# Mixed-Ag

## Integrating Agriculture within the Urban Fabric

# Sections:




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# Introduction

Abstract

Urban agriculture has taken root throughout Americas cities, and especially Detroit, with its shrinking population and expanding vacant land. It is a noble, effective, and productive conversion of unused blighted land throughout the city, but does it respond, or even acknowledge that it's located in the city? There are certain benefits to living in a city, from community collaboration, economies of scale in the business community, and viability of cultural and artistic amenities such as parks and museums. But urban agriculture takes advantage of none. It behaves just as rural agriculture behaves; the land is used for utilitarian production with the yield shipped out for distribution. While there are many benefits to locally grown food, such as reduced transportation costs, fresher food, and local profit retention, there are many aspects of city life that urban agriculture can take advantage of. This is an exploration into integrating agriculture into the urban fabric, not just carved out from it.

As Detroit struggles in their current context of declining population and disintegrating infrastructure, the city is desperate to find ways to balance its finances. Without the ability to provide basic public services, including adequate Police, Fire and Emergency Services, as well as primary education, the city will be always be limiting the prospective growth opportunities.

As the city (and State) leaders grapple with these circumstances on a macro scale, the citizens of Detroit are dealing with issues at a micro scale, their own neighborhoods. As the population of Detroit declines, more and more properties are being vacated and left without maintenance, creating dangerous blight. Blight is not only dangerous in the fact that criminals have abundant places to hide (both from authorities and from their potential victims), but the harmful effects it has on the neighborhood as a whole. In real estate, the mantra is 'Location, Location, Location', and blight creates a downward spiral decreasing the value of the location. A citywide effort to combat this property blight is long running and picking up steam, but it only addresses the vacant structures, not the empty lot left behind. A drive through these neighborhoods, or an aerial view reveals the startling result. Many blocks now consist of two to three homes, with the rest reverting to overgrown nature.

The remaining residents of many Detroit neighborhoods have done what Americans have done for decades; taken matters into their own hands. Vacant lots have been transformed into productive community gardens. These gardens not only provide a source for fresh vegetables, but they help change the perception of the neighborhood. They get residents out of their houses and involved in the community creating a vested interest in their neighborhood. As more and more residents become involved in maintaining these common areas, the expectations of maintenance throughout the community is elevated. Community gardens have the potential to be the seed of change to turn around a neighborhood.

Urban agriculture has become a phenomenon. A grass roots movement to create sustainable communities without waiting for the city to organize it. Numerous organizations have been created to provide support and resources for these urban gardeners. From Keep Growing Detroit, who provides technical assistance, to Detroit Food Lab, which provides business support for food related start-ups; Urban Agriculture is

increasing its viability as a suitable use for Detroit's vacant land. Detroit Future City lays out abundant options for productive landscapes. It's inevitable that Urban Agriculture will play a role in the future of the city. What that role is will depend on the neighborhood context.

Finding the right land use option for each area of vacant land is critical for the overall success of the city. What works in one area, won't necessarily work in all areas. In other words, there is no universal solution that can be applied.

The benefit of introducing an Innovative Productive landscape is its cost-benefit ratio. Fresh organic vegetables available to residents without the added costs of transportation can be achieved at relatively low start-up costs (when compared to full scale development). A minimal number of buildings are required; while a large amount of the project is labor based, read jobs. By its very nature, Innovative Productive landscapes are better suited to large, uninhabited areas such as the many high vacancy residential neighborhoods. But what about vacant lots near the city's urban core? Traditional urban planning would call for a mixed-use development, providing residential units as well as retail. While this is the ideal land use, implementation is extremely difficult as the capital requirements are typically high. Considering the massive amount of vacant land, even near the urban core, it is unlikely that true mixed-use developments can solve this problem alone in the near future.

The idea of plugging in an Innovative Productive landscape into the core city is not new. The MGM Grand Garden is located next to its casino and consists of two greenhouses and just less than 2 acres of outdoor growing area.

***By combing the low cost Innovative Productive model with the mixed-use model, we may arrive at a suitable land-use option that is feasible in the short-term, and***

***contributes to a vibrant city in the long-term. This 'Mixed-Ag' model would have several unique benefits when properly located, including:***

1. ***Lower cost development for larger sites***
2. ***Utilizes Vertical Integration; from the fields to the table***
3. ***Beautifies like a park, but as a productive use***

Lower Cost Development for Larger Sites

Many large vacant sites in Detroit have enormous potential, but also require enormous capital to develop. Large sites can either be developed as a whole (i.e. the new hockey arena), or they can be subdivided into smaller developments. Either way, substantial capital is required. If this kind of investment was a reality, these sites simply wouldn't be vacant. The Mixed-Ag approach requires modest development on portions of the site, with minimal development (planting beds, greenhouses, etc.)

Vertical Integration

The typical food supply chain in the U.S. is oriented horizontally. That is, every individual component, from growing it in the fields, to processing it, transporting it, and selling it, are separate business ventures. Each step of the process carries it's own overhead costs and receives a portion of profit for their role in the system. This system can be extremely efficient on a large scale; in fact, this is where the term 'economies of scale' may have been derived. By each element focusing and growing their core competencies, they are able to achieve massive production efficiencies, and without this current system, the cost of food nationwide would be drastically higher.

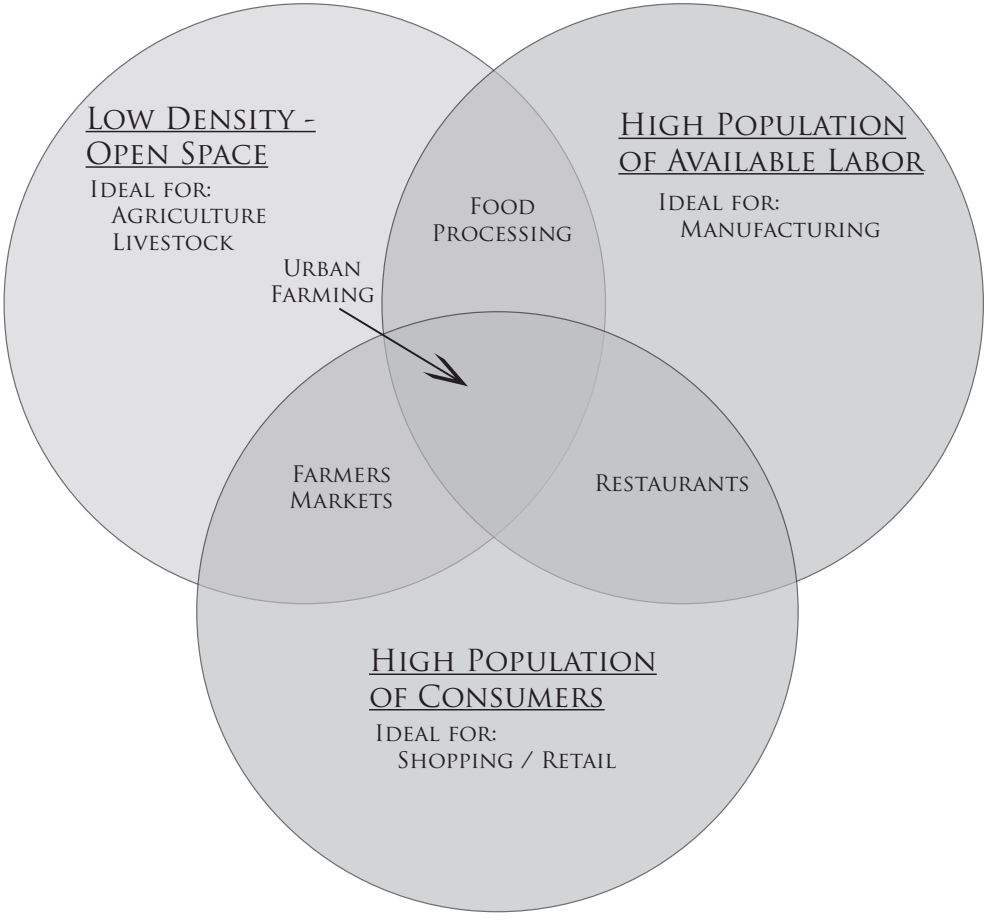
But there are also many problems with the horizontal supply model, particularly when looking at the profit margin of the local customer interface, or the restaurant. As each contributor in the supply chain provides their work and charges their profit, the cost of the product is increased and passed down the line to the restaurant who is balancing making a profit and attracting customers with reasonable prices.

The idea of Vertical Integration is not new among the business world. By combining as many levels of the production chain, efficiencies are gained by reducing redundancies, reducing transportation costs, and consolidating the profit.

If we consider the typical components of a Mixed-Ag model as being 1) agriculture production, 2) produce markets, and 3) restaurant / dining, we can begin to imagine ways to combine resources, share costs, and thereby increase profit margin. Every restaurant requires a structure to provide shelter and a kitchen to prepare food. At a certain level, ambience and décor must also be considered as a central role in the dining experience. The agriculture also may require a structure when considering the climate of Detroit and maximization of production. These are the basic up front development costs every restaurant and agriculture venture face. Can the footprint of the restaurant double as indoor growing space? Can the indoor and outdoor fields be designed to double as the restaurants décor?

