The Food Assembly:

Architecture of Sustenance for the New Industrial City

by

Danniely Alexandra Staback Rodríguez

Bachelor of Environmental Design
University of Puerto Rico, 2014

SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE IN PARTIAL FULFILLMENT
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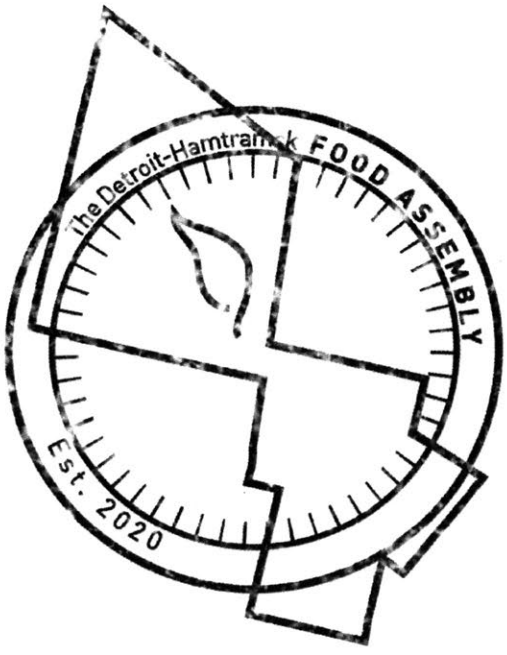

Acknowledgments

I profoundly want to thank:

The Department of Architecture of the MIT SA+P, for the invaluable opportunity that this education represents to me, and to all the kindness of those that helped me along the way. Thank you, Meejin, Cynthia, and Andreea. Also, Lisa, Chris and Duncan, for aiding me in navigating the everyday more smoothly.

The Schlossman Research Travel Fellowship, for accepting my proposal early on and contributing to the content of this work.

My advisor Mark, for all our great, lengthy conversations about the lifeblood of design and invention.

Caitlin, for the practical guidance, honest advise, and serenity, specially during the final stretch.

Mariana, for jumping in with conviction and believing there was a thesis underneath the many contradictions.

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My fantastic friends and extended family, Olivia, James, Anna, and more recently, Dwight, for four years of friendship, hugs, and laughs over good food. I hope this is only the beginning.

My dear friend MyDung, for our many adventures and for sharing your light with me.

Santiago, for closely following the unraveling of this gigantic struggle and all its iterations, from beginning to end, and helping me see the light in the most convoluted of moments.

My best friends in the world, Glorian and Franklin, who sent me warmth, love, and wisdom from home.

And my parents, Franklin and Dania, the toughest pair of human beings I know. This personal milestone is possible because of your life effort and sacrifice, and the passion and perseverance that you instill in me. This thesis and this book, born amidst very tough circumstances, *is for you.*

The Food Assembly

Architecture of Sustenance for the New Industrial City

by Danniely Alexandra Staback Rodríguez

Submitted to the Department of Architecture
on January 18, 2018 in Partial Fulfillment of the
Requirements for the Degree of Master of Architecture

Abstract

Mark Goulthorpe
Advisor
Associate Professor, Department of Architecture

Looking at Detroit is looking into the future. As the quintessential post-industrial shrinking city, it faces a myriad of problems, which include: a declining tax base, urban blight, inaccessible transportation, a waning workforce, lower educational attainment, and food insecurity. Through this conglomeration of factors, the city will inevitably witness the rise of a New Agrarian society. These New Agrarians will come from all ages and trades, and shift from a dependency on manufacturing, to an organized production of food, harnessing the conditions of place into a new productivity and a way of life that revolves around production itself.

This thesis proposes an architecture for the New Agrarians, to challenge today's culture of production for production's sake, and responds to the outlook of human obsolescence and poverty brought upon by "progress". An alternate future, in which the basis for sustenance is redefined.

The New Agrarians will need to feel productive and be creative. They will need an engaging public space. And they will need intellectual stimulus, even in the most automated and mechanized of environments.

"Obsolescence is the very hallmark of progress."

Henry Ford II, 1955[1]

The entry point for this thesis was to interrogate contemporary spaces of production and our relationship with these spaces, technologies, and products. We become our spaces of production, idle and disenfranchised. Unless we can re-claim them, along with their vitality.

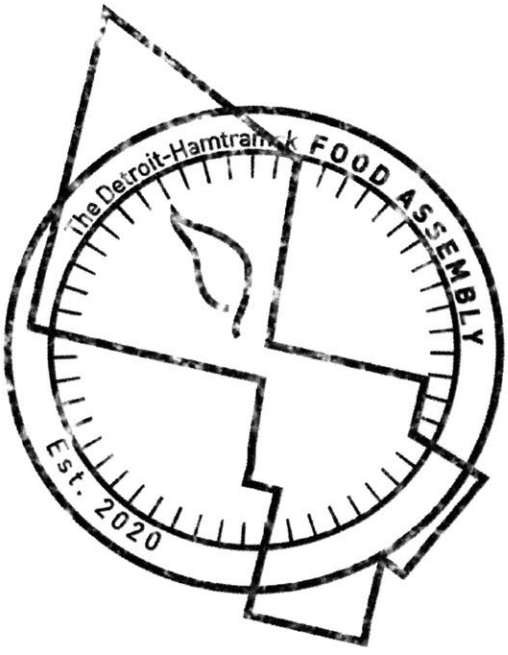
Born from the remains of the GM assembly plant, my proposal, The Detroit-Hamtramck Food Assembly, seeks to embody those precise needs. In the Assembly, agriculture is open-ly sourced, by a hybrid system of manual and automated labor that enables the creation of an urban enclave of production, allowed for by surplus space, surplus technology, surplus infrastructure, and surplus labor. This food bastion is simultaneously park, garden and workplace, a food Gigafactory, to feed their city and free their city, and hopefully, in this process, become a new driver for culture.

1 Sugrue, Thomas. "The origin of the Urban Crisis."

The Food Assembly

Architecture of Sustenance for the New Industrial City

Contents



Preface

"There can be no utopia without Prosperity."[1]

I had known for a while that Thesis was not about the end but about the process, the journey. That the final review was more of a ritual, and if the cards were well played, one could aspire to have a deep and enriching last conversation.

These conversations... through which I engaged with many individuals along the way for almost a year, became the scaffolding of my Thesis, and I am deeply grateful for the academic armature that allowed me to have so many contradictory, revealing, and intense conversations that gave way to many intellectual and personal transformations in a very short time.

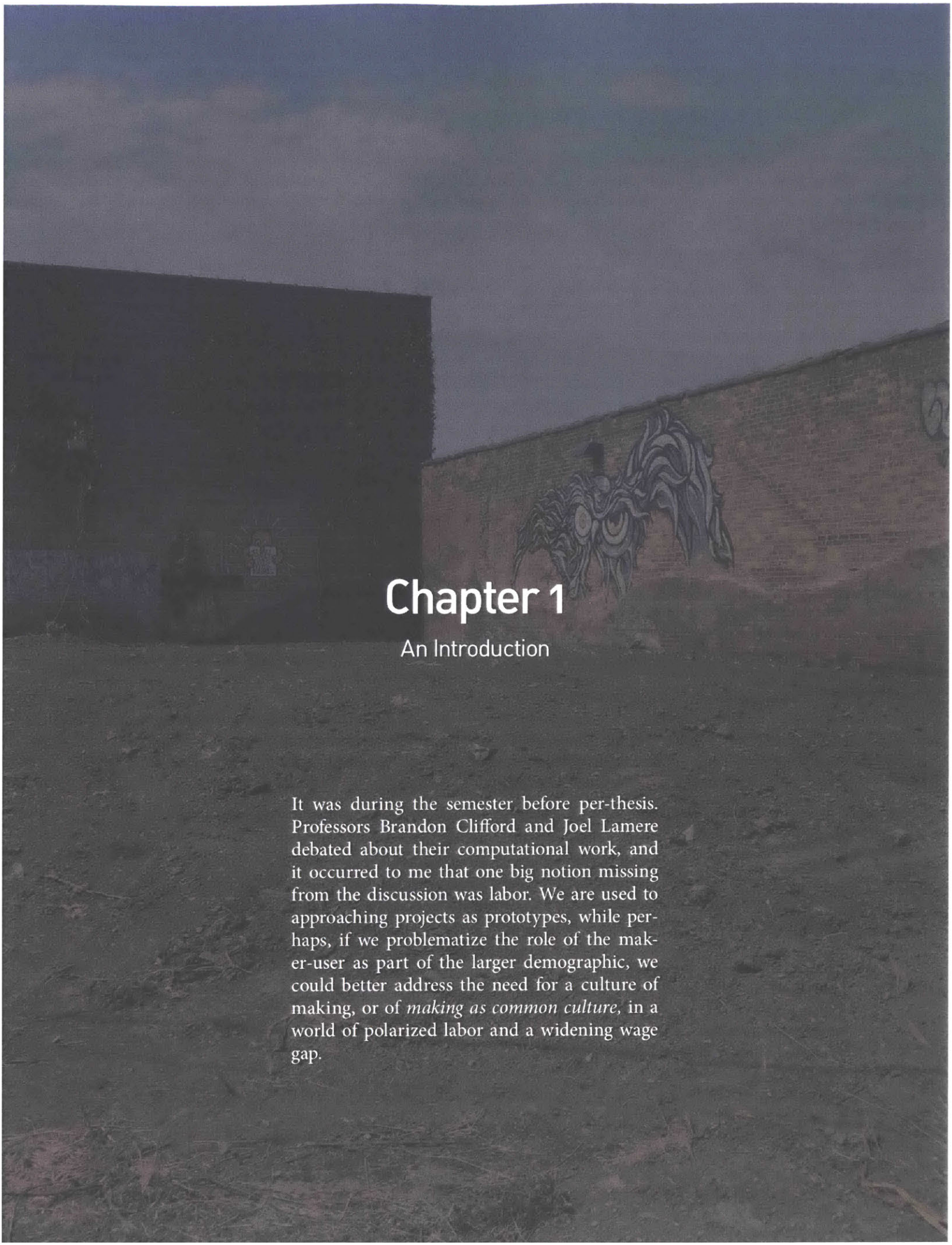
This Thesis did not turn out like anything I could have imagined a year or two ago, but its uncanny nature, at the intersection of architecture, technology, and sociology (if I may add) prompted deep thought and challenged my approach to design and architecture.

It is, in a way, one last conversation to be had as I close the chapter of my M. Arch, and in another way, a foundation (I hope) for my future work.

Special thanks to:

Ana María León Crespo, MIT PhD.
The Allied Media Conference in Detroit, MI
Richard Feldman of the Boggs-Lee Center in Detroit
Avi Mozkovits of Earth Grows
Anne and Maggie of Roch Library GIS
Persico US in Rochester, MI
Automated Dynamics in Albany, NY
Zhaner Steel in Oklahoma City, MO

1 Green, Hardy. "The Company Town."



Chapter 1

An Introduction

It was during the semester before per-thesis. Professors Brandon Clifford and Joel Lamere debated about their computational work, and it occurred to me that one big notion missing from the discussion was labor. We are used to approaching projects as prototypes, while perhaps, if we problematize the role of the maker-user as part of the larger demographic, we could better address the need for a culture of making, or of *making as common culture,* in a world of polarized labor and a widening wage gap.

An Introduction

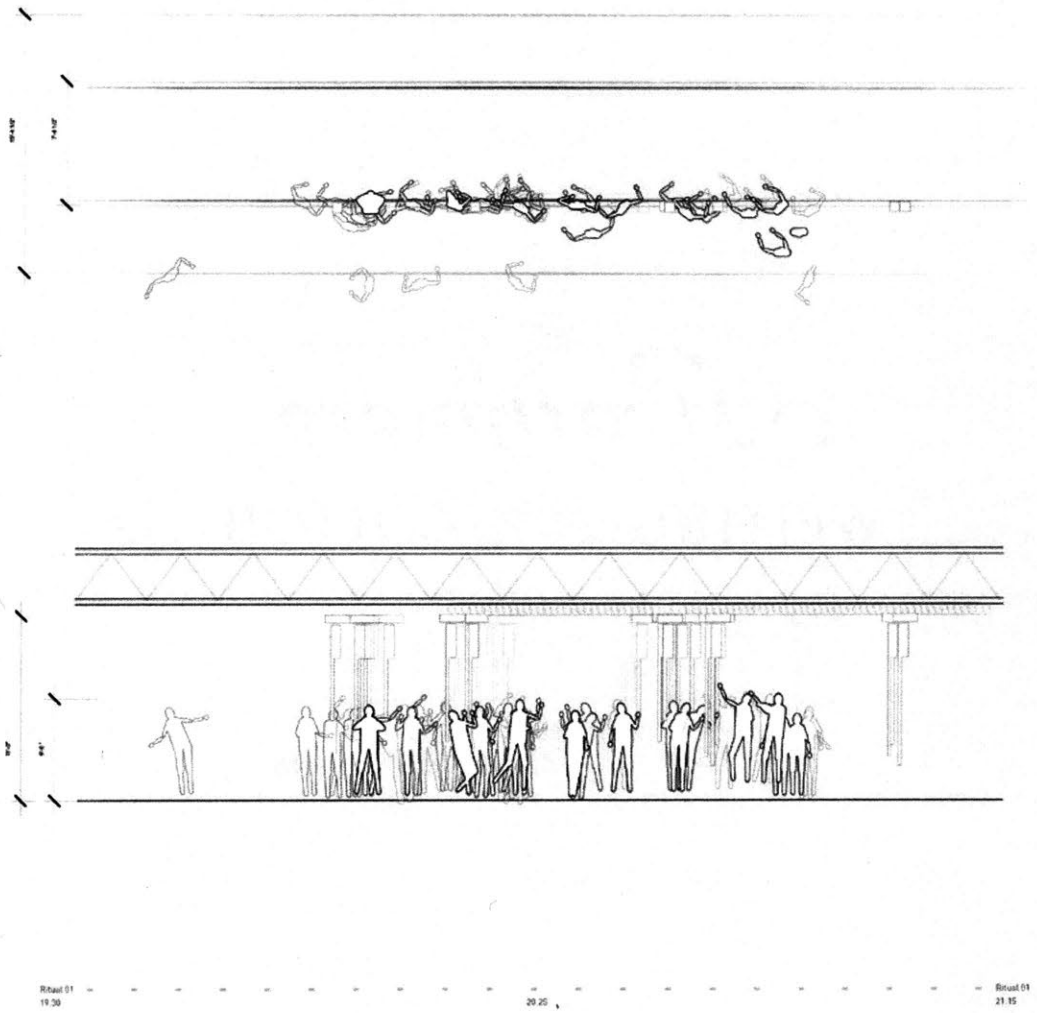
to the Research and Design Framework

"...when you come in the plant, leave your brain at the door, just bring your body in here, because we don't need any other part..."

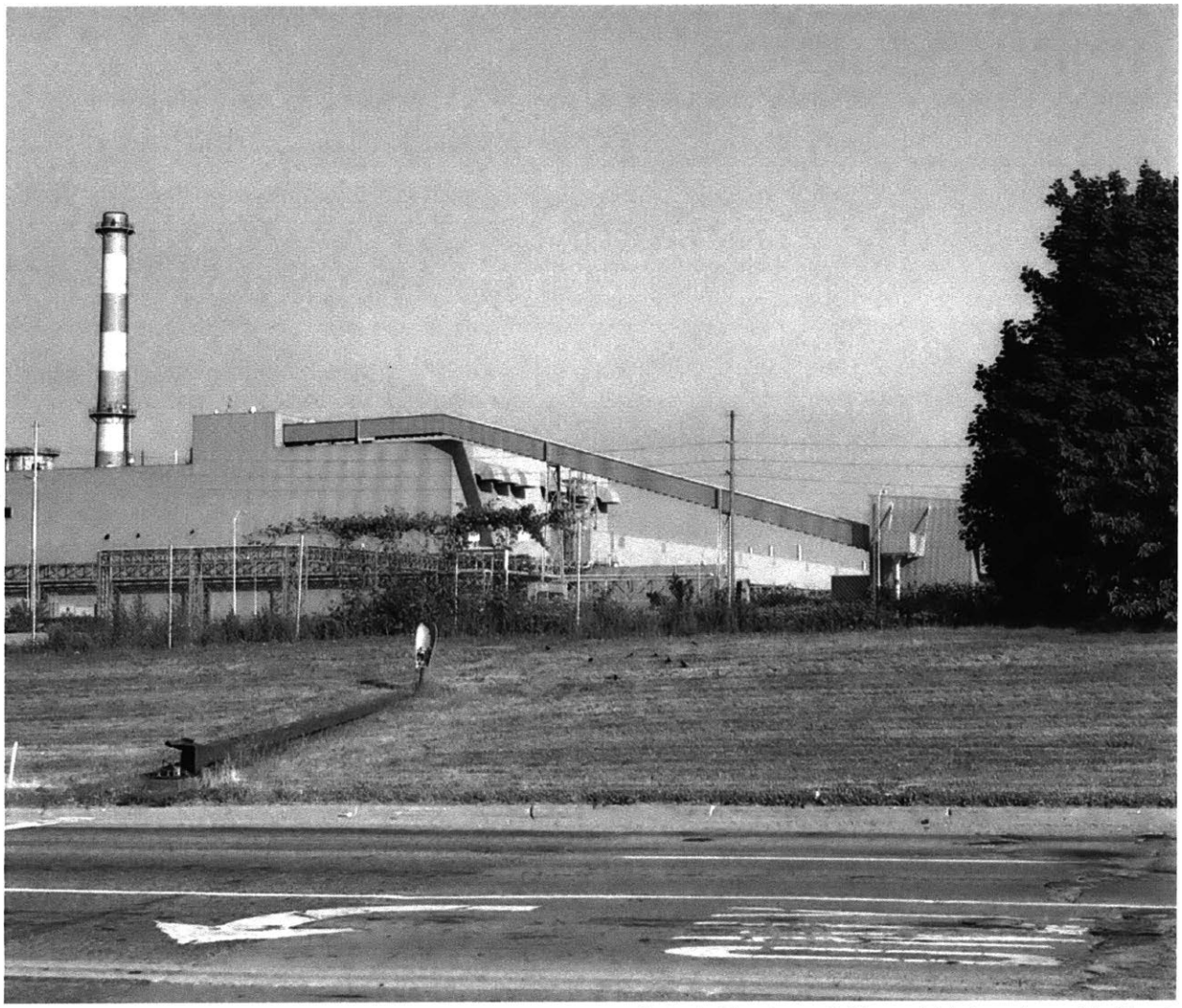
Assembly Plant worker, 1970

The entry point for this thesis was to interrogate contemporary spaces of production and our relationship with these spaces, technologies, and products. I specifically examined spaces that were embedded in the urban fabric, or in other words, industrial cities, to ask: what is there to gain from greater production automation as we move forward? Where does labor end and creativity begin for the larger demographic? And how can architecture penetrate these processes and environments? *(See image below.)*

These questions are rather urgent, and for two reasons: These often neglected spaces, hidden away from our gaze in industrial parks or developing



The two-minute repetitive assembly ritual of a car engine at the GM Hamtramack Assembly Plant. Pneumatics and human collaboration at work.



Detroit-Hamtramck General Motors Assembly Plant.

countries, possess a scale and an infrastructure that violently affects our surroundings and resources. And, they also influence us socially, through the series of determining economies and skill-sets that they bring along. We *become* our spaces of production, idle and disenfranchised from what is made. Unless, that is, we can re-claim them, along with their productive vitality.

As a case study, this thesis looks at a decaying General Motors car assembly plant *(see above)* located between the cities of Hamtramck and Detroit, the quintessential post-industrial city, because, looking at Detroit today, America's former richest manufacturing city, is a way for us to look into the future. It is simultaneously a prototypical and a specific case study.

Automotive News

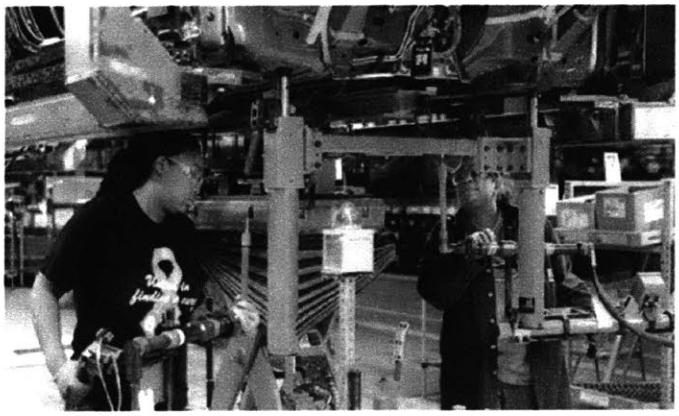
THIS WEEK'S ISSUE >

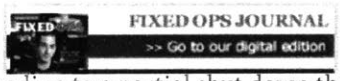
SEARCH

GM to idle Detroit-Hamtramck car plant for 6 weeks, cut output

October 12, 2017 @ 9:59 am

Michael Wayland





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UPDATED: 10/12/17 2:07 pm ET - adds details

DETROIT -- General Motors plans to scale back production and temporarily shutter an assembly plant in Detroit through the end of the year amid a slump in car demand across the industry.

GM experiences continuous contractions of output and employee numbers, leading to a partial shut down this same year.

This General Motors assembly plant has been slowly and painfully dying since its opening day in 1981, and is soon to join the ranks of many others before it (*See page 14).* The decay in production, that began over half a century ago and that will continue, forces us to think differently about obsolescence— of space, technology, labor and infrastructure of mass manufacturing in particular.

Together, these factories form a rotting landscape of past production, connected by arteries of infrastructure. *(See page 16.)*

In order to build this state-of-the-art-factory that promised 6,000 jobs in 1981, the city of Detroit had to appropriate and demolish over 400 acres of homes through eminent domain of what used

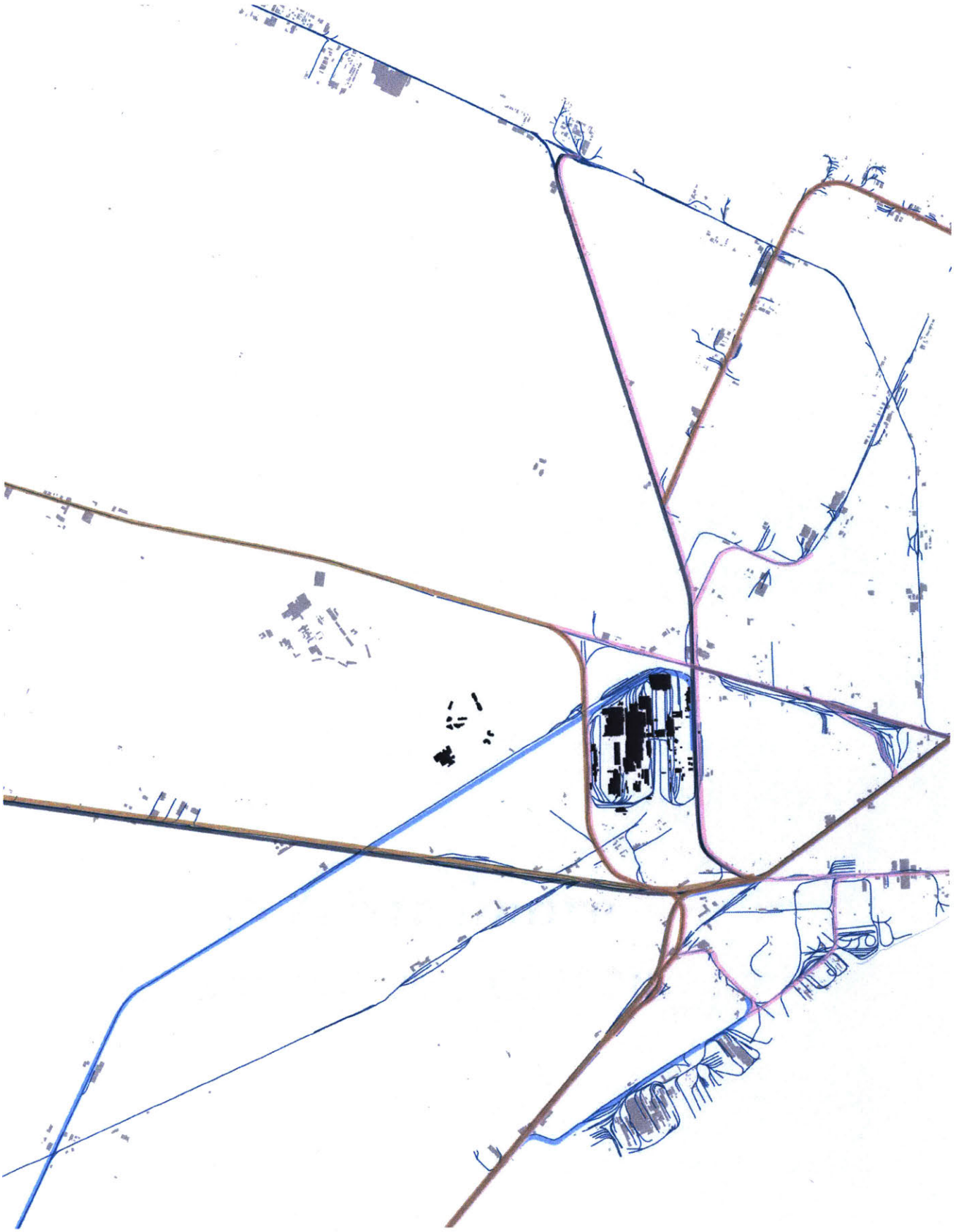

MOTOR CITY INDUSTRIAL PARK

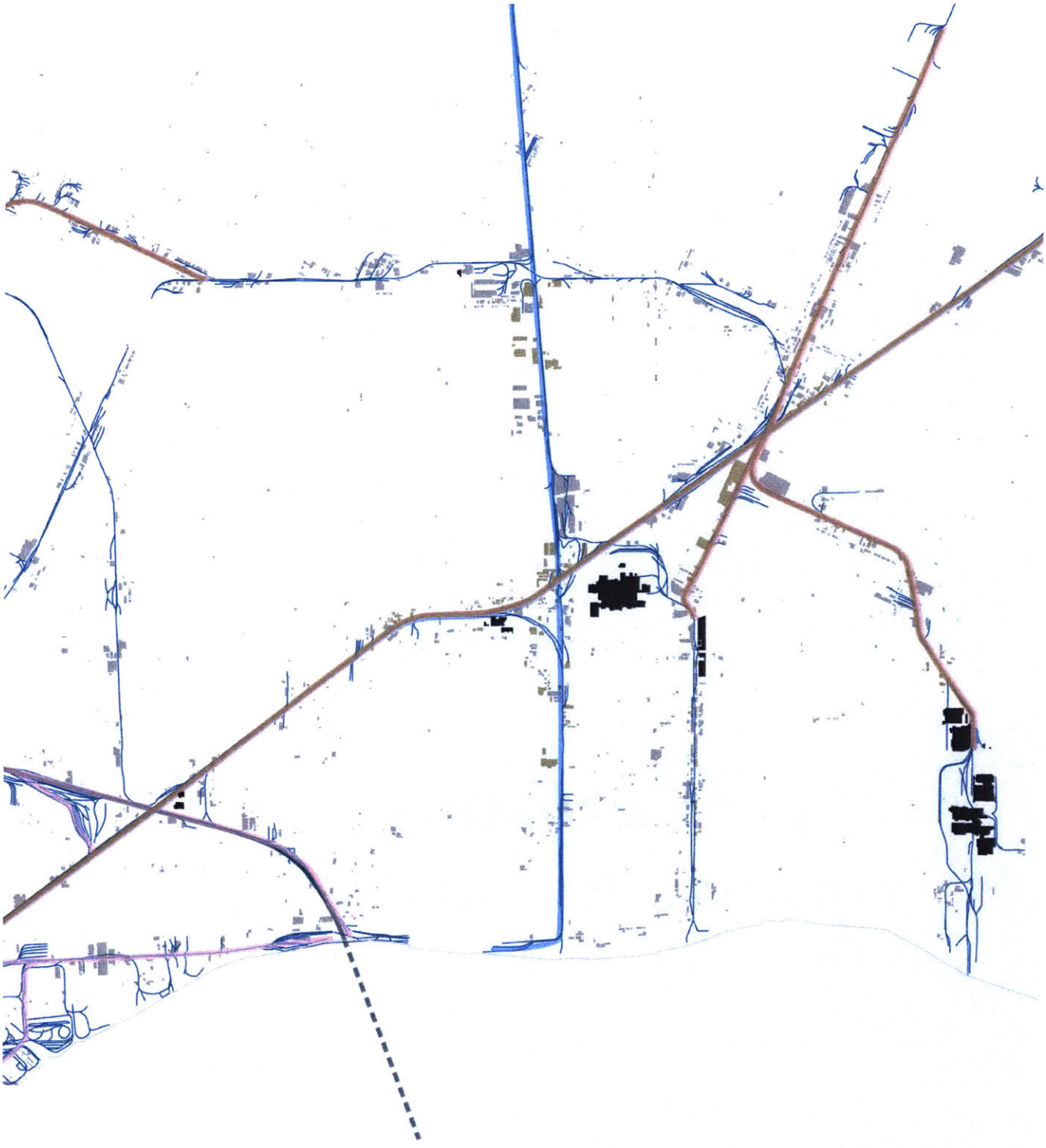
Fisher Body Plant 21 ◀◀
GM (1984). Photo : Ben
Wojdyla in "The Ruins
of Detroit Industry: Five
Former Factories"

Studebaker-Packard ◀▼
Photo: Ben Wojdyla

Ford's Highland Park, the ◀
2nd Model T Complex
(1930). Photo: Ben
Wojdyla

Ford's River Rouge ▼
Photo: Ben Wojdyla



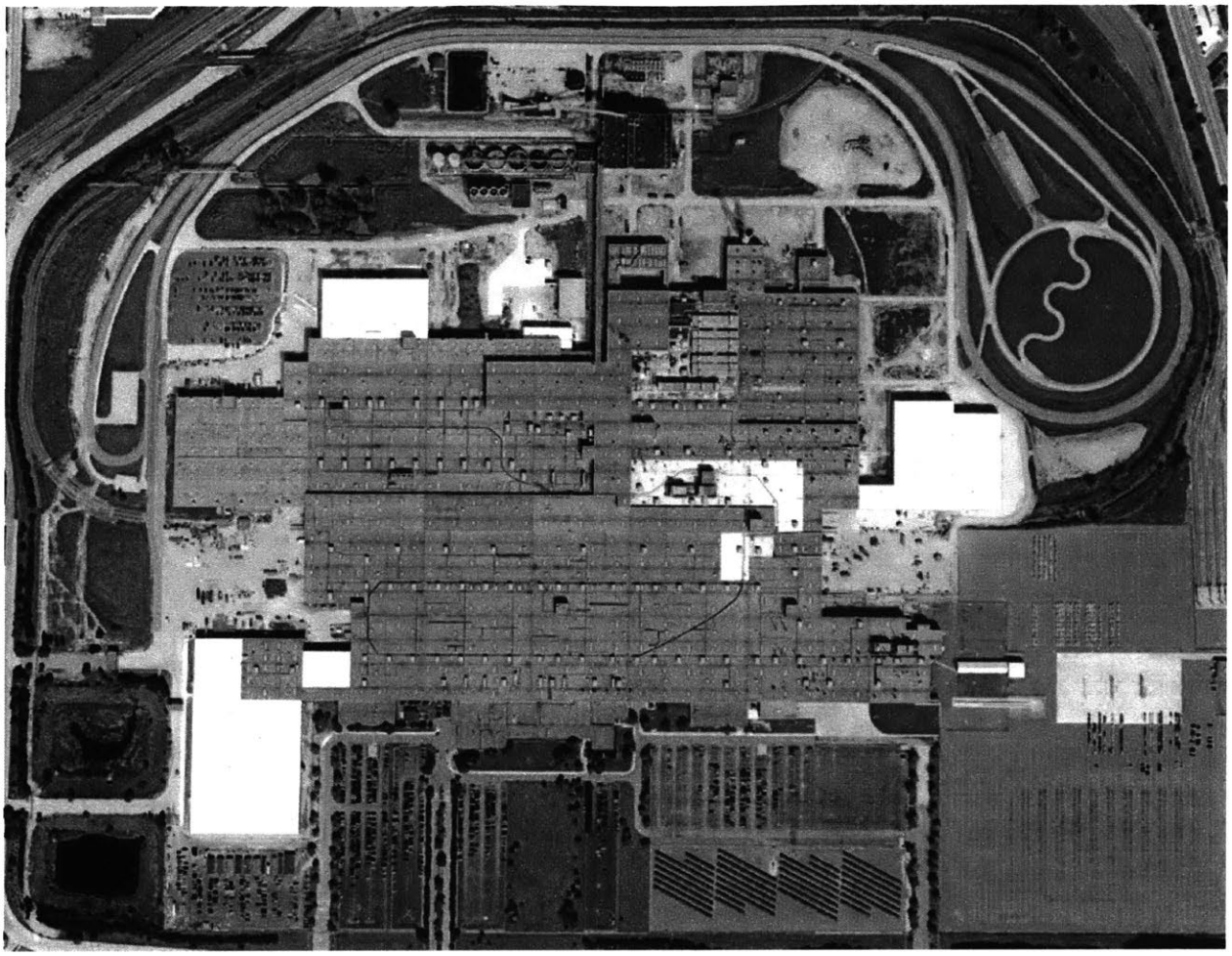

Norfolk Southern
CSX Transportation
Canadian National
Canada Pacific
1000ft
10,000ft

Pole Town and the Dodge Main before its demolition in 1979. The city of Highland park was incorporated in 1917 and the city of Hamtramck, where part of the assembly plant is located, in 1922.

to be known as Poletown, an immigrant Polish Community, for the economic benefit that this factory would bring. The Dodge Main factory was also demolished. It was roughly a quarter the size of the current GM facility, which covers about 400 acres, 94 of which are roofed while 112 are open, green areas.

