

**The Feasibility of Creating a Self-Sustaining
Hoop House Vegetable Garden
at the Padua Center**

507 Junction St., Toledo, OH

Prepared by



1811 N. Reynolds Road
Suite 204
Toledo, OH 43615
419-265-1811

info@grantfundamentals.com

www.grantfundamentals.com

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Hoop House Vegetable Garden
at the Padua Center
1343 Tecumseh St., Toledo, OH**

Prepared by

Gale A. Mentzer, PhD
Verl Luse
T. Ryan Duckett
Aaron Fader

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Executive Summary

This report includes the methodology and findings of a feasibility study that examined the viability of creating a self-sustaining hoop house garden for the Padua Center in Toledo, OH. The study examines the nutritional dietary gap for residents in census tracts 32, 35, and 36—all adjacent to or part of the Padua Center service area. There is a high degree of poverty in census tracts 32 and 36 (over 45%) and a moderate level in census tract 35 (30%). According to national dietary guidelines, the average American needs to increase vegetable consumption by 76% to meet nutritional needs. And while lower income families tend to consume more daily vegetables than their higher income counterparts, their consumption is still below recommended guidelines. Compounding this is the fact that the availability of fresh produce is scarce within the immediate target communities with the closest grocery store chain more than four miles outside the area.

In addition to selling produce grown in the hoop house to neighborhood residents, a needs assessment was conducted to determine whether there was a wholesale market with local restaurants. Twenty-five restaurants located in the neighborhood or in downtown Toledo (close proximity to the Padua Center) were contacted. Of the 25, five were not interested due to pre-existing contracts and others associated with national chains had restrictions on suppliers. Several others did not respond to our calls. Phone calls that were not returned were followed up with visits to the restaurants. Of those visited, four indicated an interest in purchasing produce from the Padua Center but needed more information (pricing, type of produce, availability). Another option for the sale of produce would be to do so through local farmer's markets. Participation at these markets comes with a cost, however, ranging from a yearly membership of \$400, a seasonal membership of \$100, and daily memberships of \$40 (May-Nov) and \$10 (Dec-April).

Finally, a cost benefit analysis was conducted to determine whether the sale of produce from the hoop house could sustain its maintenance. Findings from the nutritional gap analysis support the need for fresh produce in the target area. Additionally, some restaurants have an interest in purchasing produce. Based upon the size of the hoop house, a living wage of \$8.00 per hour, and an estimated 335 hours per year to maintain the garden, it was concluded that the produce could yield \$4,330 annually. Extra expenses for startup could exceed income during the first year by about \$150 but subsequent years, based upon selling all available produce, could realize a profit of about \$900.

Money lost during the startup year can feasibly be recuperated in subsequent years. Additionally, produce raised in the hoop house could fill a nutritional gap experienced by the local residents and the sale of produce to Padua Center neighbors would provide access to fresh foods that may not be available to some who do not have the means to travel to grocery stores outside the neighborhood. As a community service provider and a non-profit organization, the offering of fresh produce to its neighbors is a worthy endeavor for the Padua.

I Background

The Padua Center commissioned Grant Fundamentals, LLC to provide the following services with regards to a hoop house to be erected on property adjacent to the Center at the corner of Junction and Nebraska, Toledo, OH:

