Circular Communities: Melrose Commons A Circular City Vision for a Low-Income Residential Neighborhood in the South Bronx

Isil Akgul, M.S. Sustainable Environmental Systems, Pratt Institute <u>iakgul@pratt.edu</u> 347-981-7343 200 Willoughby Avenue, Brooklyn, NY 11205

Other Contributors: Larissa Lai, M.S. City and Regional Planning, Pratt Institute

Abstract

Housing is becoming increasingly unaffordable in New York City, particularly for working-class and vulnerable communities. This is due to increasing rents in urban areas and lack of affordable housing units. Due to a need to develop more affordable housing, quantity has often been prioritized, resulting in a lack of holistic design and planning around the long-term wellbeing of residents and communities by integrating ecological systems and designing sustainable environments, especially in low-income communities. Coupled with the effects of climate change, front-line communities have to be prepared to meet growing challenges related to health and the built environment.

The Circular Economy concept advocates for new modes of (re)-production that reduces social and environmental inequities generated by a traditional linear economy and could bring back the benefits to the communities, through *circular growth*. Circular Economy principles consider overall systems health in relation to long-term sustainability and resiliency across social, economic, and environmental realms.

Cities in the world are currently considering learning from Circular Economy to become *circular cities*. Europe has advanced on the Circular Economy transformation in a way that there can be generated revenue from the alternative loops that were created. The future for Europe is looking at applying the Circular Economy concept to cities by making comprehensive site-specific plans according to the *Circular City Framework*, which includes a process of extensive stakeholder engagement and also iterative analysis, visioning, and design. *circular city master planning* is a long term approach that can be adjusted with feedback over time and can be implemented through pilot projects.

This study explores the *Circular City Framework* in the context of a historically marginalized low-income residential neighborhood in the South Bronx in New York City and proposes an innovative and circular approach to the Melrose Commons neighborhood master plan, building on the assets of the community that will ensure a holistic new vision for the neighborhood.

Introduction

According to UN projections, the world population is expected to reach 9.8 billion in 2050.¹ Urbanization is on the rise, with the proportion of the population living in cities to be almost 70% by 2050.² Humanity is still under the spell of growth and consumption by resource depletion, still walking on the path set by the Industrial Revolution. In this extremely urban context, the sustainability initiatives in cities and urban areas will define the future, especially under the threat of climate change. According to the Fab City framework, cities need to produce what they consume in order to mitigate the adverse effects of human presence on Earth.³

To overcome this challenge in the neighborhood level, this study proposes a *Circular City Visioning* process according to Circular Economy principles to be executed in a low-income residential neighborhood in the South Bronx.

In nature there are no open loops, hence the concept of waste and resource does not exist. Waste is a human concept introduced after the Industrial Revolution to describe the end products of industrial processes. This becomes clear by looking at the water cycle. Water just moves from one state of material to another without human interference and no stage can actually be called waste or resource. *Waste* and *resource* are concepts that come from human understanding. The systems that humans established have a beginning and an end, but the processes in nature are cycles.



Figure 1. Natural Water Cycle Diagram. https://www.smartdraw.com/biology-diagram/examples/water-cycle-diagram/.

¹ The UN Department of Economic and Social Affairs, "World Population Prospects."

² The UN Department of Economic and Social Affairs, "World Urbanization Prospects: The 2018 Revision."

³ Diez, "The Fab City Whitepaper."

Etymologically, the word *Economy* comes from Greek. The prefix "eco" comes from the Greek word "oikos"⁴, which means home. And the suffix "nomy" comes from the Greek word of "nemeia", which means to manage. The word *Economy* actually means the management of the home. Viewing *Economy* from that perspective can shed a better light on the concept of Circular Economy and this concept can become a way to transform how we "manage" our "home".