Another current problem for the city is food insecurity, or the lack of physical and economic access to sufficient, safe and nutritious food. This access can be impaired by lack of transportation and by low household income. The following map *(See page 20)* shows the areas labeled as food-challenged in the vicinity of the site.

Although Michigan is in fact a farming state, the urban and guerrilla farm movement has a long history in Detroit. Communities have been fighting this problem for decades in one of America's



Aerial view of the General Motors Detroit-Hamtramck Assembly Plant (Google Earth)

former richest cities. "Feed ourselves to free ourselves," is their banner. On one hand, grocery store closings are tied to deindustrialization and suburbanization, and the last national chain grocery store in Detroit closed in 2007[1][2]. On the other hand, around 30% of households in Motor City do not have vehicle access[3]. Therefore, agriculture, arguably the most essential kind of productions, has become a thought experiment and the focus for this thesis.

Nevertheless, despite its essential nature, there is nothing romantic and pure about it. Agriculture as *making* is also incredibly removed, and black-boxed out of our daily reality. Food is Automated, optimized, outsourced, and yet hunger is still unresolved[4][5].

Finally, when studying this prototypical site, one also finds an impressive, though very localized, in-

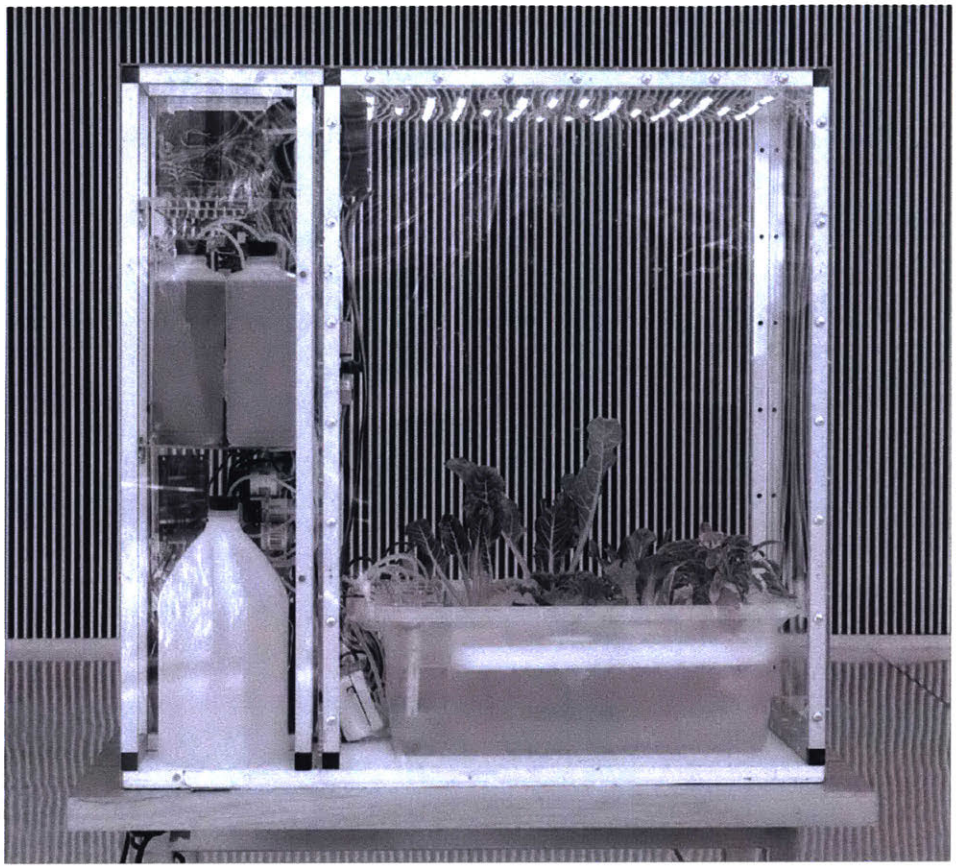
1 Hill, Alex B. "Critical Inquiry into Detroit's Food Desert Metaphor", 2017.

2 NPR. "No More Supermarkets : Major Grocers Flee Detroit", August 3, 2007, sec. economy.

3 This cipher is cited as 20% by Fairbank Sarah (thesis, 2009), 26% by UMich (article 2012), and 40% in Land Grab (Documentary 2016).

4 Ash, Ken."Solving the Food Crisis", The Organization for Global Cooperation and Development. 2013.

5 "Food Security & Food Access", Grace Communications Foundation.



Source: MIT Media Lab's Open Ag Personal Food Computer (PFC).

Source: MIT Media Lab's Open Ag Food Server.

Source: Green Sense Farms (Portage, IN). Source:

AeroFarms (Newark, NJ). Source: Business Insider.

Kwekerij Chris Endhoven system (Honselersdijk, Holland) : Automated bench systems and plant assembly line. Source: Logiqs B.V.

Source: Taylor Farms, (Salinas, CA) Automated Cabbage Picker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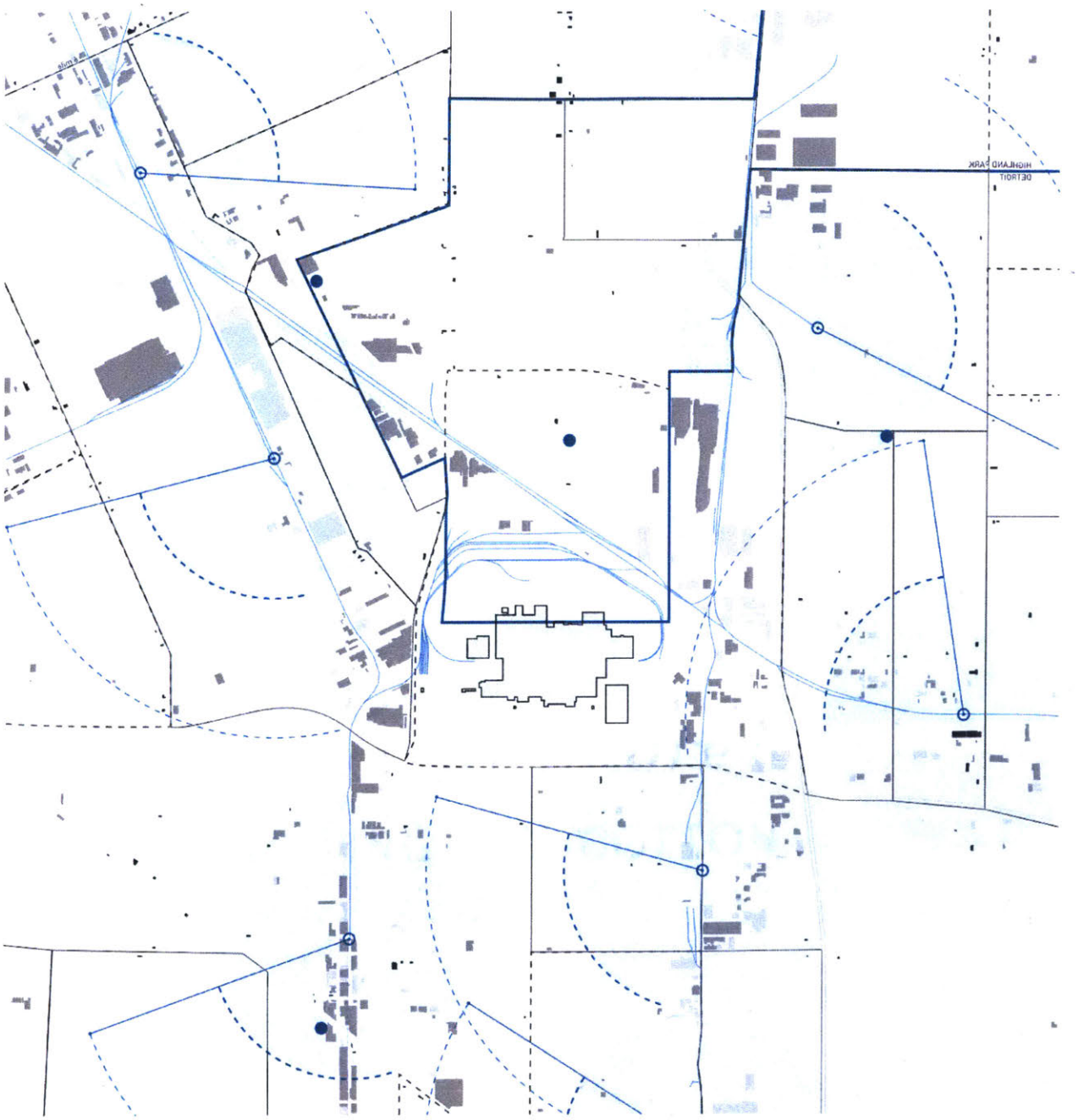


According to the USDA, a food desert is a low-income census tract where either a substantial number or share of residents has low access to a supermarket or large grocery store. "Low income" tracts are defined as those where at least 20% of the population's income is at or below the federal poverty levels for family size, or where median family income for the tract is at or below 80% of the surrounding area's median family income. Tracts qualify as "low access" if at least 500 persons or 33% of their population live more than a mile from a supermarket or large grocery store (for rural census tracts, the distance is more than 10 miles).
Shown in bold: Tracts in which at least 500 people or 33% of the population lives farther than 1/2 mile (urban) or 10 miles (rural) from the nearest supermarket. Shown in dashed lines: Low-income census tract where more than 100 housing units do not have a vehicle and are more than ½ mile from the nearest supermarket, or a significant number or share of residents are more than 20 miles from the nearest supermarket.

New Agrarians, previously manufacturing workers, from a wide range of ages.

crease in migrant population, a decline in female and male workforce, higher unemployment than the national average, college degree attainment that is half the national average, and manufacturing is still the largest employment sector.

Through this conglomeration of factors, my thesis anticipates that the city will inevitably witness the rise of a *New Agrarian* society. These New Agrarians will come from all ages and trades, and shift from a dependency on manufacturing, to an organized production, harnessing the conditions of place into a new productivity and a way of life that revolves around production itself.

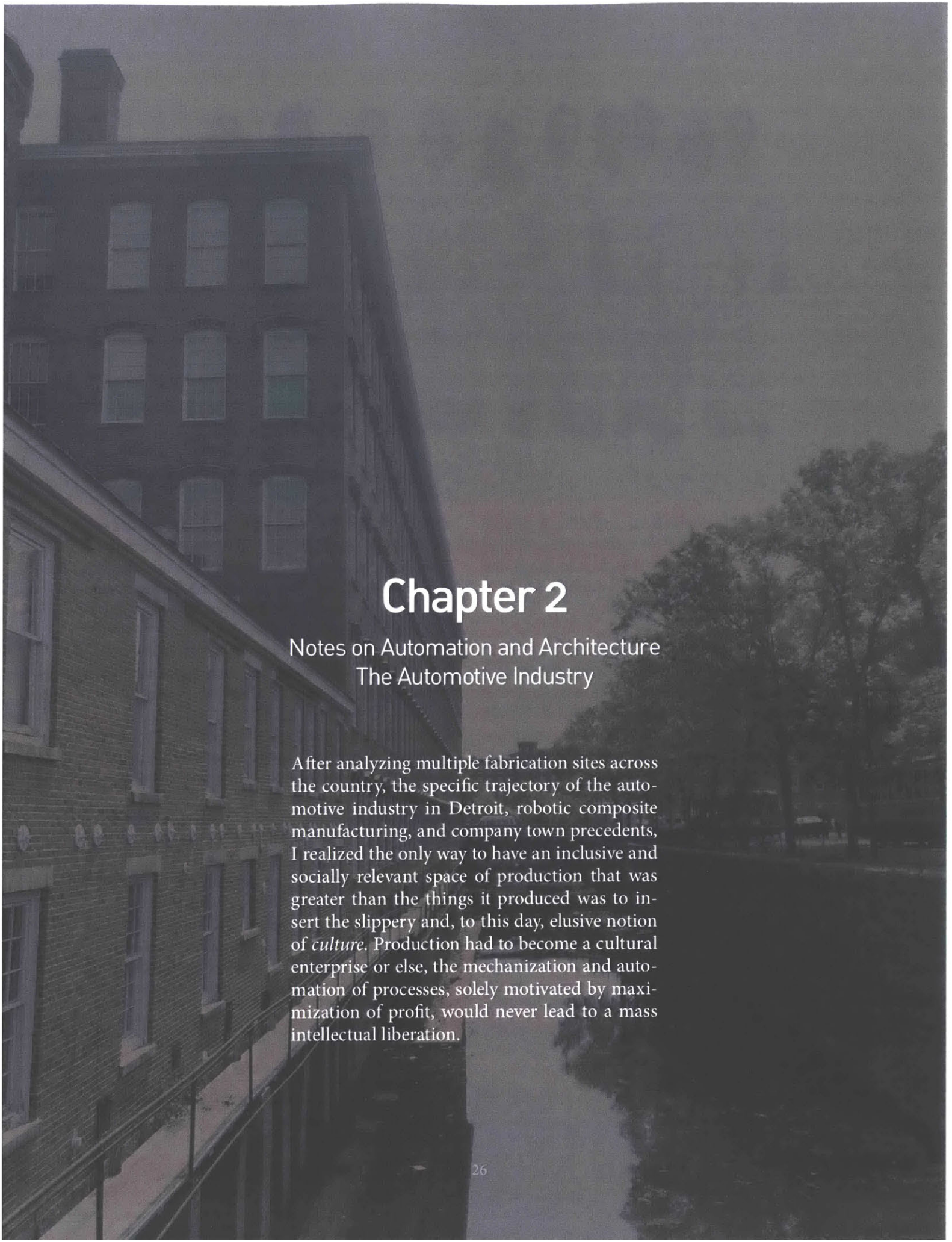
This thesis proposes an architecture by and for the New Agrarians, that challenges the culture of production for production's sake, and responds to the outlook of human obsolescence and poverty brought upon by "progress". *An alternate future.*

The end of this proposal is not to achieve a maximum efficiency of yield per acre, because, as the precedents show *(see pages 20-21)*, we are already very capable of achieving that. The end is instead to expand and redefine what a needs-met productive society is. Sustenance[6] is more than food. Unlike common manufacturing workers through the past century, The New Agrarians need to feel productive and be creative. They need an engaging public space. They need to be able to obtain intellectual attainment from their labor– even in the most automated and mechanized of environments.

Born from the remains of the GM assembly plant, my proposal, The Detroit-Hamtramck Food Assembly, seeks to embody those precise needs.

In the Assembly, agriculture is open-ly sourced, by a hybrid system of manual and automated labor that enables the creation of an interconnected, urban enclave of production, allowed for by surplus space, surplus technology, surplus infrastructure, and surplus labor. This food bastion is simultaneously a park, garden and workplace, a food Gigafactory, to feed their city and free their city, And hopefully, become a new driver for culture as well.

6 Sustenance is defined by the Merriam-Webster dictionary as means of support, maintenance, or subsistence.



Chapter 2

Notes on Automation and Architecture
The Automotive Industry

After analyzing multiple fabrication sites across the country, the specific trajectory of the automotive industry in Detroit, robotic composite manufacturing, and company town precedents, I realized the only way to have an inclusive and socially relevant space of production that was greater than the things it produced was to insert the slippery and, to this day, elusive notion of *culture*. Production had to become a cultural enterprise or else, the mechanization and automation of processes, solely motivated by maximization of profit, would never lead to a mass intellectual liberation.

Notes on Automation and Architecture

Architecture of Sustenance for the New Industrial City

"...it might have been the repetition. It's kind of hard to do your job and nothing else. It took me a long, long time, but I got used to it."

Tony D'Enrico, Lordstown Assembly Plant worker

It is common to think of the obsolescence of commodities, but people have in many ways become obsolete as well. Norbert Wiener commented on the displacement of physical and mental functions when he released his first book on cybernetics, and so did John Maynard Keynes, who said that our ability to find labor-saving technologies has outpaced our ability to invent tasks in which we can employ the labor that we save. This is neither good nor bad, only a fact.

According to Arendt, there is a distinction between work (which produces the human artifice) and labor (performed in a repetitive nature). One labors to eat, and eats to labor. The synchronized mechanization of the body in working with the machine is not hard to attain, "given that life processes are themselves rhythmic and automatic." The moment a tool begins to guide the body's labor, taking over its rhythm, it becomes, by definition, a machine, and it is served by the laborer, not the other way around.

It is not true that machines were invented by "man the maker" to ease life and labor, but to erect this world, which is the human artifice. The assembly line is the result of "the concept of manufacturing as a continuous process", and automation, is the result of the mechanization of the assembly line.

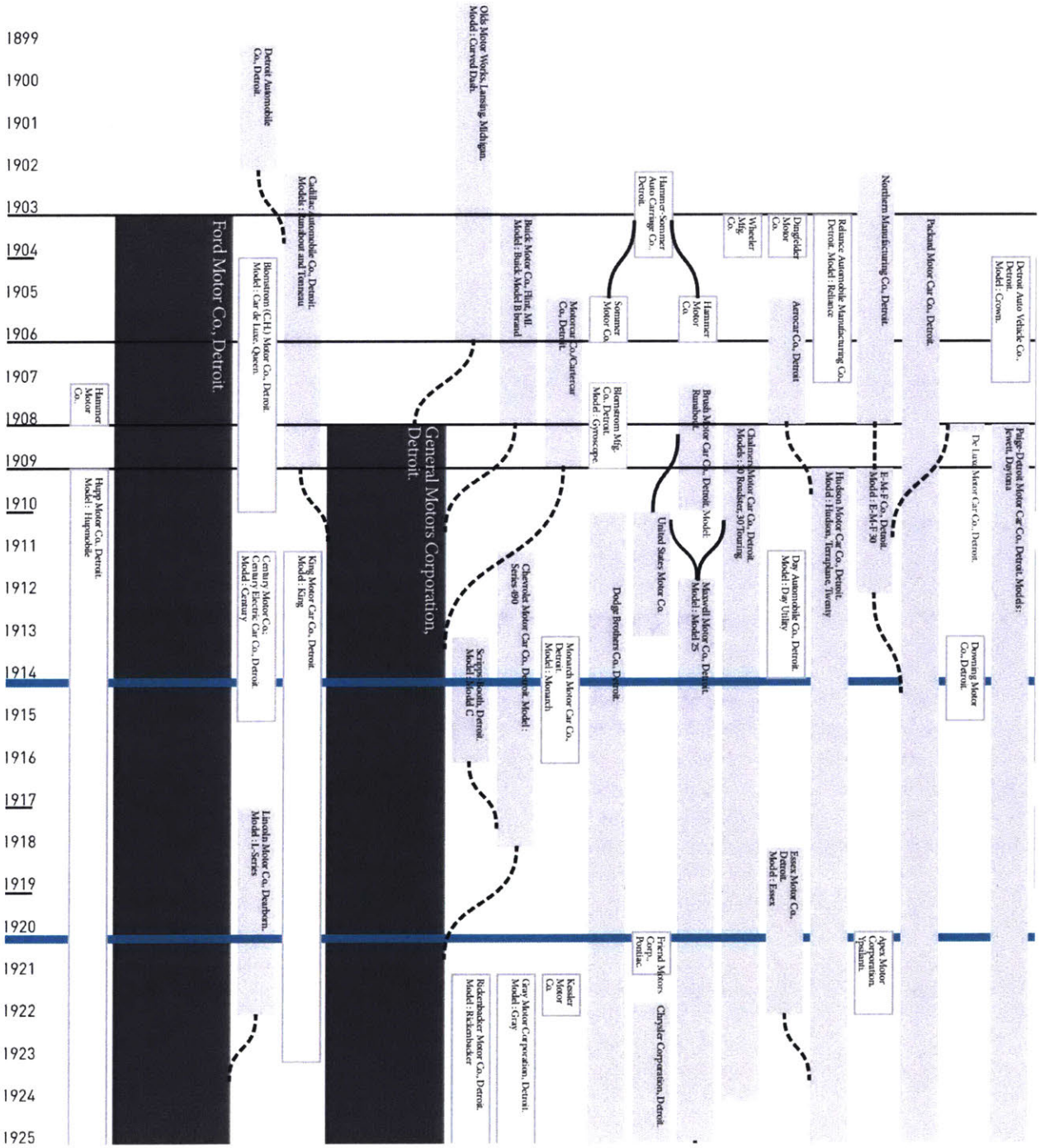
This thesis argues that spaces of production should remain part of the urban/social context, not so they can generate any sort of employment, but because, as long as they're alive, they can be nodes for human capital, they become hubs, they create centralized activity that city governments in these decimated cities no longer can promote, and they provide an opportunity for reinvention to the growing number of people being edited out of the process of production—a demographic without relevant higher education.

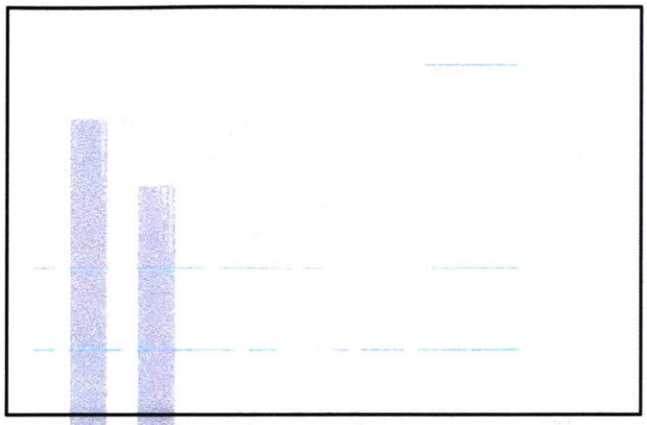
Sheer functionalism and efficiency leave, inherently, little or no space for creative emancipation. And in an attempt to democratize consumption, we have been quick to compress production itself, editing out spontaneity and the mere rhythms of life.

We must transcend the sheer functionalism of things produced for consumption, and the sheer utility of the objects produced for use. That missing *value* that this thesis seeks to add is ever-changing and social, and it doesn't have to be monetary. In a world of capitalistic automation we must arrive at other modes of exchange, in a societal, collaborative manner.

The Automotive Industry

Timeline of Automotive Companies in Detroit, workforce , and urban agriculture.

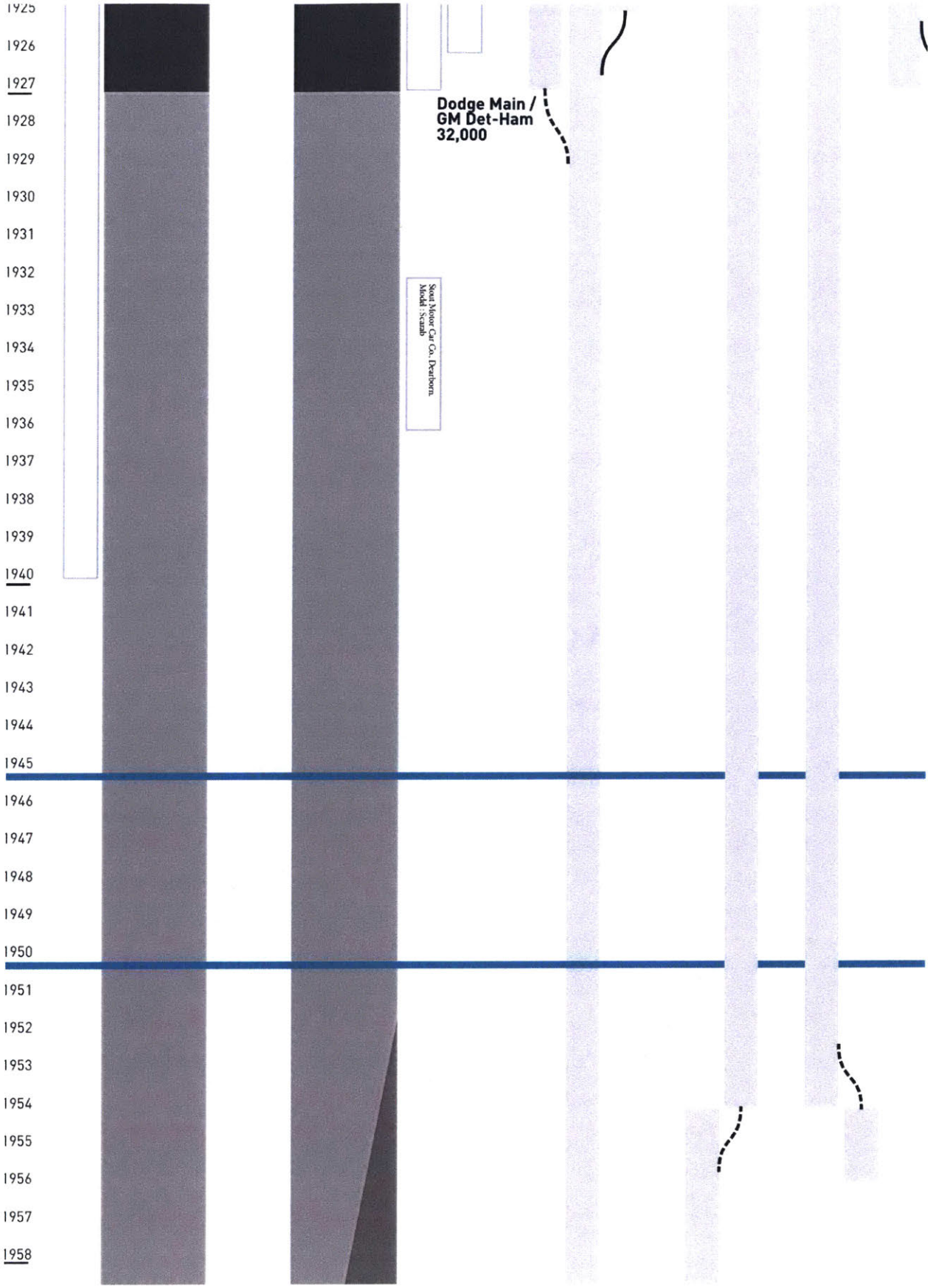




Mayor Hazen Pingree's Potato Patches.