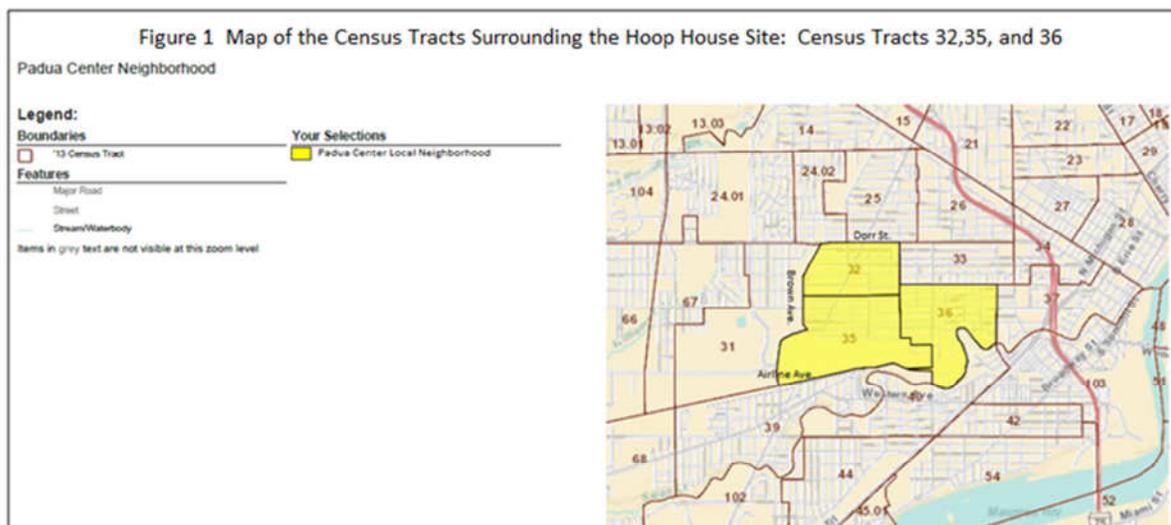
Conduct a feasibility study for the viability of creating a self-sustaining Hoop House vegetable garden that includes:

- An identification of nutritional gaps for citizens living in the neighborhood (zip code 43604; census tracts 32 and 35).
- A needs assessment of local restaurants and markets as to the type and amount of produce they would be willing to purchase from the project.
- A cost/effectiveness analysis that compares projected costs of maintaining garden, harvesting produce, and selling produce with profits from produce sales including identification of a break-even point.

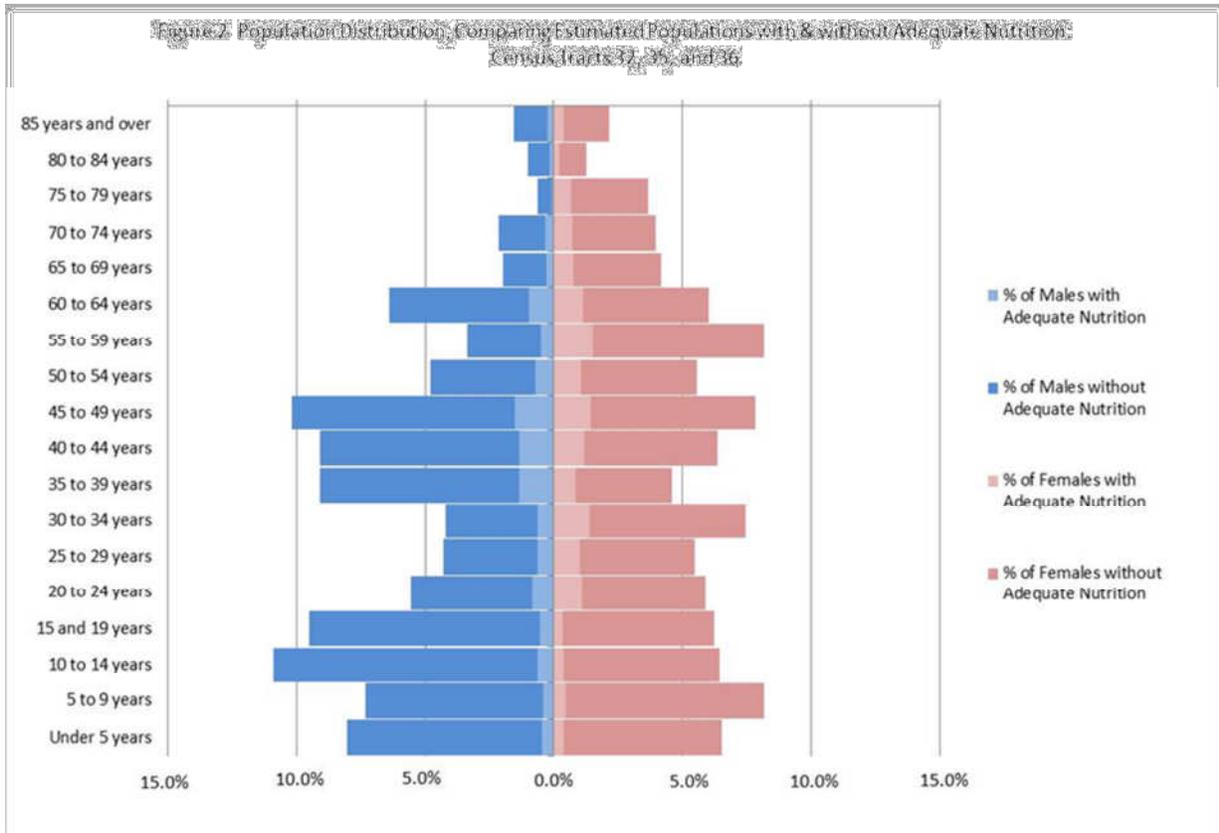
This report includes methodology and findings of the study.