Circular Economy is a concept developed by the Ellen MacArthur Foundation based the ideas of the Cradle to Cradle concept. Cradle to Cradle concept was initially introduced in the revolutionary book "Cradle to Cradle: Remaking the Way We Make Things" co-authored by William McDonough & Michael Braungart. Cradle to cradle is an idiom derived from cradle to grave and is defined as a materials flow where the waste from one process is the resource for another. This concept deals with waste and resource mostly looking at materials flow.⁵ This book led to a certification system⁶ for products used mostly in the construction industry but also in other industries. This concept divides materials into two main categories, the biological materials, and the technical materials. Biological materials are organic materials that are processed from biological nutrients such as soil and food. Technical materials are processed from technical nutrients, such as metal and plastic.



Figure 2. Circular Economy Diagram. Ellen McArthur Foundation, 2017.

⁴ Movement Generation Justice and Ecology Project, "From Banks and Tanks to Cooperation and Caring: A Strategic Framework for a Just Transition," 4.

⁵ McDonough, Cradle to Cradle: Remaking the Way We Make Things.

⁶ "C2C Product Certification Overview - Get Certified - Cradle to Cradle Products Innovation Institute."

The difference in Circular Economy is that it looks at the value chain in a broader perspective, looking at all the systems and stakeholders involved in the process throughout the lifecycle of the products, starting from the design, until the end of life of the product.

Europe has advanced on the Circular Economy transformation so that there can be generated revenue from the alternative loops that were created. In 2004, more than 30% of materials were recovered for reuse other than waste to energy practices. In 2010 this percentage increased to over 45%. Waste generation per capita has also decreased during that time.⁷ According to the Ellen MacArthur Foundation by applying Circular Economy to the sectors of food, mobility, and the built environment, Europe can bring up to 1.8 billion Euros in material savings.⁸

Cities are the largest culprits for waste and injustices related to waste and according to UN projections mentioned before, it is only going to become more prominent due to the increase in the urban population. This makes cities leverage points for this type of disruption. Europe is now transitioning to applying the Circular Economy concept to cities by making comprehensive site-specific plans according to the *Circular City framework*, one of these being the Circular Amsterdam report.⁹ The overarching goal of this study is to create a *Circular City Vision* for the residential neighborhood of Melrose Commons in the context of the pilot project, the Micro Food Hub.

⁷ Metabolic, Studioninedots, and DELVA Landscape Architects, "Circular Buiksloterham Vision and Ambition: Transitioning Amsterdam to a Circular City," 72.

⁸ Ellen MacArthur Foundation, SUN, and McKinsey Center for Business and Environment, "Growth Within: A Circular Economy Vision for a Competitive Europe."

⁹ DELVA Landscape Architects, Studioninedots, and Metabolic, "Circular Cities: Designing Post Industrial Amsterdam The Case of Buiksloterham."

Chapter 1: Circular Communities: The Process

Using the literature review and case study research, the proposed Process is identified in the *Process Diagram*. Each section in this chapter follows the process laid out in this diagram.



Figure 3. Process Diagram. Isil Akgul, 2019.

Stakeholder Identification & Engagement

Because the *Circular City Vision* requires extensive connectivity and flawless information exchange, it is imperative to have an extensive stakeholder engagement process at the beginning, to ensure buy-in from the community members for long-term sustainability. The Circular Economy concept can only work if there are stakeholders from different sectors sitting at the table to discuss interconnected ways of disruption in the legacy systems of production and consumption, in all sectors from energy to consumer products.

The stakeholder group would not only do the *Circular City Analysis* process but also the *Visioning* process by engaging and representing the community needs. After the visioning process, the group would also be incremental in identifying pilot projects that would address multiple categories specified by the group. Aside from community organizations, it is important to partner with local scientific consultants. These consultants can work together with the community organizations to prepare the Urban Metabolism Scan that would be the data driving the visioning conversation.

Some of the potential stakeholders specific to the South Bronx are listed in Figure 4. It is really important to start working with the community organizations but also finding alternative connections to bring them together so that the territory issues can be overcome. In a conversation with Raymond Figueroa, the President of the NYC Community Garden Coalition, it was pointed out that there are problems for community organizations to work together due to territory issues, especially in the South Bronx.



Figure 4. Stakeholders. Isil Akgul, 2019.

