

# Gratiot Avenue Transit Study

**Tech Memo #6: Station Area**

5/31/2016

# Table of Contents

- 1 INTRODUCTION ..... 3**
  - 1.1 PROJECT DESCRIPTION..... 3
- 2 METHODOLOGY ..... 5**
  - 2.1 POPULATION AND EMPLOYMENT DENSITY ..... 5
  - 2.2 EQUITABLE ACCESS TO THE TRANSIT INVESTMENT ..... 5
  - 2.3 CONNECTIVITY TO THE TRANSIT NETWORK..... 5
  - 2.4 CONNECTIVITY TO THE REGIONAL TRANSPORTATION NETWORK..... 5
  - 2.5 DEVELOPMENT POTENTIAL ..... 6
  - 2.6 RIDERSHIP..... 6
- 3 SUMMARY OF RESULTS ..... 7**
  - 3.1 POPULATION AND EMPLOYMENT DENSITY ..... 7
  - 3.2 EQUITABLE ACCESS TO THE TRANSIT INVESTMENT ..... 8
  - 3.3 CONNECTIVITY TO THE TRANSIT NETWORK..... 9
  - 3.4 CONNECTIVITY TO THE REGIONAL TRANSPORTATION NETWORK..... 10
  - 3.5 DEVELOPMENT POTENTIAL ..... 11
  - 3.6 RIDERSHIP..... 13
  - 3.7 SUMMARY OF STATION AREA EVALUATION ..... 14

## List of Tables

- Table 3-1: Population and Employment Densities ..... 7
- Table 3-2: Equitable Access to the Transit Investment ..... 8
- Table 3-3: Connectivity to the Transit Network..... 9
- Table 3-4: Connectivity to the Regional Transportation Network ..... 10
- Table 3-5: Development Potential..... 12
- Table 3-6: Station Ridership..... 13
- Table 3-7: Station Area Analysis Results..... 14

## List of Figures

- Figure 1-1: Study Area ..... 4

# 1 Introduction

## 1.1 Project Description

The Gratiot Avenue Transit Study represents a crucial early step in the development of enhanced transit along Gratiot Avenue. This 12-month study is being led by the Regional Transit Authority of Southeast Michigan (RTA); it includes the development and evaluation of multiple rapid transit alternatives between Downtown Detroit and M-59. The study area spans the 23-mile Gratiot Avenue corridor that serves portions of Wayne and Macomb counties. This study was initiated in April 2015 and the selection of a Locally Preferred Alternative (LPA) is anticipated in March 2016.