Ford offers the $5 day to recruit manufacturing labor.

Ford's daily wage rises to $6.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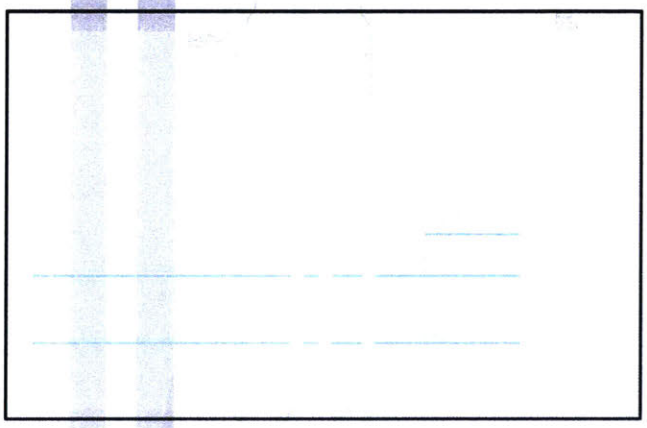
Graham - Paige Detroit Motor Car Co., Detroit.

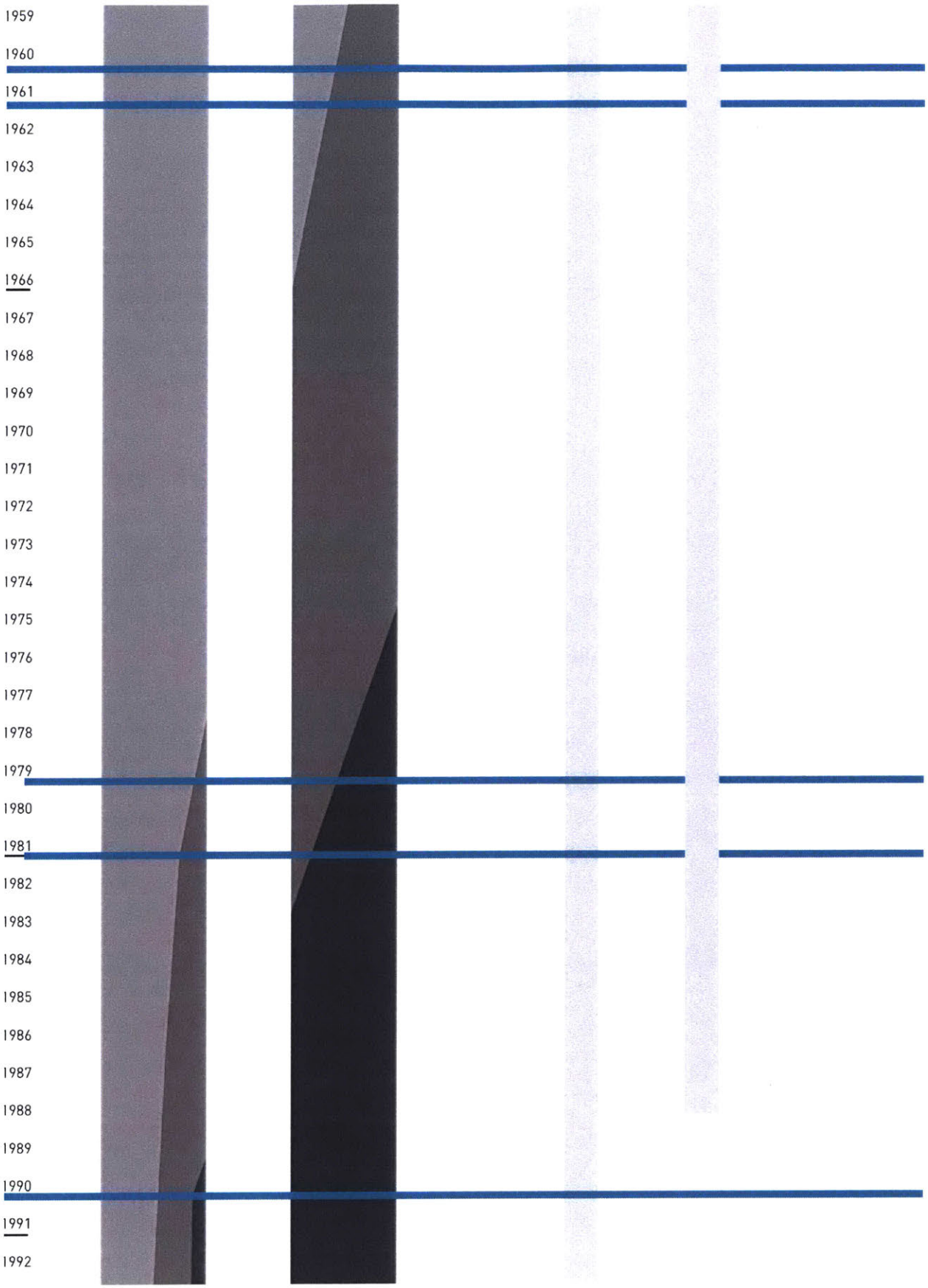
Ford River Rouge 90,000



Victory Gardens and plots under cultivation increase greatly during the war years.

Over the next 10 years, the Big Three will build 10 factories outside of the city.

Population in Detroit peaks at 2 million.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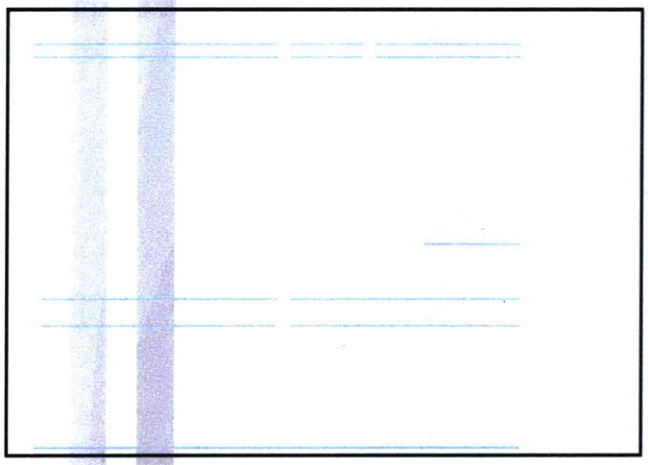
Hamtramck and Highland Park lose half their populations, while auto sales soar.

GM introduces its first industrial robot.

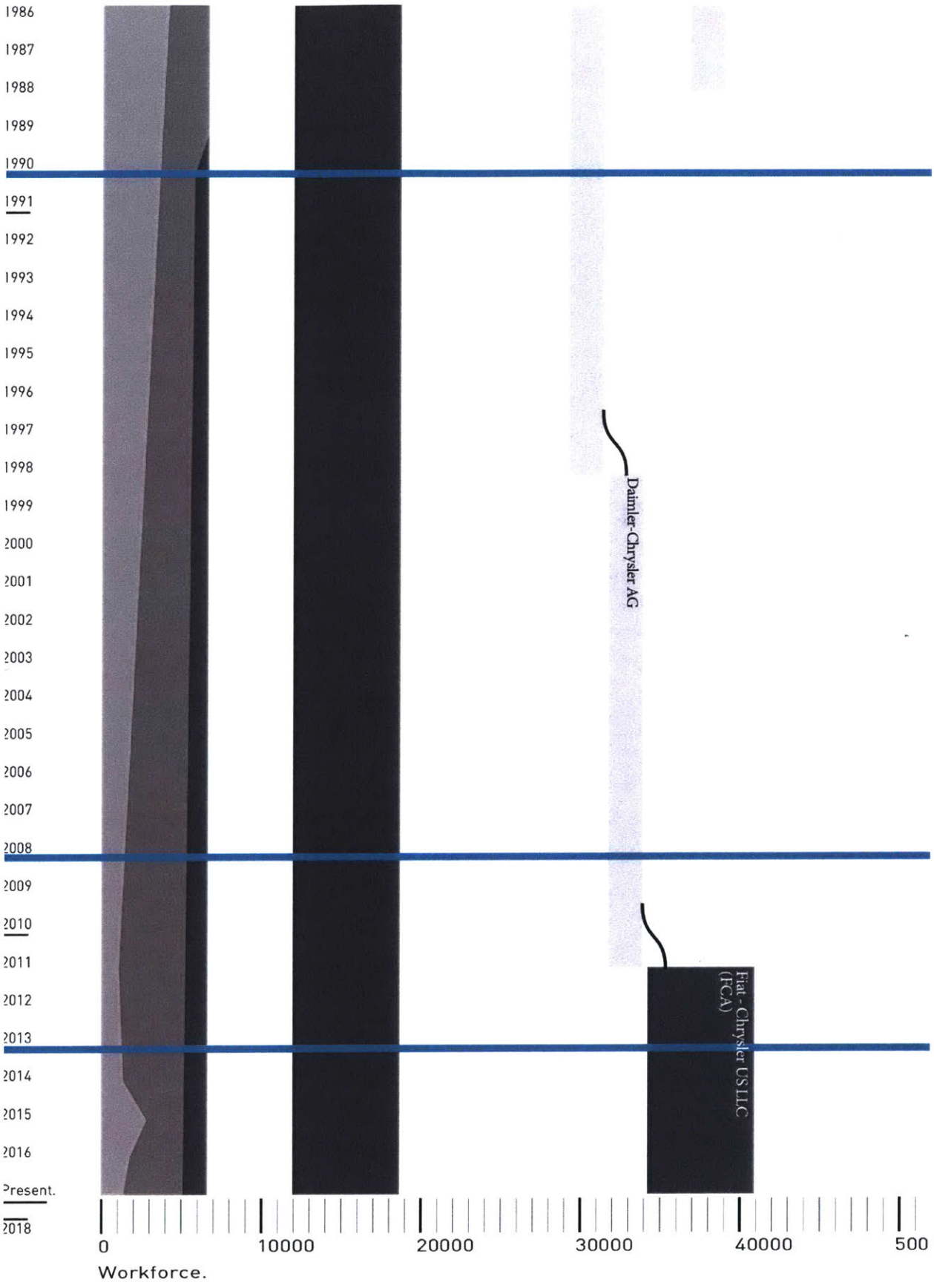
Mayor Coleman Young introduces the Farm-a-Lot program, providing assistance for residents to start gardens in vacant lots that resulted from population exodus.

The 1.5 billion Jimmy Carter loan for the auto industry is the largest in history. It comes in reaction to the OPEC embargo of 1973.

GM Detroit-Hamtramck Assembly Opens, promising 6,000 jobs.



Only 6,000 workers remain at the Rouge.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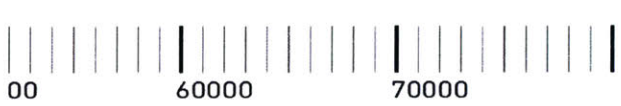
Only 6,000 workers remain at the Rouge.

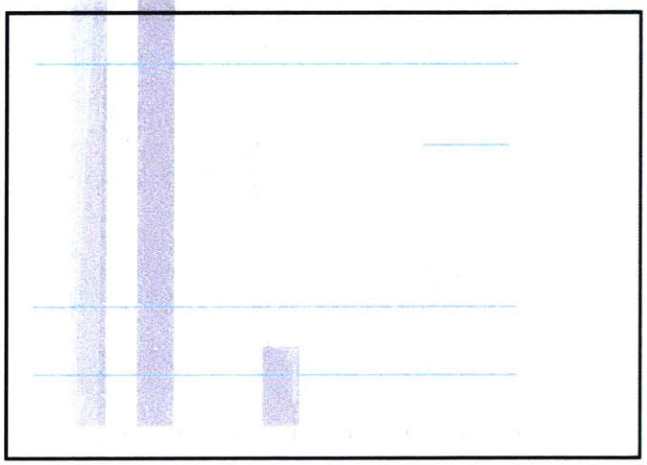
Community Food Projects Competitive Grants Federal Program suports urban agriculture.

Bush administration bails out Chrysler and GM fearing a 21% unemployment rate. The project is completed by Obama administration. The total bailout amounts to 80 billion.

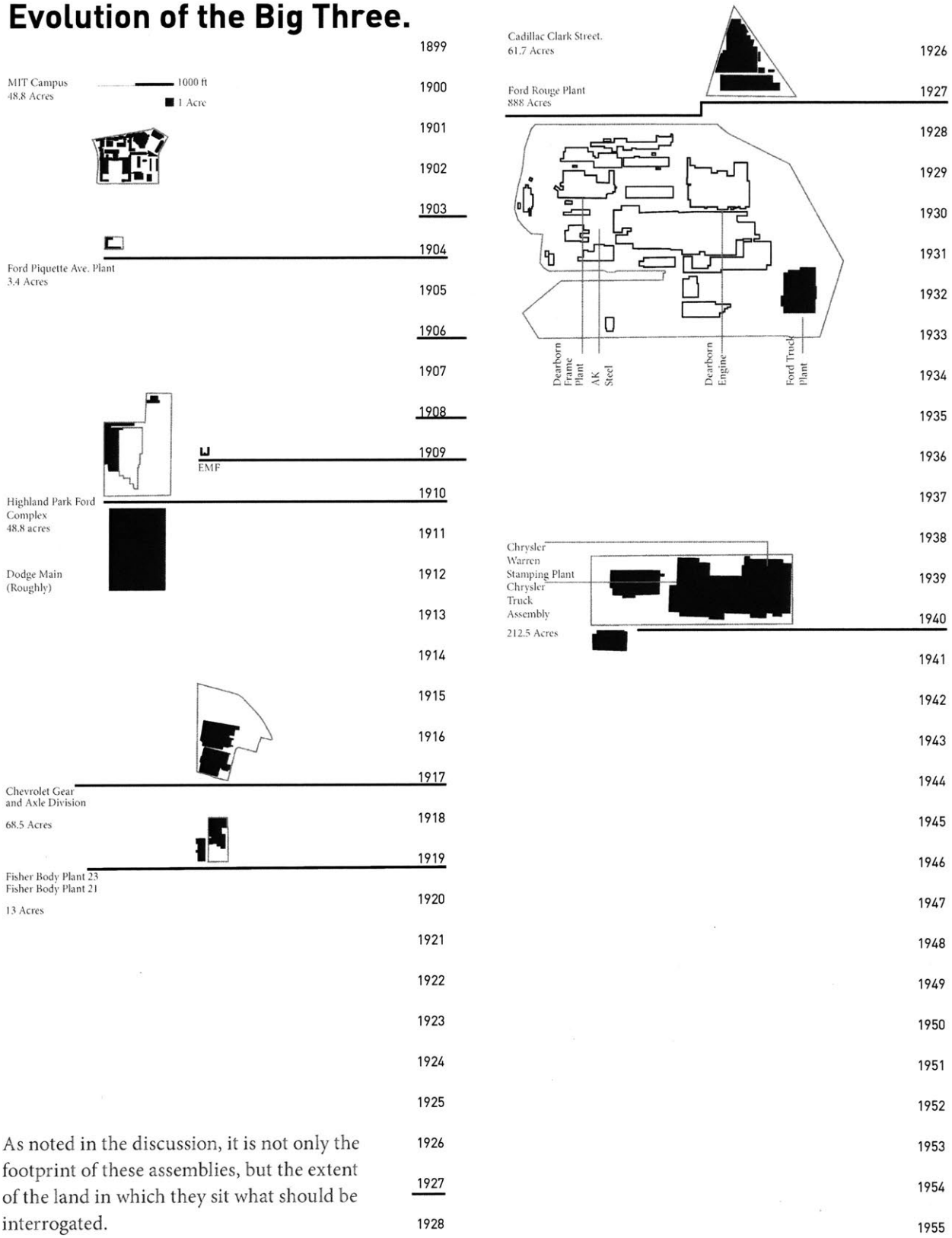
The City of Detroit files for bankrupcy. It also adopts its urban agriculture ordenance, which legalizes and better defines this practice and its procedures.

*Detroit Agricultural Data from *Urban Agriculture: Policy, Law, Strategy, and Implementation.*





Evolution of the Big Three.



As noted in the discussion, it is not only the footprint of these assemblies, but the extent of the land in which they sit what should be interrogated.

General Motors
Warren Transmission
(built 1941)

165 Acres

1957

1958

1959

1960

1961

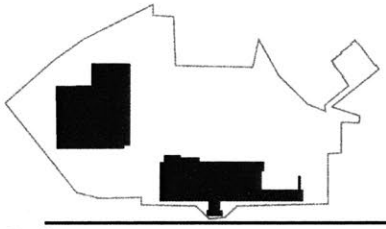
1962

1963

1964

1965

1966



GM Lordstown Complex
400 Acres

1967

1968

1969

1970

1971

1972

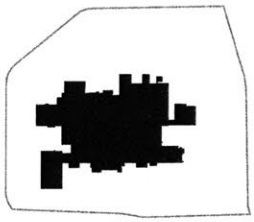
1973

1974

1975

1976

1977



1978

1979

1980

1981

GM Detroit-Hamtramck
Assembly Plant

400 Acres

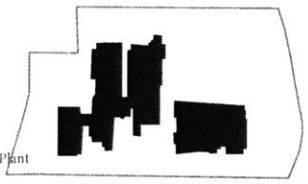
1982

1983

1984

1985

1986

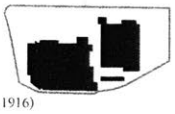


Chrysler Jefferson North Plant
380.5 Acres

1989

1990

1991



FCA "New Mack"
Engine Plant

(Michigan Stamping Co. 1916)
108.7 Acres

1992

1993

1994

1995

1996

1997

1998

1999

2000

2001

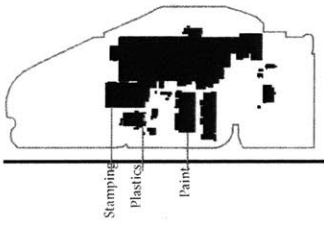
2002

2004

2005

2006

2007



Tesla Factory
312 Acres

2008

2009

2010

2011

2012

2013

2014

2015

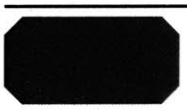
2016

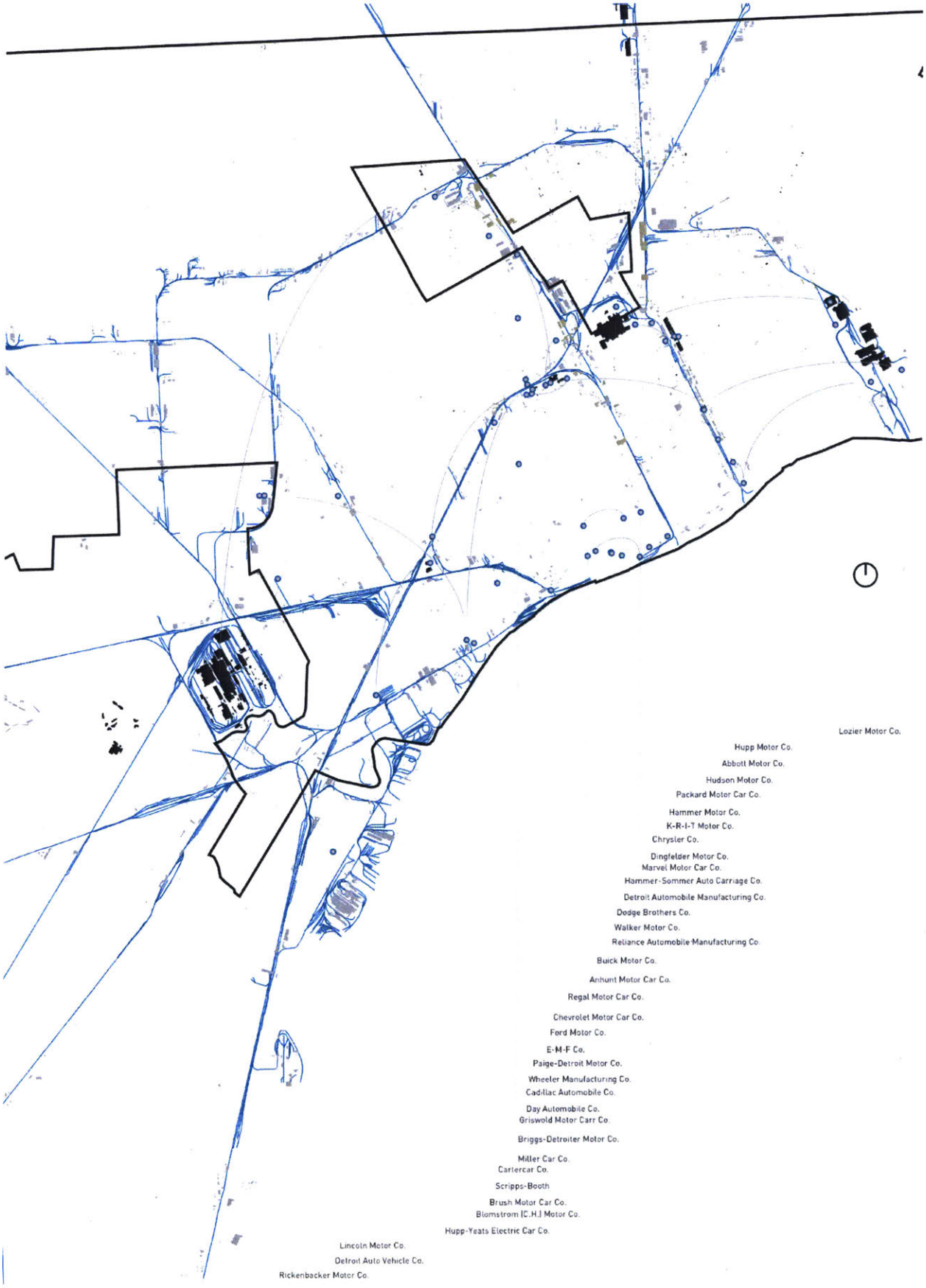
Prese

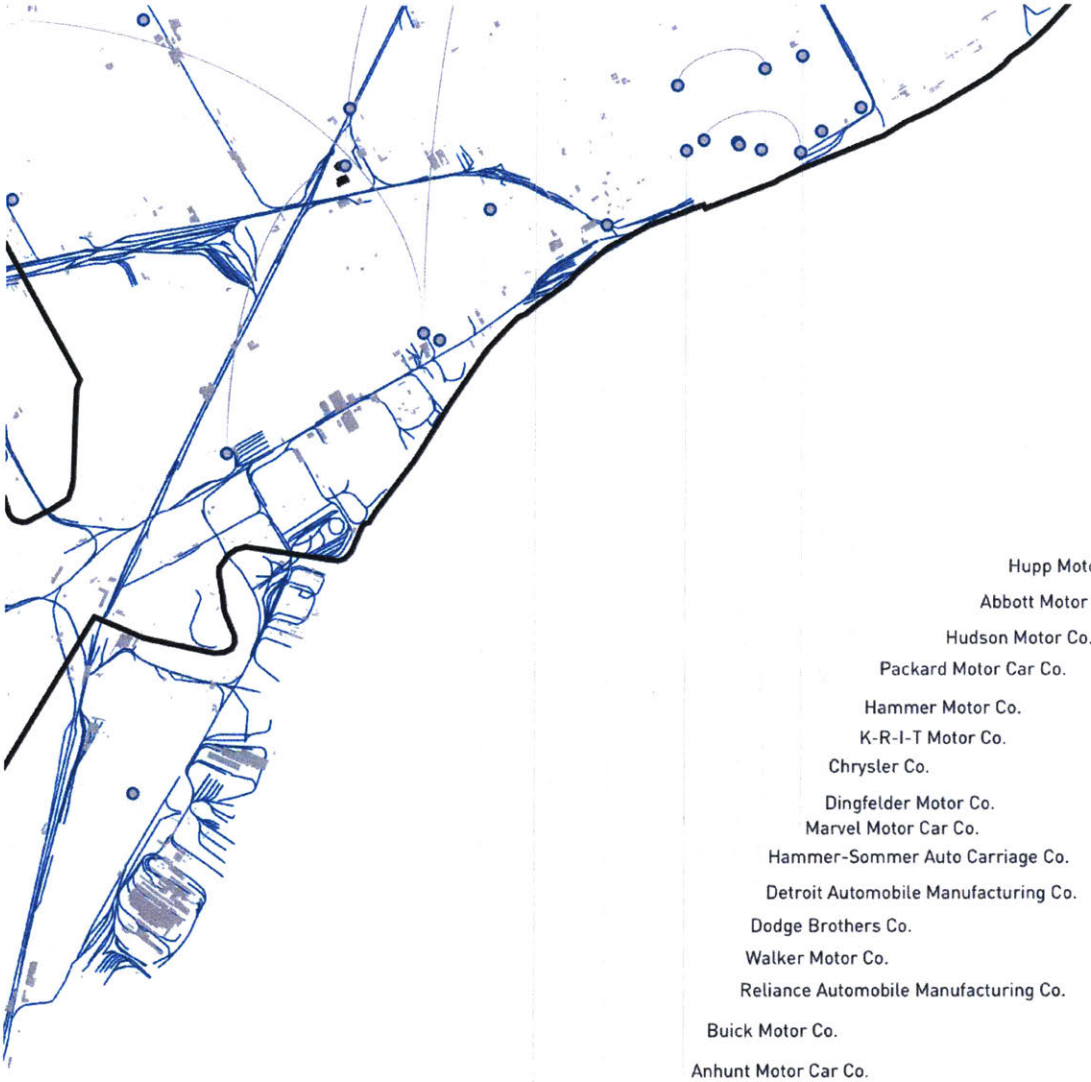
Tesla Gigafactory 1

Tesla Gigafactory Projected
128 Acres (roofed)

2018




Lozier Motor Co.
Hupp Motor Co.
Abbott Motor Co.
Hudson Motor Co.
Packard Motor Car Co.
Hammer Motor Co.
K-R-I-T Motor Co.
Chrysler Co.
Dingfelder Motor Co.
Marvel Motor Car Co.
Hammer-Sommer Auto Carriage Co.
Detroit Automobile Manufacturing Co.
Dodge Brothers Co.
Walker Motor Co.
Reliance Automobile Manufacturing Co.
Buick Motor Co.
Anhunt Motor Car Co.
Regal Motor Car Co.
Chevrolet Motor Car Co.
Ford Motor Co.
E-M-F Co.
Paige-Detroit Motor Co.
Wheeler Manufacturing Co.
Cadillac Automobile Co.
Day Automobile Co.
Griswold Motor Carr Co.
Briggs-Detroiter Motor Co.
Miller Car Co.
Cartercar Co.
Scripps-Booth
Brush Motor Car Co.
Blomstrom (C.H.) Motor Co.
Hupp-Yeats Electric Car Co.
Lincoln Motor Co.
Detroit Auto Vehicle Co.
Rickenbacker Motor Co.



Lozier Motor Co.
Hupp Motor Co.
Abbott Motor Co.
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Packard Motor Car Co.
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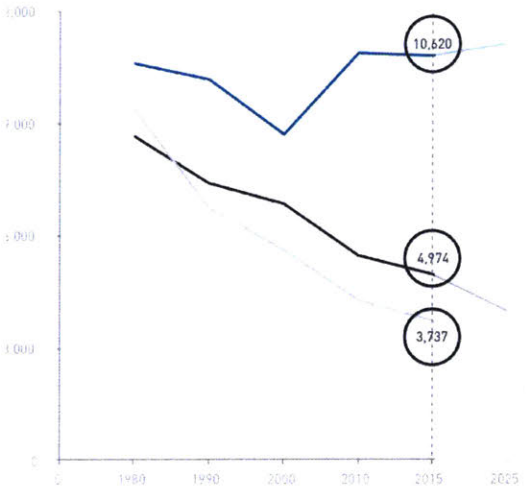
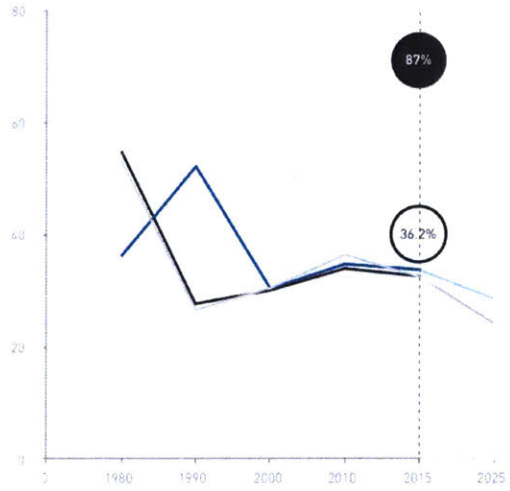
Scripps-Booth
Brush Motor Car Co.
Blomstrom (C.H.) Motor Co.
Hupp-Yeats Electric Car Co.
Lincoln Motor Co.
Detroit Auto Vehicle Co.
Rickenbacker Motor Co.

This diagram traces the movement of different factories (decentralization) away from the center of Detroit, and into adjacencies like Hamtramck, Highland Park, Warren, and Dearborn.