Urban Metabolism Scan

In scientific terms, *Metabolism* means the plethora of biochemical actions that fulfill specific functions in living organisms, such as the production of energy from food and consumption of that energy to sustain life. But also the end products of these systems which could be called waste being transformed by natural processes. The systems of the cities work in similar ways.



Figure 5. Urban Metabolism of Buiksloterham. Circular Buiksloterham: Transitioning Amsterdam to a Circular City, 2015.

The analogy of comparing cities to a living organism in the manifestation of metabolism was part of the discourse since the 19th century. The Marxist philosophy talks about the social metabolism and ecological rift.¹⁰ But it is Abel Wolman who coined the idea of looking at the systems of cities as living metabolisms that transform inputs into outputs.¹¹ The Circular Buiksloterham report also refers to the Urban Metabolism concept as a way to analyze the city metabolism, inputs, outputs, and stakeholders, using the Urban Metabolism methodology of Metabolic.¹²

In the urban metabolism that is New York City, each element fulfills a purpose. When there is an overarching goal of the overall system, each element can fulfill a meaningful purpose. Without a purpose, there will not be a way to construct a meaningful system.

Each neighborhood of New York City again is an element of this overarching system. Now, the main purpose of these neighborhoods is to consume, in other words, create demand. When we deconstruct this system and reconstruct it again according to the *Circular City Vision*, each neighborhood should not only create demand but also create supply to fulfill a more diverse purpose and become a resource, not just a sink.



Figure 6. The Metabolism of the City. Isil Akgul, 2019.

The *Circular City Framework* identifies the metabolism of the city in a *circular* way where there are different zones starting from the *city center* and ending in the *hinterland* of the city. In the *Circular City Framework* the city and environs are divided to;

¹⁰ Angus, "Marx and Metabolism."

¹¹ Wolman, "The Metabolism of Cities."

¹² Metabolic, Studioninedots, and DELVA Landscape Architects, "Circular Buiksloterham Vision and Ambition: Transitioning Amsterdam to a Circular City."

- 1. City center
- 2. Around the city center
- 3. Broader metropole
- 4. Peri-urban areas
- 5. Near hinterland



Figure 7. The Metabolism of the City Centered in Melrose Commons. Isil Akgul, 2019.

The aim of the *Circular City Visioning* process is to close the loops as close to the city as possible by making the city metabolism *circular* instead of *linear*. But in many cases, the urban density and climate might not allow for all types of production happening in the city center. Hence, It is possible to extend the area up to the near hinterland by considering the competitive nature of the land in urban areas and looking at benefits of other uses that might be competing for the land area in question. It is also important to look at the larger context of New York City and considering neighborhoods should not individually but as part of a system.

Urban Metabolism Interactive Map and Database

It is critical that this system can be crowd-sourced. The data needs to be accessible, legible, transparent, easily reachable. An interactive map of Urban Metabolism is just one way to make that happen. The urban metabolism map can also become a cloud-based, shared database that the community can fill in. New technologies like the Blockchain can allow for the communities to have community-sourced databases. It is also possible to integrate the safe exchange of information and money, by introducing a local currency.



Figure 8. The Interactive Metabolism Map. Isil Akgul, 2019.

Circular City Visioning

The Stakeholder Engagement process should be used to identify specific Sectors to be rendered *circular* for each neighborhood and city. In Figure 9, is a list of sectors that can be used a starting point, but this list can differ according to each neighborhood, community or city. The Stakeholder engagement would also be incremental in choosing these sectors and prioritizing. There could be a lengthy process that includes lectures, workshops, design charrettes, and research to identify the categories and prioritize the most important ones. This list is supposed to act as a way to help the communities work around the initial steps of *circular master planning*. The sectors can even be used in identifying the range of stakeholders included in the process. In the visioning process, the stakeholders can start on formulating goals for each of these sectors to reframe them as *circular, hyper-local*, and *self-sufficient*.



The Pilot Projects

In the *Circular City Vision*, it is important to endorse economic development that is bottom-up and entrepreneurial. This is the main reason for framing actions as Pilot Projects. A community-wide accelerator program can ensure a sustainable entrepreneur culture in the community. For example, during the stakeholder engagement, the community should be introduced to different funding options, such as government grants but also venture capital funds. The accelerator could act as a small business service provider for the community. Because the *Circular City Visioning* process is also a long term planning model, the implementation of these projects could provide feedback and that would lead to changes in the visioning.