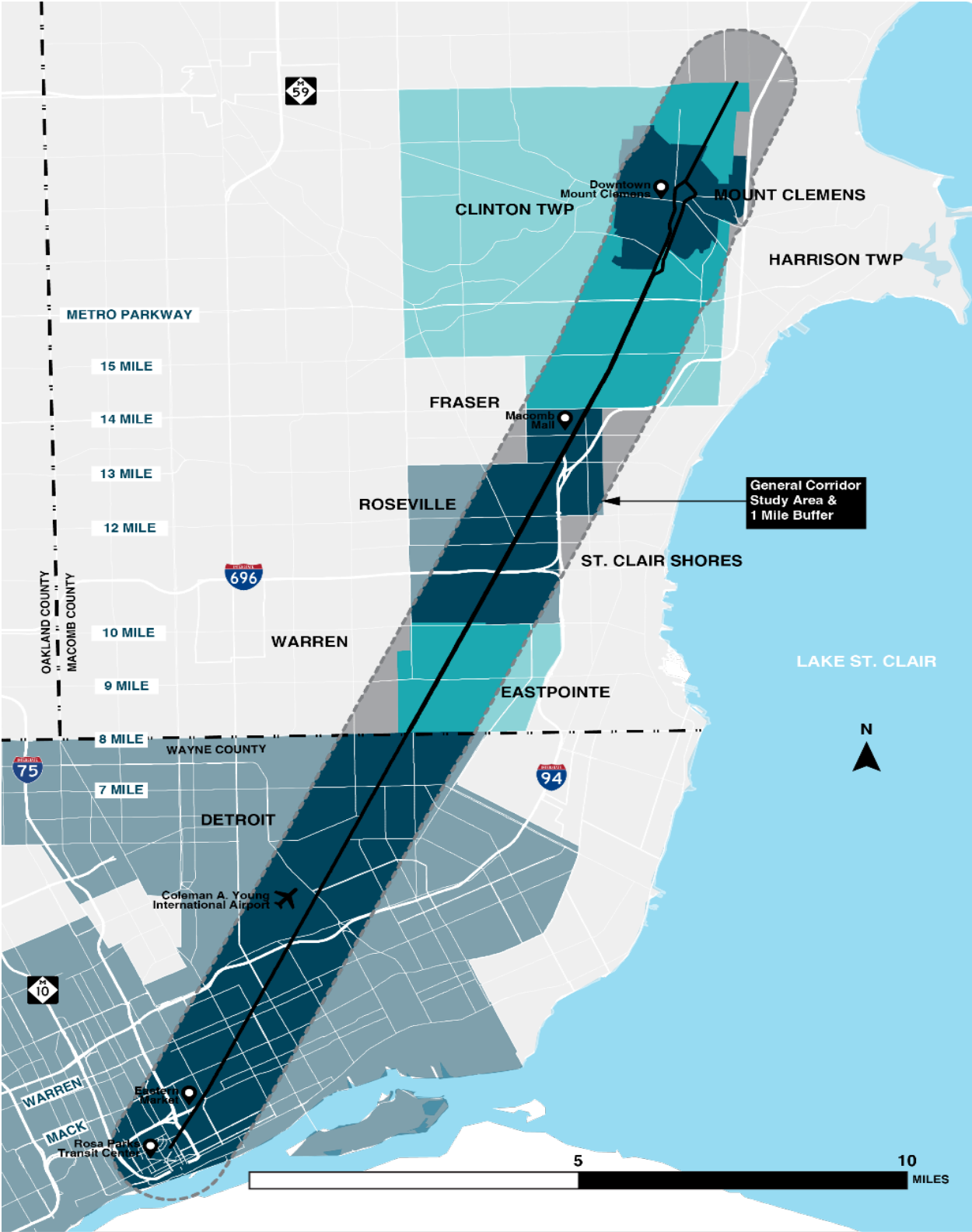
The corridor communities along Gratiot Avenue include five cities and townships in Wayne and Macomb Counties:

- Clinton Township
- Detroit
- Eastpointe
- Mount Clemens
- Roseville

As represented in Figure 1-1, the main study area extends from downtown Detroit in the south to M-59 in the north.

This memorandum presents an evaluation of the station areas being considered in the Gratiot Avenue Transit Study. Specifically, examining the development potential, ridership, regional transportation connections, transit connections, proximity to zero car households, and population and employment densities. Station locations with scoring high using the above criteria are considered more favorable than those scoring low, though some stations may make sense for other reasons, such as a stop spacing.

FIGURE 1-1: STUDY AREA



# 2 Methodology

## 2.1 Population and Employment Density

Population and employment density was measured by developing estimates of the number of population and employment within a half-mile radius of each station. This analysis was conducted consistent with FTA guidance, which instructs these estimates to be created by assigning population and employment totals to each station area based on the pro-rated amount of area that falls within the half-mile radius of each station, assuming that these metrics are evenly dispersed throughout the traffic analysis zone (TAZ) where the data originated.

Population density totals at each station were evaluated against each other on a scale from one (1) to five (5), as thresholds were developed in alignment with the results of this analysis. Employment density totals at each station were evaluated against each other on a scale from one (1) to five (5), as thresholds were developed in alignment with the results of this analysis.