I Nutritional Gap Analysis for the Padua Center Neighborhood

The Padua Center is located in the Kwanzaa Park neighborhood, near the northwest corner of Nebraska and Junction Avenues. The projected site of the proposed hoop house is across Nebraska Avenue from the Padua Center on the southwest corner of the Nebraska and Junction Avenues. Three census tracts—32, 35, and 36—were included in this analysis (Figure 1). Because the western block groups within census tract 36 were a short distance from the hoop house location and the census tract was located within the 43604 zip code, census tract 36 was added to the requested area of analysis. Based on the 2012 American Community Survey data, the community had an estimated total population of 4,529 people—2,091 males and 2,438 females.



The age structure of the community is important because nutritional needs and nutritional gap vary by age and gender (Figure 2). According to a recent article (Kimmons, et al., 2009), in general only 5.8% of adolescents age 12-18 met the recommended consumption of vegetables per day, compared to males age 19+ consuming 14.7% and females age 19+ consuming 18.6% of the recommended daily vegetable intake. Compared to the highest income groups, lower income groups (those less than 3 times the poverty level) were more likely to consume the recommended daily vegetables than their higher income counterparts¹, *but still well below the recommended guidelines*. Comparisons between dietary trends are as follows: among lower income individuals, adolescents, 6.6% (average of the two lowest income groups) met the recommendations; among males age 19+, 14.5% (average of the two lowest income groups) met the recommendations and among females age 19+, 35.7% (average of the two lowest income groups) met the recommendations (Kimmons et. al.). In this community, 31.2% percent of the population are under the age of 20 and 47.0 percent of the children under the age of 18 are in poverty (Table 1).



Note: 5.8% was used for all individuals less than 20. For males and females age 20 plus, 14.7 percent and 18.6 percent was used for males and females respectively.

¹ This finding is somewhat suspect and goes against other data within the same chart that suggest a lower level of consumption for lower income groups. This is also contrary to social theory that would suggest that lower incomes would have lower consumption rates. Recent research would also support lower consumption rates for lower income groups (see Knai, et al., 2006). Attempts to contact the authors to correct this information were not successful.