Chapter 2: Circular Communities: Melrose Commons

The Analysis

The site chosen for this study is Melrose Commons, a predominantly residential neighborhood in the South Bronx that encompasses a portion of both the Community District 1 and 3. The boundary for the neighborhood study follows the boundaries of the master plan that has been done by the community¹³, surrounded by Saint Ann's Avenue on the east, 156th Street on the south, Park Avenue on the west and 163rd Street to the north. Nos Quedamos is the community development corporation that was the leader of the community response to the urban renewal.

The South Bronx (Bronx Community Districts 1,2 & 3) continues to be one of the most underserved areas in New York City today. With 29-31% residents below the New York City government poverty threshold, the South Bronx ranks among the top 8 of New York City 59 community districts in poverty rate, when the citywide average is at 20%. Unemployment rates and rent burden are also higher in the South Bronx than the rest of New York City.¹⁴



Figure 10. MHHI in the South Bronx. Isil Akgul, 2019. American Community Survey, 2016. Community Health Profiles, 2018.

South Bronx is also an area with a higher proportion of young people compared to the rest of the aging city with 29% of the population aged under 18 compared to the citywide average of 21%.¹⁵ At the same time, the South Bronx has the lowest educational attainment rates alongside some areas in Brooklyn, with only 10-15% of its residents achieving a

¹³ Stand, "Melrose Commons, A Case Study for Sustainable Community Design."

¹⁴ Naidoo et al., "Community Health Profiles 2018 Map Atlas."

¹⁵ Naidoo et al.

bachelor's degree or higher. The area remains to be Hispanic/Black dominant, with around 65% of its residents identifying as Hispanic/Latino and around 30% identifying as Black/African-American.¹⁶

The Urban Renewal '94

The urban renewal area boundary is located between Community Districts 1 & 3. It consists of 344 buildings with multiple typologies and a total of 4797 units in an area of 76 acres. 32,105 residents are living in 4563 residential units. Melrose Commons is famous for the density of community gardens in the area.



Figure 11. The Map of Urban Renewal. Magnusson Architecture and Planning, n.d.

The map in Figure 11 shows the urban renewal area and the developments constructed by Magnusson Architecture and Planning. The study area was established for the LEED for Neighborhood Development application considering a couple of factors that would affect the certification process. It also reflects a core residential area surrounded by more commercial activities. Melrose Commons is a residential neighborhood with limited mixed-use and commercial activity. While the South shows more incline to rowhouses, the North has institutional land use like the Boricua College.

¹⁶ Naidoo et al.

According to the 2017 Census, Median Household Income in Melrose Commons is almost half of New York City with \$26,250.¹⁷ Aggregated from New York City average numbers, Melrose Commons residents use 28,000 kWh of Electricity per year¹⁸ and 3,692,075 gallons of City supplied water per day.¹⁹ One Melrose Commons resident discards 7,715,974 lbs of trash and 1,778,247 lbs of recyclables each year.²⁰ The buildings in Melrose Commons produce 34,202 metric tons of Greenhouse Gases annually. And the total emissions from Melrose Commons including transportation comes up to 150,000 metric tons.²¹

The Vision

In 2050, Circular Melrose Commons is fully energy self-sufficient with a 100% renewable energy supply. Space heating and cooling, and water heating are largely supplied from the block-based closed-loop geothermal energy. Cooking gas is supplied by the bio-digesters placed in the larger buildings. Food waste collected from the community is fed to the digester to be transformed into biogas.