## 2.2 Equitable Access to the Transit Investment

Equitable access to the transit investment was measured by determining the number of zero-car households within a half-mile of each station. This analysis was conducted consistent with FTA guidance, which instructs these estimates to be created by assigning household totals to each station area based on the pro-rated amount of area that falls within the half-mile radius of each station, assuming that these metrics are evenly dispersed throughout the block group where the data originated.

Equitable access characteristics at each station were evaluated against each other on a scale from one (1) to five (5), as thresholds were developed in alignment with the results of this analysis.

## 2.3 Connectivity to the Transit Network

Connectivity to the transit network was measured by analyzing the number of existing transit routes that intersect or align with Gratiot Avenue within a half-mile of each station. This analysis was conducted by utilizing current transit provider route data and determining the number of routes that fall within the half-mile radius of each station.

Connectivity to the transit network at each station were evaluated against each other on a scale from one (1) to seven (7), as thresholds were developed in alignment with the results of this analysis.

## 2.4 Connectivity to the Regional Transportation Network

Connectivity to the regional transportation network was measured by determining the number of regional highway interchanges and park-and-ride facilities within a half-mile of each station. This analysis was conducted by utilizing current MDOT data and determining the number of facilities that fall within the half-mile radius of each station.

Connectivity to the regional transportation network at each station were evaluated against each other on a scale from one (1) to three (3), as thresholds were developed in alignment with the results of this analysis.

## 2.5 Development Potential

Development potential was measured by evaluating local development and zoning policies, the number of major trip generators, the number of recent and approved developments, and development potential within a half-mile of each station. This analysis was conducted through qualitative and quantitative analyses that match the local support for transit-supportive development with the amount of developable land in each location.

Development potential at each station were evaluated against each other on a scale from one (1) to ten (10) as a cumulative score of each metric listed above.

## 2.6 Ridership

Ridership was measured by utilizing a travel demand forecasting model (E6C+) developed by the Southeast Michigan Council of Governments (SEMCOG). This model is a traditional 4-step, trip based model that was updated by SEMCOG in early 2015 and includes trip distribution and mode choice components. The following summarizes the key characteristics of the E6C+ model:

- The trip distribution and mode choice model were calibrated to a base year of 2010
- The highway assignment utilizes five different time periods (AM, mid-day, PM, evening, overnight)
- The transit assignment uses two time periods (peak and off-peak)
- Transit assignment is implemented by using trip tables in P-A format
- The revised time of day model was calibrated using 2010 traffic patterns
- E6 model managed lane features were incorporated in highway assignment
- The model summary program was revised to reflect the changes made in E6C+
- Alternative Specific Constants for non-included attributes were added for the premium modes

Ridership at each station was evaluated against each other on a scale from one (1) to ten (10), as thresholds were developed in alignment with the results of this analysis.

# 3 Summary of Results

## 3.1 Population and Employment Density

This analysis indicated that population concentrations exist near downtown Mt. Clemens, downtown Roseville, Eastpointe, the northern portion of Detroit, and in downtown Detroit. Areas of lower population densities exist in Clinton Township and in various portions of Detroit. Employment densities were concentrated in fewer locations, specifically near downtown Mt. Clemens and downtown Detroit with a modest concentration of employment near Macomb Mall. The remaining stations had very little employment density, all scoring within the lowest threshold. The results of the analysis are shown in Table 3-1.