Table 1: Percent in poverty by demographics for census tracts 32, 35, and 36

Percent Below Poverty	Census Tract 32	Census Tract 35	Census Tract 36	Total
Population below poverty level	50.8	29.8	45.1	40.58
Under 18 years of age	62.8	27.4	55.9	46.96
Male	55.9	32.4	42	42.35
Female	45.4	27.2	46.9	39.05
White	20.5	30.6	41.9	34.02
Black or African American	50.8	31.9	44.9	41.53

This information is consistent with data from other sources. According to the research conducted in 2010 entitled “2010 GAP Analysis—The Federal Fruit and Vegetable Consumption Challenge: How Federal Spending Falls Short of Addressing Public Health Needs,” the average American needs to increase his/her fruit consumption by 135% and vegetable consumption by 76% in order to meet the U.S. Dietary Guidelines for 2008 (Rosenfeld, 2010). Focusing on vegetable consumption in particular, the average American consumer should increase his/her dark green vegetable (U.S. Dietary Guidelines for 2008, Table 3) intake by 247% and orange vegetable (U.S. Dietary Guidelines for 2010, Table 2) intake by 1040%, from .25 actual servings per day to .86 servings for dark vegetables and from .05 actual servings per day to .57 servings per day for orange vegetables.

Translating servings to gardening metrics is a challenge. In a conversation with staff at the Padua Center, a list of possible crops included a focus on dark green vegetables: collard greens, kale, spinach, turnip, mustard greens, beets and beet greens, okra, and Swiss chard. Based on the population of the neighborhood and the daily recommended servings of dark green vegetables (U.S. Dietary Guideline, 2010), this translates to 7,263 cups per week for the community. Converting cups per week to bushels per year, this community would need about 2,536 *bushels of dark green vegetables per year to meet the recommended consumption guidelines*. However, based on average consumption trends, the community consumes a high end estimate of 731 bushels per year (see Table 2). A low end estimate of 417 bushels per year can be estimated by averaging the male and female consumption estimates and multiplying this by the yearly recommended consumption. The percent needed to fill the gap was calculated by dividing the gap amount by the actual amount and converting to a percentage. In short, based on these estimates, the market demand for dark green vegetables in the community surrounding the Padua Center is hard to estimate precisely, but, based on national trends, the hoop house (using a dark green vegetable such as kale as an example) would produce 259 more pounds of produce than would typically be consumed within the target community and would produce 1,535 pounds less than the recommended consumption of dark green vegetables. Given the U.S. government’s push for greater vegetable consumption, the consumption gap certainly suggests that the market for dark green vegetables is present and is likely to increase over time far beyond what could be

produced at the Padua Center hoop house, assuming that low-income individuals are willing and able to follow these guidelines.

Table 2: Estimated gap between recommended and actual produce consumption

Time Frame	Recommended	Actual	Gap	% Increase Needed
Yearly	2536	731	1804	247%
Weekly	49	14	35	247%
Daily	7	2	5	247%

Table 3: Median income for target community

Median Income	Census Tract 32	Census Tract 35	Census Tract 36
Households (Estimated)	\$18,942	\$25,134	\$19,659
Families (Estimated)	\$22,196	\$30,161	\$22,057

II Local Community Demand for Hoop House Produce

The more difficult question to address is the willingness of low-income individuals to increase their consumption of crops produced by the Padua Center hoop house along with the financial means to pay for the desired increase (see Table 2 and Table 3). In 2012, the poverty threshold for a family of four with two children was \$23,283². The data in Table 2 shows that two of the three census tracts fall below the poverty threshold. Within the context of a typical home in this neighborhood and assuming a limited discretionary income, one might wonder whether the goal of increasing the consumption of vegetables is a matter of increased willingness to consume produce, increased availability of produce, reduced price and improved quality of produce, or some combination. A research study conducted in 2005 showed that fruits and vegetables were lower in cost in low income neighborhoods, but this was highly dependent upon the availability of large bulk food grocery stores and their ability to keep prices down through large sales volume. However, a great deal of pricing disparities exist for vegetables even within the same food chain (Cassady, Jetter, & Culp, 2007) and large grocery store chains are not often located in low income neighborhoods. The reality of food deserts within inner city neighborhoods is both a national and a local problem. In the report entitled “The Grocery Gap: Who has Access to Healthy Food and Why it Matters” the authors summarize numerous other studies findings:

Low-income neighborhoods have half as many supermarkets as the wealthiest neighborhoods and four times as many smaller grocery stores, according to an assessment of 685 urban and rural census tracts in three states. The same study found four times as many supermarkets in predominantly white neighborhoods compared to predominantly black ones. Another multistate study found that

² <https://www.census.gov/hhes/www/poverty/data/threshld/>

Serenity Soul Food – Very Interested – Liked the suggested produce: Okra, collard greens, etc. They also suggested that yams, green bell peppers, jalapeños, and green tomatoes to be added to possible crops. They purchase their produce as needed, usually in two week quantities.