The biological and technical materials flows are 100% closed loop. All food produced is consumed or composted or put into the bio-digester. The e-waste is separated in the South Bronx Urban Mining Center, that was built in 2030. All of single-use plastics are exchanged with bio-based products that are then fed to the compost system or the biodigester. Melrose Commons is the leader Mycelium producer in New York City working together with the Bronx Cooperative Development Initiative to produce bio-based packaging and construction materials. The organics grown in Melrose Commons are sent to the innovative urban factory of BCDI to be processed into products. Other plastics are recycled to become higher quality plastics to be used for a longer time. Bottles are standardized to allow for the reuse of glass. All metals are recovered to be recycled or reused. Discarding trash that is not diverted is considered unlawful by New York City. There are extensive fines on illegal dumping of refuse.

Melrose Commons was the leader in the South Bronx in creating the Urban Agriculture Innovation District in the South Bronx. With the economic development established through the urban agriculture movement, Melrose became a lead supplier of healthy, fresh, and fair food in the South Bronx. Melrose residents do not need to commute more than 45 minutes to work because there are more jobs in the South Bronx, created by and for the community. Hence, they do not need to have cars anymore. All parking lots were transformed into land for urban agriculture. People all over from New York City come to Melrose Commons to look at the innovative urban agriculture practices. A resident of Melrose Commons has built a Bio-lab for one of the greenhouses that captures clean water, energy, nutrients, and minerals from wastewater and organic waste. The concept was adapted from Bioplus.²² Realized through the accelerator funds the Bio-lab became a model for urban bio-metabolism hubs in the South Bronx.

Melrose Commons is 100% rainproof. All buildings have rainwater catchment systems. Rainwater is used for irrigation purposes in the green roofs that have extensive urban agriculture production. Gray water is recovered to be used for flushing of closets and urinals.

¹⁷ "U.S. Census Bureau QuickFacts."

¹⁸ "Estimated Total Annual Building Energy Consumption at the Block and Lot Level for New York City."

¹⁹ Urban Green Council, "New York City's Energy and Water Use 2014 and 2015 Report."

²⁰ Garcia, "NYC Residential, School, and NYCHA Waste Characterization Study."

²¹ US EPA, "Greenhouse Gases Equivalencies Calculator - Calculations and References."

²² "Biopolus – The Living Technology Alliance."

Urine from the urinals is crystallized to be used as a natural fertilizer. There are compost toilets in all units and the compost feeds into the urban agriculture system.

The landmarked building of the Bronx Courthouse was transformed into a Circular Resilience Hub, that is used by the community for light manufacturing, expositions, programming around the *Circular City Vision*, Climate Change, Resiliency and many other areas that the community is a leader. The building also acts as a Resilience Hub and provides refuge and power for the South Bronx, in case of a disaster.

Melrose Commons has a diverse and inclusive culture, and high quality, livable environment. Street trees cover the streets to combat the higher temperatures due to Climate Change. Using the sloped topography of Melrose, blue Streets help drain the rainwater to the man-made aquifer in the North of the neighborhood. Streets, roofs, gardens are all spots for habitat restoration in the South Bronx. There are bees on every roof and various kinds of plants. The larger multi-family buildings roofs are transformed into greenhouses with biorefineries that recover nutrients and resources from local organic waste. These greenhouses have automated hydroponics and aquaponics systems. The accelerator created along with the Urban Agriculture Innovation District has helped form a socially and environmentally responsible young entrepreneurial society. Each resident of Melrose Commons take part in the overall agricultural system, be it growing or packaging or business development.

Through the integration of a local currency that was valued by the community, it was possible to create a strong hyper-local economic system that stimulates entrepreneurship and encourages the creation and exchange of multiple kinds of value.

Melrose Commons is a healthy, safe and attractive environment with recreational activity space for all residents from all generations. By using the institutional resources to create a skilled workforce from the youth population in the South Bronx, Melrose became one of the leaders in innovative smart urban technologies. The ports in the South Bronx use zero-emission transportation methods to move goods. Melrose youth was a great asset and driver of the *Circular City Vision*. In Melrose Commons all housing is affordable. Rent burden is a concept of the past. Median Household Income has been over New York City average levels.

Melrose Commons has become an experiment of how a *circular* residential neighborhood can look like in the future, starting from the Micro Food Hub but integrating more and more systems as the master plan moves forward. As mentioned in the Buiksloterham report technological inventions such as IoT²³ or the Blockchain²⁴ can aid in the efficiency of the system as a whole, especially in resource and flow management.²⁵

²³ IoT: Internet of Things: An IT-based system that allows for machines to talk to each other and exchange data.