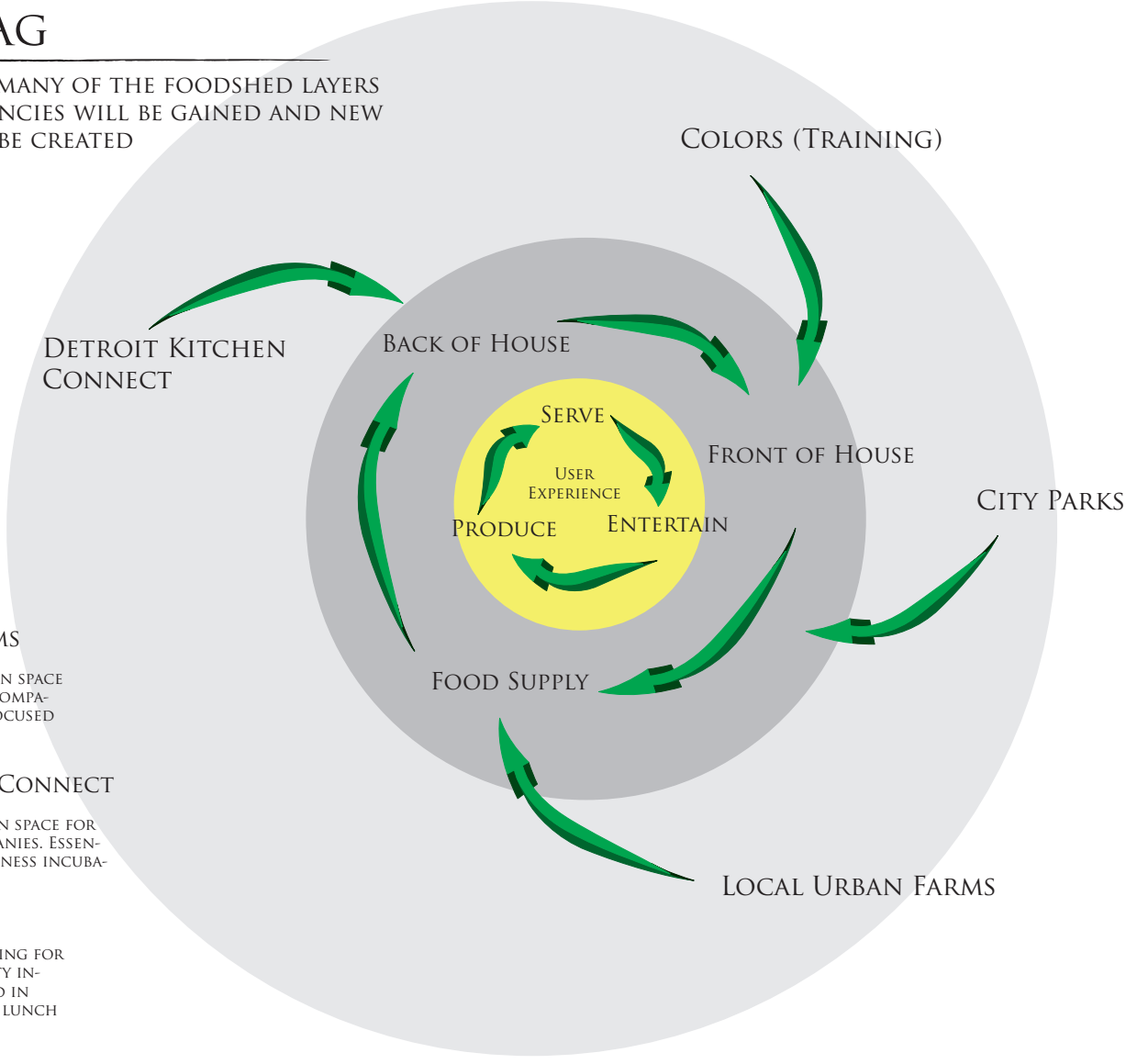
Many may argue that land close to the urban core is too valuable for use in agriculture, especially when considering the future possibilities of the site. Retail, office, or residential developments are much more beneficial to Detroit's economy. And when considering the urban core, there is the notion that a tight consolidated network of buildings, a la New York, is better. It is certainly true that this is no location for a

## Supply Chain Locators: US Food System



# Mixed - Ag

By combining as many of the foodshed layers as possible, efficincies will be gained and new experiences will be created




## Local Urban Farms

Provides access to kitchen space for food based start-up companies. Essentially a food focused business incubator.

## Detroit Kitchen Connect

Provides access to kitchen space for food based start-up companies. Essentially a food focused business incubator.

## Colors

Provides on-the-job training for restaurant and hospitality industry in Detroit. Located in Harmony Park, they offer lunch Tuesday through Friday.

SOURCE: GLOBE CORNER BLOGS

typical farm, and I would even argue, no place for a typical urban garden. What is ideal is a beautiful park. Regardless of how dense the city, an urban park provides an attractive amenity to city living. From Central Park in New York, to Millennium Park in Chicago, massive parks have a long precedent in our cities.

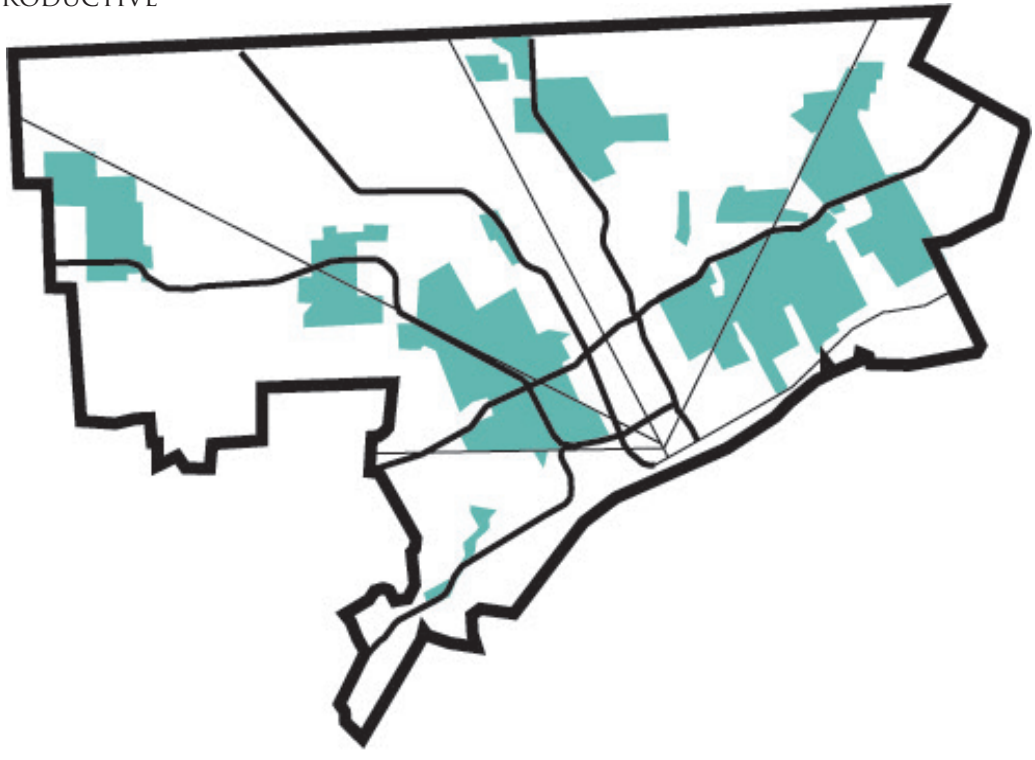
***What doesn't have a precedent is a 'Productive Park'. Take all the vegetation in Millennium Park and change it to fruit trees, grapevines, and harvest able flowers, while keeping the public spaces interspersed throughout. This is Beautification Plus+, beautification plus production; Production for a city that sorely needs it.***

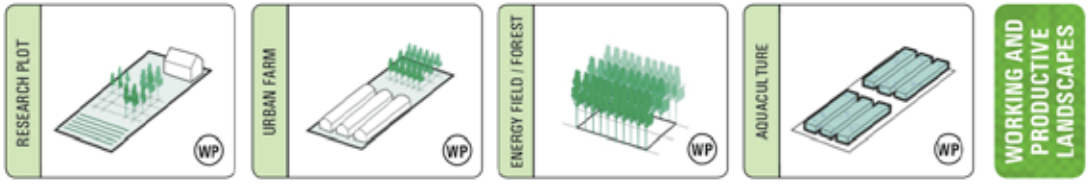
The intent of this project is to develop a hybrid agriculture system that takes advantage of, and fully integrates itself into the immediate environment of the City and in particular, the neighborhood. Much of this can be done by bringing defining elements of the neighborhood into the site, such as incorporating a restaurant on site in an area with a budding restaurant industry. But a contributing approach should entail exporting elements of the new site into the existing community. This bilateral linking works both to increase the viability of the site and to anchor it into the neighborhood. When dealing with agriculture in a restaurant district, this is easy to do. Again, we are looking for overlap. Overlap between what is already required by the existing neighborhood establishments and what can be provided by a local supplier. Analysis of industry usage standards, and menu breakdowns can reveal which crops would be viable and appreciated by the community.

Let's use lettuce as an example. According to an industry survey, conducted as part of a market research paper, the average number of heads of lettuce used by restaurants is approximately 10 per day. We then look at the various restaurants in the area and estimate their usage. Add to this number the estimated demand from the produce market and we arrive at a production volume that can be supported by local demand. We can then work backwards based on crop spacing and production volumes to determine the required square footage for each crop based on demand.

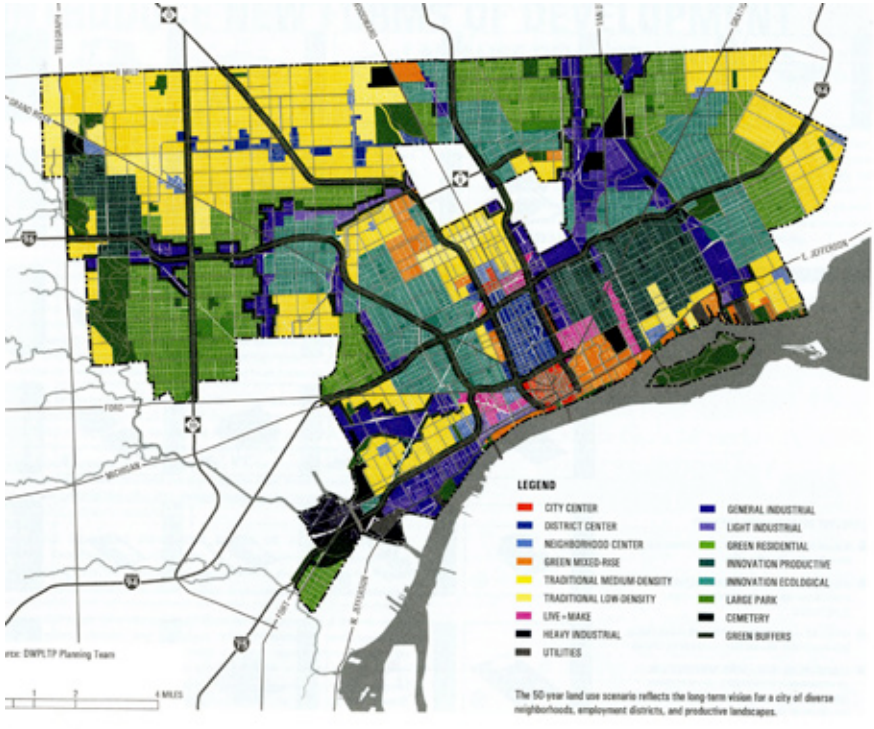
DETROIT FUTURE CITY

## 50-Year Land Use Scenario
### - Ecological Productive





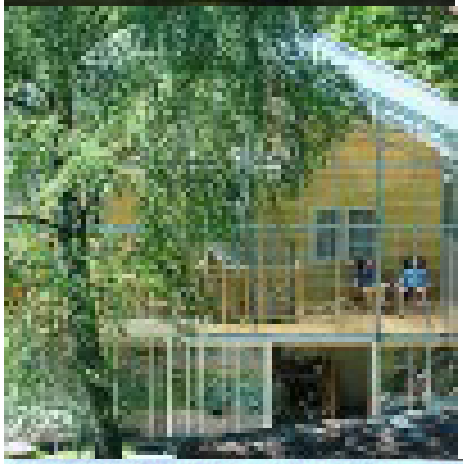

Source: Detroit Future City

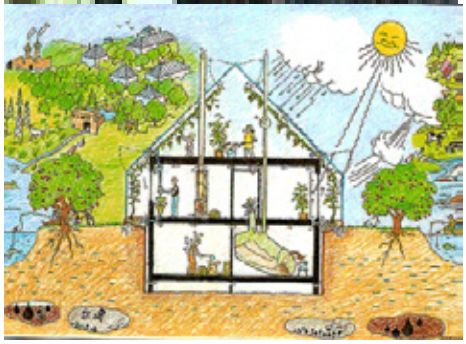



Source: Detroit Future City

The land use typologies prescribed by Detroit Future City are excellent examples of appropriate alternatives when dealing with the massive amounts of vacant land in Detroit. Each typology is based on matching the appropriate use to the various parts of the city. Getting the proper mix between the typologies isn't as important as where each typology is placed. DFC has mapped out zones for the implementation of each typology, based on data analysis, feasibility and empirical evidence. This concept argues that additional typologies may be required to utilize certain types of vacant lots.

