborhoods: insights from U.S. developers."

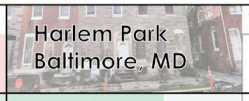
Chapter 6: Site & Proposal

Site Selection

The single most important site factor to consider is the existing distribution and consistency of green spaces in an urban environment. This is the core of the thesis proposition and serves as a vehicle with which to test a new urban design mentality and scheme that incorporates green spaces integrally at each scale, from the individual apartment unit to the city. The driving impetus for the site selection, the socio-economic issue that lends the thesis urgency in addressing green spaces of city design, must be food desert conditions. Thus, while re-integrating green spaces into our city fabric may contribute to a variety of concerns including Urban Heat Island (UHI), beautification, desirability, value, complete streets, and more, the aspects of affordability, which often overlap with food deserts, must be addressed first to ensure this new scheme serves all people equitably. Food desert conditions and the potential impact by this new urban design scheme will be the litmus test used to gauge the success of the thesis: how well can a new urban scheme with integral green spaces at all scales be viable for UA to an extent that can meaningfully impact food insecurity?

Many cities face issues of food insecurity and the other aforementioned challenges. This thesis homes in on three such cites: Detroit, MI, the Bronx, NY, and Baltimore, MD. Each city has distinct and widespread food desert conditions alongside other socio-economic and sustainability challenges. In order to determine a specific location from within these three cities, several factors were considered and assigned a numerical value signifying the relative severity of each

issue. Factors were grouped into three major categories and weighted based on their relation to urban green spaces and the opportunity for urban agriculture.

Max Points/Field			 Harlem Park Baltimore, MD	Total	 Bronx New York, NY	Total	 Detroit, MI	Total
3	2	1		19		18		12
Green Spaces			Lack of major public green spaces.	2	Lack of major public green spaces.	3	Lack of major public green spaces.	1
Food Desert			Pervasiveness of food desert conditions.	3	Pervasiveness of food desert conditions.	3	Pervasiveness of food desert conditions.	2
Density			Relative density of residential typologies.	2	Relative density of residential typologies.	3	Relative density of residential typologies.	1
Typologies			Relative variety of building typologies.	3	Relative variety of building typologies.	1	Relative variety of building typologies.	2
Affordability			Lack of affordable housing.	0	Lack of affordable housing.	2	Lack of affordable housing.	1
Climate			Viability of context climate for urban ag.	2	Viability of context climate for urban ag.	1	Viability of context climate for urban ag.	1
Community			Existing/potential strength of community identity.	2	Existing/potential strength of community identity.	2	Existing/potential strength of community identity.	1
Vacancy			Relative frequency of vacant/abandoned bldgs.	2	Relative frequency of vacant/abandoned bldgs.	0	Relative frequency of vacant/abandoned bldgs.	2
Street Systems			Lack of complete streets or streets with greenery.	1	Lack of complete streets or streets with greenery.	1	Lack of complete streets or streets with greenery.	1
Urban Heat Island Index			Relative severity of UHI.	0	Relative severity of UHI.	1	Relative severity of UHI.	0
Zoning & Regulations			Shortcomings of local regulations for urban ag.	1	Shortcomings of local regulations for urban ag.	1	Shortcomings of local regulations for urban ag.	0
Public Spaces			General lack of public spaces/place making.	1	General lack of public spaces/place making.	0	General lack of public spaces/place making.	0

James Renwick Long | Thesis Site Matrix | v3

Figure 21: Site selection matrix, by author.

While each city has ample opportunity for new, integrated green spaces, urban planning strategies, and food desert alleviation, the cities of Baltimore and Detroit ranked as potentially benefiting the most from Step into Green's focus. Baltimore,

with a greater amount of opportunity in the secondary categories, was chosen as the site home for this thesis' proposals.

There are three primary scales at which *Step into Green* operates: the city scale, the neighborhood scale, and the "unit" scale. Each scale is approached from a theoretical standpoint in order to explore the core principles that drive the design at each of these scales of place. The chosen site for this urban design proposal affords an understanding of each of these scales along with a broad variety of building typologies, which will serve as finer grain and architectural examples of how the *Step into Green* principles may be applied.

The city scale addresses guiding principles of building massing, distribution, and orientation, major thoroughfares, and public centers. The neighborhood increases the resolution of these principles by showing a variety of complete street designs with incorporated greenery, public spaces with plots suitable to urban agricultural, how manipulation of the desired density and orientation of building masses lend themselves to adequate access to sun and rain, and how buildings devoted entirely to commercial and office use may also incorporate green spaces or otherwise relate to adjacent green spaces.

The most extensively derived scheme will be that of a mixed-use residential proposal. This building typology faces the challenges of incorporating integral greenspaces at the individual unit scale, at the community scale, and at the ground level, all in a manner which allows those green spaces to be robust enough to be used for edible growth and scalable to the extent that they could easily transition to a low maintenance green space. Access to sun *and* rain is a key issue and presents a unique

challenge in the disposition and orientation of each unit's outdoor space. Simultaneously, a green space at either the ground, courtyard, or rooftop level may serve as a small-scale communal garden to supplement beyond what a unit's micro-plot may provide and to serve those unable to tend their own individual plots, whether due to time constraints, capability, desire, or knowledge. Perhaps more importantly, this communal garden serves as a classroom in urban agriculture, providing a learning environment for those unfamiliar with growing their own food. This mid-rise building may also include ground level retail and at least some above ground parking levels to exemplify how the principles of *Step into Green* may be integrated at the storefronts and into the concrete expanse of garages.