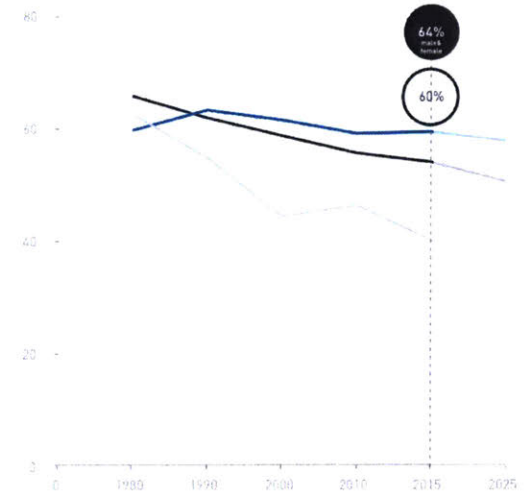
Population Density (hab/sqmile)



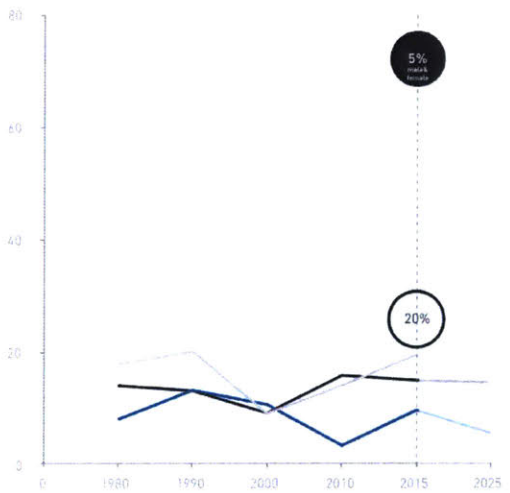
Highschool attainment as % for persons 25 yrs and over



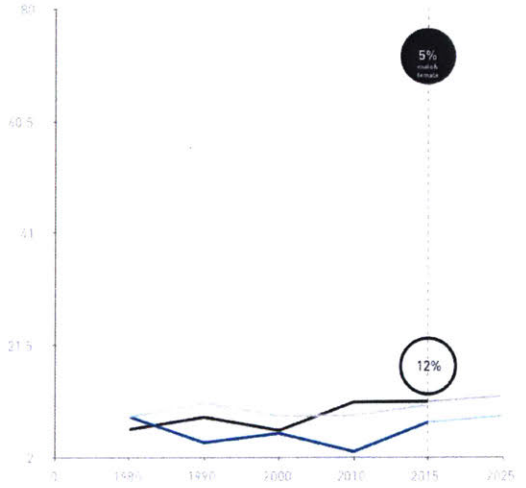
Male workforce as % of male population



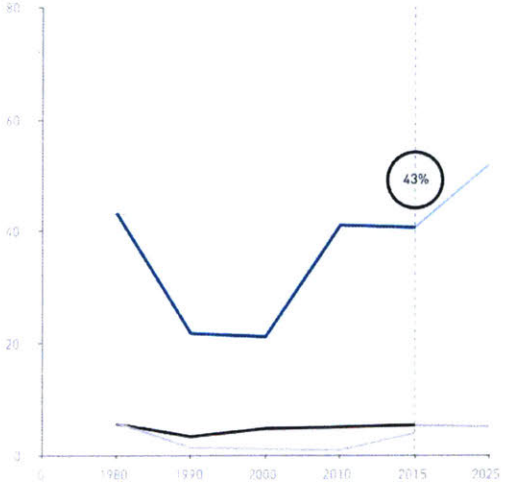
Unemployment as % of male population



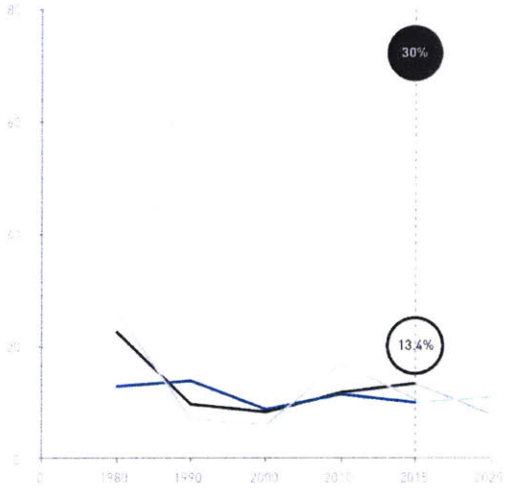
Unemployment as % of female population



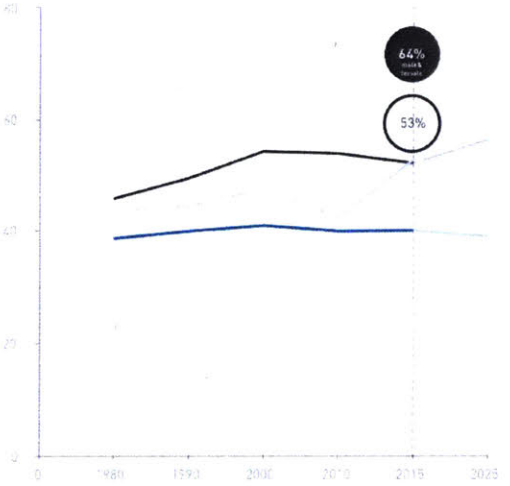
Foreign Born persons as % of total population



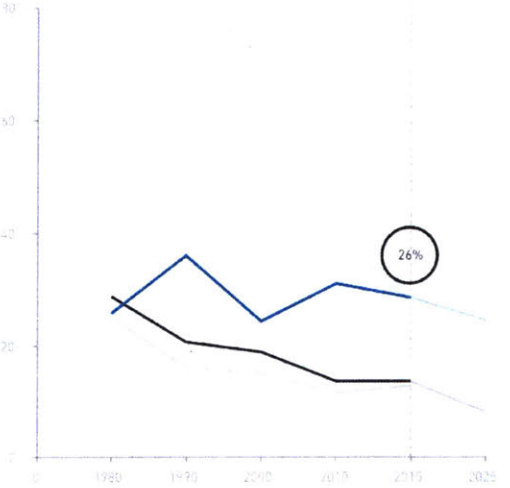
Bachelors degree attainment as % of population 25 yrs and over



Female workforce as % of female population

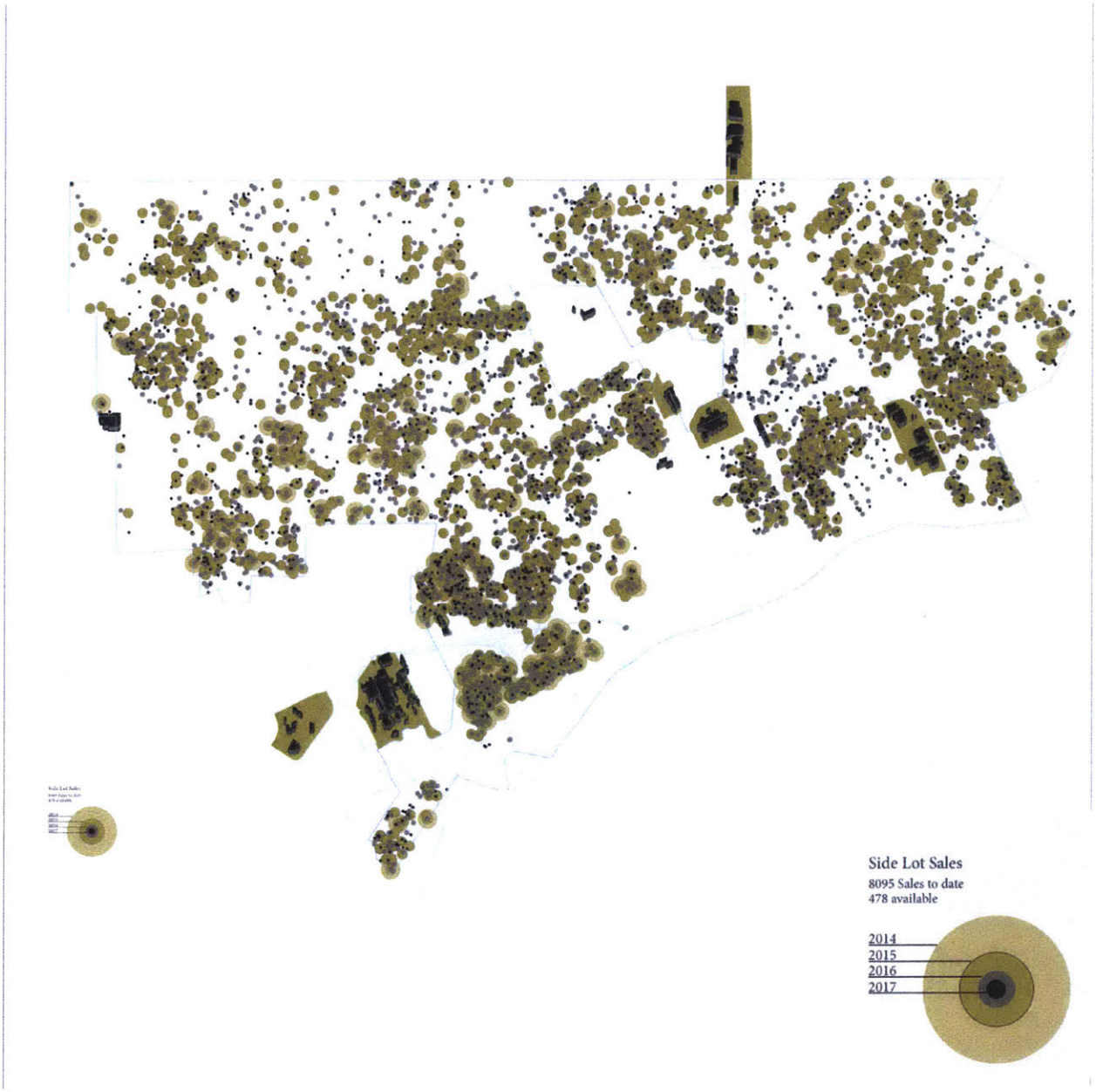


Persons in the manufacturing industry as % of Workforce

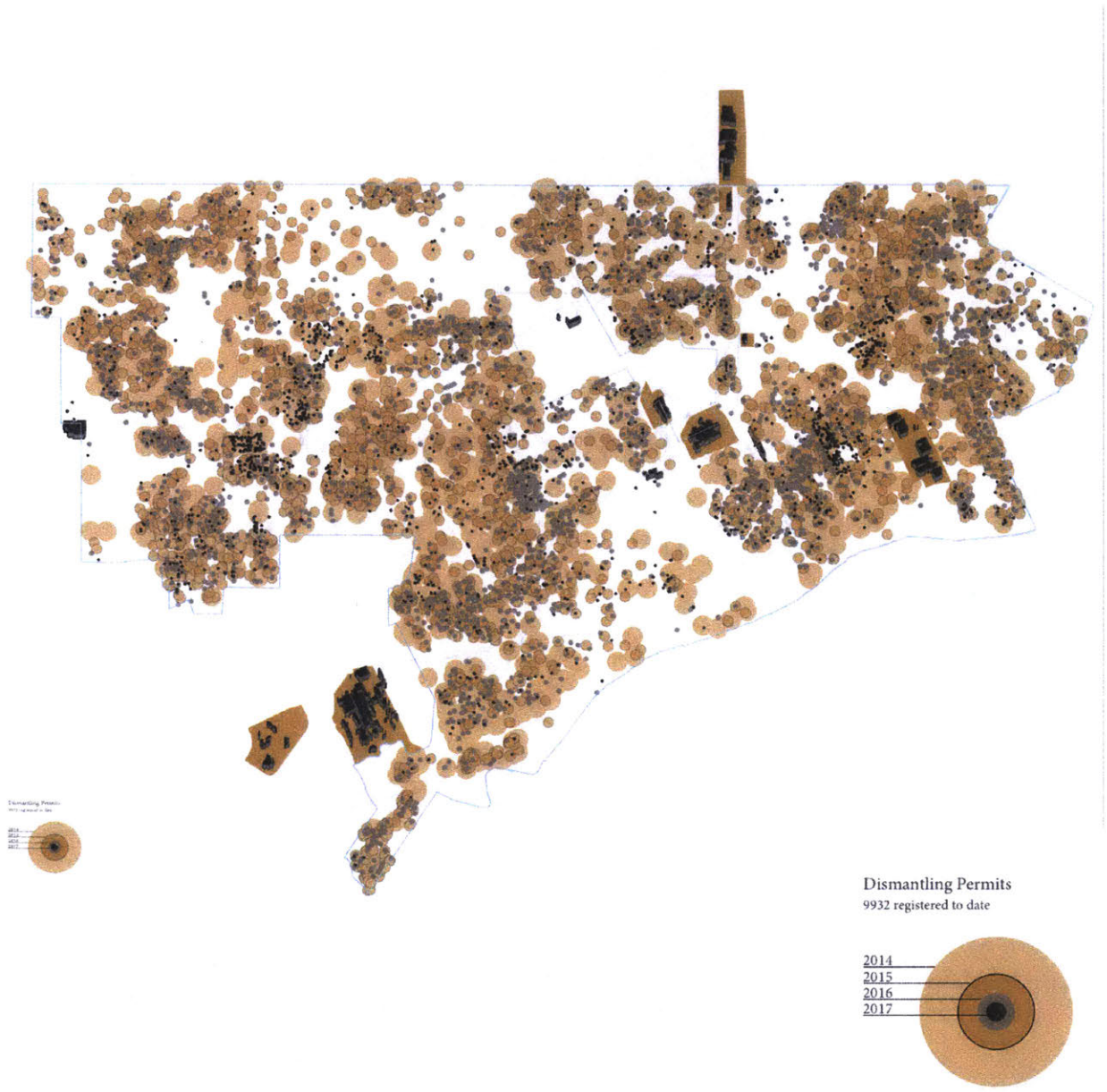


Demographic Data on Hamtramck, Highland Park, and Detroit in relation to labor and education.

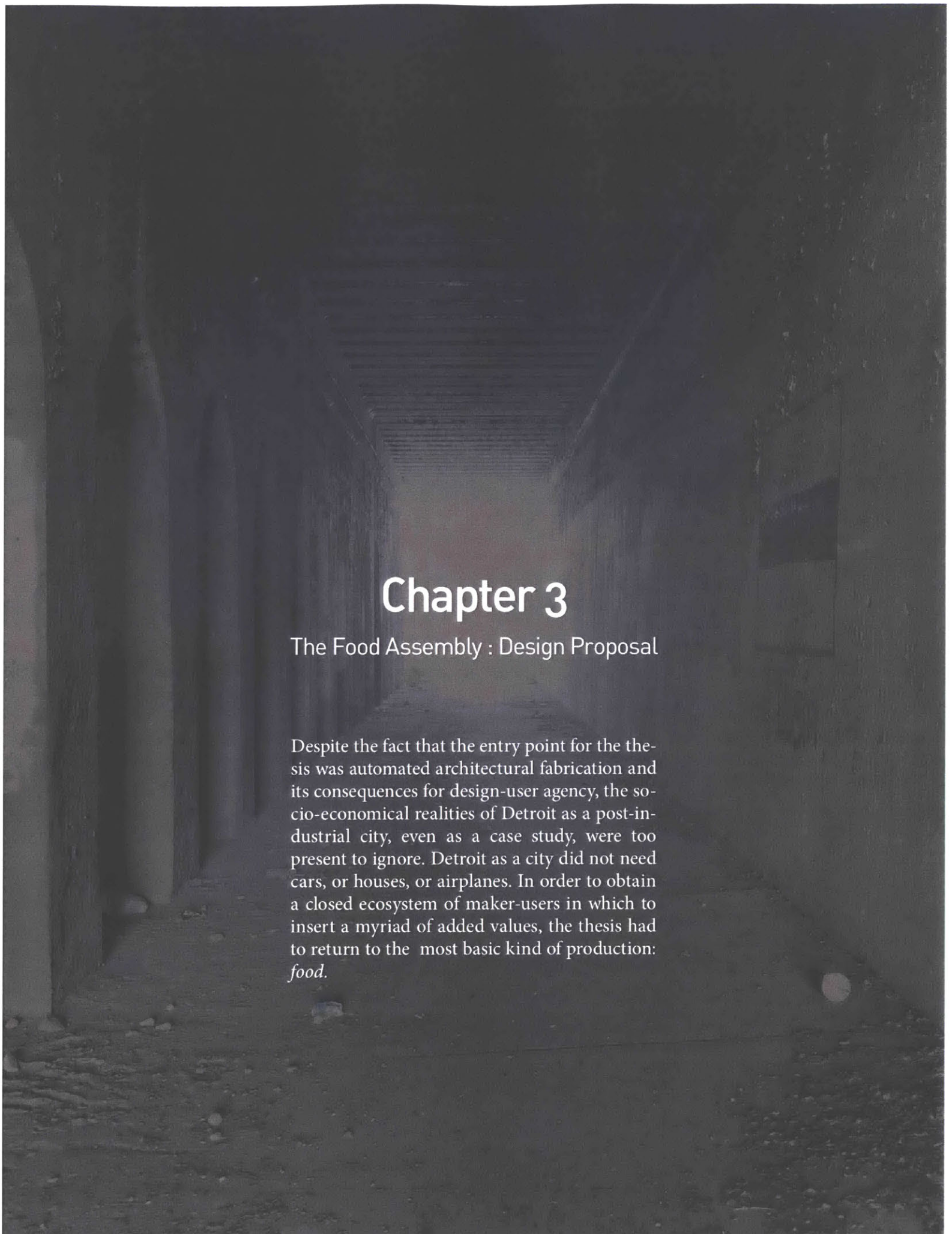
building data - provided by SEMGOG
roads and infrastructure - TigerLine 2014
factory historical data - DetroitYES Forum #3 and #8
demographic data - US Census bureau quick facts
social explorer decenial census 1980-2000
US averages from American Community Survey 2016



Main Detroit automotive factories, rail connections, and data of the side lot sales program over recent years, a city initiative to deal with blight by encouraging ownership of abandoned parcels of land. Data Source : City of Detroit Open Data Portal.



Main Detroit automotive factories and data on dismantling permits over recent years. Data Source : City of Detroit Open Data Portal.



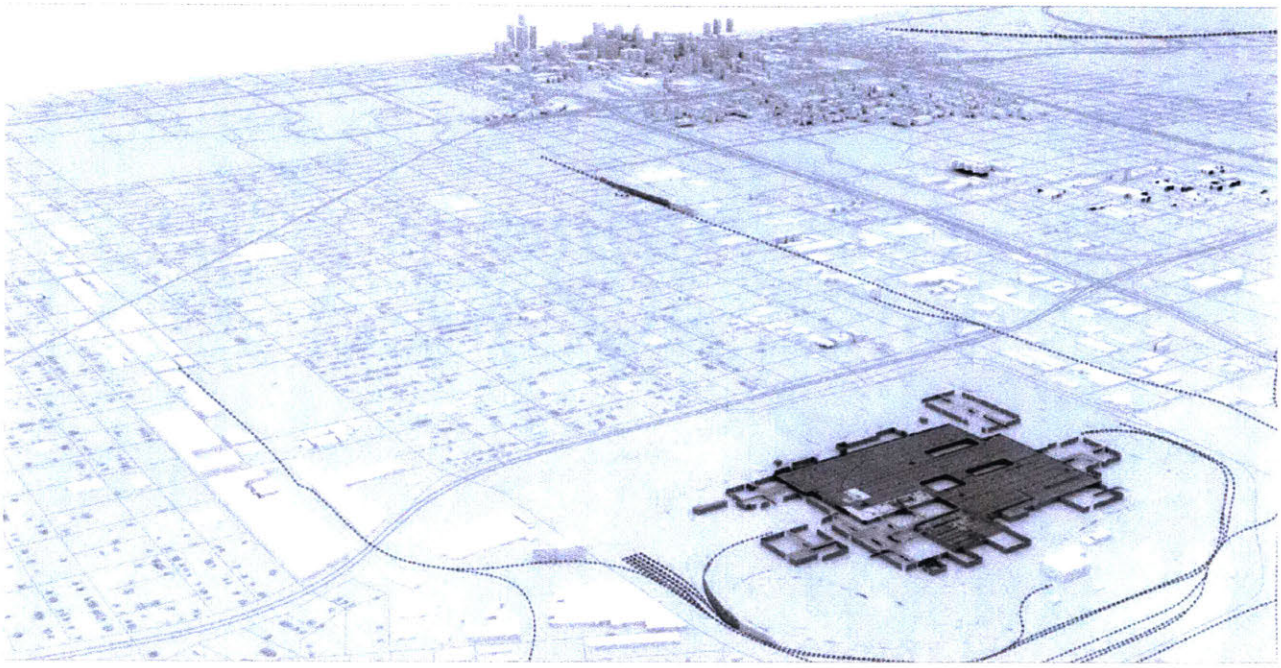
Chapter 3

The Food Assembly : Design Proposal

Despite the fact that the entry point for the thesis was automated architectural fabrication and its consequences for design-user agency, the socio-economical realities of Detroit as a post-industrial city, even as a case study, were too present to ignore. Detroit as a city did not need cars, or houses, or airplanes. In order to obtain a closed ecosystem of maker-users in which to insert a myriad of added values, the thesis had to return to the most basic kind of production: *food.*

The Food Assembly

Design Proposal

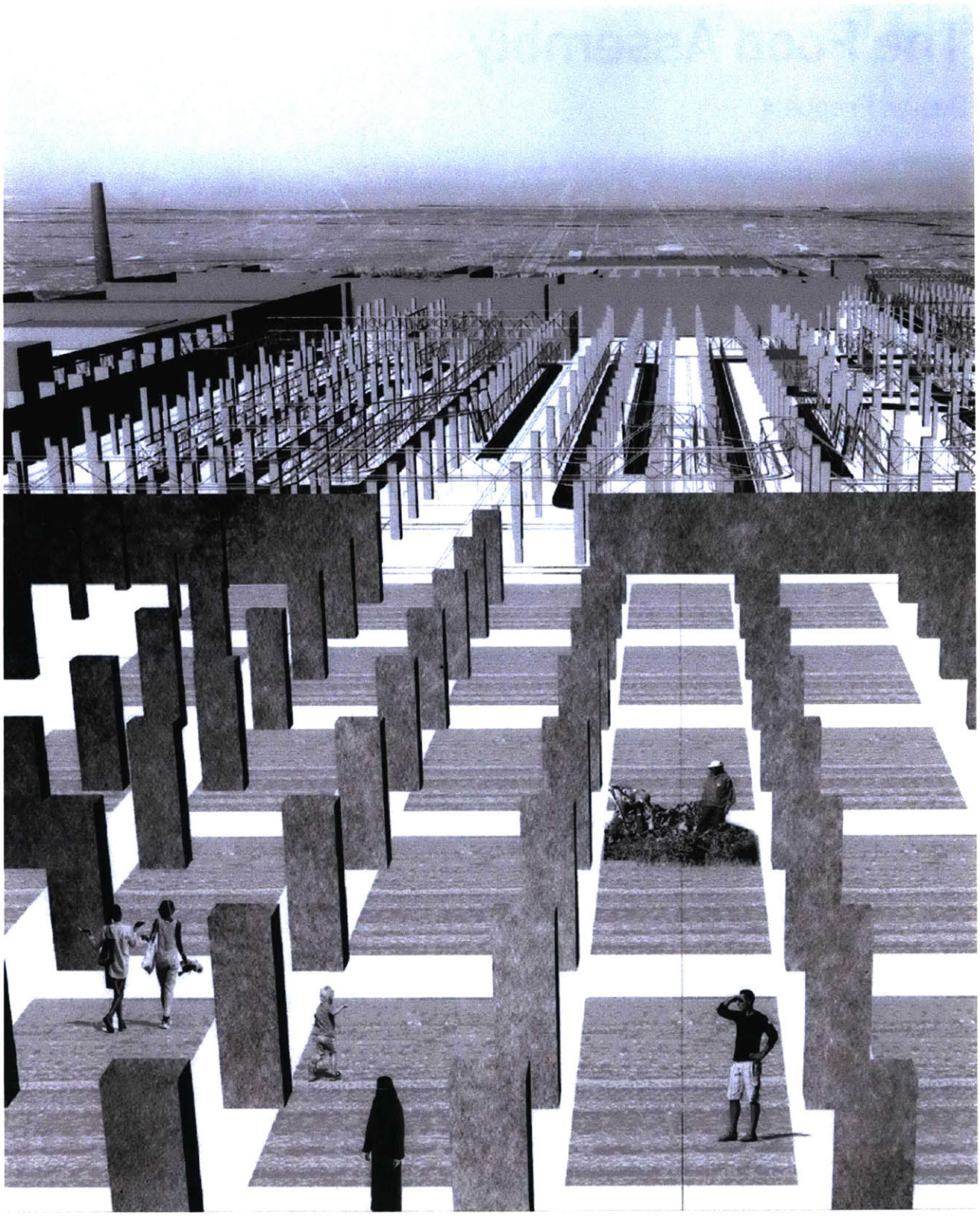


The New Agrarian society rises out of necessity from the postindustrial city upheavals, and self organizes to operate this food factory at the margins of capitalism. New Agrarians exchange their labor for *sustenance,* which is provided by the social, creative space of the Assembly, and by food itself. The objective is to sustain the 30,000 people that live close to the nodes, but a small tourism economy is established with the rest of the city as well.

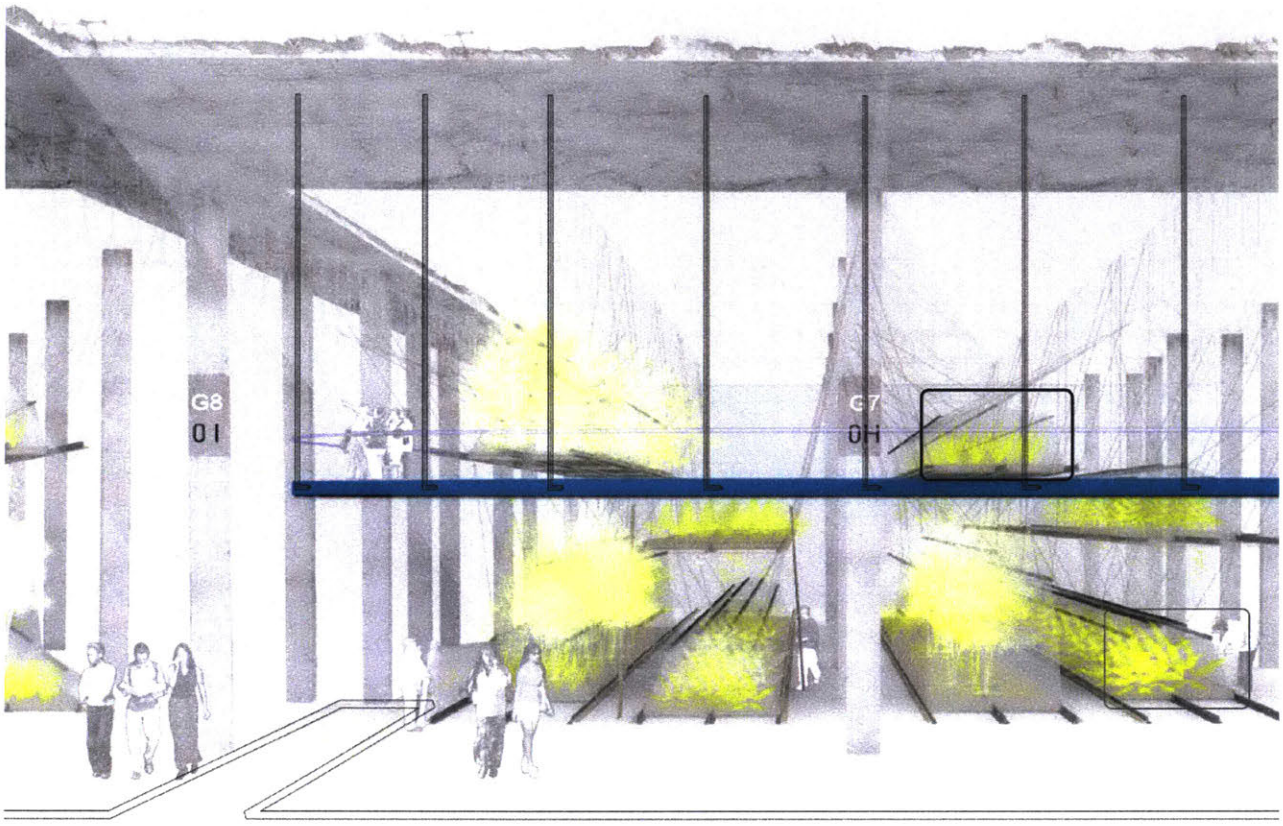
The production space of the new industrial city is one of constant immersion, surprise, and evolving complexity intertwined with a quotidian new way of life. Simultaneously, work is for sustenance, recreation is sustenance, pleasure and intellectual attainment are all sustenance. And for the Food Assembly, sustenance is production.

The Food Assembly is a *produce* ecosystem and a *people* ecosystem, that intends to become the new city center by harnessing its connective infrastructure and its vast footprint. Inside, the users participate in different levels of immersion, both passively and actively, within the different food habitats that are sourced by the greater chain of processes. The Assembly focuses on re-utilizing the existing infrastructure (columns, ceiling, conveyor belts, robots, power lines, water source) for this new production, while keeping the plants off the ground to avoid contamination.

The New Agrarians reclaim the rail system and use it for daily transportation, to and from the Assembly, and for food distribution to the different nodes. They work, eat, cook, play, in complementary shifts. Then go home. Then return. Unlike the average farmer, who is 60yrs old, everyone is a new agrarian and has stakes in this process.



Above : Earlier conceptual image of the vast infrastructure space of the assembly being used for an openly-sourced production, looking out into a conflictive city background. Next page : Sectional perspective of hung hoop-house structures, selective demolition of ceiling and walls, porous factory limits, and programmatic/connective in-fra-structures.