# Case Studies
## Mixed Environments





# Naturhus

Sweden

## A house wrapped completely by a greenhouse.

Benefits

- The greenhouse protects against the rain, snow and wind.
- The greenhouse gives daytime warmth due to the greenhouse effect.
- The greenhouse reduces ultraviolet radia tion and minimizes maintenance.
- Incoming air is pre-warmed in winter and pre-cooled in summer, in an underground pipe.
- Daytime heat is retained within the living quarters for the night.
- The self-contained ecological system conserves energy and nutrients which are transformed by plants and trees into flowers, fruits and vegetables.

# De Kas
## Amsterdam

## Dining in a Greenhouse

"A kitchen surrounded by fertile soil where vegetables and herbs thrive … Where daylight shines in from all sides and where the chefs are free to express their creativity daily using the best the season has to offer." – Gert Jan Hageman

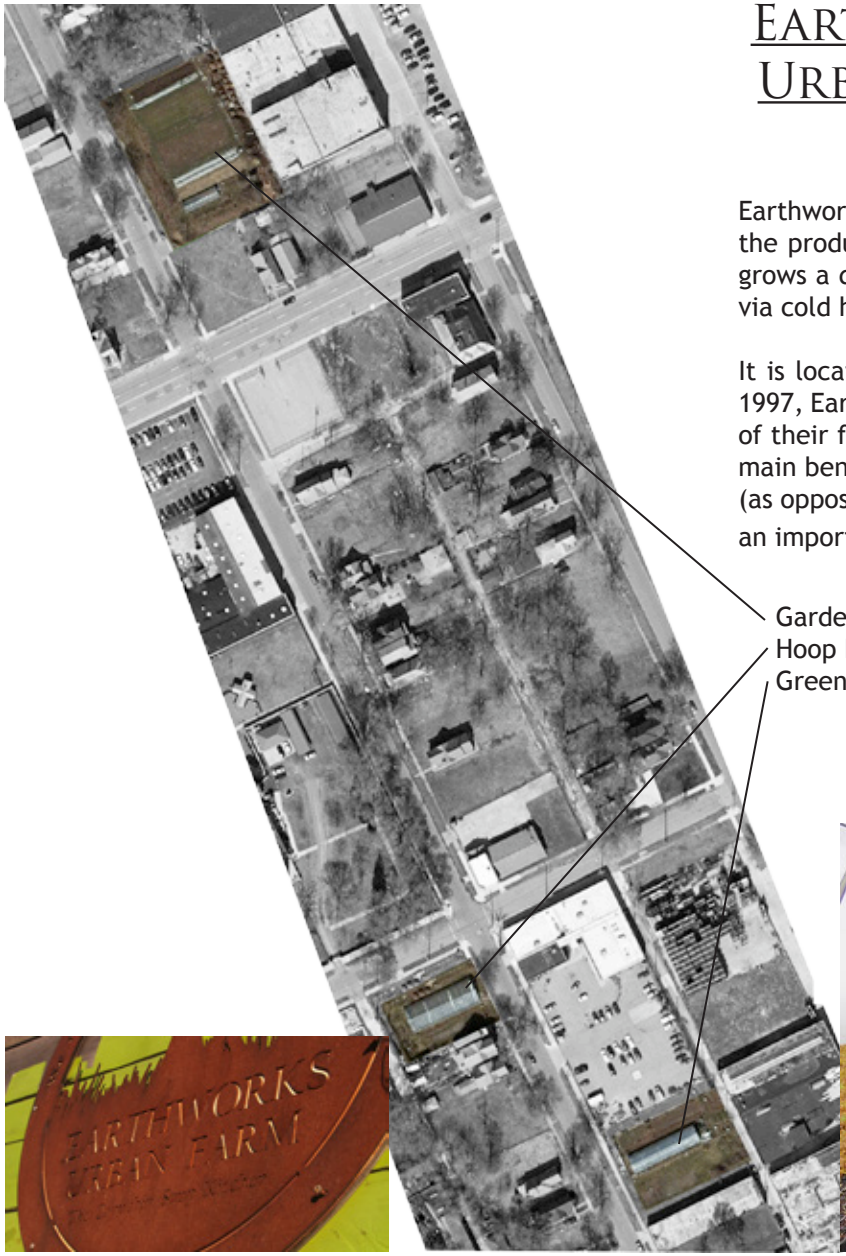
De Kas is restaurant located in a public park in the city of amstedam. The historic greenhouse structure was originally a municipal greenhouse and sat vacant for many years before its revival. Surrounded by herb gardens, it is a fine, but limited example of a farm to table restaurant.

Approximate Site Area - 1.2 acres

Approximate Building - 12,000 s.f.

# Earthworks Urban Farm

## Detroit



Earthworks is part of the Capuchin Soup Kitchen, with the majority of the produce going directly to the soup kitchen for lunch. Earthworks grows a diverse range of vegetables, striving for a year round harvest via cold hardy varieties and season extending practices.

It is located at 1264 Meldrum St., on Detroit's east side. Founded in 1997, Earthworks is an attempt to reconnect residents with the sources of their food and address social justice issues . In 2008, the focus and main beneficiary of Earthworks production was the soup kitchen itself (as opposed to local markets previously), though the markets still play an important role. (Crouch), (Bernardino)

| | |
|---|---|
| Garden | - 25,000 sf (.5 ac.) |
| Hoop House | - 3,200 sf |
| Greenhouse ` | - 1,710 sf |




Greenhouse

# Healdsburg Shed

## Agricultural Building Typology

Located in a small agricultural town near Napa Valley, this general store, restaurant, cafe, bar, and meeting place is focused on fresh, local ingredients and products. The architectural typography reflects the roots of venture by linking it to the agricultural backbone of the area. By using a standard pre-engineered Butler building as the framework, Jensen Architects had wide-open plan to work with, and the agricultural language to communicate their message.


# Site Selection

Finding the appropriate site is an important aspect, and must fit into the center of this diagram. Enough vacant land that development becomes expensive and risky, and proximity to a strong urban area. Six  sites to analyzed inititially.

Eastern Market

+ Proximity to Food/Dining Network
+ Salvageable building
+ Proximity to Dequindre Pathway
- Building lends itself to hydroponic growing
- Utilitarian feet to area

Old Tiger Stadium

+ Proximity to many new restaurants on Michigan Ave.
+ Destination location
+ Border of Green zone and greater downtown
- Controversial site with other proposals

RiverTown District

+ Plenty of open land
+ Future development of riverfront
+ Condo's and apartments offer many residents
- Lack of resident need
- Limited consumer traffic

Midtown

+ Great Visibility and traffic
+ Access to m-1 Rail
- Land is appealing to developers therefore doesn't fit into category

Kings Arms – rosa Parks

+ Existing Building and arcade
+ Some open land
+ Proximity to Brother Nature Farms
- Residential neighborhood
- Proposed as green infrastructure by DFC therefore, does fit category

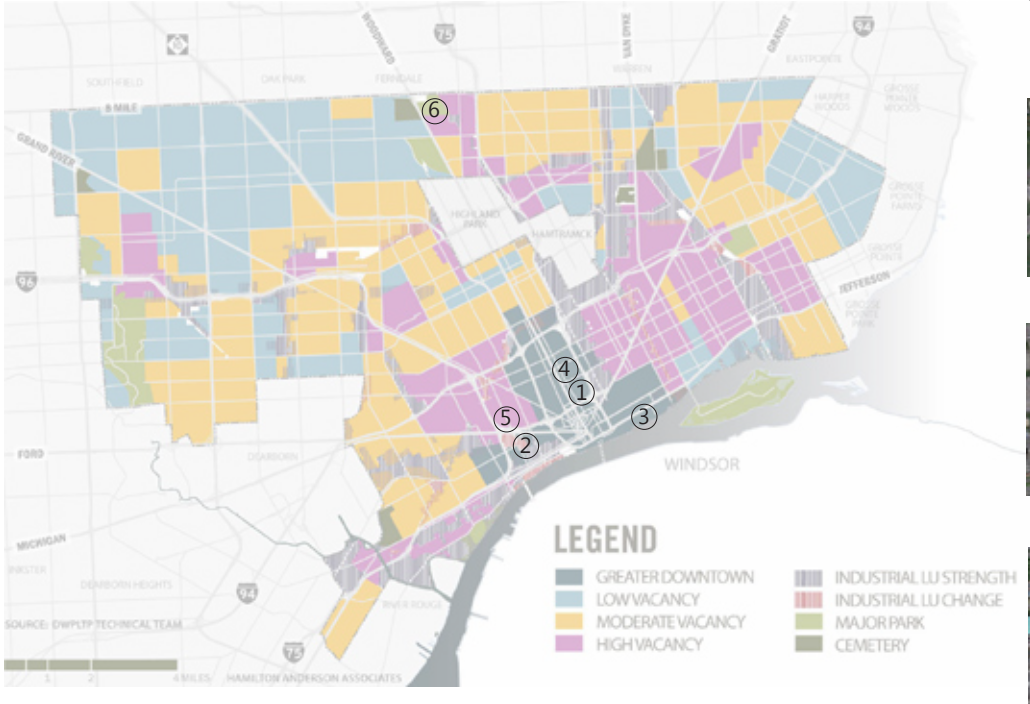
State Fairgrounds

+ Historical context with agriculture
+ Plenty of open land
- Huge scale
- Competition with Gateway marketplace
- Corporate environment
- Too far from urban core

The sites where then narrowed down to three for further analysis. The State Fairgrounds, Old Tiger Stadium, and Eastern Market. Both Tiger stadium and Eastern Market are existing food destination areas with enough vacant land that traditional development may be delayed for 100% development. The main difference between Eastern Market and Corktown is the utilitarian feel of Eastern Market and the designed entreprenurship vibe of Corktown.