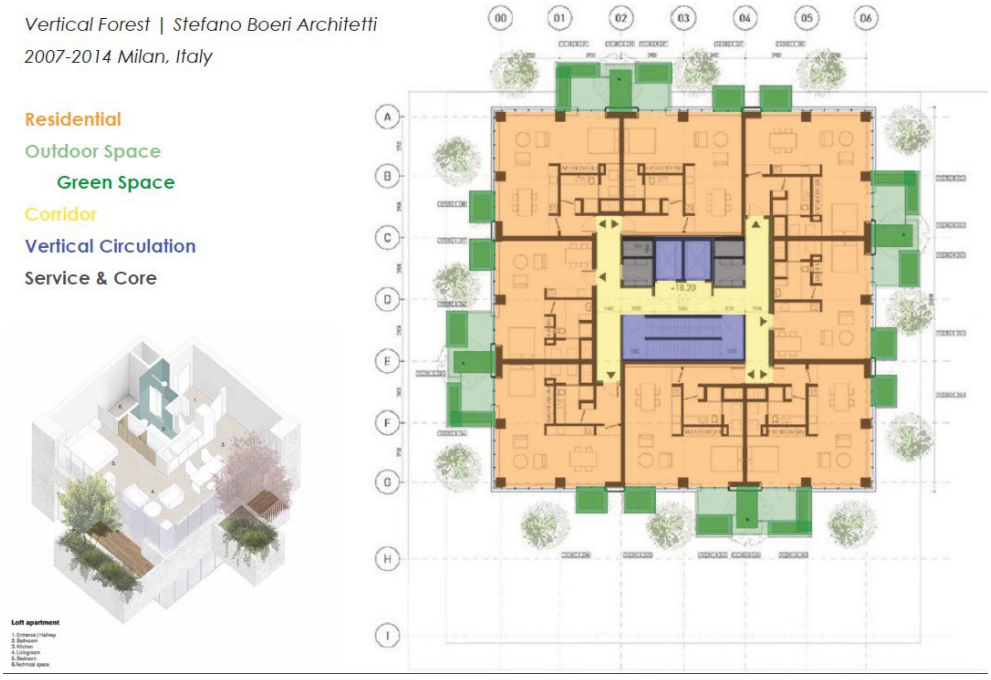


Figure 22: Vertical Forest by Stefano Boeri Architetti, programmatic overlay by author.

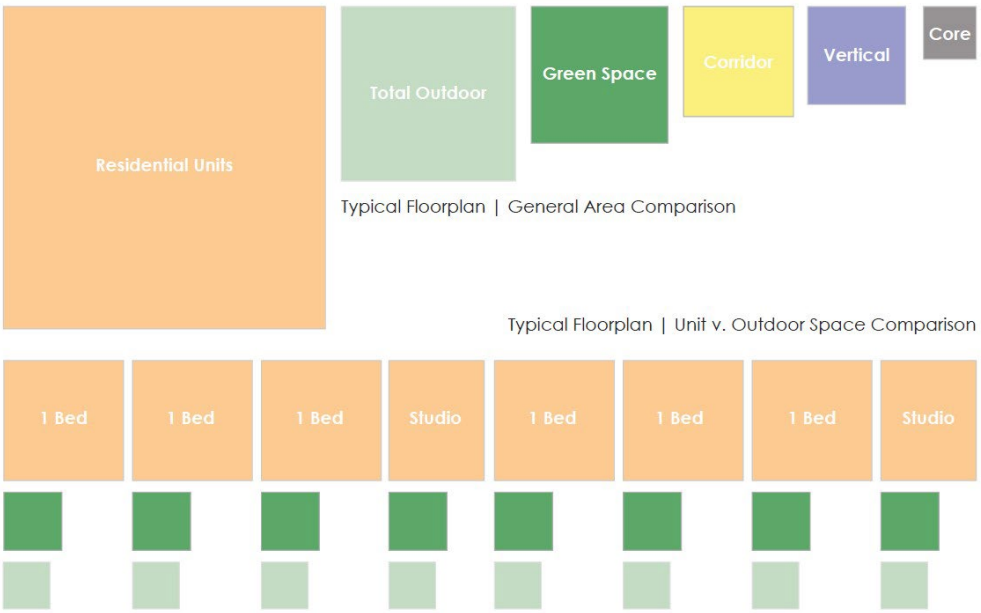


Figure 23: Reverse engineered areas, relative square footage per unit.

In all these scales, a key focus is the development of principles that guide design towards successfully integrating green spaces, specifically of the type that can support urban agriculture, without prescribing a set street grid, block form, or building typology. The core principles are meant to enable planners, designers, builders, and occupants of the built environment to integrate urban agriculture-capable green spaces across a broad range of scales, regardless of the city's name.

Proposal | City: Baltimore City, MD

This proposal fills in a gap between Baltimore's green spaces and food security coverages. The neighborhood of Harlem Park is not only underserved, but its location provides an opportunity to resolve these areas of concern by connecting adjacent neighborhoods' coverages (Fig. 27). Specifically, the addition of a

community garden and market adjacent to a reconstituted inner block park will greatly increase the usable green space while simultaneously providing means for the community to positively impact their food security. This impact can be accomplished through community led gardening efforts, hosting farmer's markets, or even securing a private organization to manage the garden and market. Additional buildout of the proposed mixed-use residential building, which will be further detailed, provides additional community space adjacent to the market and garden, which can supplement the needs of those programs while being flexible enough for use as a venue or other community events.