G8
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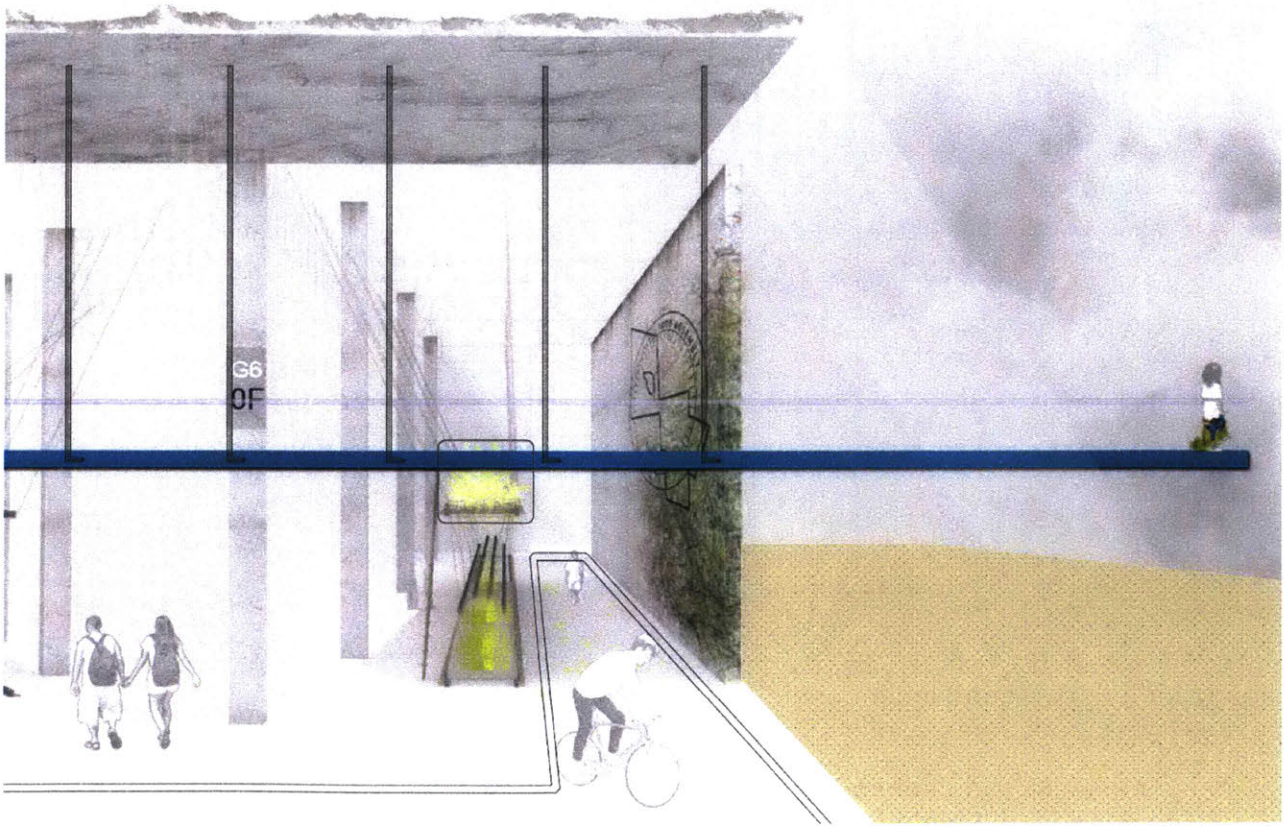
G6
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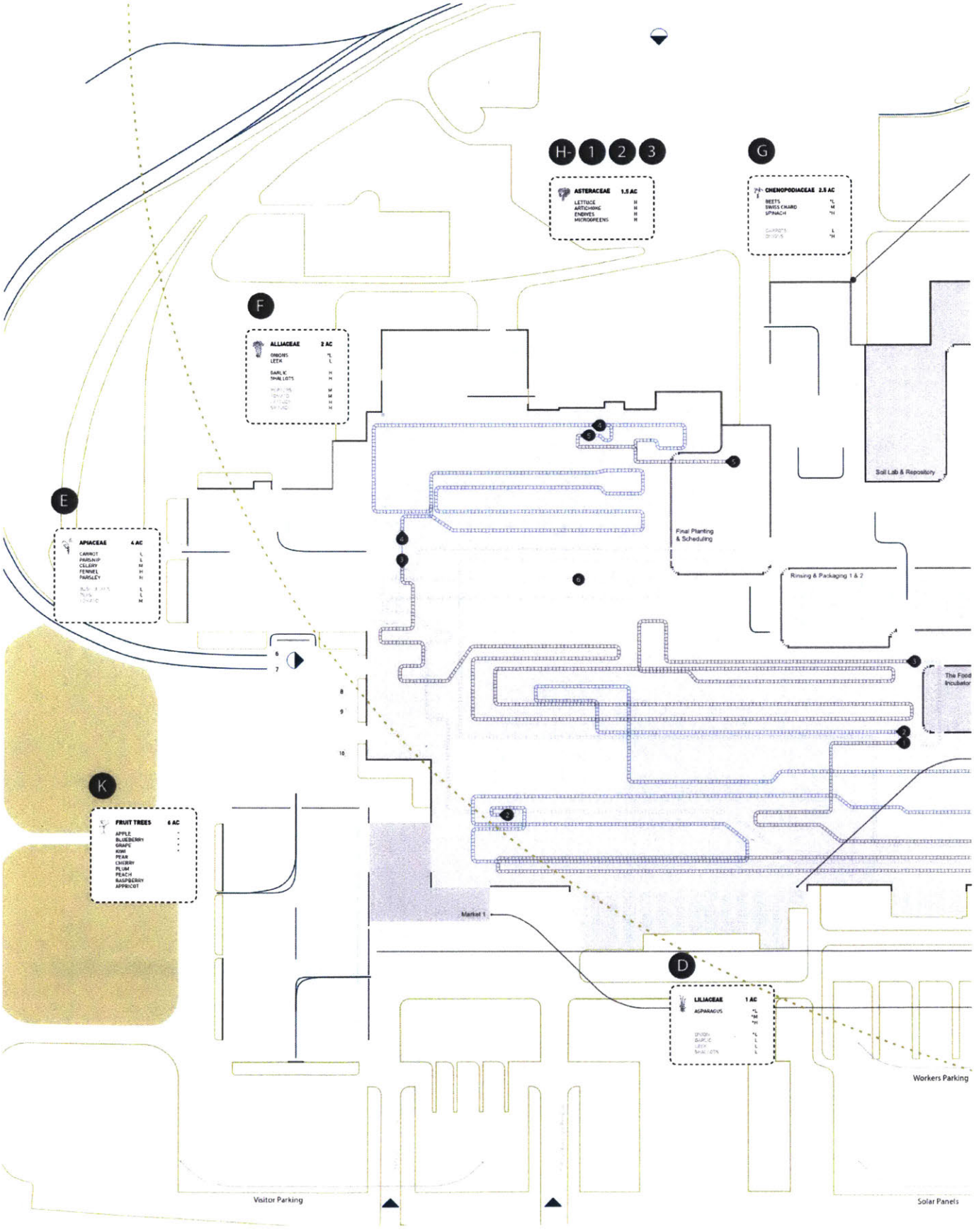

H-1 2 3
ASTERACEAE 1.5 AC
LETTUCE H
ARTICHOKE H
ENDIVES H
MICROGREENS H
G
CHENOPODIACEAE 2.5 AC
BEETS *L
SWISS CHARD M
SPINACH *H
CARROTS L
ONIONS *H
F
ALLIACEAE 2 AC
ONIONS *L
LEEK L
GARLIC H
SHALLOTS H
E
APIACEAE 4 AC
CARROT L
PARSNIP L
CELERY M
FENNEL H
PARSLEY H
K
FRUIT TREES 6 AC
APPLE
BLUEBERRY
GRAPE
KIWI
PEAR
CHERRY
PLUM
PEACH
RASPBERRY
APRICOT
D
LILIACEAE 1 AC
ASPARAGUS *L
*M
*H
ONION *L
GARLIC L
LEEK L
SHALLOTS L
Soil Lab & Repository
Final Planting & Scheduling
Rinsing & Packaging 1 & 2
The Food Incubator
Market 1
Workers Parking
Visitor Parking
Solar Panels


A
BRASSICACEAE 8 AC
RADISH L
RUTABAGA L
TURNIP L
BROCOLI *M
BRUSSELS SPROUTS *M
CABBAGE *M
CAULIFLOWER *M
KALE H
ARUGULA H
Soil Lab & Repository
B
CUCURBITACEAE 3 AC
PUMPKIN L
WATERMELON L
GOURDS M
SQUASH M
MELON M
CUCUMBERS H
ZUCCHINI H
The Food Incubator
Market 2
C
SOLANACEAE 2 AC
RED BELL PEPPERS *L
POTATOES L
SWEET POTATOES L
EGGPLANT M
TOMATO M
Workers Parking
Solar Panels
Visitor Parking

Soil Cycling

1 Extraction

Soil is extracted from healthier available privately owned lots or parcels, with Lead content of less than 300 ppm. Top soil is composed of roughly 5 to 12 inches, and will act as the primary matter for growth.

2 Testing and Storing

All soil is tested for their state of pollution and to assess the nutrient content (Potassium, Nitrogen, etc.). The laboratory is also shared with a living library of soil types for experimentation.

3 Remediation

If necessary and viable, the soil will be remediated by phytoremediation and rotation for a period of up to 2 years. A variety of plants can be used to absorb heavy metals. Lead is harder to get rid of, because most plants do not absorb it, not even produce will. The most endangered vegetables are those that grow underground, and a common cause of contamination would be direct contact with lead or ingestion. For this reason, above-ground vegetables should be thoroughly cleansed o any soil residue. However, leafy vegetables will take in a considerable amount.

4 Revitalizing

To avoid total depletion of the soil, a couple of strategies are used. Asides from crop rotation and constant nourishing of the prime matter, the soil is allowed rest period of 6 months every 3 years during which the chemistry is balanced.

5 Protection

In dealing with a post-industrial and contaminated site, it is beneficial to plant trees. Trees will block potentially contaminated wind from highways and the environment in general, and they will also provide dry leaves and wood clippings to use as compost. These carbon-rich materials promote the growth of mold, which is beneficial. One potential native species to apply on this facility is beech.

Compost Cycling

1 Compost Piles

Composting in this facility is done in open, static, stacked piles up to 16 feet wide and 8 feet tall that are self-aerating. Turning is required every so often, by an operator. Compost is expected in six to 12 months, depending on conditions. The compost pile consists of nitrogen rich somponents (such as grass, food scraps and manure), carbo rich components (dry leaves, wood chips, branches), and bulking agents to allow proper aeration, such as newspaper and cardboard.

2 Vermiculture

In order to obtain high quality compost, or casting, the compost is fed to red worms (wigglers) that diggest it . The two products of this cycle are the castings, wich are added to the top-soil, and worm tea, which is a softer dilluted fertilizer added to gardens and house plants. This process happens quickly and saily, so the vermiculture station and straction closer to the potting and planting section, but in an aereated environment.

3 On-site collection

Compost materials are collected from the tree maintenance, plant maintenance, left-over produce, and from the eatry and lab activities on a daily rutine.

Crop Cycling

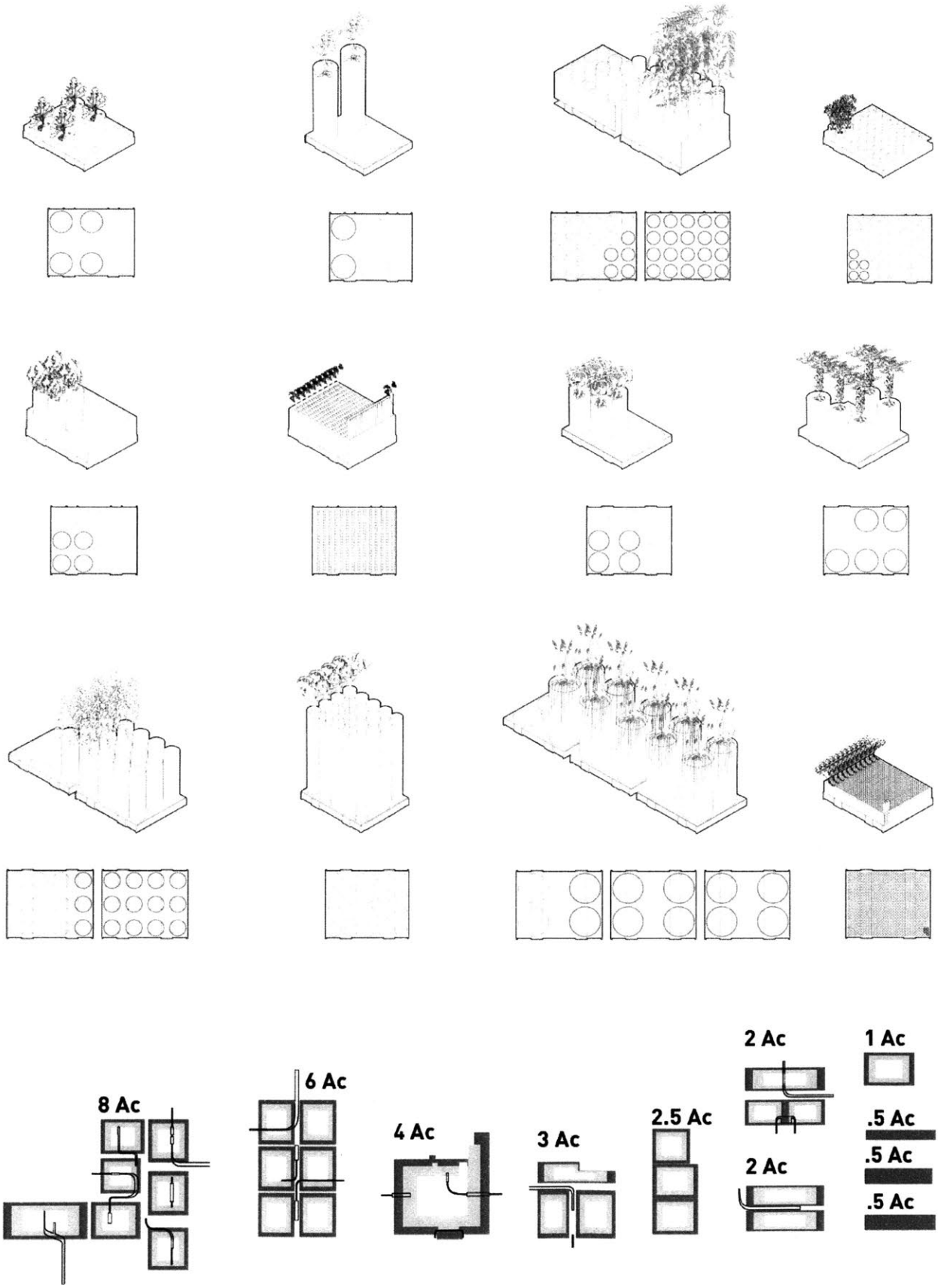
1. Soil weeding and crumbling. Takes place on the flat-surface conveyor belt section when soil is ready to be "turned and re-set".
2. Compost application, mixing and potting for both seeding and final planting.
3. Seeding. Seeds are placed at the required planting depth for each plant.
4. Germination. This process varies per plant, so seeds will spend a defined number of loops in a controlled / assisted environment in this section of the process, until they are ready to move to final planting as seedlings. Germination usually happens at higher temperatures than general growth.
5. Final Planting. Germinated seeds are potted and scheduling tags are applied to pallets with the recipe for production. Potted plants are taken to their respective habitats.
6. In-house Distribution. A central conveyor transports potted seedlings to loading docks closer to their habitats.
7. Rinsing and Packaging for distribution.

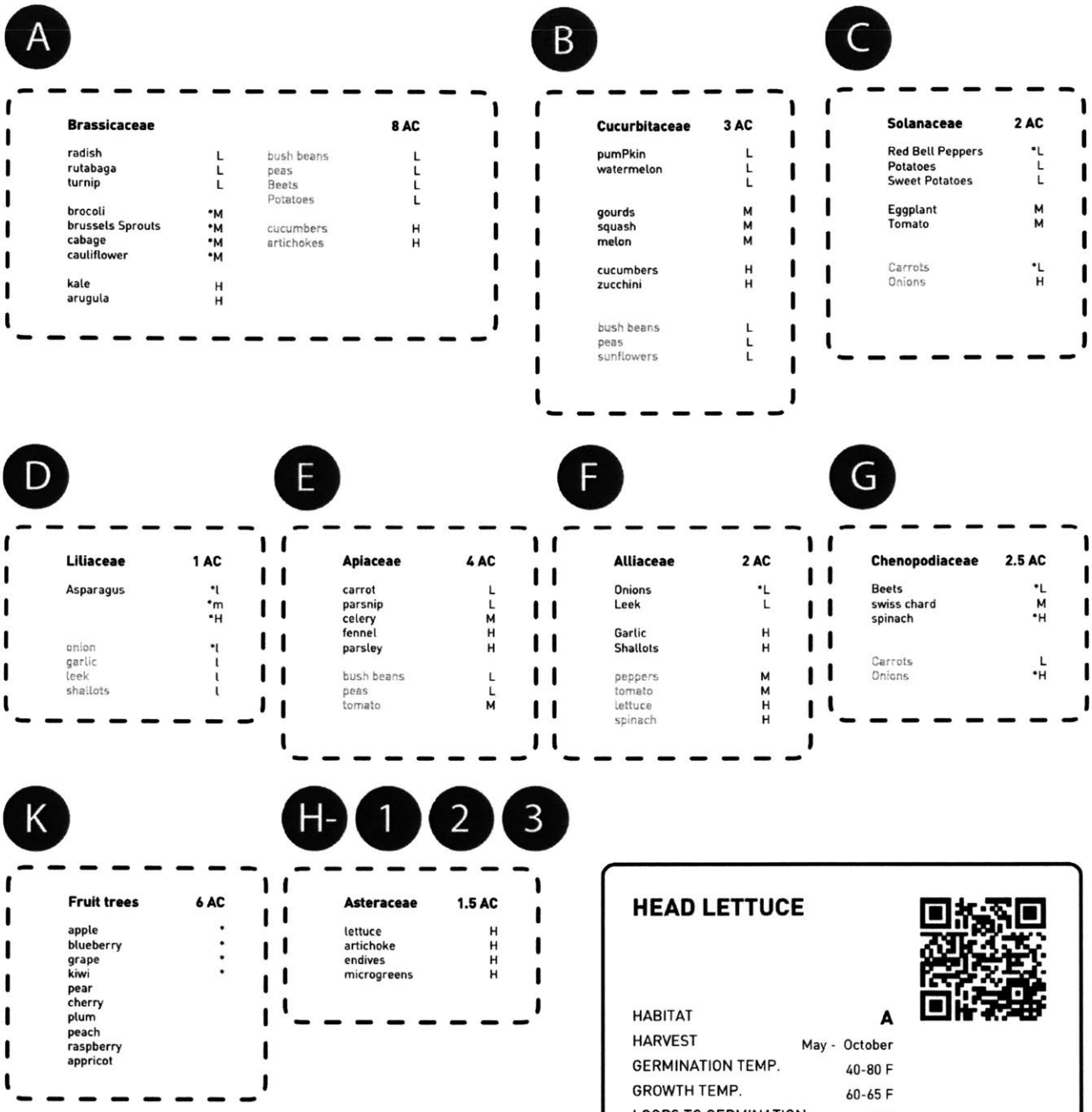
Distribution

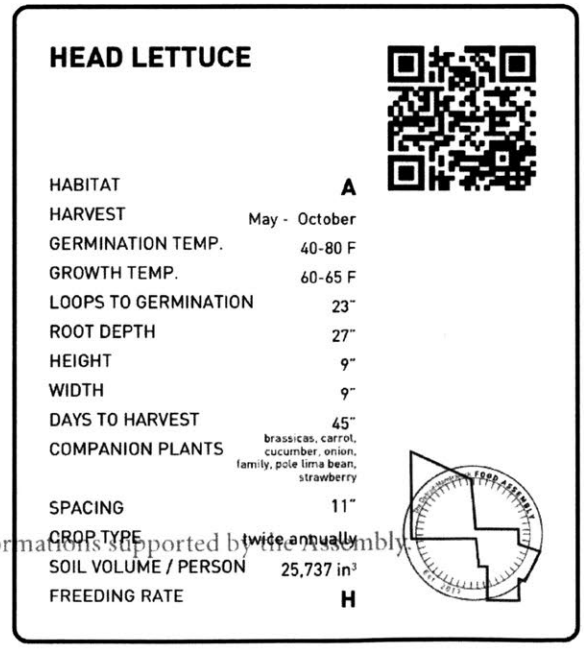
1 On site.

2 From site.

1 10 Off site.


8 Ac
6 Ac
4 Ac
3 Ac
2.5 Ac
2 Ac
2 Ac
1 Ac
.5 Ac
.5 Ac
.5 Ac

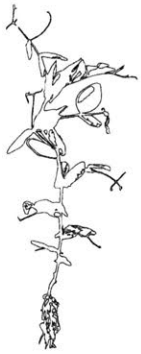




▲ Different food habitats, organized by crop family, leading nutritious crop, and companion crops. It is noted next to each crop weather the production yield is low, medium, or high, which has implicaitons on the section. Note that H-1-2-3 are high yield spaces embedded within the innermost factory footprint. Alternating these conditions, each food habitat becomes a production prairie.

▶ The next page shows a sample of the foliage and root formations supported by the Assembly.