**TABLE 3-1: POPULATION AND EMPLOYMENT DENSITIES**

Stations	Population Density	Employment Density
23 Mile	1,700	1,180
Hall Rd/M-59	1,398	1,177
Sandpiper	1,608	1,029
Downtown Mt. Clemens	3,149	3,594
South River	2,741	3,123
Metro Parkway	2,632	697
15 Mile	2,680	1,214
Macomb Mall	2,135	2,654
13 Mile	3,038	1,618
Common	3,290	1,517
12 Mile	4,085	1,953
Utica	4,674	1,761
11 Mile	4,560	1,357
10 Mile	4,684	1,880
9 Mile	5,355	1,645
8 Mile	5,256	1,478
7 Mile	4,704	1,328
McNichols	4,259	1,176

<b>Outer Drive</b>	3,312	1,135
<b>Harper</b>	2,721	1,014
<b>McClellan</b>	3,351	812
<b>Van Dyke</b>	3,739	862
<b>Warren</b>	2,890	1,096
<b>Mack</b>	1,958	1,090
<b>Eastern Market</b>	4,290	5,598
<b>Bricktown</b>	4,185	39,047

## 3.2 Equitable Access to the Transit Investment

This analysis indicated that stations in need of equitable access to the transit investment occur predominantly within Detroit, with the highest proportion of transit dependent populations existing near downtown Detroit. A medium level of transit dependent populations are dispersed beyond downtown Detroit, extending through the northern portion of the city and into Eastpointe and Roseville. Beyond Roseville, a relatively low proportion of transit dependent populations exist. The results of this analysis are shown in Table 3-2.

**TABLE 3-2: EQUITABLE ACCESS TO THE TRANSIT INVESTMENT**

<b>Station</b>	<b>Transit Dependent Households</b>
<b>23 Mile</b>	67
<b>Hall Rd/M-59</b>	40
<b>Sandpiper</b>	63
<b>Downtown Mt. Clemens</b>	209
<b>South River</b>	167
<b>Metro Parkway</b>	128
<b>15 Mile</b>	127
<b>Macomb Mall</b>	143
<b>13 Mile</b>	192
<b>Common Rd.</b>	201
<b>12 Mile</b>	225
<b>Utica</b>	251
<b>11 Mile</b>	240



<b>10 Mile</b>	253
<b>9 Mile</b>	324
<b>8 Mile</b>	370
<b>7 Mile</b>	431
<b>McNichols</b>	387
<b>Outer</b>	292
<b>Harper</b>	340
<b>McClellan</b>	434
<b>Van Dyke</b>	498
<b>Warren</b>	374
<b>Mack</b>	327
<b>Eastern Market</b>	926
<b>Bricktown</b>	948

### 3.3 Connectivity to the Transit Network

This analysis indicated that stations with the highest concentration of connections to the existing transit network exist within Detroit, with nearly every station scoring in the highest threshold. Stations located in Macomb County typically are not in areas where multiple routes intersect or align with Gratiot, as service is more dispersed, but stations in Roseville provide the most opportunity for connections to multiple routes of the existing transit network. The results of this analysis are shown in Table 3-3.

**TABLE 3-3: CONNECTIVITY TO THE TRANSIT NETWORK**

<b>Station</b>	<b>Transit Connections</b>	<b>DDOT Route Number</b>	<b>SMART Route Number</b>
<b>23 Mile</b>	1		560
<b>Hall Rd/M-59</b>	1		560
<b>Sandpiper</b>	1		560
<b>Downtown Mt. Clemens</b>	1		560
<b>South River</b>	1		560
<b>Metro Parkway</b>	1		560
<b>15 Mile</b>	2		560/780
<b>Macomb Mall</b>	4		560/550/615/620

<b>13 Mile</b>	2		560/760
<b>Common Rd.</b>	1		560
<b>12 Mile</b>	2		560/740
<b>Utica</b>	1		560
<b>11 Mile</b>	1		560
<b>10 Mile</b>	2		560/730
<b>9 Mile</b>	2		560/710
<b>8 Mile</b>	3	17/34	560
<b>7 Mile</b>	4	9/34/45	560
<b>McNichols</b>	4	32/34	530/560
<b>Outer</b>	5	13/34/38	530/560
<b>Harper</b>	6	7/11/34	530/560/580
<b>McClellan</b>	4	34	530/560/580
<b>Van Dyke</b>	6	34/48	510/530/560/580
<b>Warren</b>	6	14/34	510/530/560/580
<b>Mack</b>	6	31/34	510/530/560/580
<b>Eastern Market</b>	7	31/34/40	510/530/560/580
<b>Bricktown</b>	6	34/40	510/530/560/580