Downtown Latté – Would like more information about the program. They use very basic produce (e.g., peppers, cucumbers). The owner also does his own bargain shopping and picks out his own vegetables—may be interested in the future once he can see quality of produce and prices.

Georgio’s Café – Would like more information. He has great interest in locally grown produce, but is already doing business with other vendors. Will keep Padua in mind, but needs some numbers to look at before making a decision.

Glass City – Would like more information. He may have an interest in lettuce, green bell peppers, and other typical produce. We spoke with the son of the main manager/owner.

Pam’s Corner– Not interested – Has tried small local produce before, needs steady and reliable influx.

Table 44, Manhattan’s, Ye Olde Durty Bird—Already has produce vendors established.

Big Mama’s, Fine Things Bistro—Closed

Grumpy’s—Too busy to talk; but locally owned; a place we left message with during cold calls.

Market Prices for Popular Produce³⁴

- Beets: (2) \$1.26/lb
- Bell Peppers (Green): (1) \$1.39/lb; (2) \$1.33/lb
- Collard Greens: (1) \$1.76 per bunch; (2) \$1.47 per bunch
- Jalapeno: (1) \$0.69/lb; (2) \$1.26/lb
- Kale: (1) \$1.18 per bunch; (2) \$1.87 per bunch
- Lettuce (Iceberg): (1) \$0.99/lb; (2) \$1.52/lb
- Lettuce (Romaine): (1) \$1.42/lb; (2) \$1.01/lb
- Okra: (2) \$3.58/lb
- Spinach: (1) \$4.78/lb; (2) \$4.12/lb
- Tomatoes (Green): (1) \$1.64/lb; (2) \$1.26
- Yams: (1) \$0.98/lb; (2) \$1.85/lb

³ Price (1) (where listed) is from the USDA national average (<http://www.ams.usda.gov/mnreports/fvwretail.pdf>);

⁴ Price (2) (where listed) is from <http://www.foodcoop.com/go.php?id=90>

The cost of marketing produce in established community markets was also researched. The following is a summary of costs for stall rental (Taken from the Toledo Farmers' Market's Webpage⁵):

Downtown Market – 525 Market St.

\$400 Annual fee (April 1 – March 31)

\$40 Daily Fee (May – Nov.); Saturday 8 a.m. – 2 p.m.

\$10 Daily Fee (Dec. – April); Saturday 9 a.m. – 1 p.m.

Westgate Market

Association Members - \$100 for the first stall per market season, \$50 for each additional stall.

Non-Member Associates - \$250 for the first stall per market season, \$125 for each additional stall.

There are no daily rentals at the Westgate Market

All markets require approval from the Board of Directors before vendors are allowed to sell at any given market. The board requires sellers of food related items to obtain all permits needed to sell those items.

The Toledo Farmers' Market will begin reviewing applications again in June of 2015. Any applications received earlier will be held until June of 2015 and sellers will be invited to present food products to their Board for approval. NOTE: According to the Farmer's Market Association, "Non-profit groups may request use of a stall free of charge on any Saturday other than Flower Day Weekend or other special events. A maximum of two (2) stalls per day may be allocated to such groups, as long as the stalls are open/not rented. Any non-profit group may use a free stall a maximum of three (3) days per calendar year. . . If any product the non-profit is requesting to sell would be in competition with any paying vendor on the market, the Executive Director must contact the affected vendor(s) for prior approval. As an alternative, approval may be given by the Board President for a non-profit to sell a competing product."