lettuce



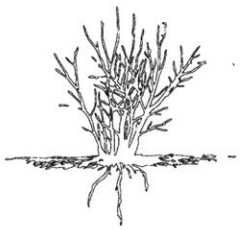
peas

onion

beans

carrot

apple tree



blueberry tree

arugula

pepper

asparagus

beet

broccoli

brussels sprout

cauliflower

cabbage

celery

eggplant

kale

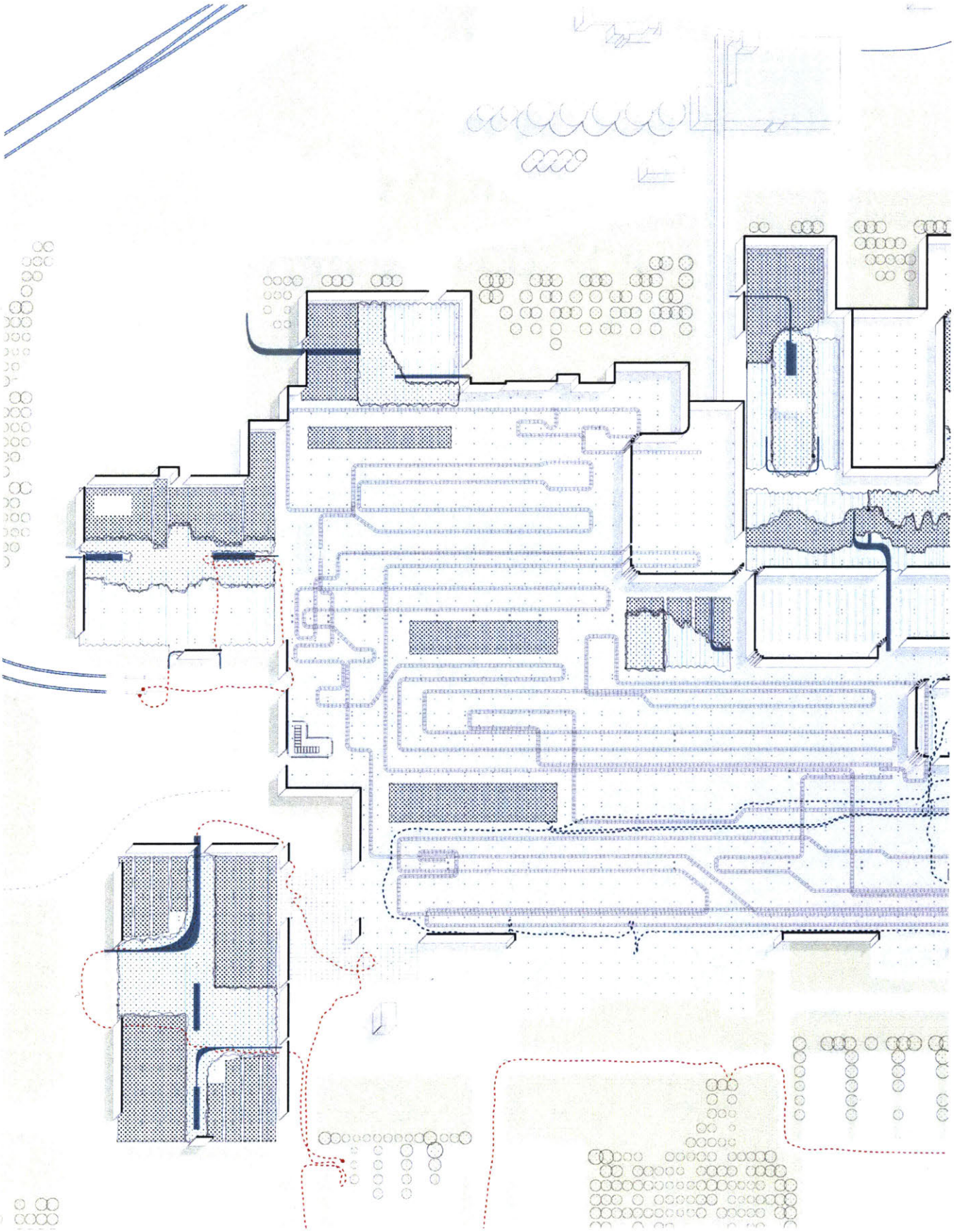
asparagus

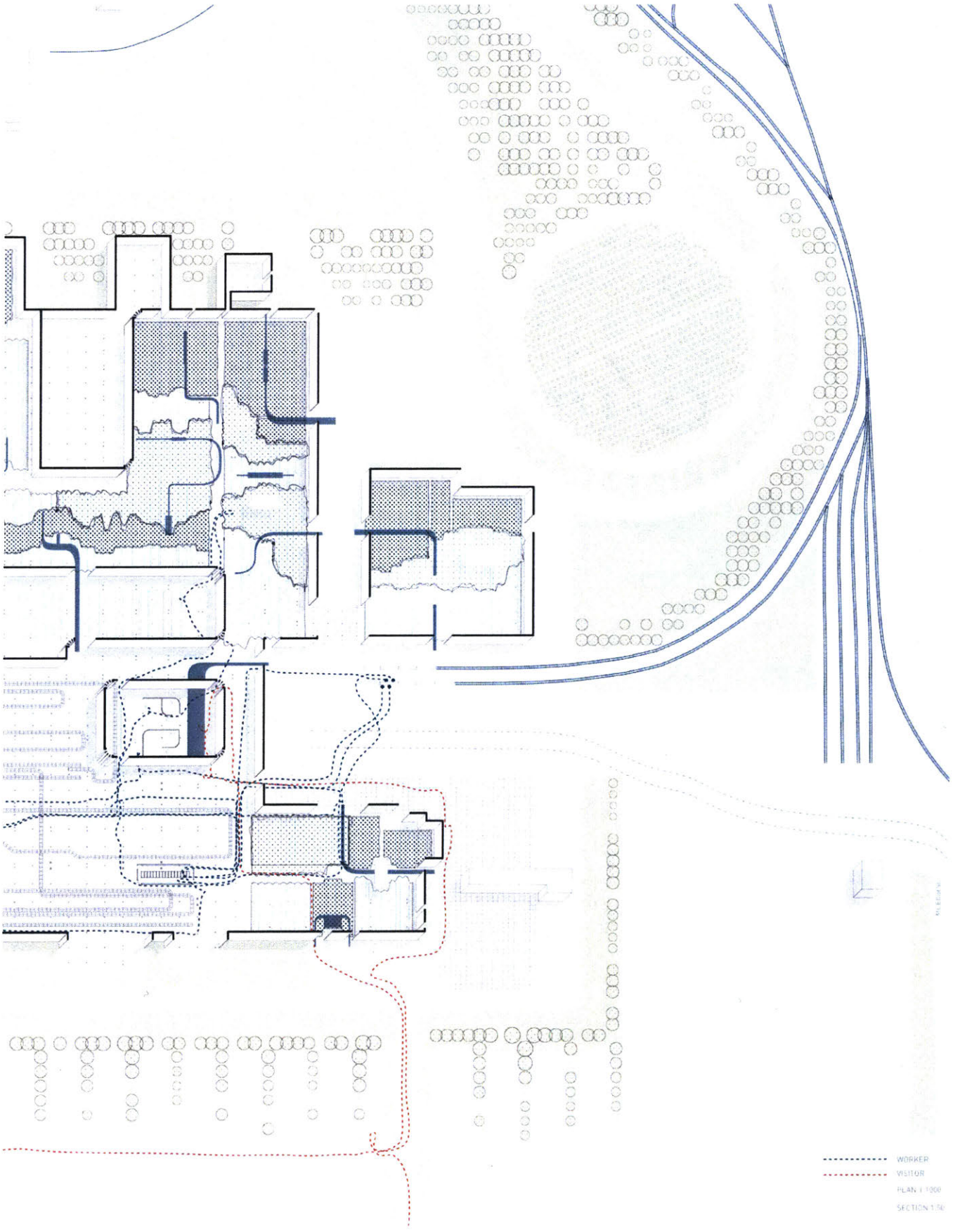
potato

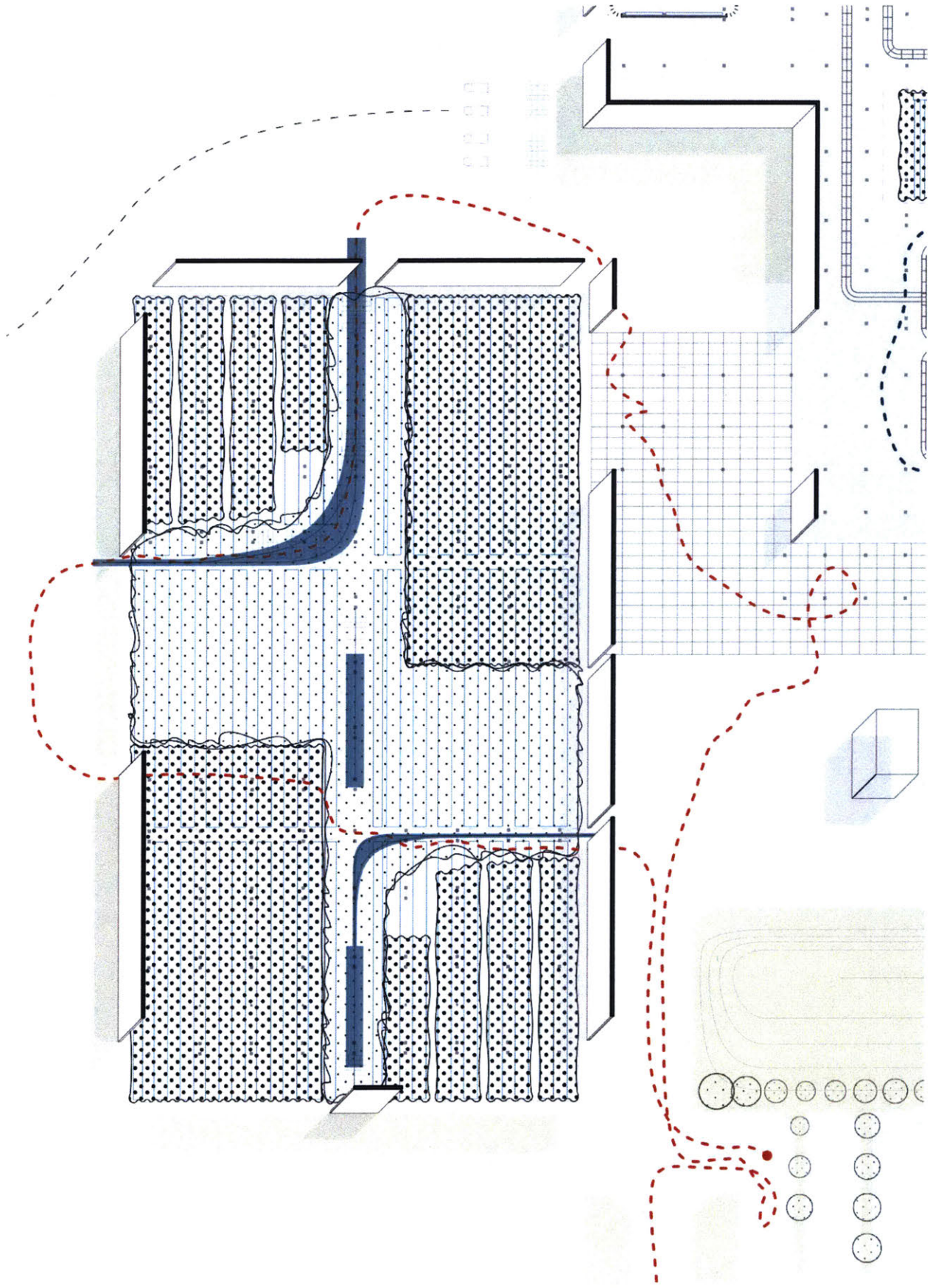
PRODUCE	HARVEST[2] J F M A M J J A S O N D	GERMINATION TEMP.[3] 40° 90°	GROWTH TEMP. 40° 90°	DAYS TO GERMINATION[1] & LOOPS ∞		PLANTING DEPTH	ROOT DEPTH	HEIGHT	WIDTH
Arugula		40-55 F	50-65 F	6	3	0.25"	18"	9"	10"
Asparagus		70-85 F	60-70 F	21	11	10"	48	72"	36"
Beets		50-85 F	60-65 F	8	4	0.25"	72"	12"	6"
Beans		60-85 F	60-70 F	7	3	1.5"	42"	138"	6"
Broccoli		50-85 F	60-65 F	7	3	0.25"	27"	33"	20"
Brussels Sprouts		50-80 F	60-65 F	7	3	0.25"	27"	36"	24"
Cabbage		45-95 F	60-65 F	6	3	0.5	36"	13"	32"
Carrots		45-85 F	60-65 F	15	8	0.5"	36"	12"	18"
Cauliflower		45-85 F	60-70F	7	3	0.5"	33"	21"	27"
Celery		60-70 F	60-65F	21	11	0.5"	9"	17"	10"
Corn		60-95F	60-75 F	8	4	1"	45"	90"	33"
Cucumbers		60-95 F	65-75 F	8	4	0.75"	12"	12"	14" trellis
Eggplant		75-90 F	70-85 F	9	5	0.25	60"	27"	42"
Kale		45-95 F	60-65 F	8	4	0.5"	9"	15"	10"
Lettuce (various)		40-80 F	60-65 F	42	23	0.5"	27"	9"	9"
head									
leaf									
romaine									
Melons		75-95 F	65-75 F	8	4	.5"	12"	24"	30 sqft
Onions		50-85F	55-75 F	10	5	.5"	24"	25"	12"
Peas and pea pods		40-70 F	60-65 F	9	5	1"	24"	46"	8"
Peppers (sweet)		65-95F	70-85 F	25	13	.25"	28"	30"	24"
Potatoes		65-70F	50-65 F	seed potatoes		3"	21"	27"	24"
Radishes		45-85 F	60-65F	3	1	.5"	4"	4"	4"
Raspberries			60-70 F	bare-root		same as root	16"	48"	30"
Spinach		45-75F	60-65 F	8	4	.5"	12"	5"	7"
Squash (summer)		70-95F	65-75 F	9	5	.75"	45"	30"	4 sqft
Strawberries		68-72 F	64-77 F	30	16	0"	10"	10"	11"
Sweet Potato		60-85 F	65-75 F	seed halves		5"	8"	13"	6 sqft
Tomatoes		60-85 F	70-75 F	8	4	1"	40"	6"	30"
Watermelons		75-95 F	65-75 F	9	5	.5"	12"	24"	30 sqft

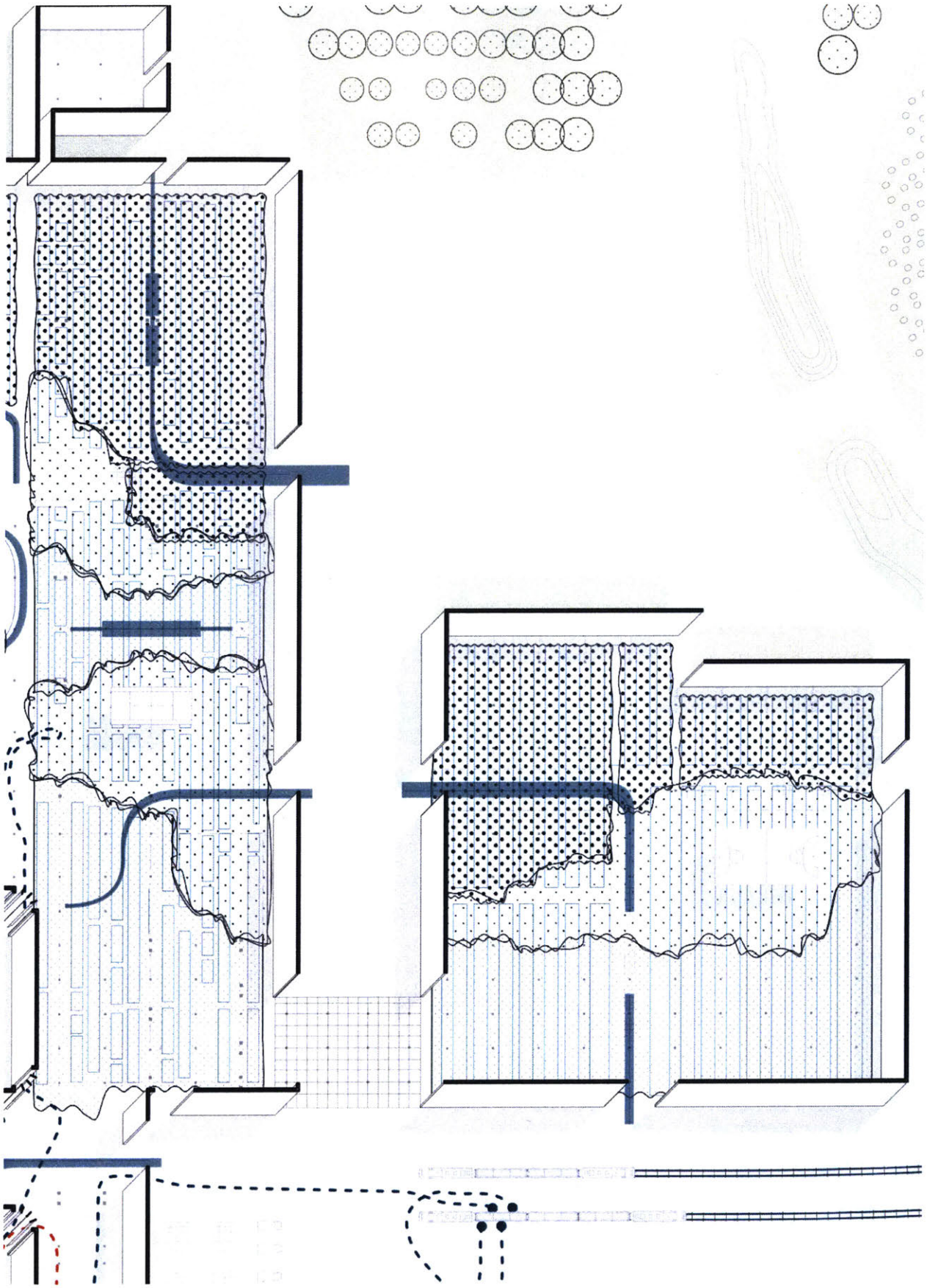
DAYS TO HARVEST	COMPANION PLANTS		SPACING BETWEEN PLANTS	CROP ROTATION	X	PLANTS/ PERSON	SOIL VOLUME	FEEDING TYPE
21	Bush beans celery carrots nasturtium mint dill	lettuce cucumbers onions rosemary potatoes	1"	annual		5	5	L
3rd year for 4 weeks	none		12"	pernnial		10	10	H
60	brassicas bush beans head lettuce		5"	succession plant every 2 weeks		15	15	M
50 6-8 weeks	Carrot chard corn cucumber	eggplant peas radish strawberry	6"	annual		15	15	M
70	Artichoke beet bush beans chard cucumber	lettuce peas potato spinach	15"	annual		8	8	H
90	Artichoke beet peas	potato spinach	17"	annual		5	5	H
90	Artichoke beet bush beans cucumber	lettuce peas potato spinach	15"	annual		4	4	M
60	beans leeks	pepper tomato	2.5"	annual		25	25	M
70	artichoke beet bush beans garlic	lettuce peas potato spinach	13"	annual		4	4	H
90	beans brassicas spinach	squash tomato	7"			5	5	H
75	cucumber melon	pumpkin squash	10"	perennial		26	26	H
60	beans cabbage eggplant kale	melon peas sunflower tomato	12"	annual		4	4	H
80	beans pepper		36"	annual		2	2	H
30	Artichoke beet bush bean celery cucumber	lettuce onion peas potato spinach	16"	annual		4	4	H
45	brassicas (except broccoli) carrot cucumber	onion family pole lima bean strawberry		twice annual		11	11	H
			11"					
			7"					
			10"					
90	pumpkins radish	squash	2'	annual		4	4	H
150	lettuce pepper spinach	strawberry tomato	2"	annual		40	40	L
65	beans coriander corn	cucumber radish spinach	3"	annual		43	43	L
75	Basil carrot eggplant	onion parsley tomato	12"	annual		5	5	M
90	brassicas corn	marigold pigweed	23"	annual		20	20	L
20	beets carrots spinach	parsnips cucumbers beans/lettuce	2"	annual		15	15	L
2nd year	Garlic Tansy	Turnips Yarrow	36"	perennial		17	17	L
45	beans brassicas celery	onion peas	9"	annual		15	15	H
60	beans brassicas celery	onion peas	15"	annual		3	3	H
1st year	Bush beans spinach	lettuce	12"	annual		10	10	
90	none		11"	annual		4	4	L
70	Brassicas carrot celery/chive cucumber marigold	melon/asparagus bean onion peapepper	48"	annual		4	4	H
80	pumpkins radish	squash	24"	annual		4	4	H

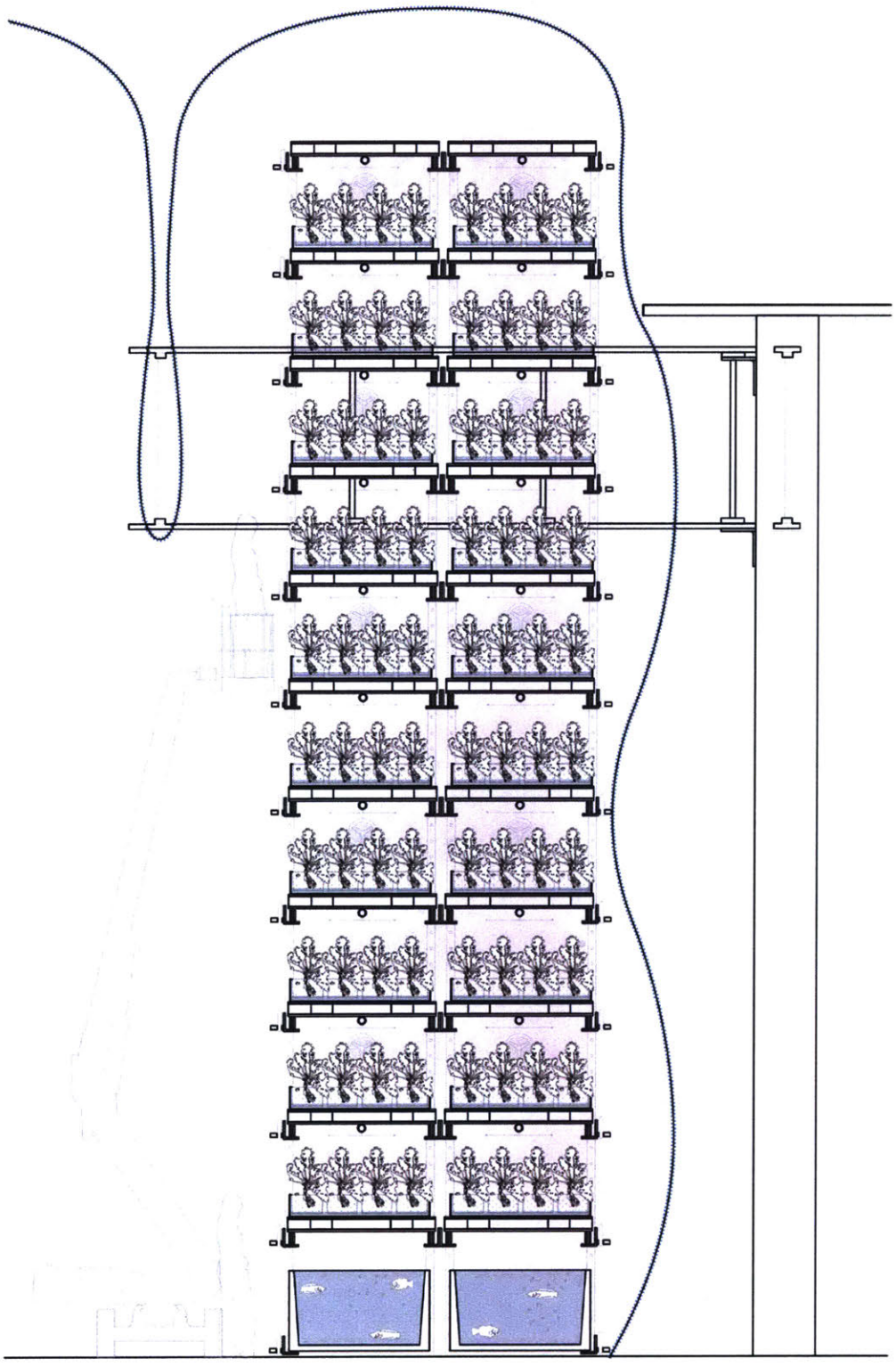
HEAVY FEEDING CROP	MEDIUM FEEDING CROP	LOW FEEDING CROP




WORKER
VISITOR
PLAN 1:1000
SECTION 1:50

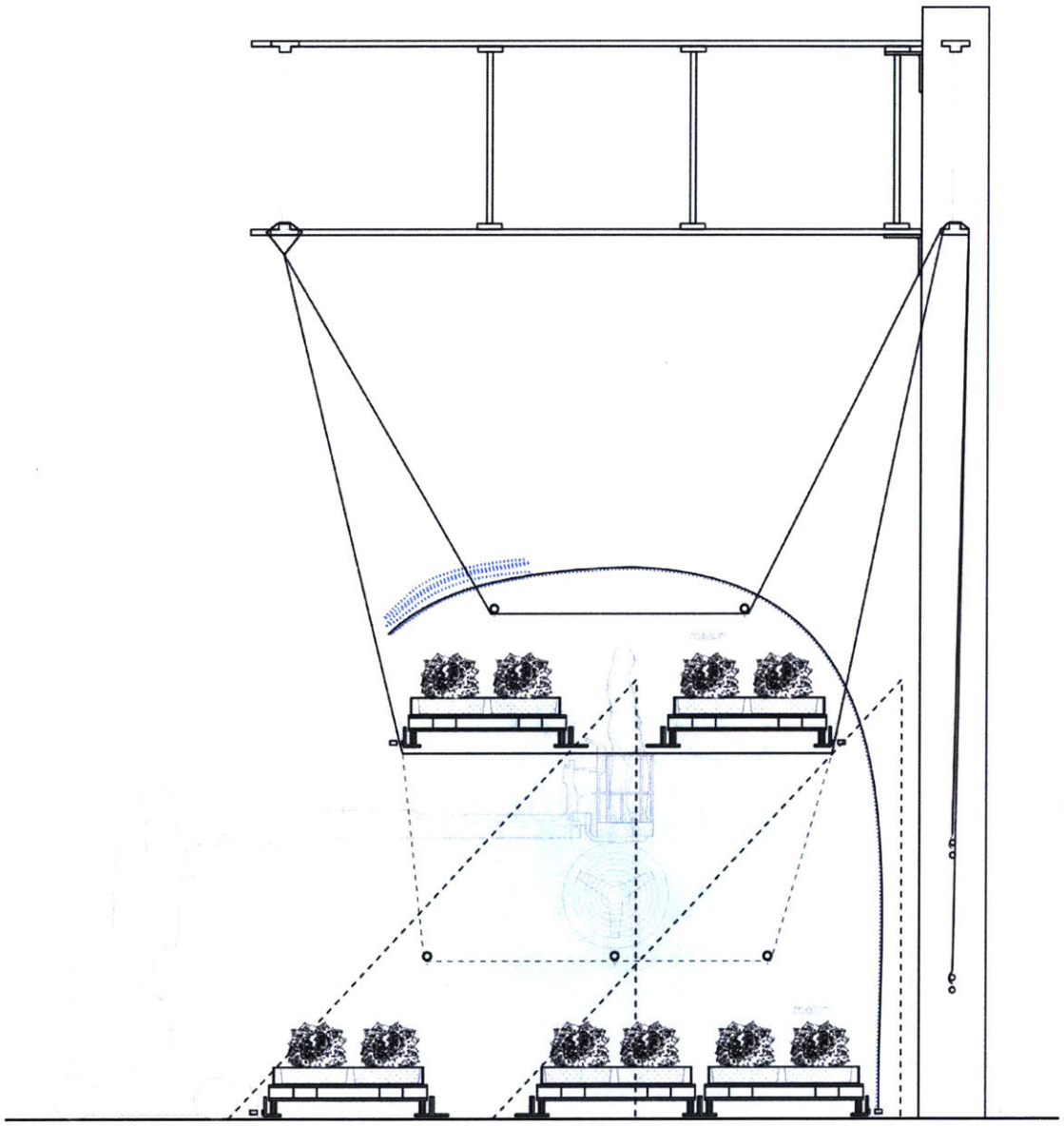


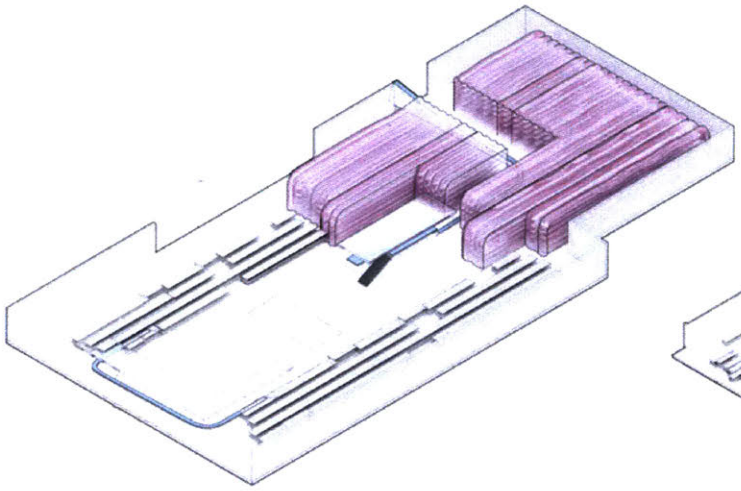




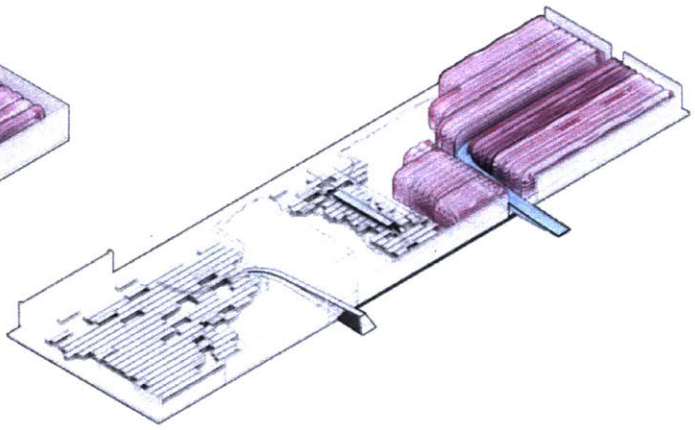
◀ High Yield rigid stacking structure sectional arrangement, incorporating ETFE hoop-houses, aquaponics, and custom LED lighting.

▼ Medium Yield sectional arrangement, incorporating suspended rails and removable hoop-houses for medium weight crops. To avoid pollution, given the post-industrial site, plants never go directly on the ground. The soil is continuously moved around and re-conditioned.