In the end, Old Tiger Stadium site; its location on the edge of greater downtown, and the proposed greenzone by Detroit Future City make it an ideal site for exploration. Additionally, the deep sentimentality to preserve and memorialize the baseball diamond sets it apart from other vacant land in the city. The following maps contributed to the overall understanding of the various sites considered.

# Site Selection




## Site Requirements

- High Density Population
- High Density of Consumers
- Vacant / Blighted Land
- Walkable Area, Surrounding Activity

### 1 Eastern Market

+ Proximity to food/dining network
+ Salvageable building
+ Prox. to Dequindre pathway

- Massive building with little open space
- Lends itself towards hydroponics
- Utilitarian feel to entire area
  (poor dining experience)

### 2 Old Tiger Stadium

+ Proximity to Corktown activity (slow's)
+ Prox. to soup kitchen
+ Well known location
+ Visible from freeway
+ Developing Restaurant Row
+ Room for Residential Growth

- No existing buildings to tie into
- Pollution from freeway exhaust?

### 3 Rivertown District

+ Existing buildings to work with
+ Open land to grow crops
+ Future development of Riverfront
+ Prox. to Atwater Brewery?
+ Condos/Apartments in area

- Lack of resident need?
- Perception of contamination?
- Limited consumer traffic area

### 4 Midtown

+ Great visibility
+ Access to M-1 Rail
+ Open Land

- Land too Valuable
- No context for gardening?
- No buildings to work with

### 5 Kings Arms - Rosa Parks

+ Great buildings to work with
+ Some open land

- Residential Neighborhood

### 6 State Fairgrounds

+ Historical context with agriculture
+ Lots of land for crops
+ Great buildings to work with

- Huge Scale
- Competition with Gateway Marketplace
- Soon to be corporate environment
- Too Far from Urban Core

## State Fairgrounds

## Old Tiger Stadium

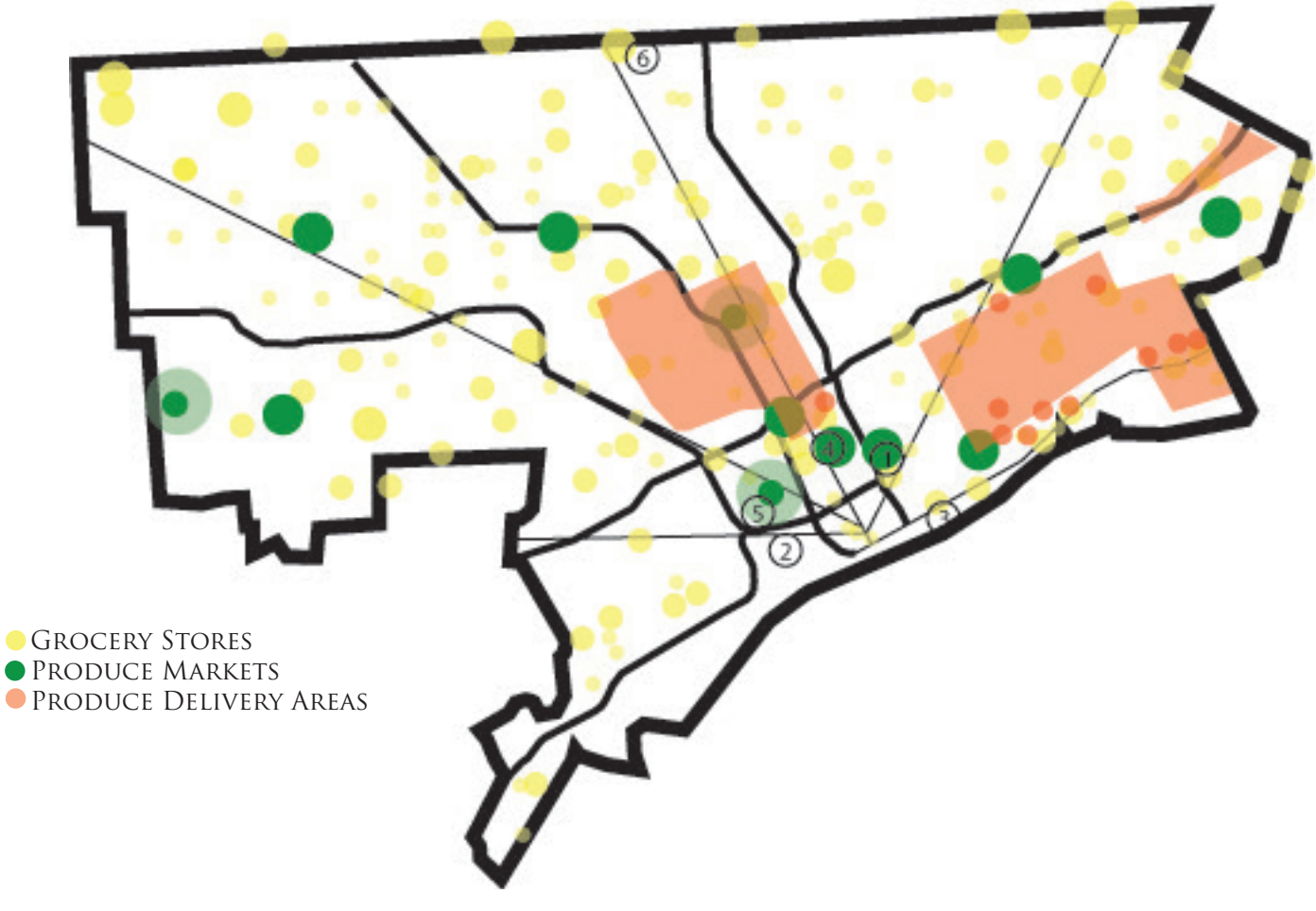
## Eastern Market

Residential | Vacant | Retail | School / Church | Urban Farm | Light Mfg. | Casinos

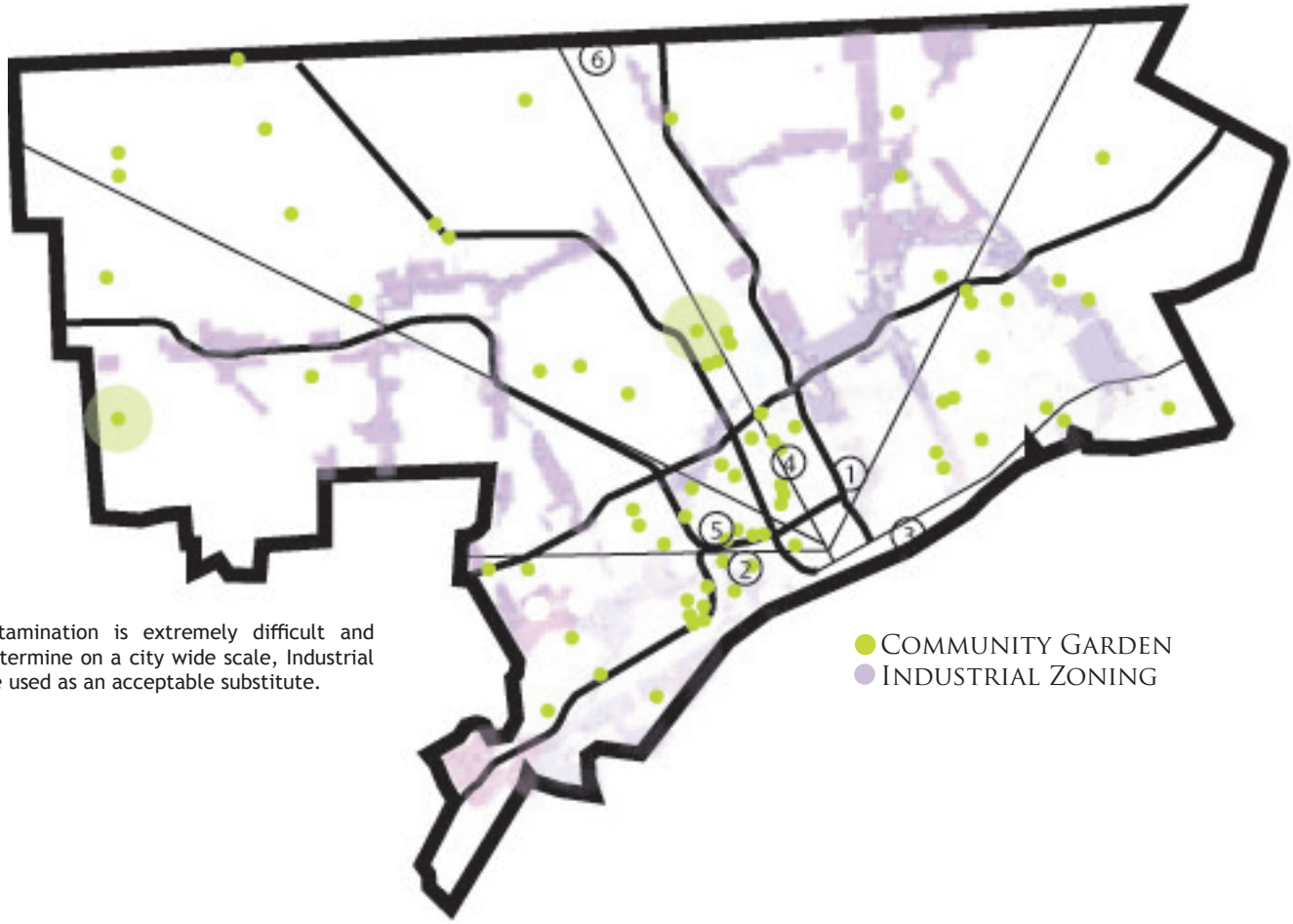
# Community Gardens


This data set should be used as soft data only. As many of these community garden projects are not technically legal, it is extremely difficult to get an official listing of all Urban Farming Gardens. All Data sourced from Detroit Future City.