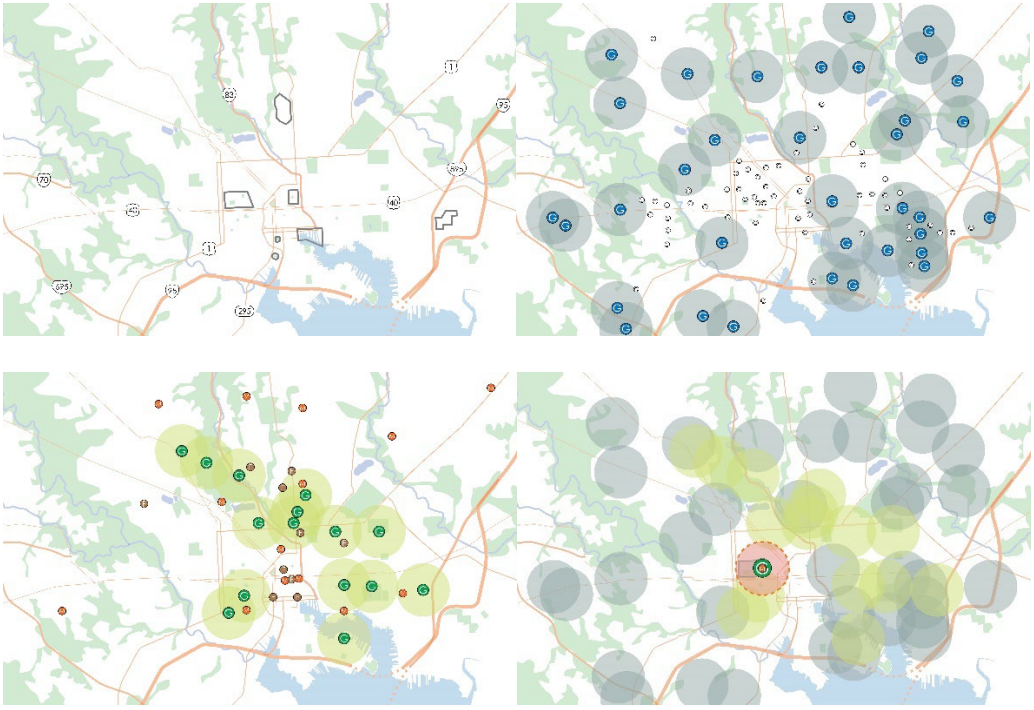


Figure 24 (top left): Baltimore City with major green spaces and districts.

Figure 25 (top right): Locations of Grocery supermarkets (blue) with 15-minute walking radius; convenience stores (white).

Figure 26 (bottom left): Locations of community Gardens (green) with 15-minute walking radius; Food halls: Market halls.

Figure 27 (bottom right): Harlem Park proposal impact overlaid with walking radii.

Proposal | Neighborhood: Harlem Park

How this proposal impacts the site on a city scale becomes clearer as we consider the specific target block within Harlem Park. Located on the east border of Harlem Park at the 900 block, the neighborhood-scaled portion of this proposal's site serves as a template for strategic urban interventions that focus on balancing the current density needs, reconstituting street and inner block edges, and providing new "anchors" for the community that provide scalable opportunities for social and economic growth. All these implementations are accomplished while considering the access and makeup of community-scaled green spaces and balancing those with intended hardscapes. Streets serve as a microcosm of this idea: how can a balance be achieved between hardscapes and greenspaces, when can a hardscape be made permeable or semi-permeable, and integrated bioswales (greenspaces that are multi-functional and/or resilient). Aiding with this development of the urban environment, this proposal determines a "kit-of-parts" from which components can be chosen to address different street types and widths. Streets with greater stormwater needs can increase bioswale area, streets with greater potential for pedestrian or bicycle usage can ensure they are well buffered from vehicular traffic, and street parking can be scaled to meet target demands.

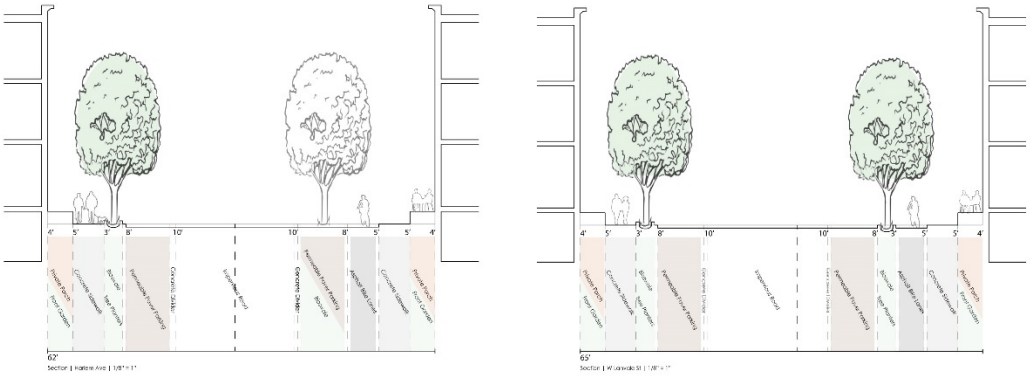


Figure 26 (left): Street section and kit-of-parts, 62’ wide road with bike lane.

Figure 27 (right): Street section and kit-of-parts, 68’ wide road with bike lane.

The culmination of these strategies results in a block structure that is safer for non-vehicular users, does not compromise the use of vehicles, and expands the versatility and total area of dedicated greenspace within the built environment.

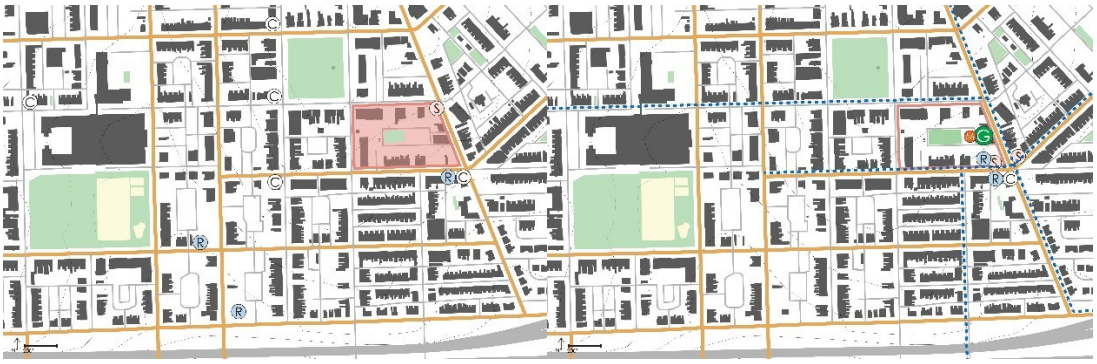


Figure 28 (left): Harlem Park east, 900 block, with existing retail.

Figure 29 (right): Proposal retail, green space, bike & pedestrian routes.