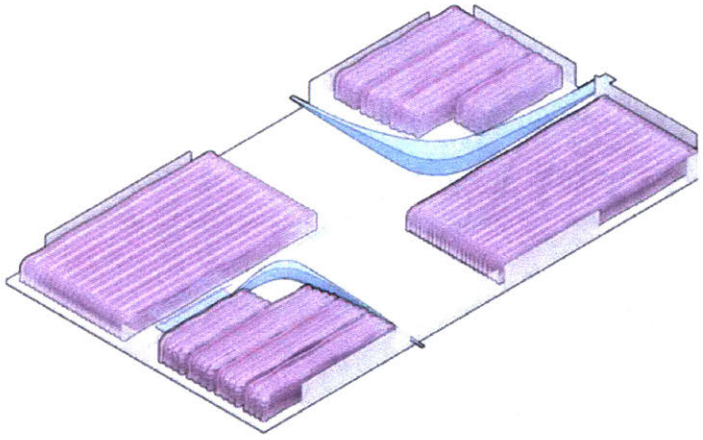




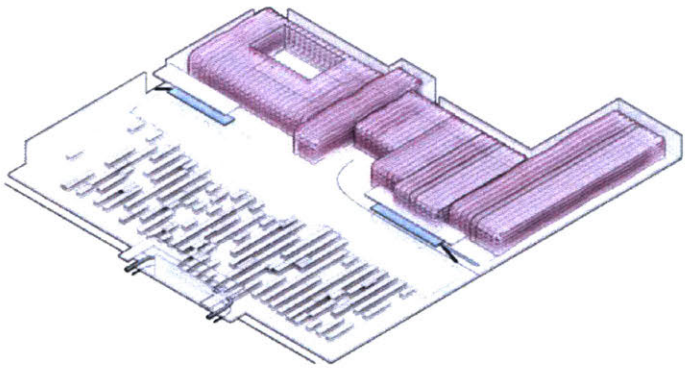
G **Chenopodiaceae**



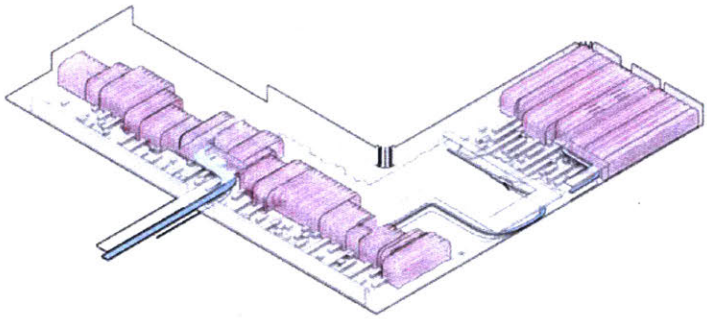
A.1 **Brassicaceae**



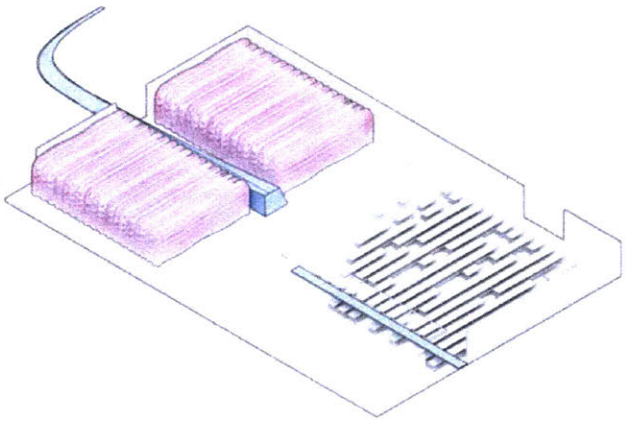
K **Fruit trees**



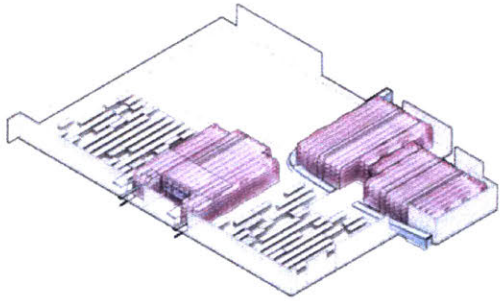
E **Apiaceae**



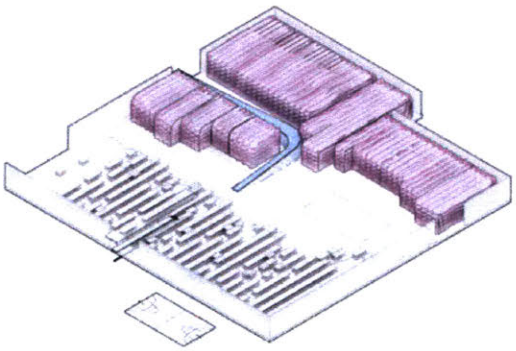
A.2 **Brassicaceae**



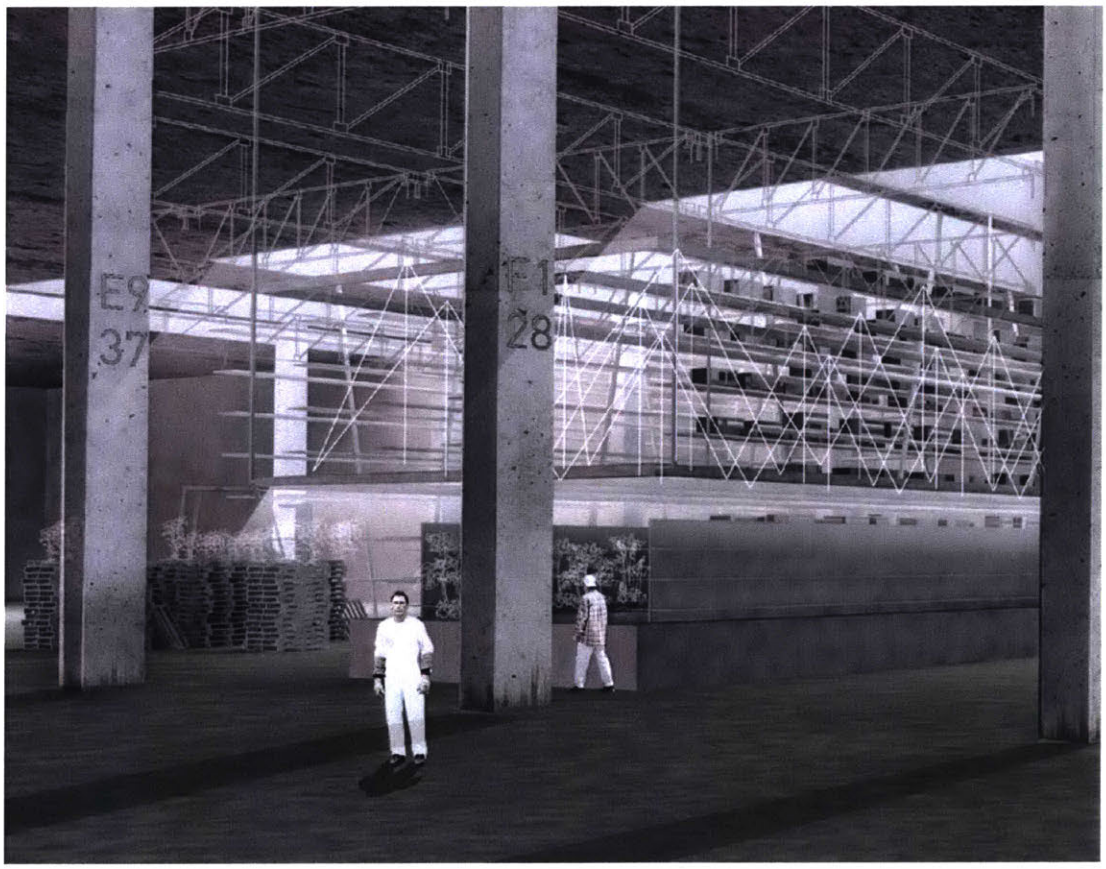
F **Alliaceae**



C **Solanaceae**



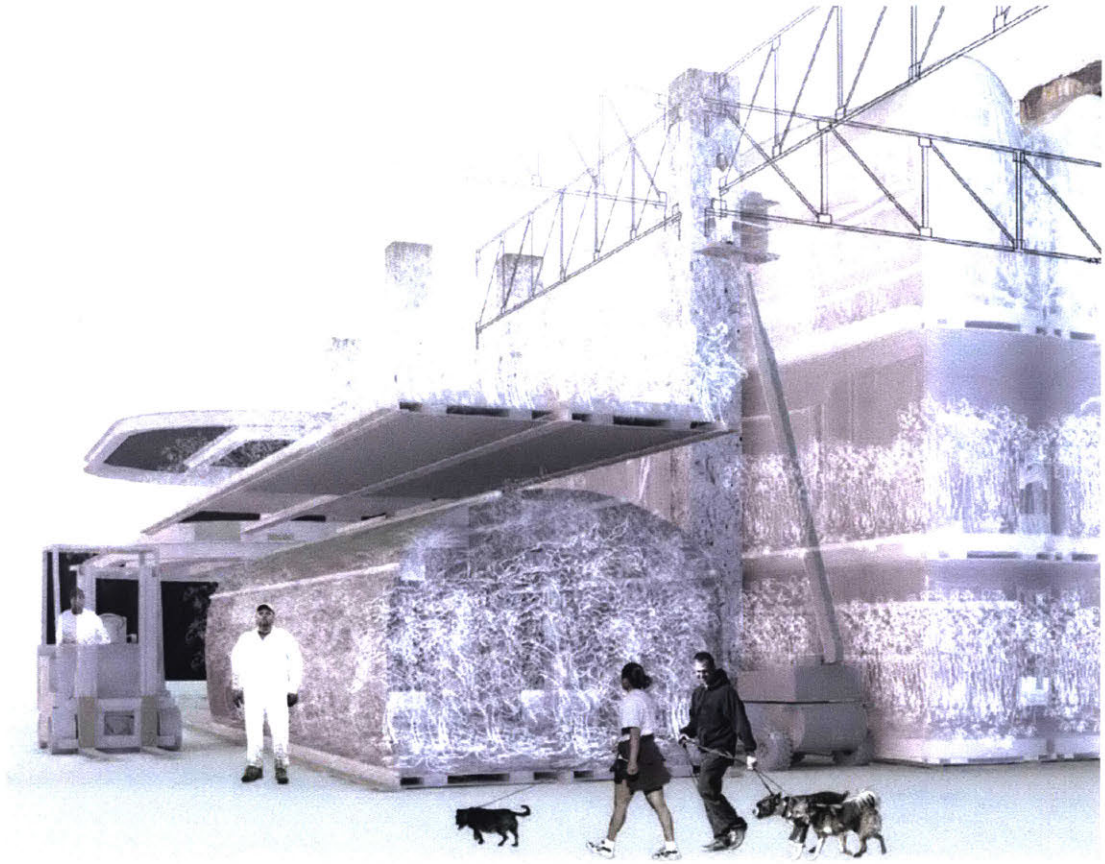
B **Cucurbitaceae**



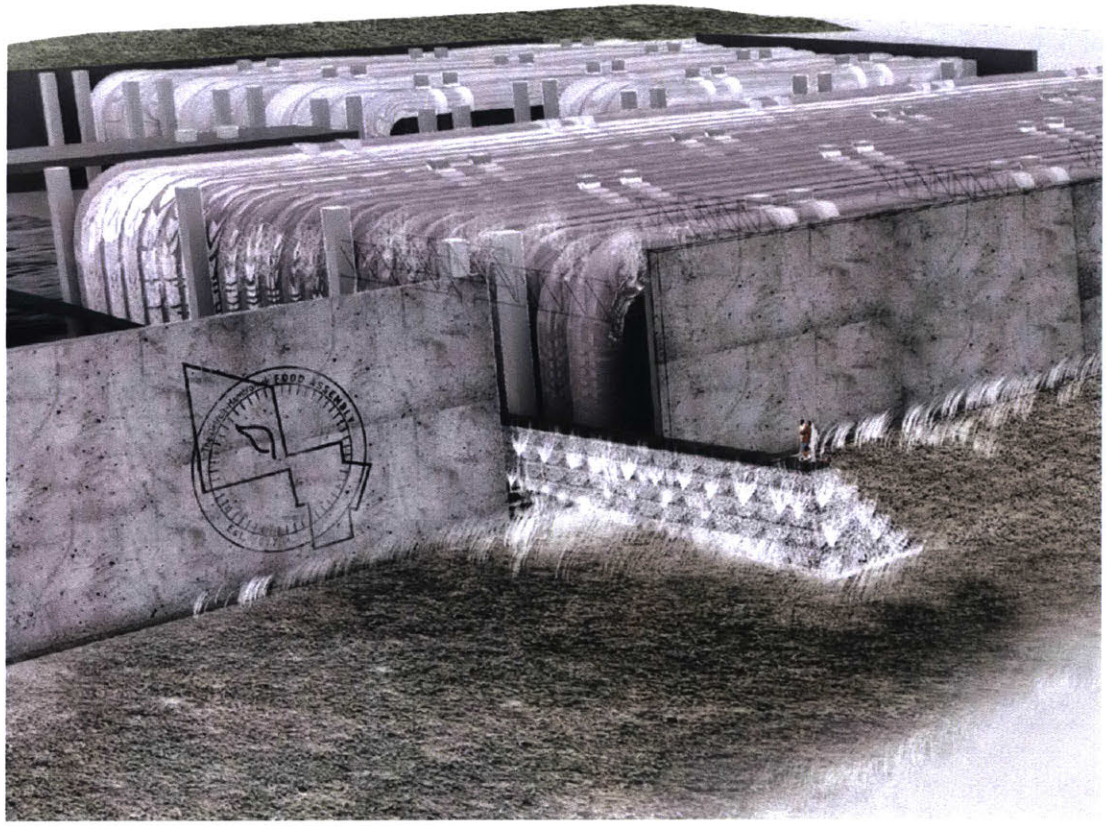
Previous Page:
Axonometric diagrams of different production habitats, arranging Hi, Medium, and Low modes of production to achieve spatial qualities.

▲ View from habitat B: Cucurbitaceae production, with its high-yield greenhouses and the social spaces embedded within it.

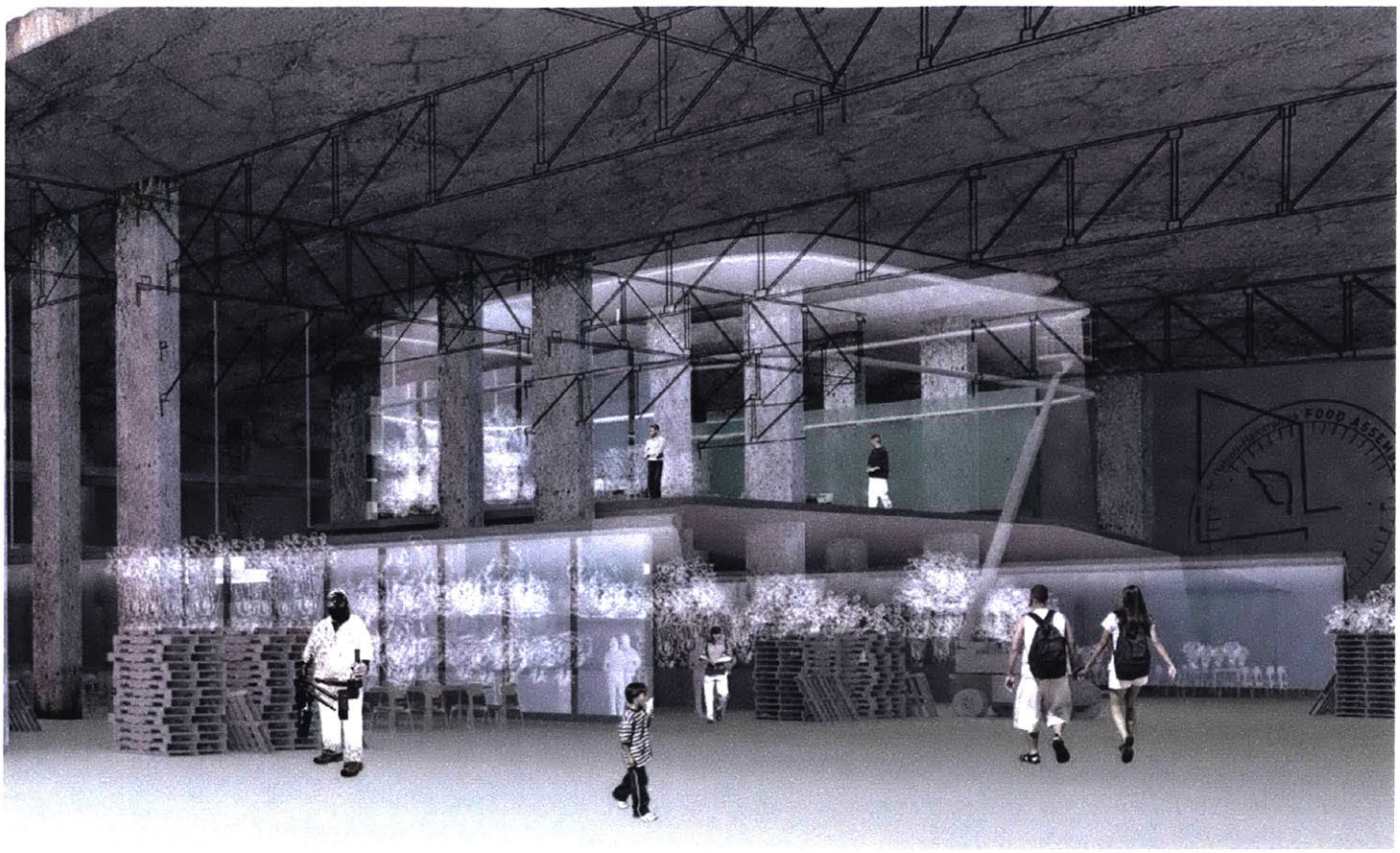
▶ View from the Soil Repository, an on-going vertical stacking of soil types and test samples open for research to the Assembly and the greater community.

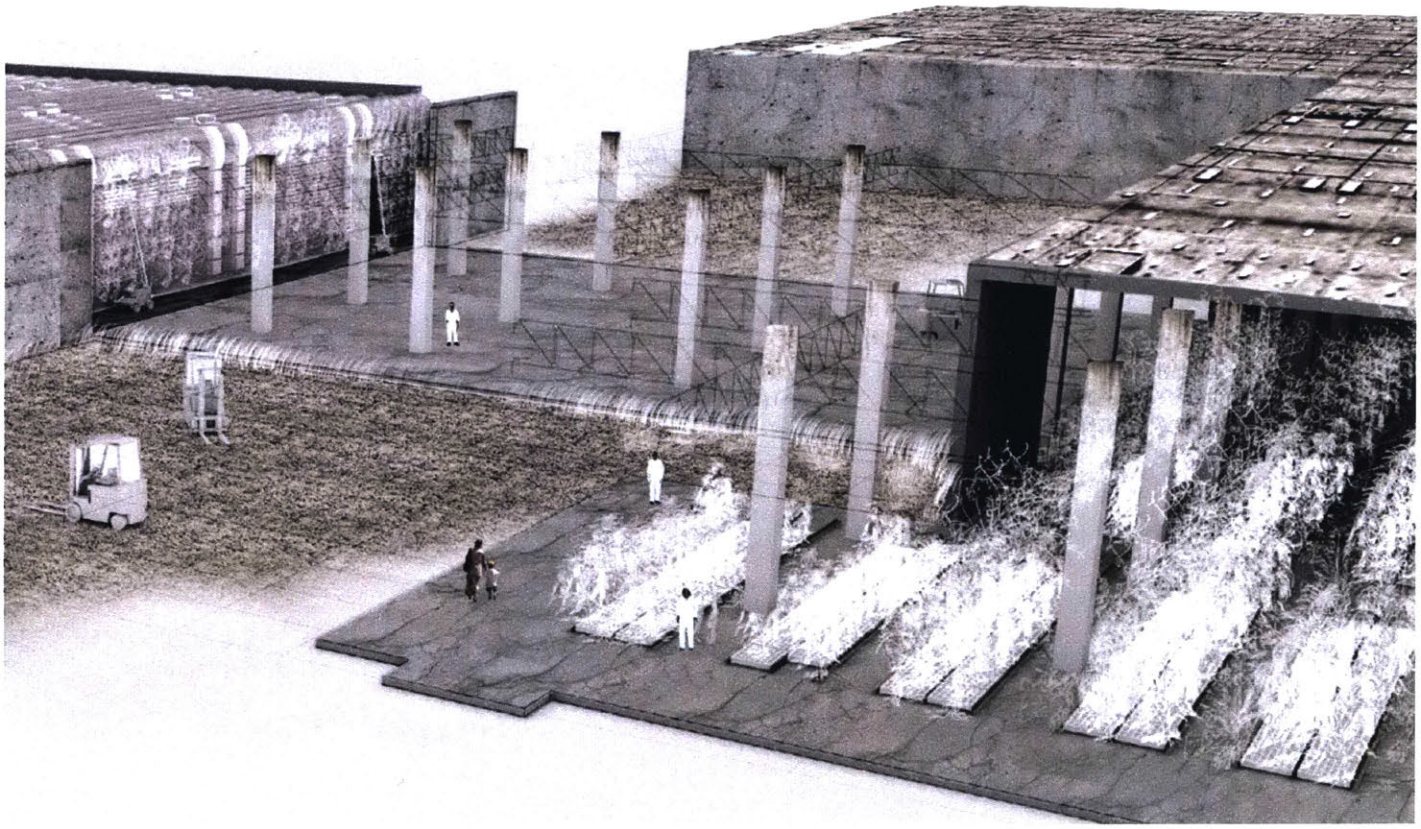


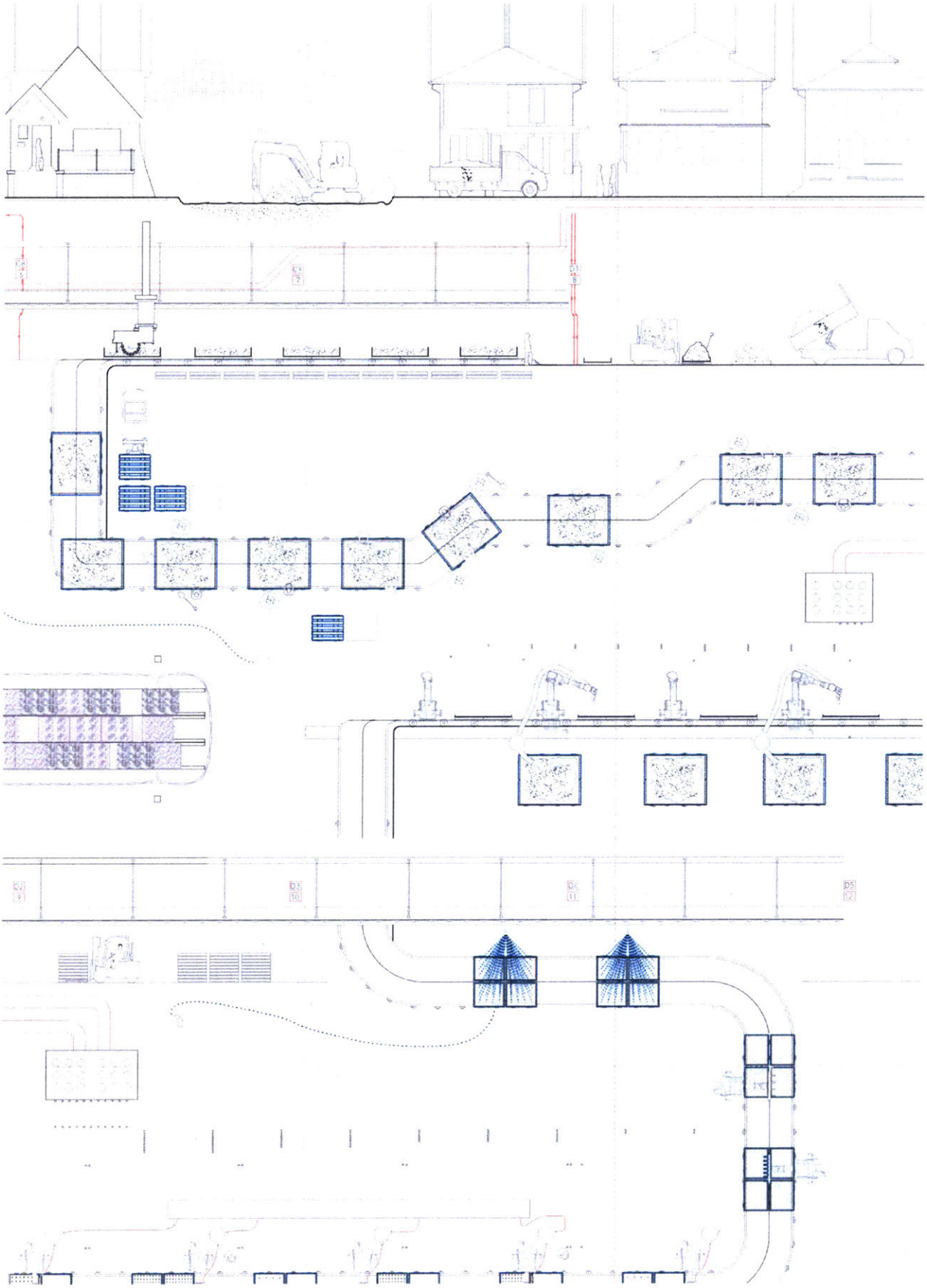
▲ View from Food Incubator and dinning spaces, adjacent to production spaces.

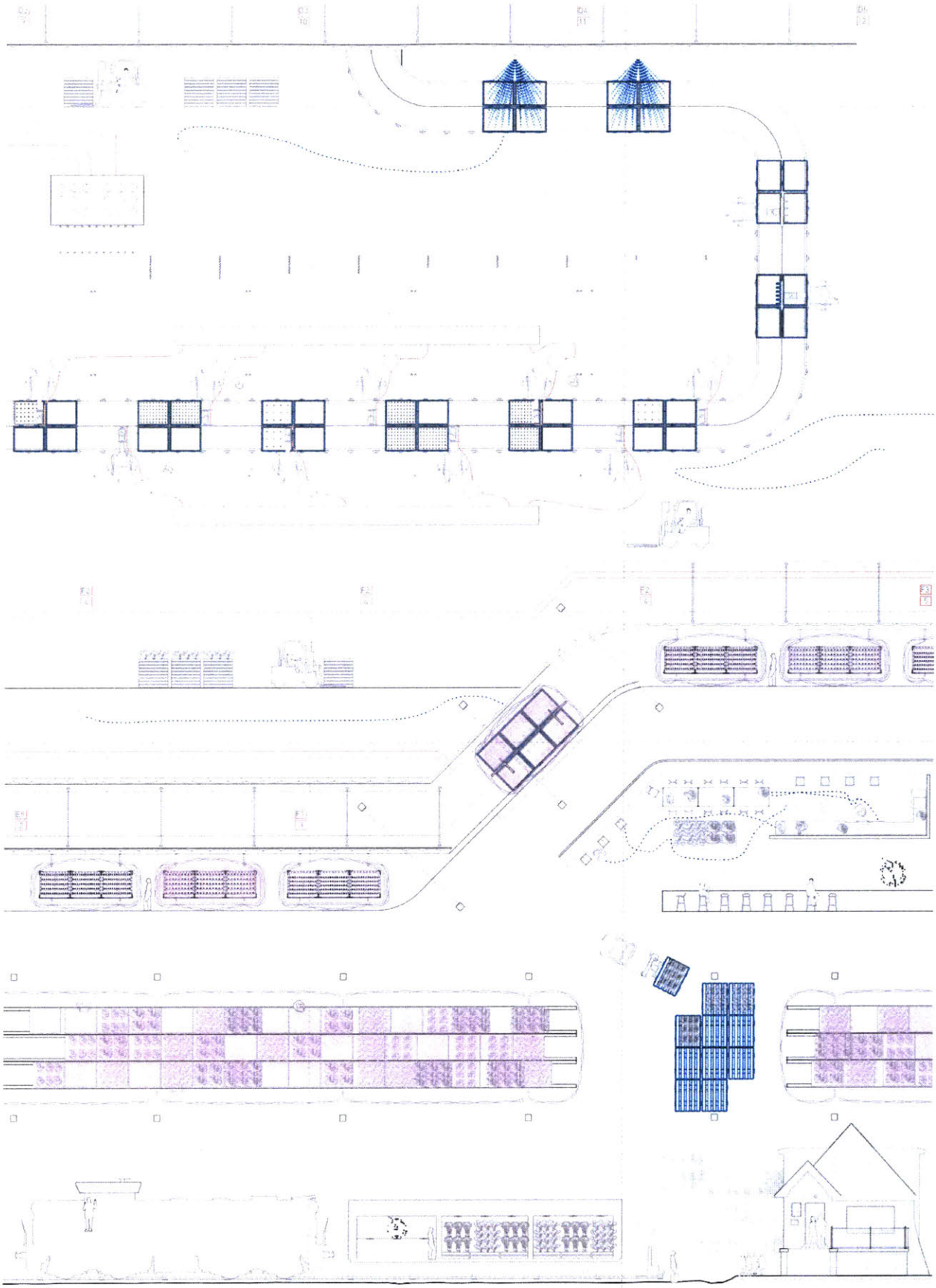


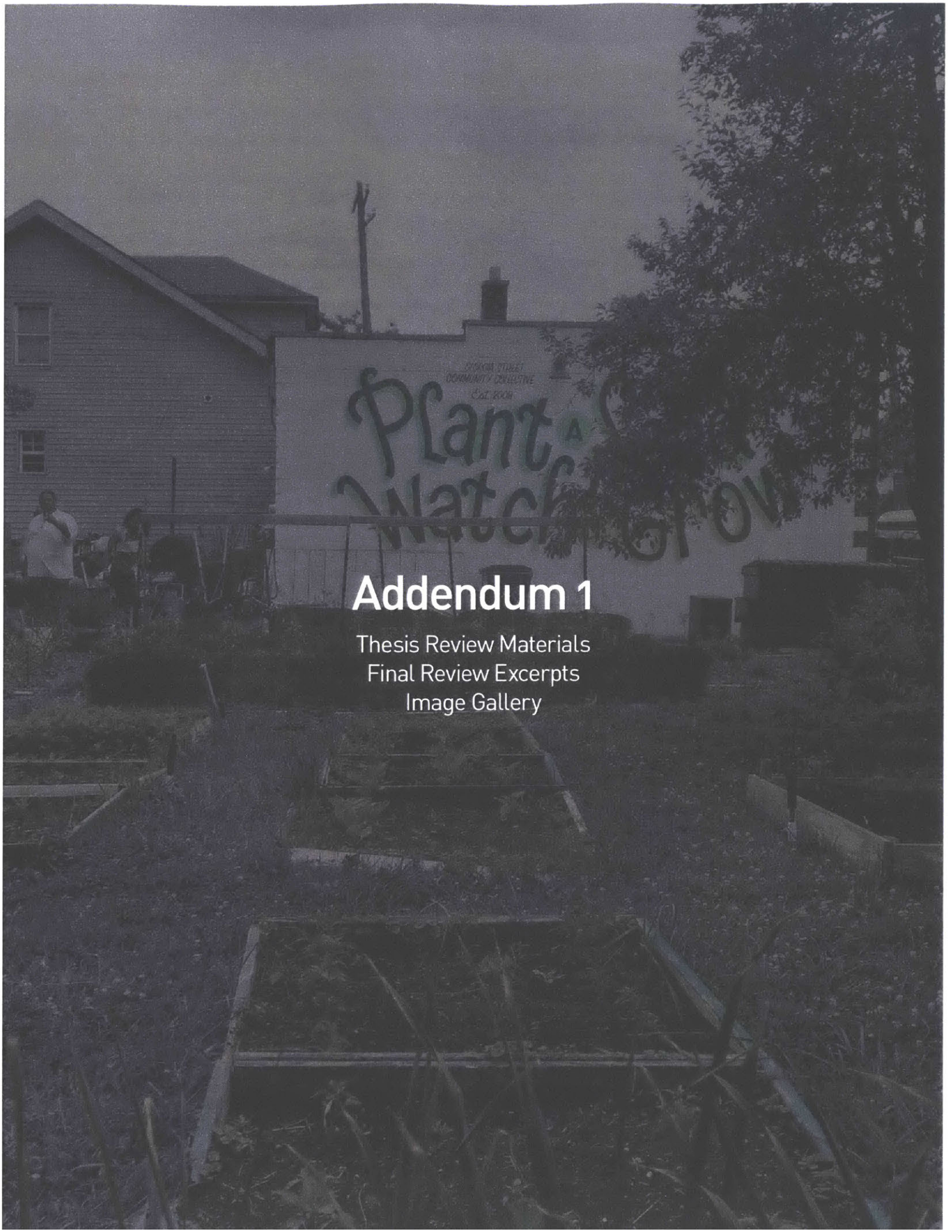
▶ Open market adjacent to open space and fruit tree production habitat.











Addendum 1

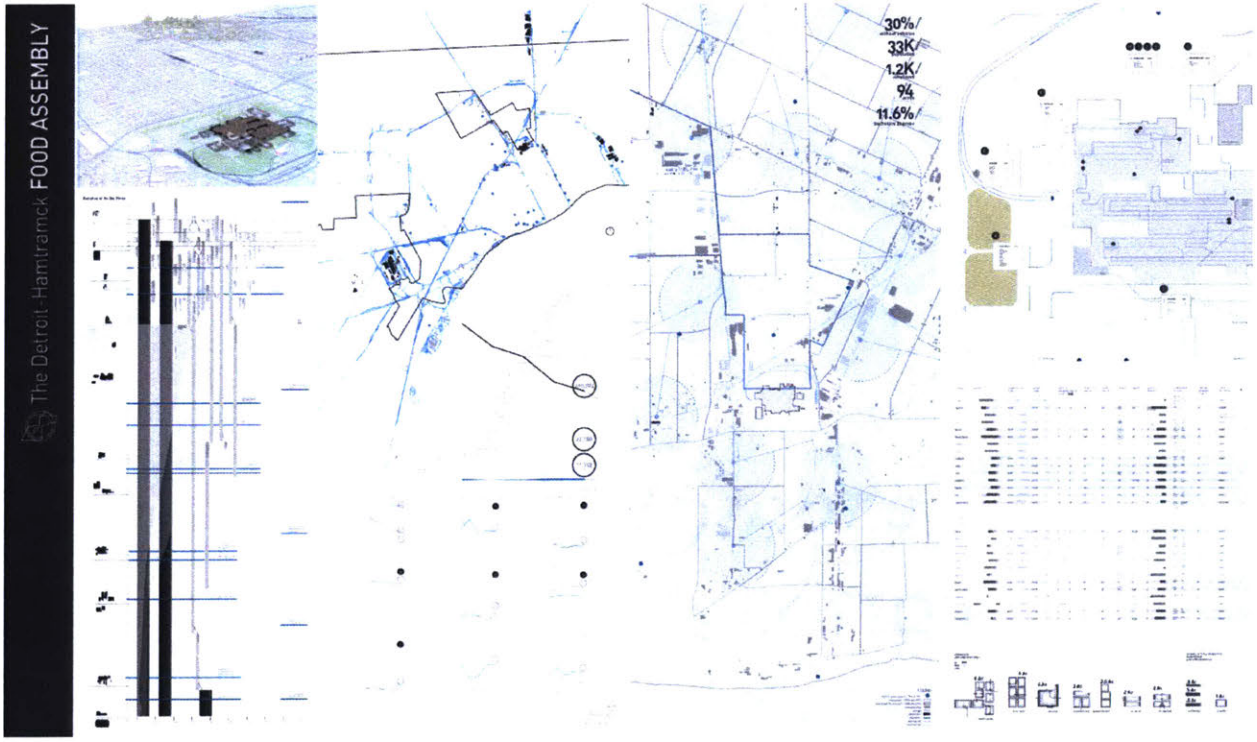
Thesis Review Materials
Final Review Excerpts
Image Gallery

Thesis Review

Final Layout

The big idea: a food gigafactory in the heart of the city. The timeline exposes the scale of auto assemblies, the consolidation of the industry, and the decline of the workforce and economy.

The map shows the decentralization of factories and a demographic reading of the site.