VI Cost Effectiveness Analysis of Hoop House

The nutritional gap in the community surrounding the Padua Center hoop house is created by two different realities: first, the local and national trend with regards to the under-consumption of vegetables and dark and orange vegetables in particular, and second, the nutritional gap caused by limited financial and community resources. Assuming the estimations are correct, the hoop house could potentially produce more than enough produce to meet local need, but not enough to meet the need based on 2010 U.S. Dietary Guidelines. Given the right pricing structure, the hoop

⁵ http://www.toledofarmersmarket.com/dynamic_content/uploadfiles/1663/Rules%20and%20Regulations5.5.11.pdf

house produce could help the local community increase their vegetable consumption. With the additional proviso that any vegetables produced in excess could then be sold to the larger community, local restaurants or through the local farmers markets, the hoop house may be able to find a market for everything that is grown.

The question of self-sustainability, with the goal of paying a gardener a living wage based upon a hypothetical garden scenario (Table 4) suggests that the garden could break even. Based on estimated 2.5 growing seasons per year and dividing the hoop house into fourths, an annual income of approximately \$4,300 could be realized (assuming all produce is sold). The costs for labor, site preparation, and supplies exceed the income during the startup year by about \$150. Subsequent years will be less expensive and the hoop house could actually bring in an annual profit of about \$900.

Table 4: Hypothetical Balance Sheet for Padua Center Produce

Income		Expenses	
Produce Sales*	312 sq ft=25% of area	Site preparation	First year only
\$ 133.66	Peppers @ \$1.36/lb with avg yield ¹	\$ 1,000	Soil upgrade/leveling
Optimum yield	.35 lb/sq ft=109.2 lbs of produce at optimal yield	\$ 50	Herbicide
Expected yield	.28 lb/sq ft=87.36 lbs of produce		
		Labor- Produce	Per year
\$ 773.58	Tomatos @\$1.45/lb with avg yield ¹	\$2,680	335 hrs @\$8.00/hour
Optimum yield	1.9 lb/sq ft=592.8 lbs of produce		
Expected yield	1.52 lb/sq ft=474.2 lbs of produce	Planting related-In season	Per year (2.5 plantings)
		\$ 125.00	Fertilizer
\$1,249.56	Spinach @\$4.45/lb with avg yield ¹	\$ 525.00	Water
Optimum yield	1.0 lb/sq ft=312 lbs of produce		
Expected yield	.8 lb/sq ft= 249.6 lbs of produce	Workmans Compensation	Per Year
		\$ 53.60	2%
\$ 316.33	Egg Plants @\$2.25/lb with avg yield ²		
Optimum yield	.80 lb/sq ft=249 lbs of produce	Equipment	First year only
Expected yield	.64 lb/sq ft=199.7 lbs of produce	\$50	Hoses, Garden Implements
Subtotal	\$2,473.13	\$ 3,434	Per year
Total	\$4,327.97	\$ 4,484	Per year (Years 2+)
		Net (Startup Year)	\$ (155.63)
		Net (Subsequent Years)	\$ 894.37
*Produce sales were based on 1 hoop house with a 1,248 (26' x 48') sq ft area and a four crop rotation.			
¹ Price estimates taken from page 9 of report "Market Prices for Popular Produce."			
² Price estimates taken from Conner 2010.			

Determining how many hours are actually needed to plant and harvest a crop grown in a hoop house was based on a recent Michigan State University (MSU) study involving 12 novice hoop house farmers. The study found that for a 2,880 square foot hoop house, a year's labor required an average of 1096.4 hours (Waldman, et. al, 2010). Considering that the estimated size

of the Padua Center hoop house is 1,248 sq. ft., 43.3% of the hoop houses in the MSU study, the Padua Center hoop house would require 475 hours of labor. Another report sites MSU research as estimating that a hoop house required 335 hours per year (Conner, 2010). For our example in Table 4, we used the more conservative 335 hours because the gardener at the Padua Center is experienced.