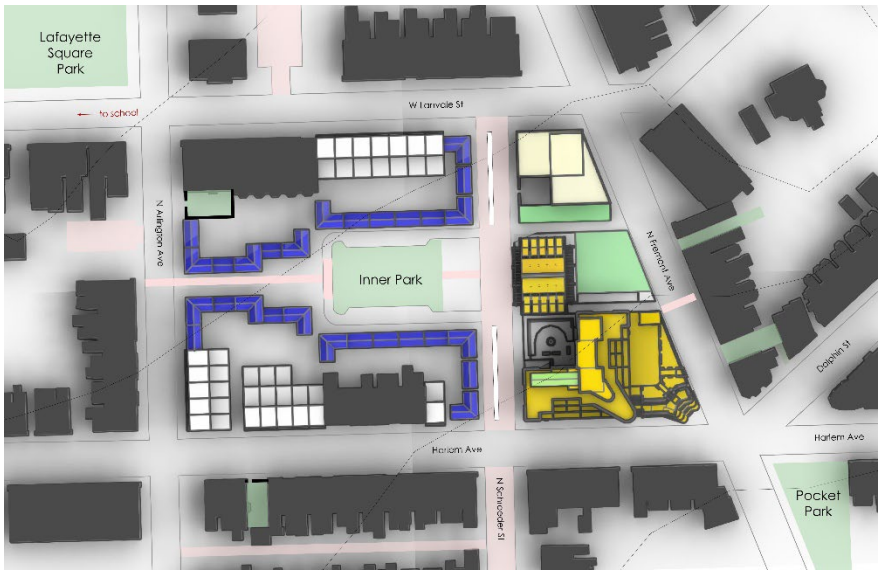


Figure 30: Proposal plan with small footprint houses (blue), rowhouses (white), 62+ residences (tan), and “anchor” market & mixed-use building (yellow).

This proposal also increases the variety of typologies within the block. Existing rowhouses that are in good condition and occupied are preserved and any vacant rowhouses that are sensibly renovated are retained. A new rowhouse which is wider and more modern in makeup has been added to add variety to the rhythm of the urban edges while abiding by general height, total number of levels, and tripartite composition of the existing rowhouses. Since these rowhouses are wider, they may be shallower than the existing rowhouses, making way for the inner block facing portion of their properties to be converted into small footprint house lots. These small footprint houses are intended to be scalable and affordable. A basic unit is a simple 500 square feet (sf) efficiency unit. Additions can be made in 250 sf increments, adding a dedicated bedroom, transforming the mass into an “L” with an implied courtyard, or even a second level to greatly expand the square footage. Roofs can be

gabled to differentiate them from the formal rowhouses or remain flat to be used as an outdoor space with greater separation from the public at ground level. Both proposed rowhouses and small footprint houses retain a minimum of 500 and 250 sf of greenspace, respectively, meeting the minimum 200 sf necessary for urban ag to satisfy the fresh produce needs of an individual for an entire year. Adding a step-back to the proposed rowhouses not only introduces roof decks viable for greenspace, but also allows greater access to direct sunlight should the back yard be subject to shadows from the rowhouse.

Figure 31: Site longitudinal section.

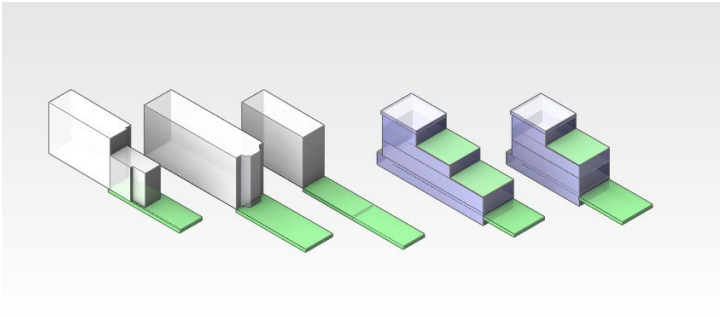


Figure 32: Existing rowhouses vs. proposed rowhouses with green spaces.

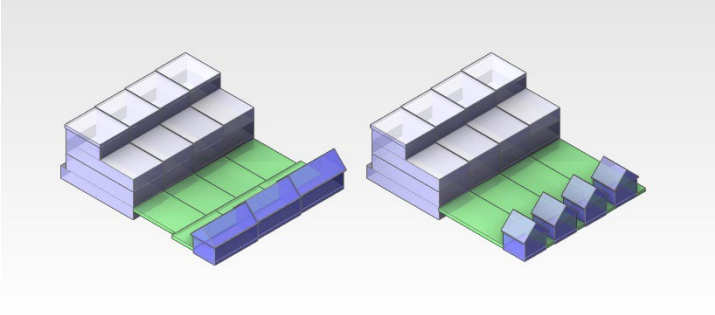


Figure 33: Repurposing carriage house urban form (right) into subdivided lots with affordable small footprint house typology (left).

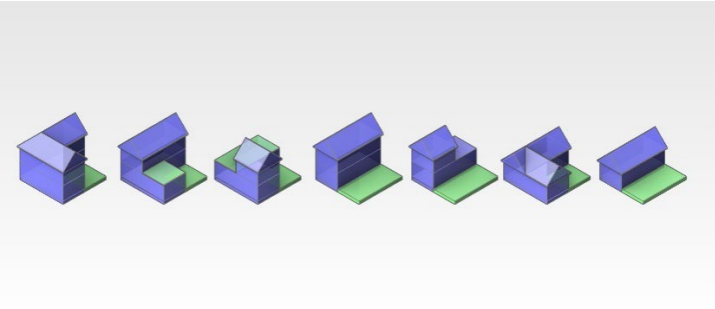


Figure 34: Small footprint house variations/expansion over time.

This organization of rowhouse and small footprint house is a reimaging of the prevalent existing rowhouse and alley garage urban form found throughout Baltimore City. In lieu of a garage with potential ADU on a second floor, the small footprint house allows for an affordable and scalable option that has its own dedicated greenspace. These units can also form a homogeneous edge to the inner block, redefining that space and affording occupants an elegant urban setting with a sense of identity.