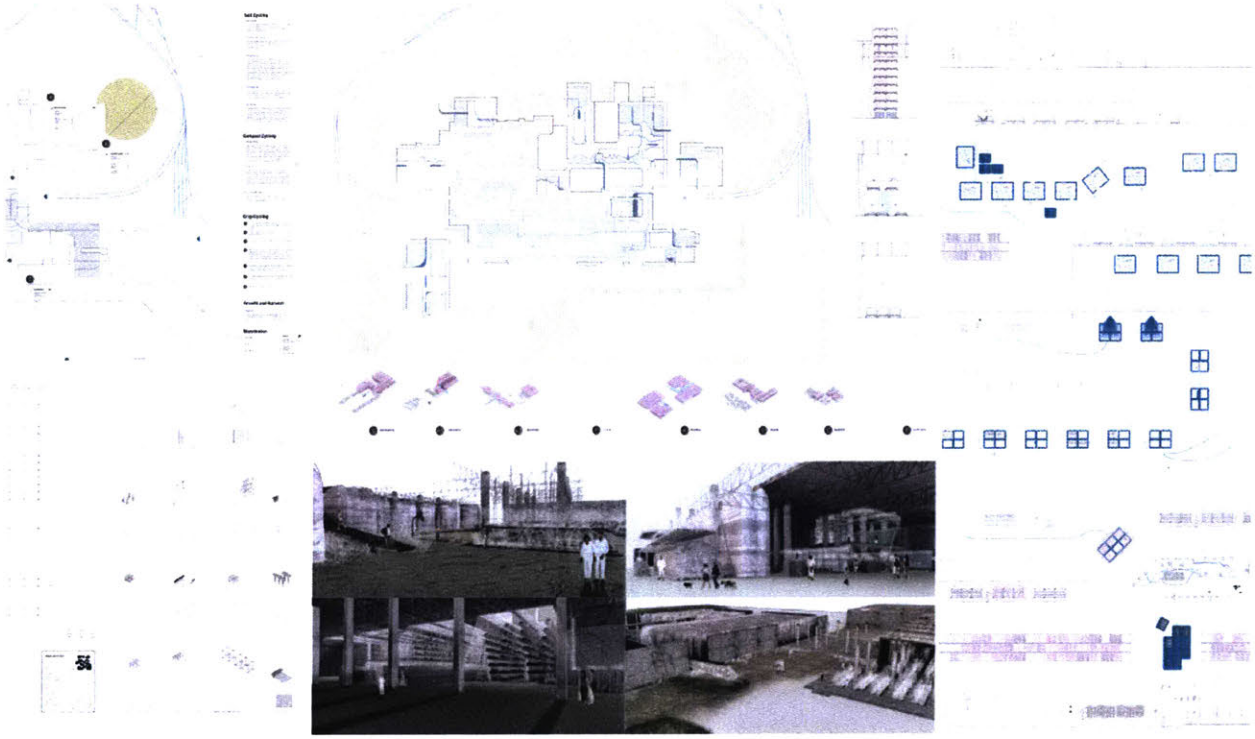


Master Plan in context. The Food Assembly is connected by rail to nodes in the most food-challenged neighborhoods, between Detroit, hamtramck, and Highland Park.

(Bottom) Crop data as accrued and studied by the New Agrarians for optimization of resources and yield.

(Top) Plan diagram of site ecosystem and flows of people, soil, and produce, organizing it by habitat as well.

Architectural plan and sections of the different densities and conditions.



Diagrammatic axonometrics o the different greenhouse conditions, and renderings of four inner/outer spaces of production.

Composite drawing of the overlap of processes and human activities, and the door-to-door flow of produce.

Final Review Excerpts

Guest Critics

Milton S.F. Curry
Dean, School of Architecture
University of Southern California

Sheila Kennedy
Principal, Kennedy & Violich Architecture
Professor of Architecture at MIT

Rosetta Sarah Elkin
RSE-Landscape
Assistant Professor of Landscape Architecture, Harvard University Graduate School of Design

Bryony Roberts
Principal, Bryony Roberts Studio
Adjunct Assistant Professor, Columbia GSAPP and AHO

BR: I want to say it's been a really good presentation. Your project is a revival of Marxism and the power of labor taking over production. There's a political discourse to your project, it's very captivating. I just wanted to ask you about the ownership structure, given that, who pays for this? Who's they?

DS: The factory is as is, and the New Agrarians take over the site. They utilize all the segments of production and hack them to frame this development.

RE: Ok, but who is they? Is it this range of the neighborhood? Is this the general sort of amount of people that are able to be fed based on the yield method?

DS: The factory can produce food for 30 thousand, but it would be run by 4 to 6 thousand people.

SK: I think the thesis is too vast for us to imagine— it is a bit disingenuous to say that the factory is exactly as it is. There are some operations that are happening. There's some selective demolition, some selective envelope transformations. And then it seems – I'm not quite understanding what this purple drawings are, but in my fantasy of what they could be, it seems like there is potentially a very interesting subdivision of the factory, that the factory is not quite as monolithic as it seems. And rather, that you can take advantage of its scale, or at the same time divide it in work cells or subdivisions, that could actually be quite collective. That is, a cooperative that is not vast, but is reproducible. It could be a promising dimension of it. As opposed to saying you need to keep the same monolithic, highly centralized structure that would be detrimental.

RE : It also essentially says that the infrastructure stops at the wall, right? Because that's what you've done, you've turned off the roof. And you've kept this figure – and specially, maybe it's also because I'm sitting right in front of it, it's actually just sitting in a lot of land, and one of your critiques is of course, the sort of the technology that has given us these GPS driven cabbage collectors and pushing arms in the plastic pots. Soil is an organism, it's a bunch of organisms, it's absolutely alive. It can be designed, you mix it up, just like chemistry. It

surprises me that you went that far, but part of the answer, and I'm also pushing you a little, because it's a great project, what else could you do to get out of the architectural spin, which is "I'm just gonna take off the roof". Actually, the roof in many parts would be useful, specially because it offers two layers. And why wouldn't you take out the floor? There's thickness, there's such a sectional... I'm missing the section. And you could do so much more with soil that is connected to more soil, that is near the water table, in that section, than you could do with soil in a pot. Or that you could do with any of these... you know, how far we are from food is actually how far we are from the fact that food is just plants. Everything we just saw is plants, we're plant-dependent species. Plants need soil. They don't need plastic pots, they need soil. And there's a cycling there between the atmosphere and the soil that is mitigated by plants and I just, I wonder if you could see yourself also using all of this, and also this, sort of inverting what you're doing. It's saying the roof is very useful for certain species, and actually the soil is what I'm after, and so the footprints of many of these buildings are much more important that the figure-ground.

You keep pointing at this and saying "the infrastructure," but the whole thing is the infrastructure. It's even amazing that you kept this. Why would you keep— what is that big turn-around? So the site itself is the infrastructure, and then how do you use those open systems that have various layers, roof, floor, ground, is deserving of more sectional consideration. And would be fun to see.

MC: Yeah, I think that this is a very interesting project, having spent time in Detroit and the region. On the one hand this a reuse project, it's prototypical, how would you reuse a factory like this? On another level, it's about exposing the tensions between the diverse constellation of production, with farms and more corporate farm models. And as that becomes more automated and made more efficient, it result in less human agency, less labor for exploitation. So I think the most captivating image is in this diagram, because here you're thinking visually and spatially about productive space which not necessarily has to rely on the productive capacity of things. I think that's what you're saying, that the hermetics of the factory actually produce efficiency but also produce conditions of extreme exploitation. Then, when I scan out of that and look at the market car cuts, the question is how do you utilize what used to be an asset in the factory to actually spawn a new constellation of diverse industries, collectivities, possible economic streams of revenue, etcetera, etcetera. The day you lock into one, you make the mistake of actually having people participate in their own obsolescence. Locking into the factory model, the Amazon model of food production, which might be great right now, but in ten years they are designing their own obsolescence. Maybe that's on the table, but architecturally trying to get out of that would be an innovation.

RE: That's a really nice way of saying, more articulate way of saying, what I was trying to say. That it's the site itself that has the agency for you, the ground. To get stuck in the factory footprint, or to get stuck in the techno little bits and pieces that you can reuse, is automatically creating its own obsolescence, right? So you're better off getting back to those thoughts of where is it gonna be cool, where is it gonna be warm, what can I do with the basement, what can I do with the roof. So you're growing all kinds of different things, in section, that will not become obsolete, because they're not hinged on that which you're critiquing.

SK: But it's true, what's been pointed out. This adaptive reuse, this taking over, suggests more of these different cells. And I'm using the word cell in its full sense. The scale is something that's very interesting. There could be different kinds of subdivisions, different kinds of new collectives imagined. Given the amount of research done in this project, maybe the plan has been tricky. The plan is always this top view, this master plan, and that's really how the plan operates, capitalistic speculation operates. So it's interesting that the perspectives begin to separate out and distill moments within that of very specific environments, and the section, of course, would do that too.

RE: You're making it more about human effort than about technical innovation, that's what I think you're trying to do. In which case the ruin, and take-over, and the subtraction is so exciting, but then it starts to give you a metric or scale for understanding of how much can a human harvest in a day? What is the size of a generous community

garden? You start to use these metrics within this large space to come up with parcel-ization.

SK: Also, for the purposes of debate, it seems like there is some new audience, some new kind of imaginary growers, this new-agrarians, and they're not like the old farmers. So I'm kind of interested to know if these people would build skills to re-program machines and which machines.

RE: I think this is where all these comments are going. You did such a vast space that you can start to be more specific about what's happening where, and where those machines are, you can choose between having a roof or a floor, you can have all these minor manifestations. It's very much a monolith right now. Right? And you're trying to find scales that are more human within them, at either side of the wall. I think that's a tremendous ambition, and unique, and exciting.

MC: Another calibration that may help harness the incredible vastness would be to access the axis of the problems. The food insecurity is about the quality, the access, the cost. Those are the three big drivers. I wonder how in this urban situation, you would begin to approach those three axis? Then, what is the quality of the soil? Because if it's just mass produced, that's not gonna give you the quality of the food. In terms of access, how do you get to those places of extreme need?

SK: How does it get out?

DS: It's all connected by the rail network.

BR: It's like a new town center, market-place. It's very European, to go to the market, and buy your food, and it seems to me that in the range that you're working in, and it can even shrink, it does speak to an urbanist chain whereby people would walk, and not be met with these huge parking lots, but actually start to have porous entries. This is a nice moment, right here. How can I come in? How does this island start to reconnect?

MC: The precedent that you're missing is Eastern Market, in Detroit. It has a historically contemporary legacy. That's a real key ingredient.

BR: I think that also in the vector representational approach... The drawings that you've done I think are a pleasure to look at. Each of them emphasizes the systems of the site, rather than the systems of the architectural intervention. But when you hit the perspectives, I would actually question the use of the aesthetic. It comes down to how you are approaching the idea of industry. I think that is the larger question of your project. What is your edge towards the type of construction that you're inheriting? And it seems to me like you're actually trying to revive an iteration of it. Whereas a lot of the images that you see is really more about the kind of decay and the loss of that. You have to make decisions, when you're reusing an infrastructure, on how it will perform aesthetically. Other finishes, other colors, other organizations. How does this transform? Because the way you've played it out, it really would feel like a new version. I wish there were more on how this structure supports something else. It's the kind of thing you can do now, before putting it in your portfolio. I think we've seen so many ruin porn that it's worth asking what else is there.

SK: One of your main questions is how would architecture operate in this situation, its rhetorical capability. If it's just always a ruin, you are limiting its capacity. It's not only about introducing social productive practices, but the qualities of space, the changes in lighting, coloration.

RE: But you didn't use the word ruin, it came up after. You used the word obsolescence, and it's so different. It's incredible, but one of the things that struck me about how he defines obsolescence is that it is assumed that one technology takes over from another, or one value takes over from another. There is a replacement during obsolescence that occurs, in order for one thing to become obsolete, become something else. And it doesn't become a ruin. Obsolescence is never predicated on downward spirals. It's predicated on a kind of capitalist gain, upping, upscaling, up-marketing. And if you're gonna use that term, obsolescence, I'm curious about how deliberate you are in using it, but also about what are you replacing? I might be reading into it too much, but I think you're replacing the super industrial techno-managerial idea of agriculture by repossessing the infrastructure

to create maybe less production, but more of many other things, as opposed to it necessarily being an upping of that activity. And that doesn't resonate necessarily... Photoshop is just... Just stick with vectors and let other people imagine what it looks like and peek into actually what is replacing what, in each case, what is being extracted, what is being added. Where is the value added?

Mark Goulthorpe: We talked a lot during this semester about Thomas More's Utopia, which was a critique of the existing political situation, and with enough detail that the counterpoint was very effective. And he went into real detail about what a proto-communist society would be. What I've always been fascinated with is the social proposition, and you begin to get to that in your graphics, but it's kind of overwritten maybe by the technical detail. Is this real or not? But I'd love to get a detailed description of what the New Agrarians do, how they dress, what's their ethos, what's their government form, and then how do you do that in drawing?

Image Gallery

Final Review and Models

Review photos by Sarah Wagner and model photos by Andy Ryan.*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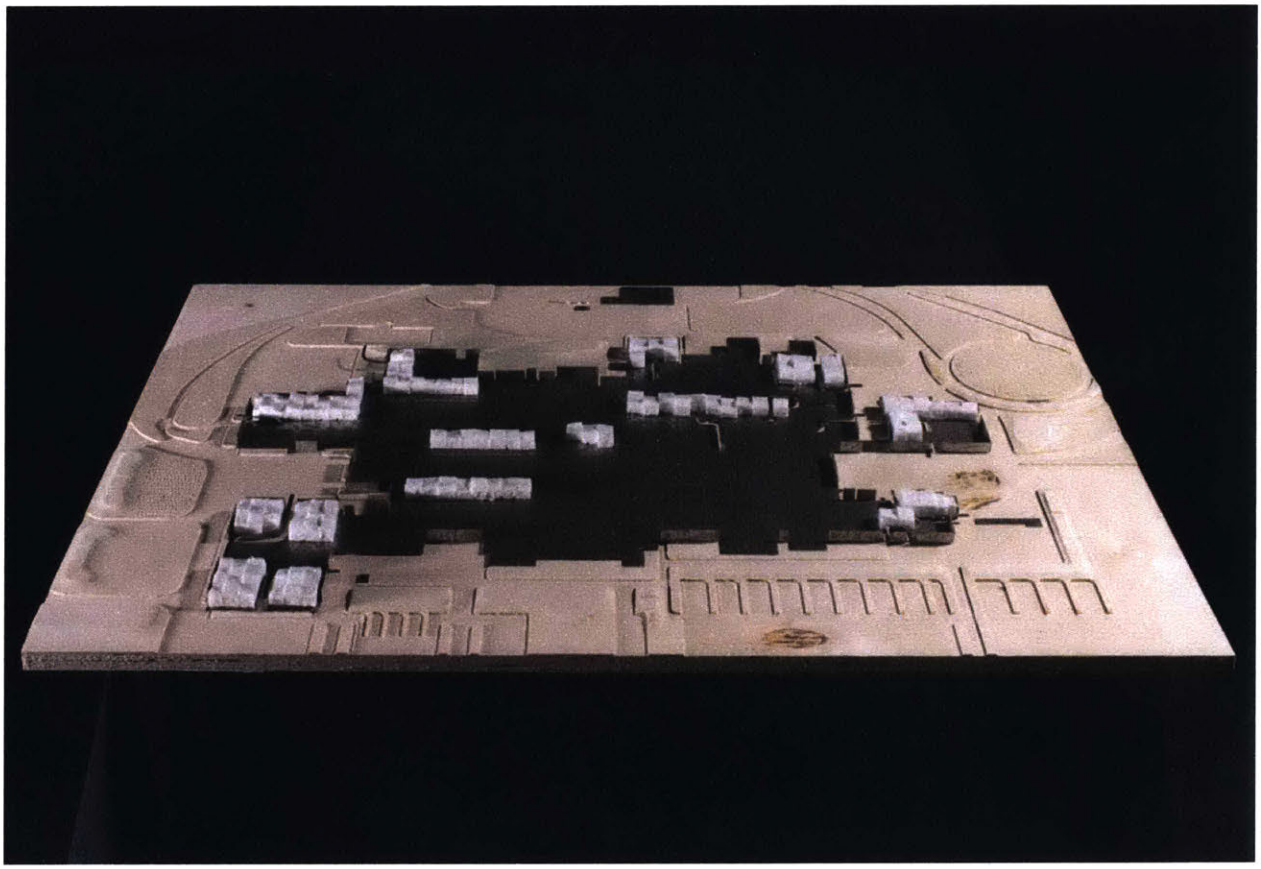
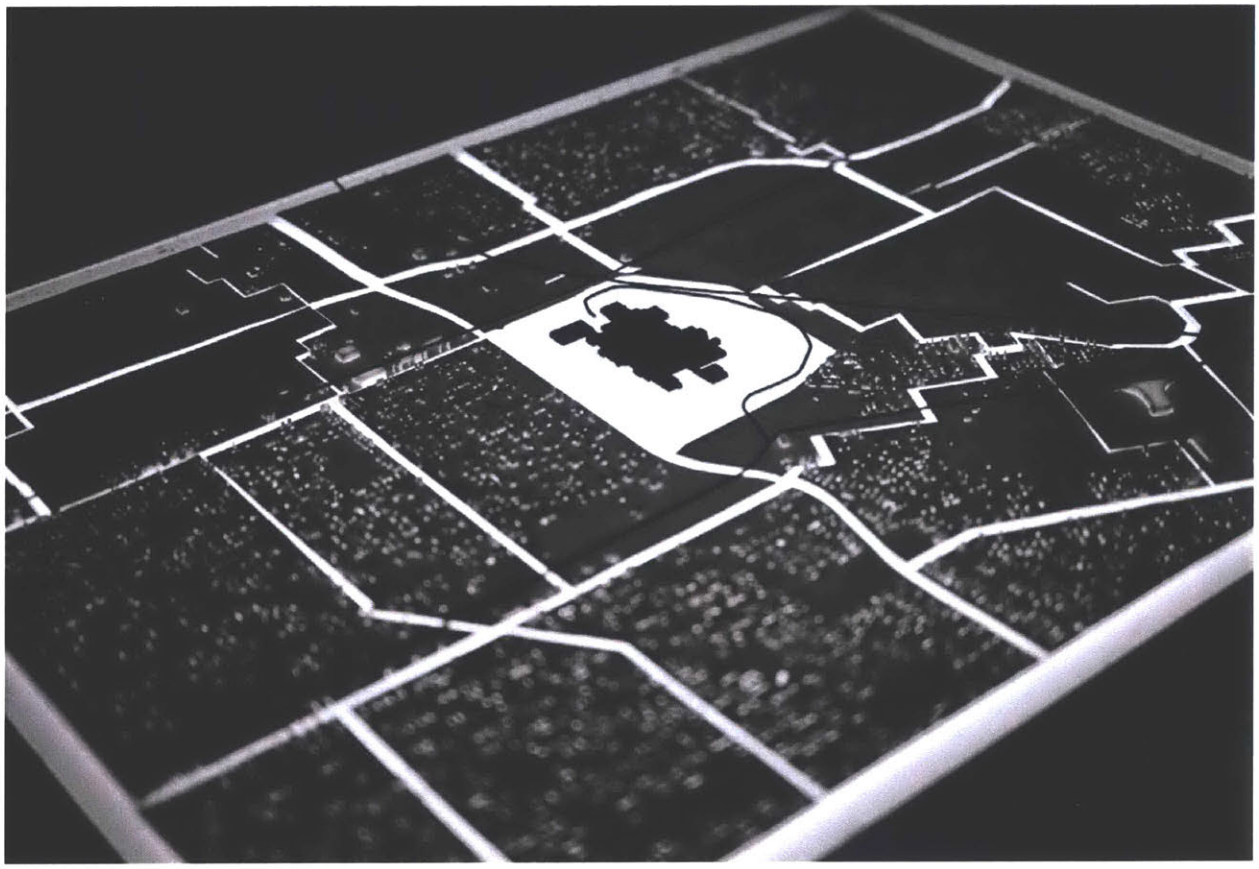
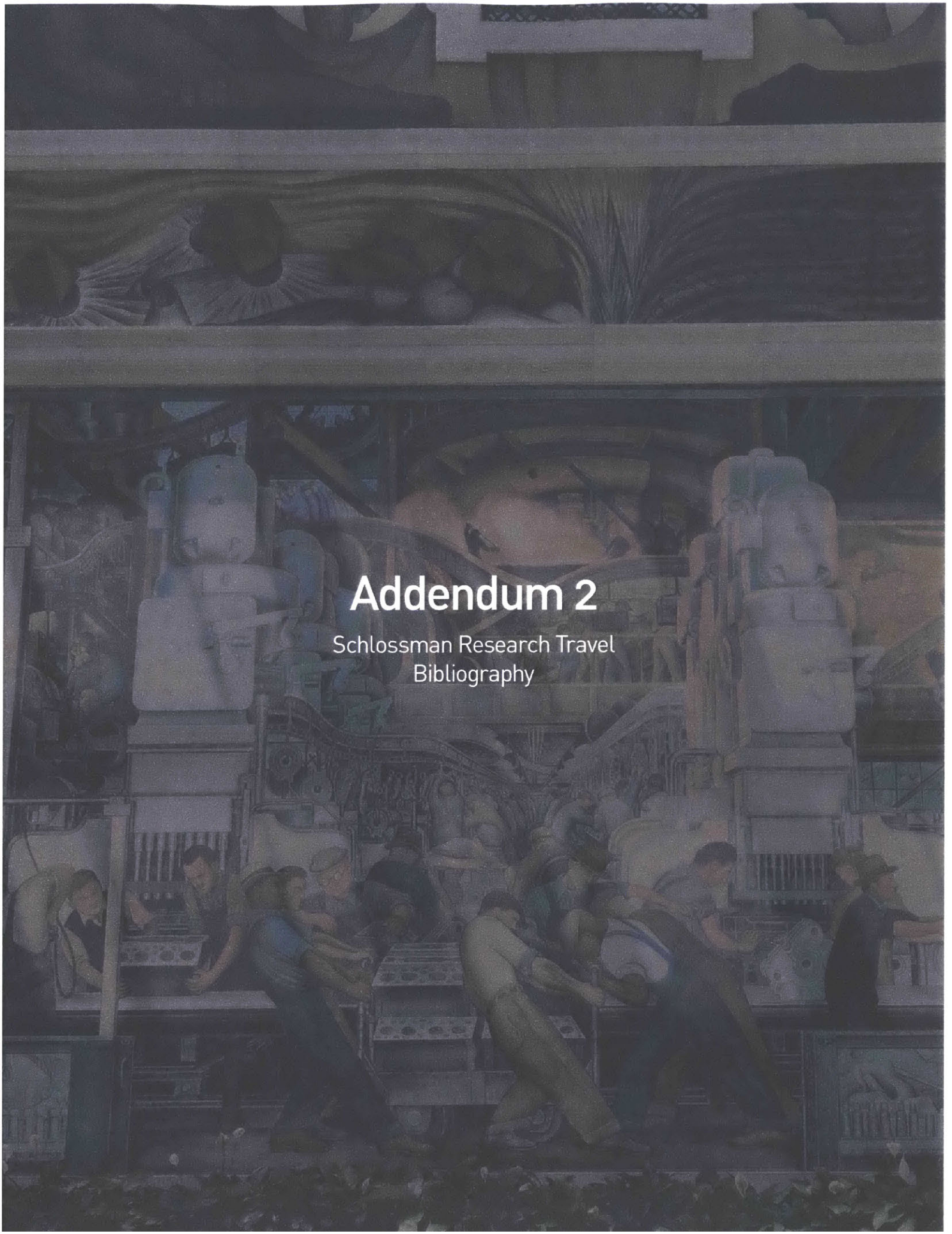
94
11.6%







Addendum 2

Schlossman Research Travel
Bibliography

Schlossman Research Travel

1. Lowell, MA

Boott Mills

2. Detroit, MI

Allied Media Conference
Hamtramck/General Motors
Grace and James Lee Bogs Center
Persico Marine (Automotive)
Urban Farms

3. Chicago, IL

Future of Composites in Construction Symposium
Museum of Science and Industry

4. New York, NY

Automated Dynamics
Brooklyn Navy Yard

5. Kigali, Rwanda

Design-Build prototype housing in Mageregere

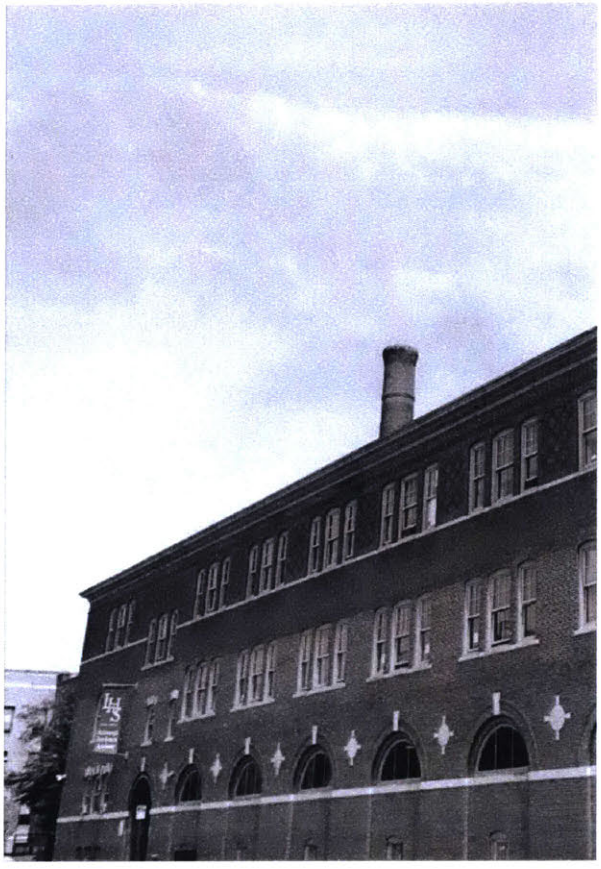
6. Georgetown, KY

Future of Composites in Construction Symposium
Museum of Science and Industry

7. Oklahoma, MI

Zhaner Steel


UNION MADE
IN USA
Cotton grown in: Turkey
Cloth woven & dyed in: USA
Stitched & assembled in: USA
$60
Look at LABOR costs for this oxford shirt:
Are you willing to pay more for workers to earn more? Some garment workers in the U.S. make as much as $12 to $18 per hour.



Previous Page: ▲
Images from the Boott Mills Historical Site and Museum in Lowell, MA

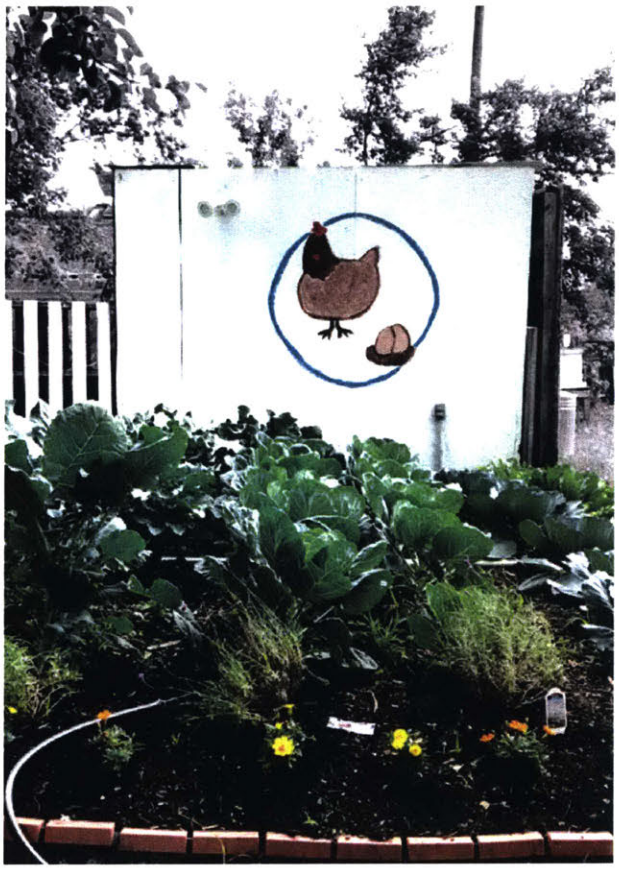
Apartment building in ◀
Detroit, close to Wayne State University

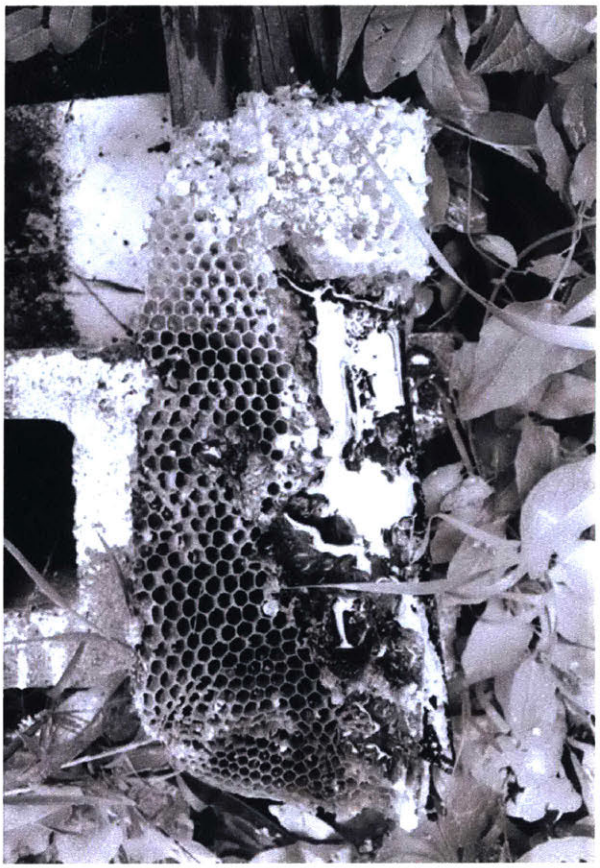
Heidelberg Project 1 ▼

Heidelberg Project 2 ▶

Georgia Street Farm ▶▼

Sample from an independent, backyard Beekeeper in Detroit ▶▶▼



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Vacant lot and art installation in East Grand Blvd. ◀

Shoes and flags installation at Heidelberg Project. ◀◀◀

View from top of the Ford Truck Assembly, towards the extents of the Old River Rouge ▲

Image of blighted street. ◀◀

Difficult pedestrian access to overpass. ◀

Persico US, assembly shop floor ◀◀

Persico US, fabrication shop floor ◀

Zhaner Steel mock-up areas (Source: Zhaner) ◀

Zhaner Steel shop (Source: ArchDaily) ▼

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Thesis reception. Photo by Irina Chernyakova.

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