²⁴ The Blockchain: A peer to peer system that allows the exchange of money and information in a secure way.

²⁵ Metabolic, Studioninedots, and DELVA Landscape Architects, "Circular Buiksloterham Vision and Ambition: Transitioning Amsterdam to a Circular City," 12.

Chapter 3: The Pilot Project

Raymond Figueroa, the President of the NCY CGC is currently working on a proposal for a Micro Food Hub to be located in the South Bronx. This project was chosen as a pilot project for the *Circular City Vision* because it can be a way to see concrete results of *circular* thinking. Although it was not possible to do an extensive stakeholder engagement process to identify and prioritize the sectors, it was possible to have initial dialogs with the community leaders that led to identifying food access as a priority.

The Micro Food Hub

The Micro Food Hub is an alternative to the Macro Food Hub, a regional food hub where the food comes from outer regions of the city to be distributed from one location to the whole city's retail locations. In a Macro Food Hub, the consumer is separated from the producer, geographically making it hard for the consumer to verify the quality of the food.²⁶ It is also possible that the food loses its freshness during transportation and shelf life, which is the reason for extensive packaging and additives. The life cycle of food in the Macro Food Hub system is linear. The food is grown, processed, packaged, distributed, sold, consumed, and waste is discarded.

According to the USDA, food deserts are defined as low-access areas where "at least 500 people and/or at least 33 percent of the census tract's population must reside more than one mile from a supermarket or large grocery store (for rural census tracts, the distance is more than 10 miles)".²⁷ This implies that food access is to a large percent about the distance to the food supplier. This becomes irrelevant in an area like the South Bronx, where the Hunts Point Food Distribution Center is supplying food to the entire city but because South Bronx houses the most underserved community districts of New York City, people living close to the Food Hub cannot afford food. In the South Bronx, food access is not about distance but about financial abilities.

According to the Community District Profiles, 42% of the adults living in the Community Districts 1 & 3, including neighborhoods, Mott Haven, Melrose, Morrisania, and Crotona are suffering from obesity. This percentage is the highest in New York City and almost twice the citywide 24% and more than ten times the lowest percentages in the Financial District and Greenwich Village. Community district 1 & 3 also has the highest percentage of Diabetes in adults older than 18 with a percentage of 22% as opposed to citywide 11% and the lowest percentage of 3% again in Financial District and Greenwich Village.²⁸ As mentioned in the New York Times article; "something is killing America's urban poor, but this is no ordinary epidemic."

The micro food hub is a response to this issue of poverty and oppression by creating ownership for the community over the food system by proposing a new approach that will be equitable, circular, efficient, close to the consumer, and co-located.

- ²⁷ "USDA Defines Food Deserts | American Nutrition Association," accessed May 12, 2019,
- http://americannutritionassociation.org/newsletter/usda-defines-food-deserts.

²⁶ Raymond Figueroa, "Micro Food Hub and Community Agriculture within the NQ CLT Boundaries of the SBxLCRT," 2019, 1.

²⁸ Naidoo et al., "Community Health Profiles 2018 Map Atlas."

²⁹ Helen Epstein, "GHETTO MIASMA; Enough To Make You Sick?," *The New York Times*, October 12, 2003, sec. Magazine,

https://www.nytimes.com/2003/10/12/magazine/ghetto-miasma-enough-to-make-you-sick.html.



Figure 12. Comparison of Food Systems. Isil Akgul, 2019.

The Current Food System

The current food system is a centralized network where all nodes are dependent on central entities, that are located far from the consumer causing high transportation emissions and air pollution.

Proposed Food System

In contrast to the Macro Food Hub, the proposed *circular* and hyper-local food network would be a distributed system, where the nodes have multiple functions and each node takes part in the production not only consumption. This would create redundancy, making the system more resilient and while doing that also creating geography to curb emissions related to transportation in the food life cycle. This system would not be a linear one but a *circular* one where the food production and consumption waste is used as a resource in one area of the life cycle. A *circular* life cycle will be efficient due to its design and intentionality guaranteeing access to food in the community due to its equitable nature.