Figure 35: View from W Lanvale St towards proposed small footprint houses, wider rowhouses, and existing rowhouses (left to right).

The development of the site also adds a brick road that extends from N Schroeder St in the south up to W Lanvale St at the north side of the site. Built partially from reclaimed brick of the demolished vacant buildings on site, this brick road harkens back to a time in Baltimore City when many streets were made of brick. This added character also signifies that this street may serve for vehicular traffic and loading zones but is primarily meant for pedestrians. Specifically, the center portion of the new brick road is situated directly in front of the market and may be cordoned off to vehicular traffic to allow the market to spill out into a large open hardscape. This market and brick road also terminate the reconstituted inner block park with a

central axis and pedestrian route leading towards N Arlington Ave and Lafayette Square Park to the west.

Figure 36: View from N Arlington Ave through inner block park to market.

The last edge of the inner block is formed by the “jewel box” market. This open concept market hall and community building is comprised of timber with steel connectors, clad in glazing and topped with a metal roof. Generous wood trellises extend over the sidewalk on the east side of the market building and over the west side facing the community garden.

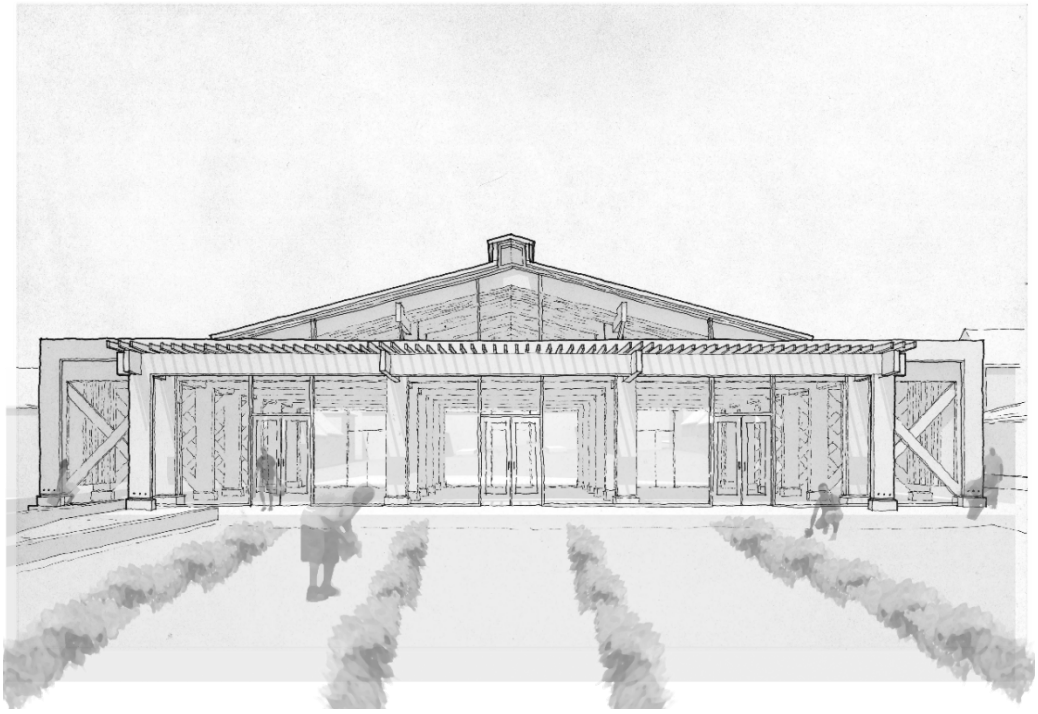


Figure 37: West side of market with community garden.

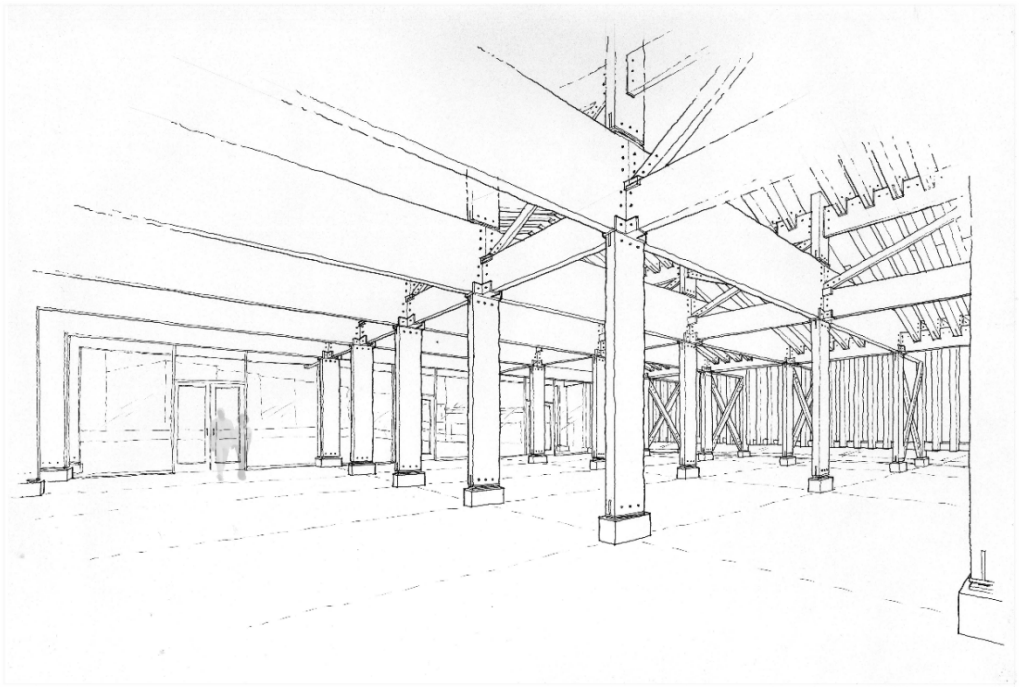


Figure 38: Market interior with typical stall dimensions outlined.