# Access to Food



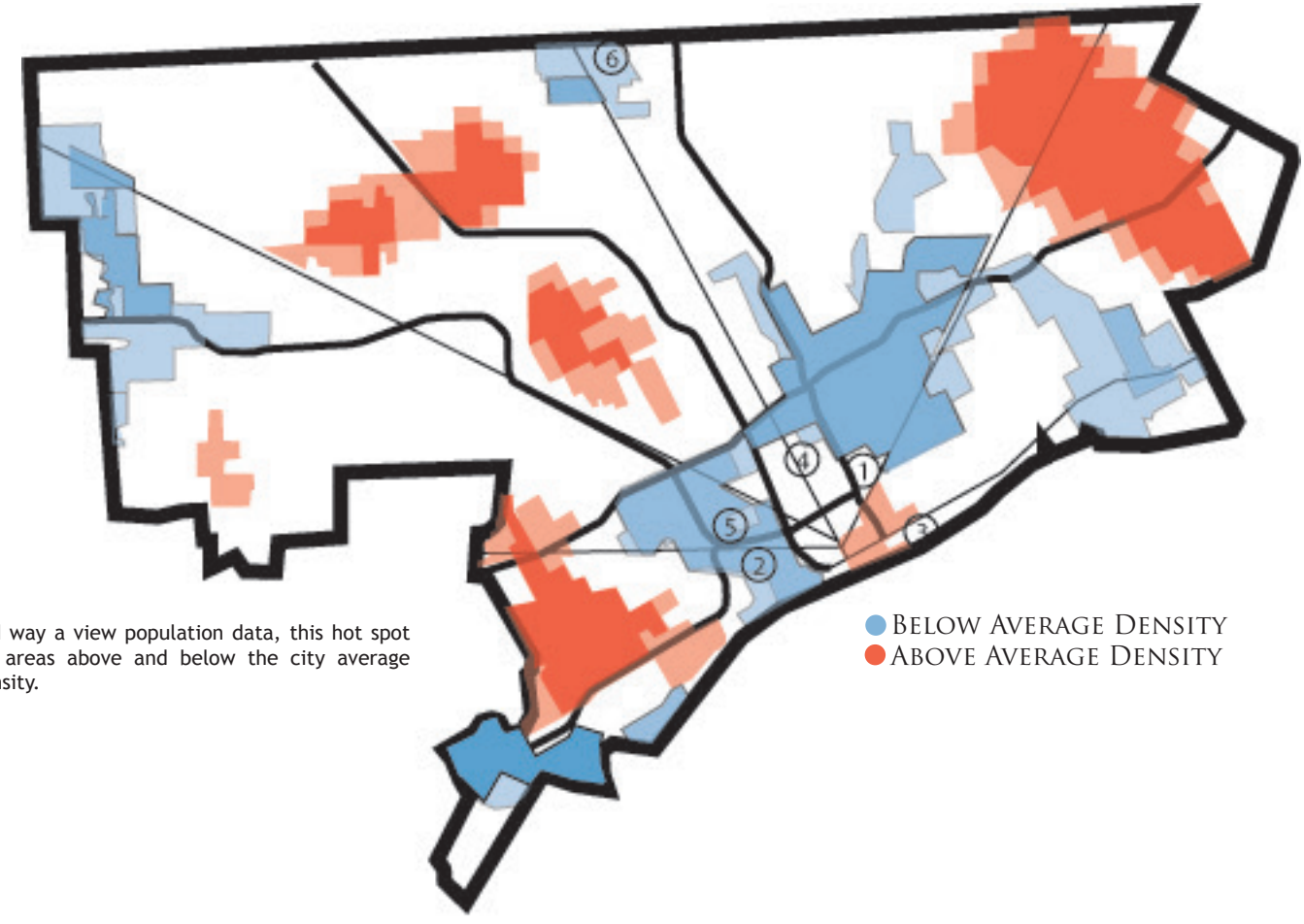
# Ground Contamination




As ground contamination is extremely difficult and expensive to determine on a city wide scale, Industrial zoning areas are used as an acceptable substitute.

Community Garden
Industrial Zoning

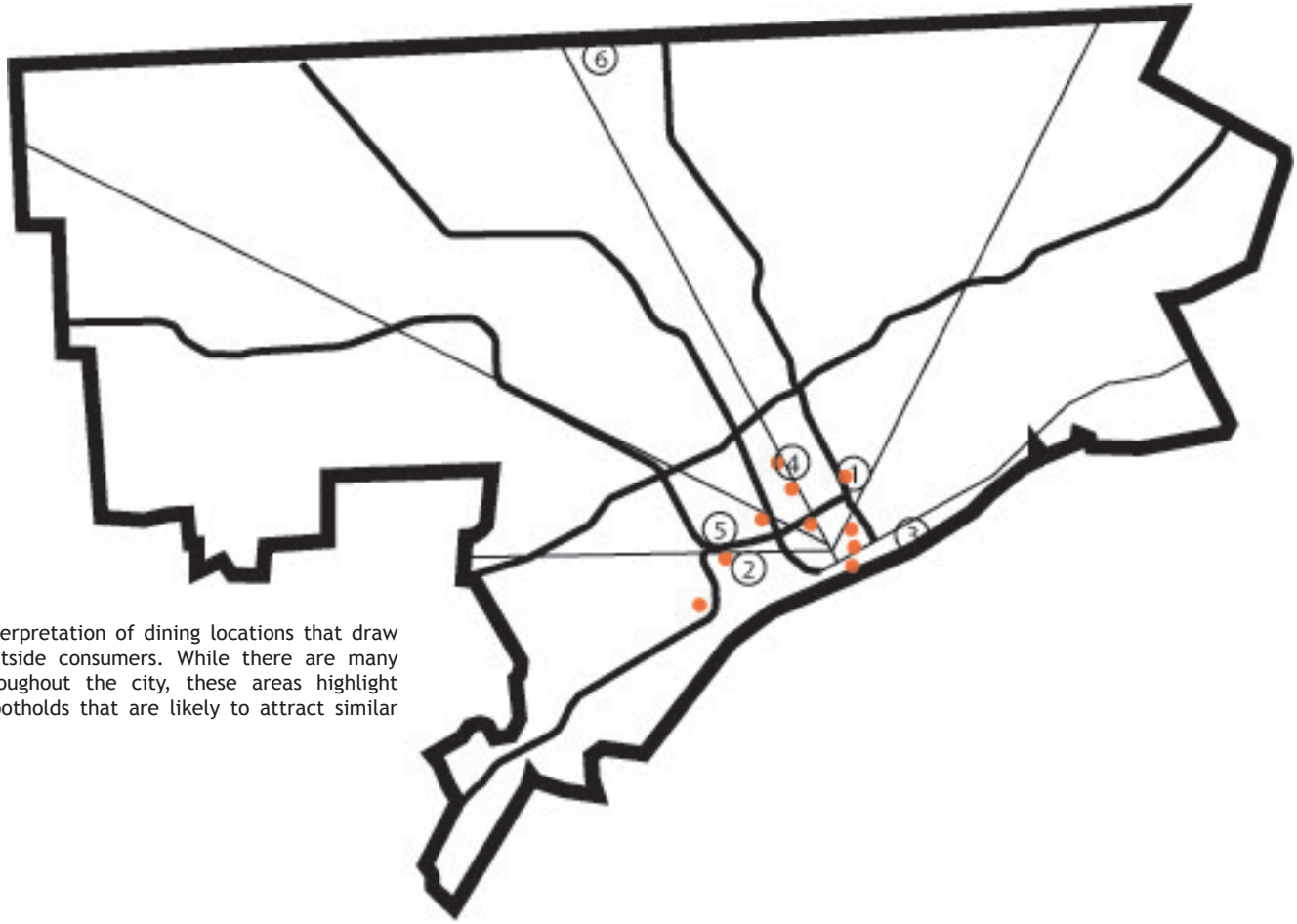
# Population Density




As a simplified way a view population data, this hot spot analysis show areas above and below the city average population density.

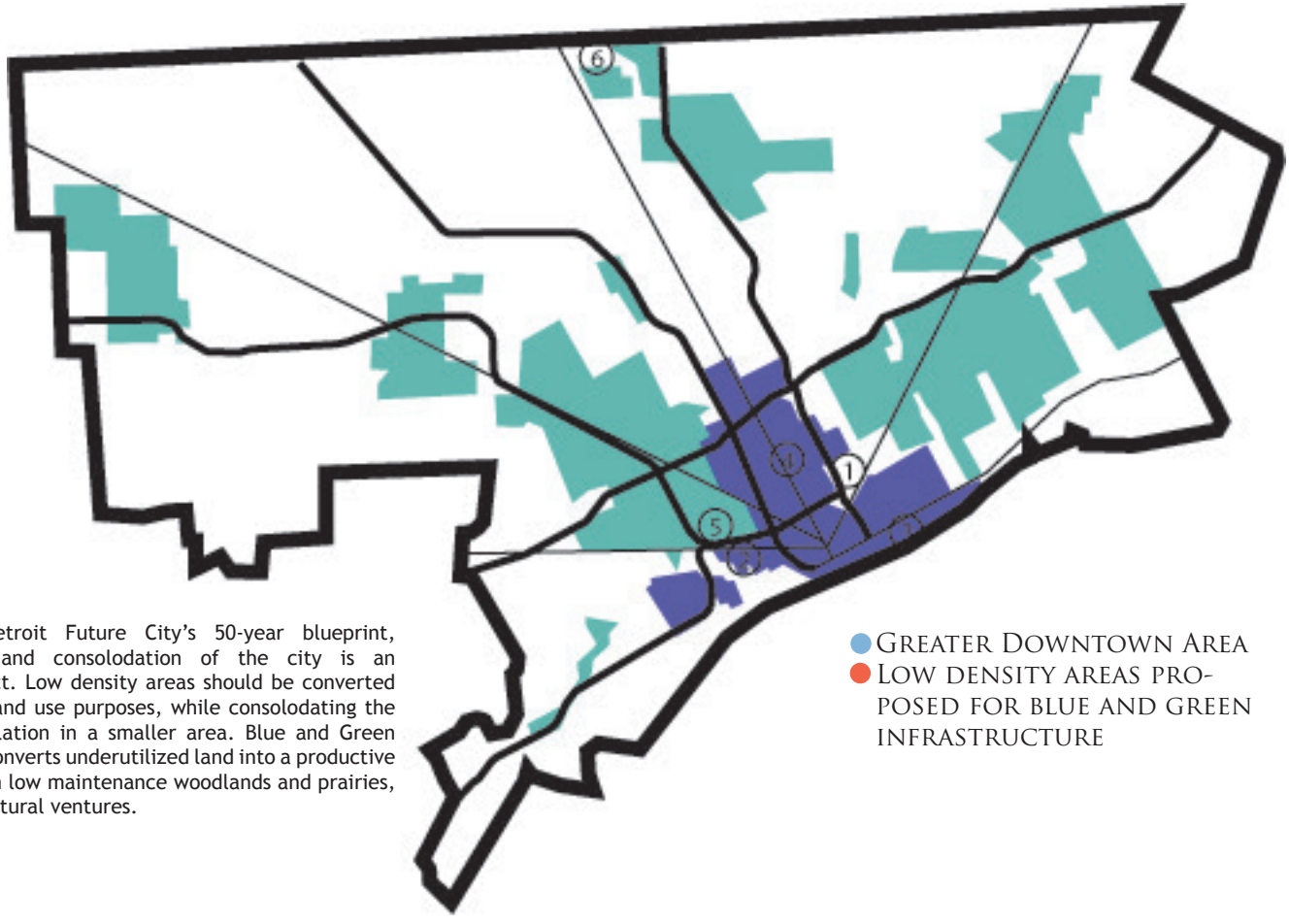
Below Average Density
Above Average Density

# Dining Destinations




A subjective interpretation of dining locations that draw an influx of outside consumers. While there are many restaurants throughout the city, these areas highlight strong dining footholds that are likely to attract similar establishments.