### 3.4 Connectivity to the Regional Transportation Network

This analysis indicated that stations with the highest concentration of connections to the regional transportation network exist at M-59, Metro Parkway, 11 Mile (I-696), 8 Mile, and near downtown Detroit. The remaining stations provide very few connections to the regional transportation network, all scoring within the lowest threshold. The results of this analysis are shown in Table 3-4.

**TABLE 3-4: CONNECTIVITY TO THE REGIONAL TRANSPORTATION NETWORK**

Station	Transportation Connections	Park-and-Ride	Highway Interchange
<b>23 Mile</b>	2	Yes	Yes
<b>Hall Rd/M-59</b>	1	No	Yes
<b>Sandpiper</b>	0	No	No
<b>Downtown Mt. Clemens</b>	0	No	No

<b>South River</b>	0	No	No
<b>Metro Parkway</b>	0	No	No
<b>15 Mile</b>	0	No	No
<b>Macomb Mall</b>	1	No	Yes
<b>13 Mile</b>	1	No	Yes
<b>Common Rd.</b>	0	No	No
<b>12 Mile</b>	0	No	No
<b>Utica</b>	0	No	No
<b>11 Mile</b>	1	No	Yes
<b>10 Mile</b>	0	No	No
<b>9 Mile</b>	0	No	No
<b>8 Mile</b>	0	No	No
<b>7 Mile</b>	0	No	No
<b>McNichols</b>	0	No	No
<b>Outer</b>	0	No	No
<b>Harper</b>	1	No	Yes
<b>McClellan</b>	1	No	Yes
<b>Van Dyke</b>	0	No	No
<b>Warren</b>	0	No	No
<b>Mack</b>	0	No	No
<b>Eastern Market</b>	1	No	Yes
<b>Bricktown</b>	1	No	Yes

### 3.5 Development Potential

This analysis indicated that stations with the most development potential exist near downtown Mt. Clemens, downtown Roseville, and downtown Detroit. Stations with a moderate level of development potential exist near Macomb Mall, Eastpointe, the northern portion of Detroit, and near I-94 in Detroit. Beyond these locations, relatively low levels of development potential exist. The results of this analysis are shown in Table 3-5.

TABLE 3-5: DEVELOPMENT POTENTIAL

	Local Development Policy	Local Zoning Policy	Major Trip Generators	Recent and Approved Development	Development Potential	Overall
23 Mile	0	0	1	0	1	2
M-59	0	0	1	1	0	2
Sandpiper	1	1	0	0	1	3
Downtown Mt Clemens	2	2	2	0	2	8
South River	2	0	0	0	1	3
Metro Parkway	1	0	1	0	0	2
15 Mile Rd	0	0	1	1	1	3
Macomb Mall	1	1	1	1	1	5
13 Mile Road	0	1	1	0	1	3
Common Road	0	1	0	0	0	1
12 Mile Road	0	1	1	0	1	3
Utica	2	2	1	0	2	7
11 Mile Road	0	1	1	0	0	2
10 Mile Road	0	2	0	0	0	2
9 Mile Road	2	2	1	0	1	6
8 Mile Road	2	2	0	0	1	5
7 Mile Road	1	1	1	0	1	4
McNichols	2	1	0	0	1	4
Outer Drive	1	1	1	0	1	4
Harper Avenue	1	1	1	0	0	3
McClellan	1	1	1	1	1	5
Van Dyke	1	1	1	0	0	3
Warren Avenue	1	1	0	0	1	3
Mack Avenue	1	1	1	0	0	3
Eastern Market	2	1	2	2	2	9
Bricktown	2	1	2	2	2	9

## 3.6 Ridership

This analysis indicated that stations with the most ridership potential exist at the intersections of major crosstown bus routes (i.e. transfer points) and within Detroit. Beyond these locations, several activity centers like Macomb Mall, near downtown Roseville, and near downtown Easpointe have the potential to generate solid ridership. The results of this analysis are shown in Table 3-6 where a ridership range is given based on the results of several model runs.