This market is intentionally an open floorplan space. Three sets of double doors on the west and east facades allow the interior spaces to connect the brick hardscape to the garden-scape and unify these spaces for larger events. Thus, while this market hall is well suited to farmers markets, it can be flexible in use to satisfy any number of community or private events. The adjacent mixed-use building has a ground level community space that has easy access to the garden side of the market, further expanding this series of interconnected spaces. The east side of this enclosed community space also has three sets of double doors that open onto the hardscape plaza at the corner of Harlem Ave and N Fremont Ave. As a result, this series of five distinct spaces can either be used separately for multiple events (or programmatic needs) or they can be combined into a unified whole for larger events.

Figure 39: Site aerial view from south with full buildout, new streets shown.

Proposal | Unit: Low-rise Mixed-use Residential

The final and most deeply explored aspect of this proposal is that of a mixed-use low-rise residential building at the corner of Harlem Ave and N Fremont Ave. This corner of the site is most likely to be the first impression a visitor has of the site and is therefore intended as the "front stoop" of the entire block. Thus, the hardscape plaza steps down to the street corner and serves as a community-level front stoop where larger gatherings or more frequent spontaneous meetings might occur. In accordance with the theme, green spaces are implemented at multiple levels and shade trees provide thermally comfortable environments. Any wall or ledge has an incorporated bench height seating element and the main level of the plaza has direct connection to both the lobby and community space of the mixed-use building. The north end of the plaza leads directly to the garden, market, and brick road and therefore forms a connection between the front stoop at Harlem and Fremont to the inner block park and Lafayette Square Parke beyond.

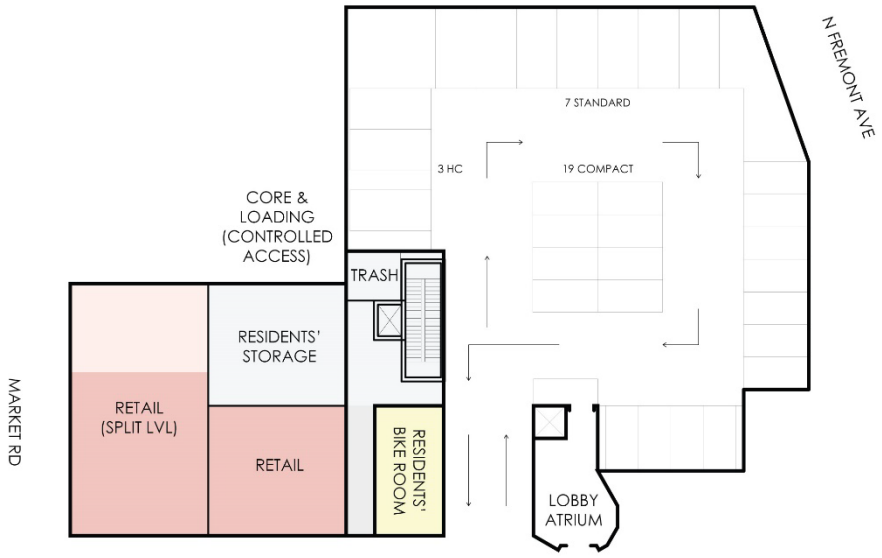
The mixed-use building also incorporates retail options at the street level of Harlem Ave. A restaurant at the corner of Harlem and the new brick road dubbed "Market St" has outdoor seating facing the enclosed ground floor courtyard. A small retail unit sits between the restaurant and the proposed parking level that enters under the lobby at Harlem Ave. The parking level extends under the plaza and is proportioned so that future buildouts might replace this parking with additional retail, possibly even a supermarket.

Figure 40: Mixed-use low-rise residential building with plaza, as seen from pocket park to southeast.

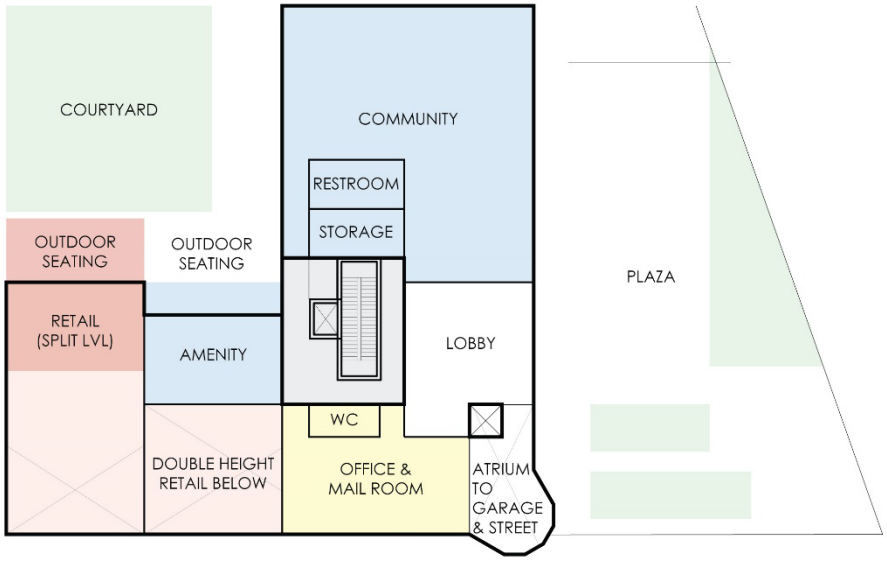
Moving up to the residential levels of the building, there is a balance struck between interior and exterior square footage. A variety of typical units, through and/or corner units, and “green” units has been achieved. Stepping back the massing of the building generates large outdoor areas that result in each “green” unit having a minimum of 128 sf of outdoor space, and the typical green unit has 256 sf or more. These spaces have ample access to direct sunlight and are proportioned to accommodate large, raised planter boxes. Should a resident desire their own greenspace, these planter boxes can be placed within their outdoor space.