# Alternative Land USe and Greater Downtown




As part of Detroit Future City's 50-year blueprint, reorganization and consolodation of the city is an important aspect. Low density areas should be converted to alternative land use purposes, while consolodating the remaining population in a smaller area. Blue and Green infrastructure converts underutilized land into a productive landscape. From low maintenance woodlands and prairies, to active agricultural ventures.

- Greater Downtown Area
- Low density areas proposed for blue and green infrastructure

# Site Analysis

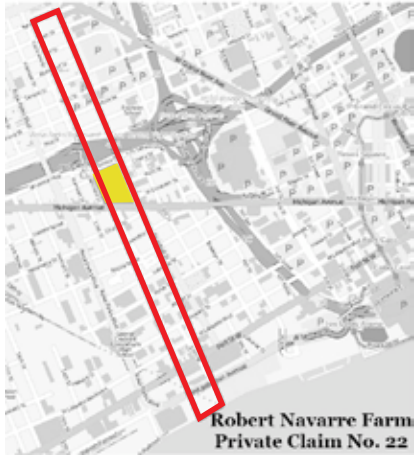
# Site History

"The Corner" - Michigan Ave. & Trumball - Corktown, Detroit

## 1709-1895

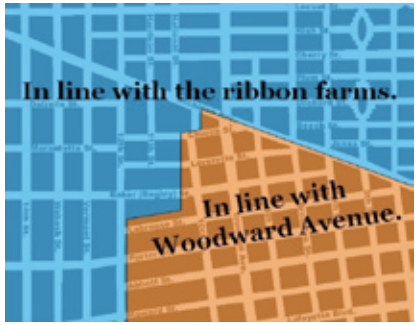
### Ribbon Farm to Public Picnic Park

The history of this site is relatively well documented starting in 1709 with the settlement of Detroit by the French. Initial located in the middle of a ribbon farm, which provided water access to each strip of farmland. After several changes in ownership, the property was eventually subdivided in response to annexation by the City of Detroit, which would have resulted in substantial taxes. A portion of the property located at Trumball and Cherry St. was reserved as a wooded public picnic park, and remained such until 1896 with the establishment of Bennet Park. (Szewczyk)



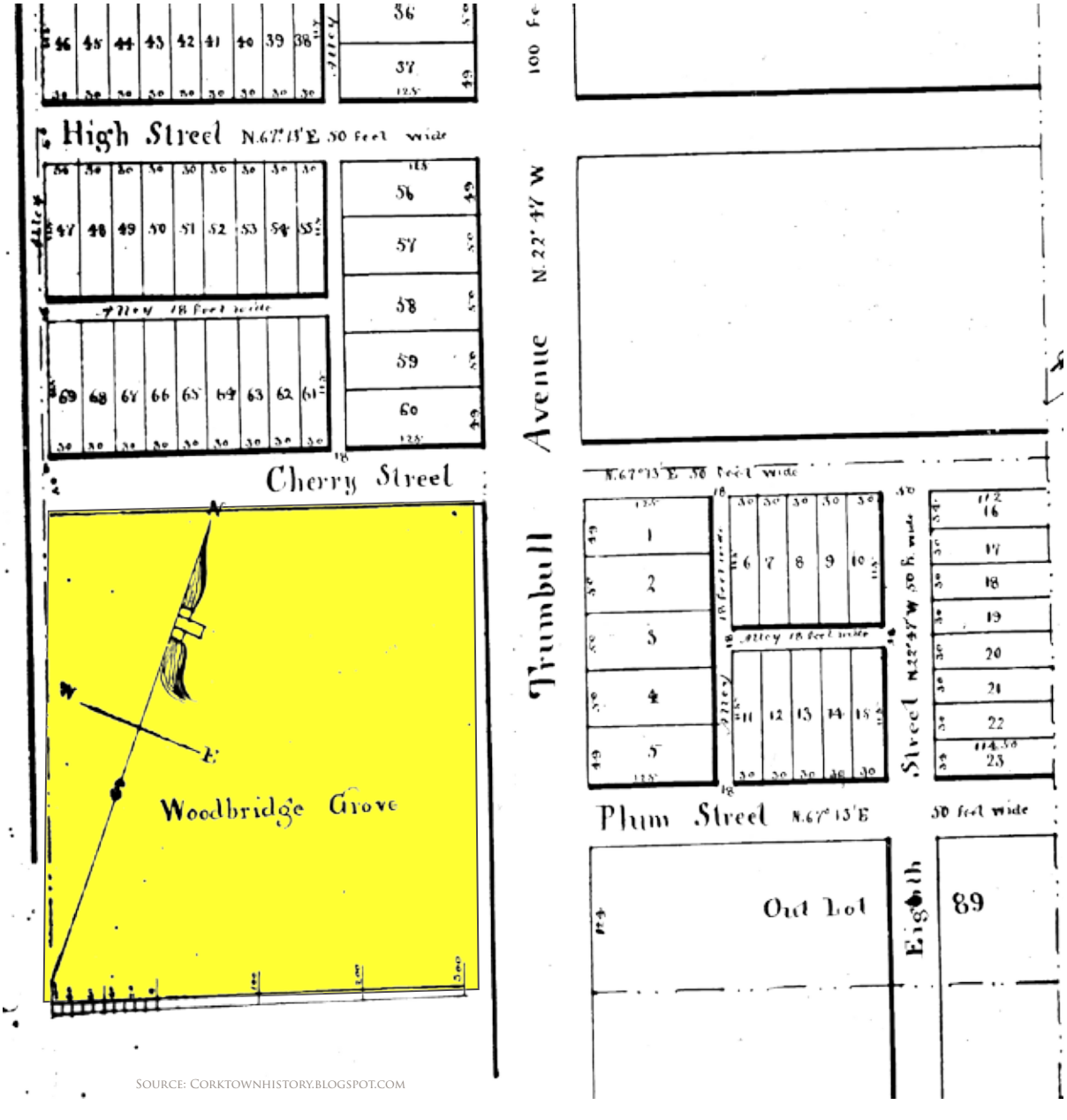

Navarre Farm sold to Woodbridge in 1819

Source: Corktownhistory.blogspot.com




Platting began in 1858

Source: Corktownhistory.blogspot.com




Source: Corktownhistory.blogspot.com

## Woodbridge Grove Public Picnic Park

Following annexation by the City of Detroit, woodbridge subdivied his farm plot. A wooded lot on the northwest corner of Michigan and Trumbull was left as a public picnic park.

## 1896 - Present

### Baseball to Relic

The baseball history of this site is also well documented through its evolution from its start in 1896 as Bennet Park. Over the years as both the baseball league system, as well as the city of Detroit grew, various expansions and remodels took place. Along with various changes inn ownership, the name of the stadium also changed over the years. But this was the home for Detroit baseball for over 100 years. It became known as "the corner", as many historic and memorable scenes unfolded at Trumball and Michigan Ave. (Szewczyk)

Following the construction of a new stadium, 1999 was the final season of baseball at Tiger stadium. It then sat emply for years as preservation groups fought to save Tiger Stadium, until its complete demolition in 2009.

Controversy

Even after the demoltion of the stadium, debate and controversy rule the site. The only remains include the diamond, flag pole, and Stadium fence on Michigan Ave. Tall weeds quickly began to overgrow the site. In an effort to honor the site, a small group began to mow the weeds and grass, collect trash and generally maintain the site. In response, the City of Detroit treated it as trespasing and attempted to prevent the group from maintaining the site. Under the direction of the Detroit Economic Growth Corporation, several RFP's have been issued with all of the proposal being turned down. The devisive issue remains the future of the baseball diamond. As of March, 2014 a new RFP has been issued on the basis of Mixed-Use with Baseball.

SOURCE: SABR.ORG

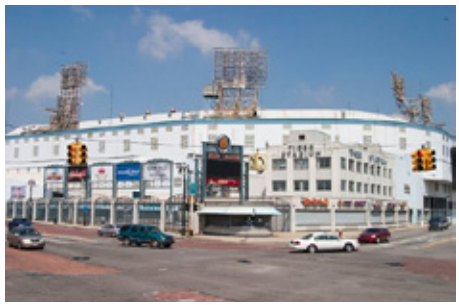
SOURCE: SABR.ORG

SOURCE: SABR.ORG


SOURCE: RETROBALLPARKS.BLOGSPOT.COM


SOURCE: RETROBALLPARKS.BLOGSPOT.COM


SOURCE: ETHANCASEY.COM


SOURCE: FLICKR.COM

SOURCE: FLICKR.COM


SOURCE: FLICKR.COM

## Current Site Analysis

This anaylysis shows the site in context with Michigan avenue. The red indicates bars and food service establishments. As you can see, it is the primary business along this strip with many new restaurants drawing an influx of consumers each day. It is also becoming a destination for new residents with several loft buildings and the historic corktown neighborhood providing attractive living spaces. Michigan ave is also home to the headquarters of The Greening of Detroit, a non-profit resource for urban farmers throughout the city. Among their many activities, they manage several gardens including MGM Gardens, Detroit Market Garden and the Romanowski Farm Park.