V Conclusions and Recommendations

There is a definite nutritional gap with regards to dark green and orange vegetables for residents in Census tracts 32, 35, and 36. In addition, there are few markets located in these neighborhoods. Produce grown in the Padua Center hoop house could feasibly be offered for sale to the residents of the target census tracts but the venue for selling should be considered carefully. For example, membership in the Downtown Market could cost up to \$400 (annual membership). Subtracting the membership fee from expected annual yield of income would reduce net profit thereby lowering the amount that could contribute to the salary of the gardener and the purchase of supplies. There also appears to be a market for produce with local restaurants but the cost of delivering (fuel and personnel expenses) should be factored into the equation.

It is recommended that the Padua Center hoop house project proceed with its intention of growing and selling the types of vegetables identified by the nutritional gap and by the needs assessment with local restaurants. These include leafy green vegetables and lettuces, green peppers, cucumbers, tomatoes and yams. While the sale of the produce will not pay for the amount of labor required to maintain the hoop house garden during the startup year, it could recover that amount during subsequent years and provide enough income to sustain itself. Moreover, it will, in the long run, provide essential food requirements to its community that is currently deficient.

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APPENDIX

Padua Hoop House Garden Potential Vendors:	Call Response	On-site Visit
Serenity Soul Food – 1.1 mi 527 Nebraska Ave	Very interested	Yes
Georgio’s Café – 2.7 mi 426 N Superior St	Left message, interested	Yes
Black Kite Coffee – 3.0 mi 2499 Collingwood Blvd	Some interest, sent email	
El Tipico – 2.0 mi 1444 South Ave	Not interested	
Attic – Manos – 2.4 mi 1701 Adams St	Not interested	
City Grill – 2.6 mi 421 N Huron St,	Not interested	
Registry Bistro – 2.4 mi 144 N Superior St,	Not interested	
Fine Things Bistro – 2.3 mi 38 S St Clair St	Not in business	
Spaghetti Warehouse – 2.1 mi 42 S Superior St	Not interested	
Rockwell’s– 2.3 mi 27 Broadway St	Not interested	
Jefferson Express – 2.4 mi 1220 Jefferson Ave	Not interested	
Focaccia deli – 2.7 mi 333 N Summit St	Not interested	
Blarney – 2.2 mi 601 Monroe St	Not interested	
Pizza Papalis – 2.2 mi 519 Monroe St	Not interested	
Home Slice – 2.3 mi 28 S St Clair St	Not interested	
Big Mama’s Restaurant - 0.5 mi 1008 Nebraska	Not in business	
Manhattan’s – 2.5 mi 1516 Adams St	Left message	Yes
Ottawa Tavern – 2.7 mi 1817 Adams St	Left message	
Our Brothers’ Place – 2.4 mi 233 N Huron St	Left message	
Glass City Café – 2.8 mi 1107 Jackson St,	Left message	Yes
Lazeez – 2.7 mi 337 N St Clair St,	Left message	
Grumpy’s – 2.0 mi 34 S Huron St	Left message	Yes
Michael’s Bar and Grill – 2.3 mi 901 Monroe St	Left message	
Big C’s Smoked BBQ – 2.7 mi 316 N. Michigan St.	Disconnected	
Bleakhouse Coffee – 2.5 mi 612 Adams St	Left message	
Table 44 – 2.2 mi 610 Monroe St	Left message	Yes
Downtown Latte – 2.3 mi 44 S St Clair St	Left message	Yes
Dexter’s Jamaican – 1.9 mi 1830 W Bancroft St	Left message	
Ye Olde Durty Bird – 2.4 mi 2 S. St Clair St.	Left message	Yes
Pam’s Corner – 2.3 mi 116 10th S.	Left Message	Yes