The penthouse level consists of amenity space, roof decks, a greenhouse, and ample outdoor space to accommodate any planters not currently used by residents. Between the greenhouse and the unclaimed planter boxes, as well as portions of the cornice which are sized to accommodate their own herb or ornamental planter boxes, residents can grow food communally. This allows for a range of flexibility in the case where residents are unable to grow their own food, they can instead work cooperatively to manage the greenhouse and planters. As with the community garden, this function could also be overseen by a private company, such as the aforementioned New York Grange, either in tandem with the larger community garden or separately.

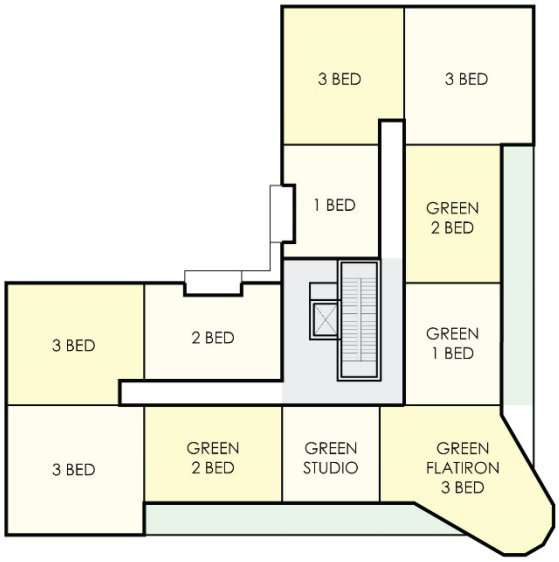
Figure 41 and 42: Balcony and roof decks with planters and greenhouse.



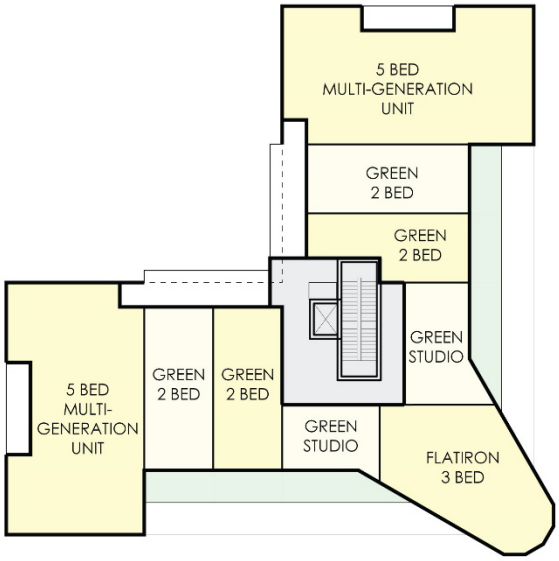
STREET LEVEL



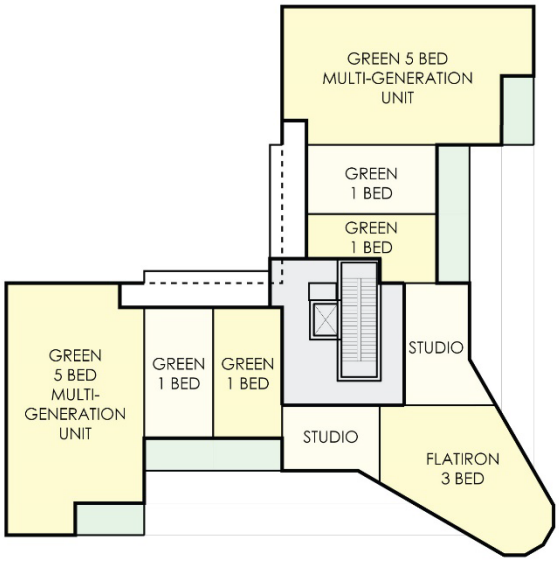
PLAZA LEVEL



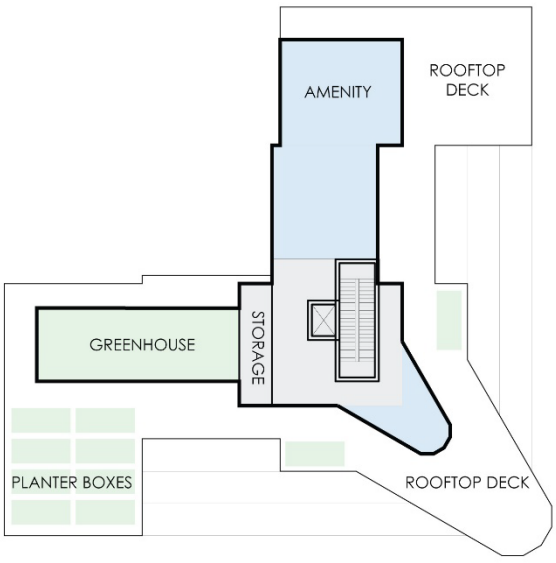
1ST LEVEL RESIDENTIAL



2ND LEVEL RESIDENTIAL



3RD LEVEL RESIDENTIAL



PENTHOUSE

Figures 43-48: Floor area plans of mixed-use building.

Another key component of this proposal is the development over time and the endeavor not to introduce densification. While densification is not introduced, it is planned for in the long term. This is what the “full buildout” represents: a relocation of existing residents within a reconstituted and integrated green urban environment while accommodating future densification as the neighborhood and city become more desirable.

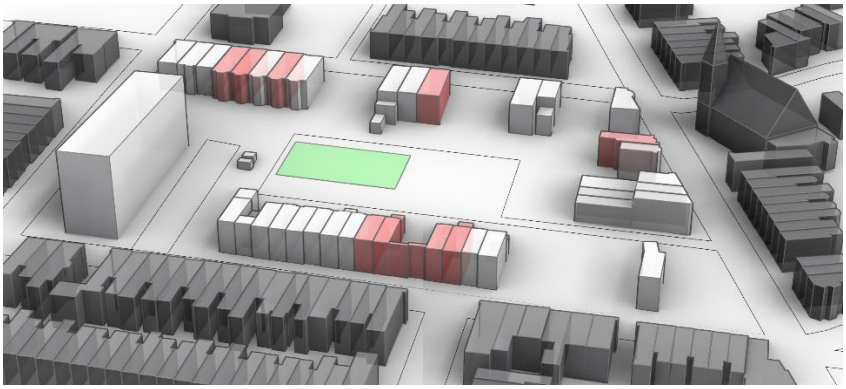


Figure 49: Existing conditions with vacant buildings (red).