To contribute to the urban fabric of the neighborhood, and capitalize on the economic viability of the agriculture, it is important to form connections with the existing restaurants in the area, by providing produce for use in their ventures. From lettuce, vegetable and herbs for the restaurants, and tea production for Astro Coffee, to Hop Production for Batch Brewing. Integration, and visible integration is important to maintain neighborhood identity. Preservation of the baseball diamond is also an important aspect and can be done, while also reverting the site to one of its historical uses, a public picnic park.

# Old Tiger Stadium

- Restaurant / Bar
- Light Industrial
- Residential
- Vacant
- Religious / community
- Commercial

# MasterPlanning

# Space Required for Estimated Demand

**Lettuce** - .5 acre
8,000 heads per year

Source: 1996 Coachella Valley Loose Leaf Lettuce Cost Study`

**Hops** - 2 acres
Provides 1/8th of Batch Brewing demand 16-20 acres to meet full demand
Source: Batch Brewing

**Tea** - 1,400 s.f.
Provides 5 cups of tea per day
Source: ineedcoffee.com

Old Tiger Stadium - 16 acres

## Estimated Growing Space: 7.5 Acres

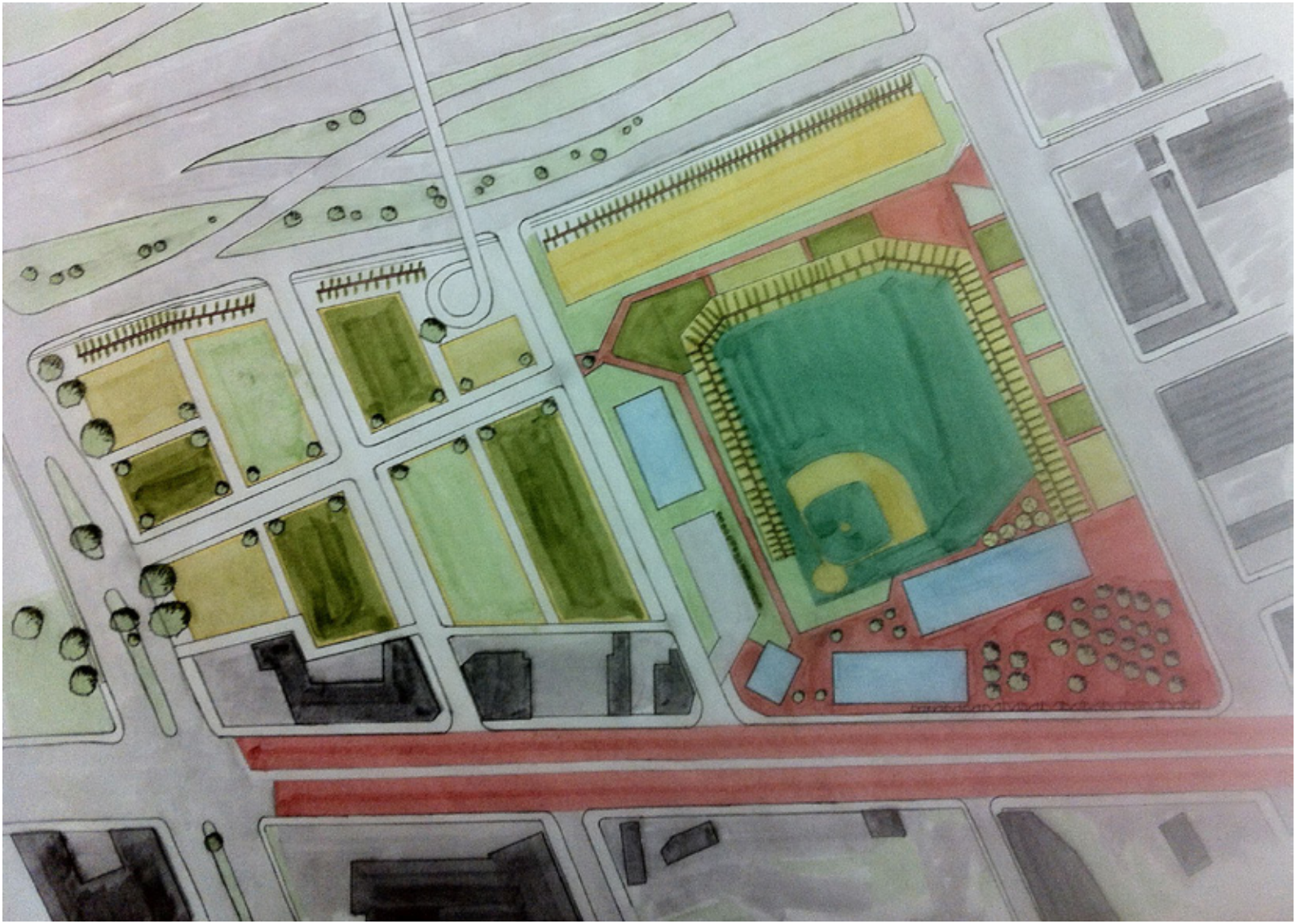
Lafayette Greens - .5 Acres

De Kas Amsterdam - 1.2 Acres

Brother Nature - 1 acre

D-Town Farms - 6 Acres

EarthWorks - .7 ` Acres



## Integrating Baseball

While baseball is not an integral factor to my thesis concept, public space throughout the site is. Based on the contextual history of the site, as well as public demand, the preservation of the baseball diamond can and should be included in this intervention. Not only can it provide a additional draw to the site, it can serve the site in a variety of ways. The large green open space can host a variety of events including; summer festivals and concerts, picnic style dining, free range space for children, and an outdoor beer garden for Octoberfest. The design includes a sectioned, and permeable trellis structure surrounding the field. The wide flange columns and sloped metal roof canopy harken back to the form of Tiger Stadium, while providing support for hop vines. The columns are spaced at twenty feet to provide visual definition but also allow open visual access from all vantage points, which is an important safety criteria.

Surrounding the ball field are traditional growing fields offering a variety of crops for use in the restaurant and market. Hop fields are ideal along the north side as a visual and sound barrier to the freeway.

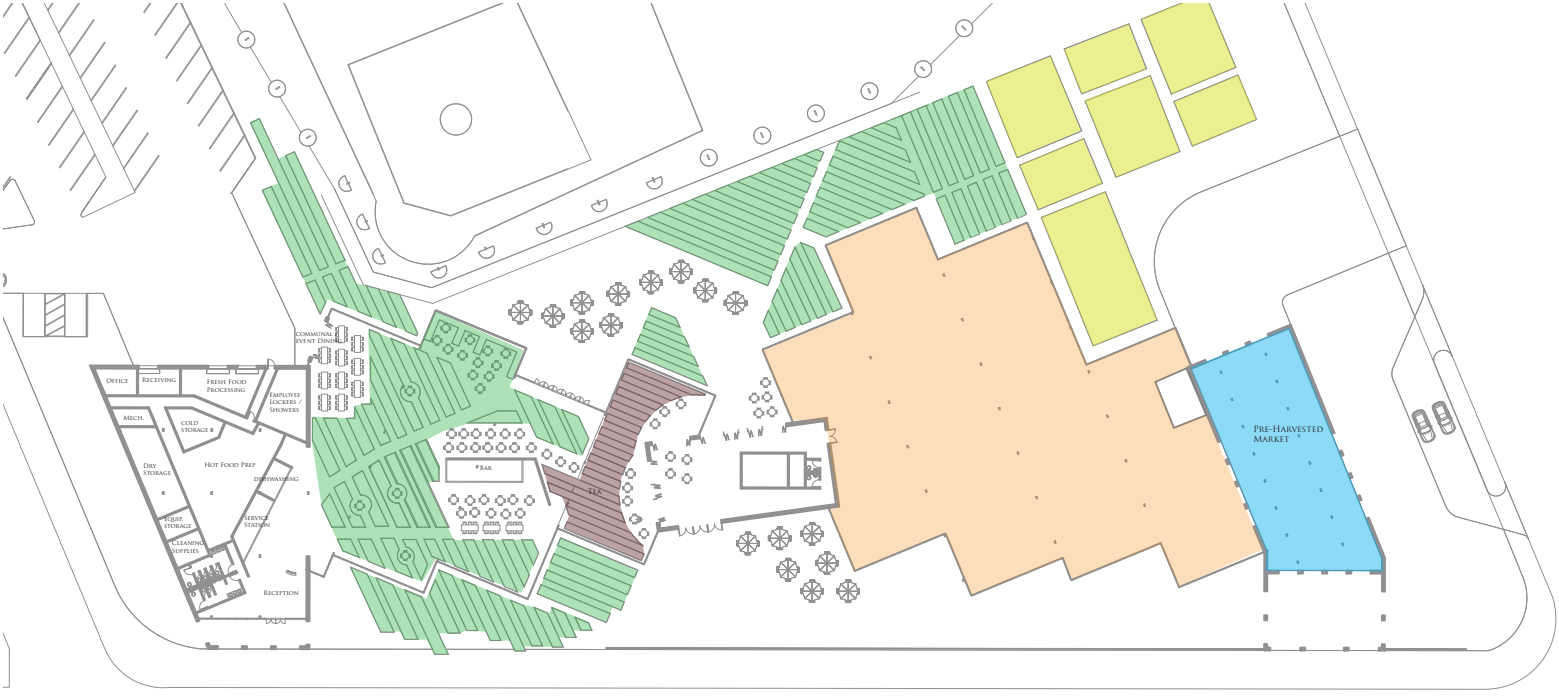
The main architectural component will front Michigan Ave. to maintain and contribute to the street front persona of Corktown. While most of the two and three story buildings in the area are situated directly on sidewalk, there is opportunity to set the structure back slightly to create a public plaza between the new building and the remaining fence from Tiger Stadiums Tiger Plaza, with the fifteen foot tall fence providing the street presence.

# Architectural Development

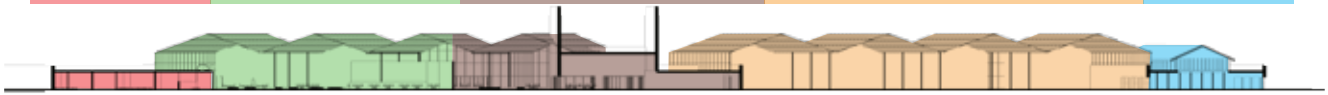
By utilizing the traditional from of industrial greenhouses, we are not only able to capitalize on their efficient and proven growing spaces, we are able to capitalize on their recognizable form to express function and purpose. As our function and purpose is a hybrid between food production and food service, the design itself should represent this hybrid nature. Modest and complementary alterations to the greenhouses add the additional layers of complexity that show the public this isn't just a normal greenhouse.