Urban Agriculture Innovation District

Looking at all this information, the study proposes to create a Circular Urban Agriculture Innovation District in the South Bronx that also encompasses Melrose Commons. The map of the South Bronx has a large amount of public vacant land that can be used for urban agriculture purposes. Any new development happening on this land can include not only rooftop but also interior urban agriculture options. The innovation district would be managed by an accelerator organization bringing investors and community together to fund projects related to urban agriculture.

Overlaying the food system life cycle with the environmental systems it is possible to close loops in the Melrose Commons neighborhood. In order to start mapping this life cycle and finding opportunities in the South Bronx for each node of this system these nodes are identified as; growing, cooking, processing, packaging, and exchange.

By looking at the physical limitations and opportunities of the Melrose Commons area some recommendations are identified that can be further researched. For example, rainwater reuse can lead to grants from the Department of Environmental Protection and brownfield remediation can lead to grants from the Office of Environmental Remediation. The shaded areas of community gardens can be used for mycelium production. Mycelium is a type of mushroom that can be used in bio-based packaging and construction materials.

The life cycle mapping can also be used as a categorization method for the accelerator. For the purposes of this study, the focus is on the growing node of the life cycle. But the maps showing other typologies located in 1 mile are also included to give an idea about the future of planning for the *circular* food system.

The growing node of the life cycle can happen in multiple typologies; green roofs of Nos Quedamos owned buildings, the existing Greenthumb community gardens, existing parking lots transformed into community gardens, and existing parking lots. In this type of innovation district, the benefits of flexible development could be leveraged to allow for interchangeable space to be used for multiple programs.



Figure 13. A Sustainable and Circular Approach to the Life Cycle of Food. Isil Akgul, 2019.

Transforming Parking Lots to Community Gardens

According to an interview with Petr Stand, the Zoning code at the time of the urban renewal required more parking and the Melrose Commons community had negotiated a way to lower the parking requirements. In the end, they ended up increasing the density without increasing the parking requirements. According to an interview with Christine Hunter from MAP, since then the building code has changed to incorporate less parking. Now, there is an opportunity to leverage these spaces to grow food that could also become an asset in the *circular* food system. In the future with the expansive transportation opportunities in New York City and with the congestion pricing introduced, it is possible that the need for parking will go down.



Figure 14. Existing Concrete Parking Lots. Photo by Isil Akgul, 2019.



Figure 15. Map of Potential Surfaces to Grow Food. Isil Akgul, 2019.

Community Assets in 1 mile

According to the *Circular City Framework*, economic development has to happen from the community for the community. In order to achieve that, the community can look at the existing assets drawing a meaningful boundary for keeping the system equitable and transportation emissions as low as possible. This study specified 1 mile as a meaningful distance because it includes most of the South Bronx but also works with the idea of incorporating EV-trucks for the last mile.



Figure 16. Map of Community Assets. Isil Akgul, 2019. NYC Open Data, 2019.

Partnership with BCDI

The Bronx Cooperative Development initiative is another not-for-profit community organization in the Bronx that works in workforce development. And they are currently opening a new innovative factory that would increase the amount of light manufacturing in the Bronx through partnerships with the Futureworks, the innovation agency of the New York City Economic development corporation. The Micro Food Hub can use bio-based packaging produced by start-up companies through the urban agriculture accelerator, partnering with the BCDI to manufacture using their space and resources in the Bronx.

Moving Forward

Melrose Commons and the South Bronx are historically marginalized communities that suffer even more due to environmental injustice caused by consumption patterns. The existing assets in these communities are a manifestation of self-determination and resilience in the face of disinvestment. Community gardens are the manifestation of this self-determination. *Circular City Vision* puts the assets and the needs of the community in the center of sustainable economic development. Melrose Commons cannot wait for this change to happen, neither can the South Bronx. The process laid out by this study can be implemented as a pilot in the South Bronx bringing together the community organizations mentioned in the report. This is just the start of a larger conversation that will lead to a Circular Melrose Commons and Circular South Bronx.