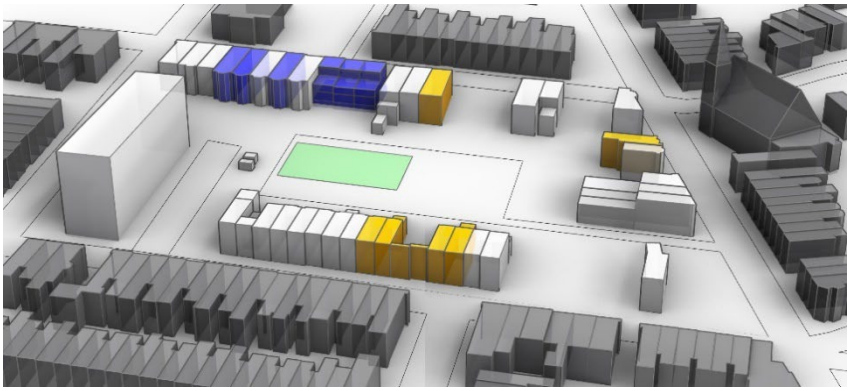
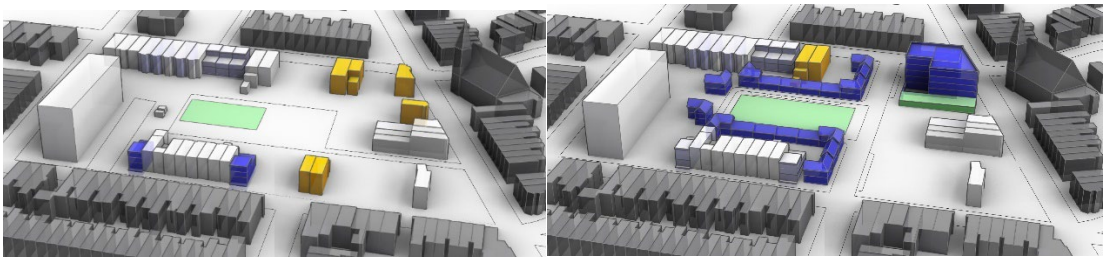
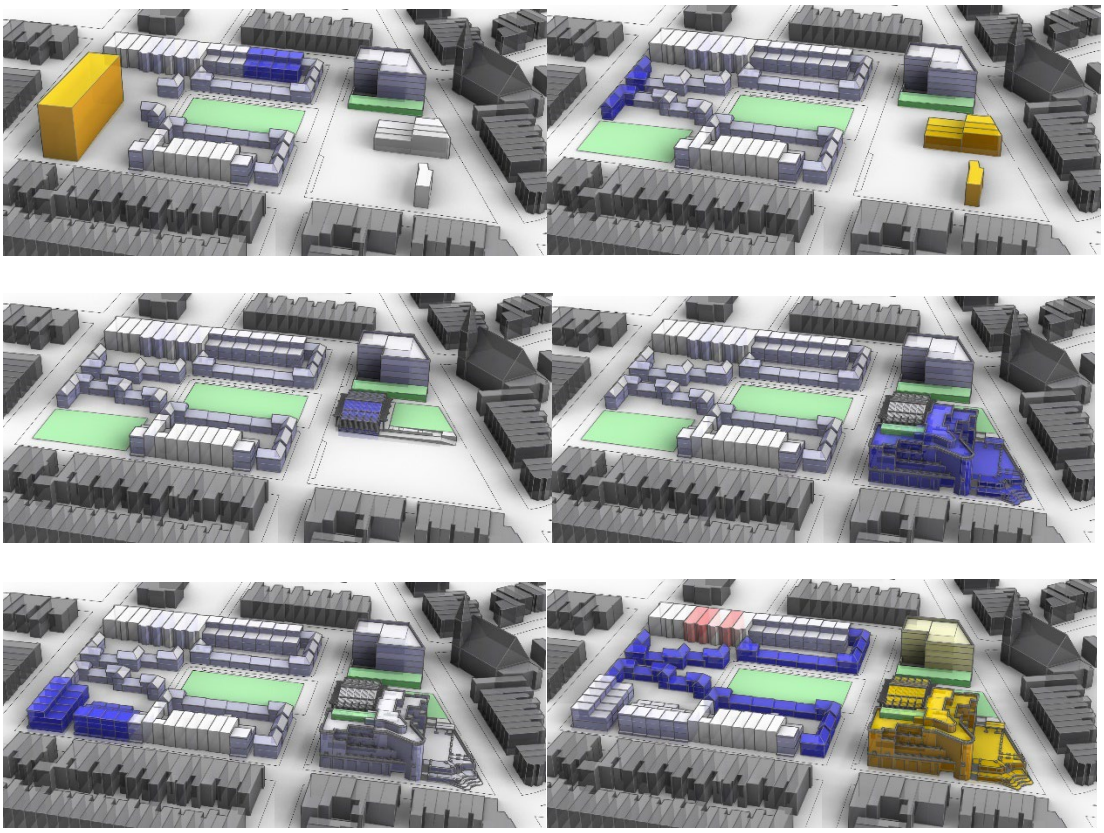


Figure 50: Phase 1 | Yellow = demo, Blue = New/Rennovate





Figures 51-58: Phases 2-8 and final buildout.

Conclusion

This proposal provides a template for urban design from the scale of the city and neighborhood down to the individual buildings. Each of these scales incorporates green spaces that are not only integral and balanced with the built environment but are also resilient and scalable enough to function as urban agriculture plots. Lastly, this scheme proves that these priorities can be achieved while simultaneously addressing socio-economic issues of the day and in response to the specific conditions and needs of a unique site.

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