With two separate greenhouse areas, the composition is anchored at the middle and ends with traditional and very opaque structures. These anchors act as the way finders for entry. The center anchor is a tall single story cafe with a supplemental growing screen on top. This towers over each wing and is visible from both the east and west perspective. Conversely, the two end anchors are lower, allowing the greenhouses to be seen rising above them upon approach.

The entire composition is arranged to orient and greet the public arriving along Michigan Ave. from the east and west. Each greenhouse section is angle towards the approach to create a picturesque arrangement, thereby contrasting with the purely utilitarian arrangement of traditional commercial greenhouses.




| West Anchor | West Greenhouse | Center Anchor | East Greenhouse | East Anchor |
|---|---|---|---|---|
| Receiving<br>Fresh Process.<br>Storage<br>Employee Showers<br>Kitchen<br>Restrooms<br>Customer Entrance | 5,000 s.f planter beds<br>Restaurant Dining 188 seats<br>Bar Area 58 seats | Opaque Cafe<br>Tea crop production<br>Michigan Ave. Plaza<br>Indoor / Outdoor Seating | U-Pick Produce Market<br>Traditional table based crops for flexible arrangement | Market space for local vendors<br>Market space for onsite production |



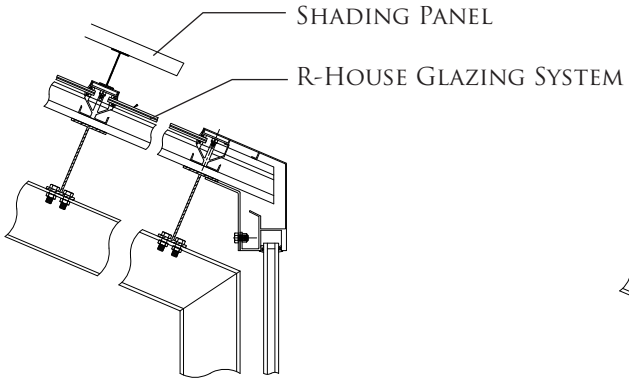

EAT

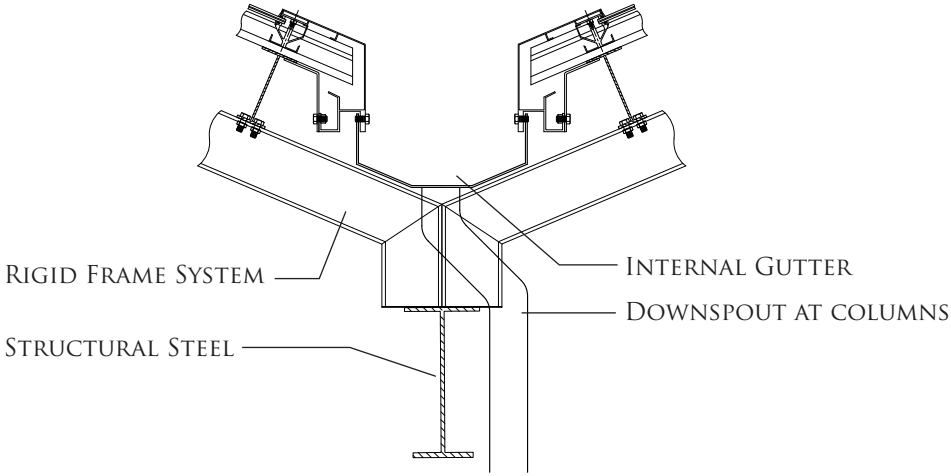

MARKET

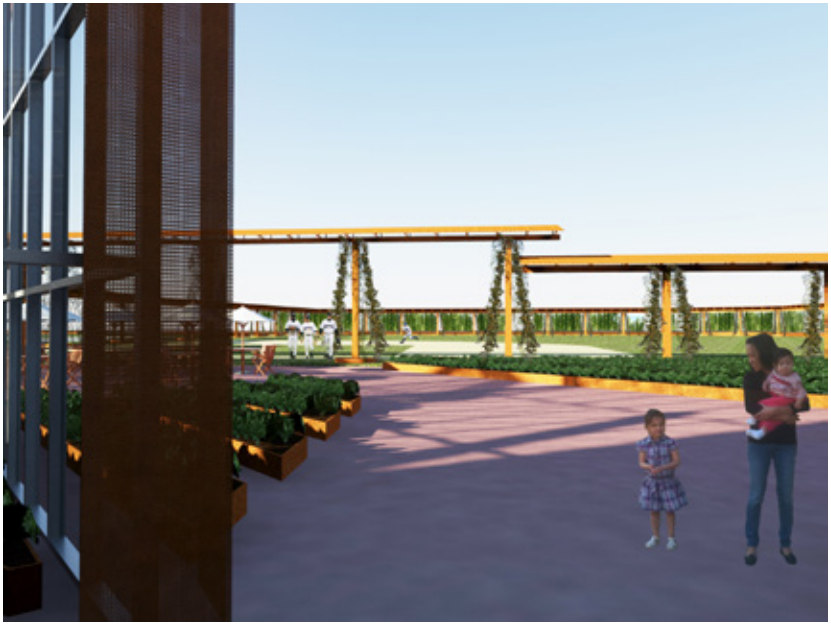
With the intend being to merge urban agriculture into the fabric of the city, it was important to merge the agriculture into the fabric of the restaurant. Where a traditional restaurant has a budget for decor such as artwork, antiques, and neon lights, this concept utilizes the agriculture as the decor. Dining next to the tomato plant that provided for the tomato bisque offers a deeper connection and experience


Located in the Center Anchor, the cafe offers central access to all aspects of the composition. It has center stage in the resurrected Tiger Plaza on Michigan Ave., and offers quick access to the patio dining near the ballfield.

The interior consists of a high bay lounge area with vertical clerestory lighting. The service station extends from the lower portion. The opaque construction not only acts as the visual anchor, but provides a shady spot on hot, bright days. To fully enjoy a cup of tea, the tea gardens are interspersed with tables. Where else can you enjoy a cup next to the very plant itself.


Shading Panel
R-House Glazing System

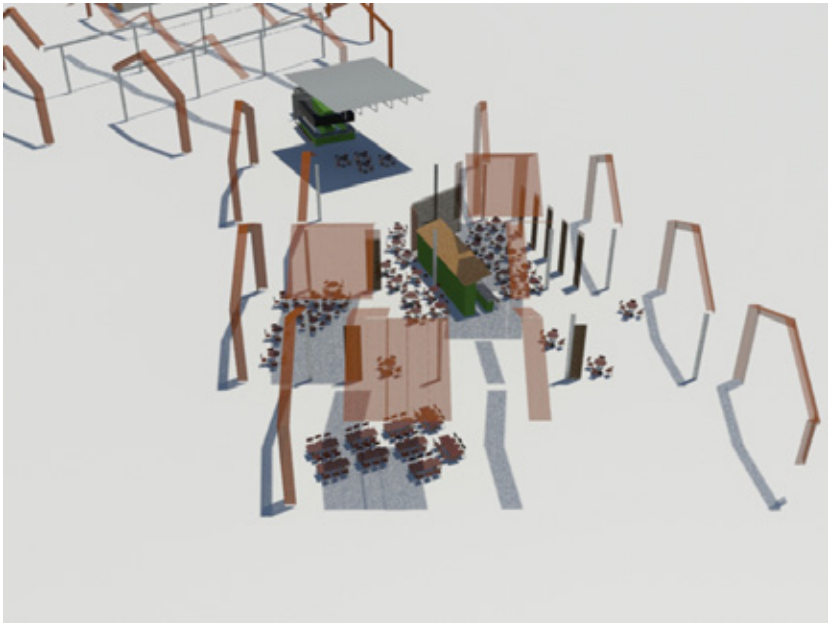

Rigid Frame System
Structural Steel
Internal Gutter
Downspout at columns

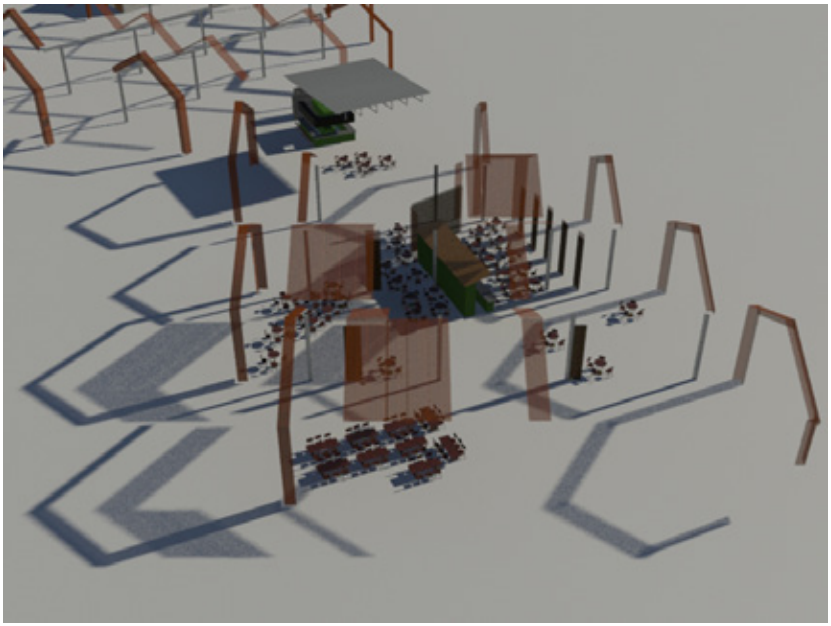


Between the greenhouses and the ballfield, space is available for outdoor dining, strolling and enjoying the game. Temporary netting can be raised and lowered to provide protection from an errant ball.

Salvaging and integrating with the remaining Stadium fence was an opportunity to maintain as much of the original site as possible. It also offered a means of backing the building away from the street edge without losing the street front presence. Traditional mixed-use development would certainly be expected to locate close to the street, however, this concept is a hybrid, and therefore, should hint at its density.

It also offers the opportunity to provide a public plaza between the gates and the building. From gardens to cafe seating to open market space, the plaza offers a level of psychological protection from the often busy Michigan Ave., without removing the people from the street side experience.



Utilizing corrugated and perforate corten steel panels to frame the greenhouse profile, they are also utilized as shading devices on the roof. Not meant to provide complete shade protection at all times, but merely offer a section of the dining area to be shaded depending on time and season.

The technical aspect of the HVAC system was not explored at this time, thought it is the logical next step, and arguably the most important aspect of taking this from a unique experience to a replicable, citywide land use strategy.

Natural ventilation is a standard feature available on commercial greenhouse structures and the typical automated ridge vent systems are assumed here.

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