**TABLE 3-6: STATION RIDERSHIP**

Station Location	Ridership Range
23 Mile Road	70 – 85
M-59	180 – 215
Sandpiper	45 – 75
Downtown Mt. Clemens	140 – 220
South River	190 – 200
Metro Parkway	310 – 340
15 Mile Road	225 – 250
Macomb Mall	440 – 985
13 Mile Road	150 – 165
Common Road	260 – 275
12 Mile Road	700 – 800
Utica Junction	205 – 225
11 Mile Road / I-696	305 – 330
10 Mile Road	620 – 670
9 Mile Road	740 – 810
8 Mile Road	1,050 – 1,170
7 Mile Road	770 – 875
McNichols Road	345 – 410
Outer Drive	230 – 265
Harper Avenue	1,100 – 1,150

<b>McClellan Avenue</b>	1,025 – 1,080
<b>Van Dyke Avenue</b>	370 – 430
<b>Warren Avenue</b>	410 – 470
<b>Mack Avenue</b>	355 – 415
<b>Eastern Market</b>	265 – 300
<b>Bricktown</b>	380 – 410

### 3.7 Summary of Station Area Evaluation

Following the individual analyses of each evaluation criteria, the scores were aggregated to determine the stations that met the desired threshold to be advanced for further evaluation as part of the locally preferred alternative (LPA). Through extensive coordination with participating communities and the study's advisory committee, it was determined that the stations scoring in the highest thresholds aligned with the preferences of each municipality. Additionally, several locations that scored in the middle threshold meet the desired 1-mile spacing requirements of the study and were preferred by the participating communities. These stations will also be advanced for further evaluation as part of the LPA.

The results of this analysis are shown in Table 3-7, with stations currently expected to advance for further evaluation as part of the LPA highlighted.

**TABLE 3-7: STATION AREA ANALYSIS RESULTS**

	Transit	Transportation	Population	Employment	Zero Car	Development Potential	Ridership	Total
<b>23 Mile</b>	1	2	1	1	1	2	1	9
<b>Hall Rd/M-59</b>	1	3	1	1	1	2	2	11
<b>Sandpiper</b>	1	1	1	1	1	3	1	9
<b>Downtown Mt. Clemens</b>	1	1	3	3	2	8	3	21
<b>South River</b>	1	1	2	3	1	3	3	14
<b>Metro Parkway</b>	1	2	2	1	1	2	4	13
<b>15 Mile</b>	2	1	2	1	1	3	3	13
<b>Macomb Mall</b>	2	1	2	2	1	5	7	20
<b>13 Mile</b>	4	1	3	1	1	3	2	15
<b>Common Rd.</b>	2	1	3	1	2	1	3	13
<b>12 Mile</b>	1	1	4	1	2	3	7	19

Utica	2	1	4	1	2	7	3	20
<b>11 Mile</b>	1	2	4	1	2	2	4	16
10 Mile	1	1	4	1	2	2	7	18
9 Mile	2	1	5	1	2	6	9	26
8 Mile	3	2	5	1	2	5	10	28
7 Mile	4	1	4	1	3	4	10	27
McNichols	4	1	4	1	2	4	4	20
Outer	6	1	3	1	2	4	2	19
Harper	4	1	2	1	2	3	10	23
McClellan	5	1	3	1	3	5	9	27
Van Dyke	6	1	3	1	3	3	3	20
Warren	6	1	2	1	2	3	7	22
Mack	6	1	1	1	2	3	5	19
Eastern Market	6	2	4	5	5	9	3	34
Bricktown	7	2	4	5	5	9	4	36