Bibliography

Angus, Ian. "Marx and Metabolism: Lost in Translation?" *Climate & Capitalism* (blog), May 1, 2018.

https://climateandcapitalism.com/2018/05/01/marx-and-metabolism-lost-in-translation/. "Biopolus – The Living Technology Alliance." Accessed May 9, 2019. https://www.biopolus.net/.

- "C2C Product Certification Overview Get Certified Cradle to Cradle Products Innovation Institute." Cradle to Cradle Certification. Accessed May 12, 2019. https://www.c2ccertified.org/get-certified/product-certification.
- DELVA Landscape Architects, Studioninedots, and Metabolic. "Circular Cities: Designing Post Industrial Amsterdam The Case of Buiksloterham," 2016.
- Diez, Tomas. "The Fab City Whitepaper." The Fab City Initiative. Accessed April 2, 2019. https://fab.city/uploads/whitepaper.pdf.
- Ellen MacArthur Foundation, SUN, and McKinsey Center for Business and Environment. "Growth Within: A Circular Economy Vision for a Competitive Europe," 2015. https://www.ellenmacarthurfoundation.org/publications/growth-within-a-circular-economy -vision-for-a-competitive-europe.
- "Estimated Total Annual Building Energy Consumption at the Block and Lot Level for New York City." Accessed May 12, 2019. http://qsel.columbia.edu/nycenergy/.
- Garcia, Kathryn. "NYC Residential, School, and NYCHA Waste Characterization Study." NYC Department of Sanitation, 2017.
- McDonough, William. *Cradle to Cradle: Remaking the Way We Make Things*. North Point Press, 2002.
- Metabolic, Studioninedots, and DELVA Landscape Architects. "Circular Buiksloterham Vision and Ambition: Transitioning Amsterdam to a Circular City." Metabolic, 2015.
- Movement Generation Justice and Ecology Project. "From Banks and Tanks to Cooperation and Caring: A Strategic Framework for a Just Transition." Movement Generation Justice and Ecology Project, n.d.
- Naidoo, M, K Traore, G Culp, L King, C Lopez, K Hinterland, LH Gould, and RC Gwynn. "Community Health Profiles 2018 Map Atlas." NYC Department of Health and Mental Hygiene, 2018.
- Stand, Petr. "Melrose Commons, A Case Study for Sustainable Community Design." *Planners Network*, February 11, 2013.

https://www.plannersnetwork.org/case-studies-and-working-papers/melrose-commons-a-case-study-for-sustainable-community-design/.

The UN Department of Economic and Social Affairs. "World Population Prospects: The 2017

Revision | Multimedia Library - United Nations Department of Economic and Social Affairs." United Nations, June 21, 2017.

https://www.un.org/development/desa/publications/world-population-prospects-the-2017-revision.html.

The UN Department of Economic and Social Affairs. "World Urbanization Prospects: The 2018 Revision." The 2018 Revision: The UN Department of Economic and Social Affairs. Accessed May 12, 2019.

https://esa.un.org/unpd/wup/Publications/Files/WUP2018-KeyFacts.pdf.

- Urban Green Council. "New York City's Energy and Water Use 2014 and 2015 Report." The City of New York Mayor's Office, Urban Green Council, NYU, CUSP, 2017. http://urbangreencouncil.org/sites/default/files/energy_and_water_use_report_spreads.p df?_ga=2.66647596.345940514.1556076038-774054119.1554580442.
- "U.S. Census Bureau QuickFacts: New York City, New York." Accessed May 12, 2019. https://www.census.gov/quickfacts/fact/table/newyorkcitynewyork/INC110217#INC11021 7.
- US EPA, OAR. "Greenhouse Gases Equivalencies Calculator Calculations and References." Data and Tools. US EPA, August 10, 2015.

https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-an d-references.

Wolman, Abel. "The Metabolism of Cities." *The Metabolism of Cities*, 1965. https://irows.ucr.edu/cd/courses/10/wolman.pdf.